First year nursing students' perceptions of stress and resilience during their initial clinical placement and the introduction of a stress management app: a mixed methods approach.

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Declaration

I declare that this thesis has been composed solely by myself and that it has not been submitted, in whole or in part, in any previous application for a degree. Except where states otherwise by reference or acknowledgment, the work presented is entirely my own.

Date: 01/03/19

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Acknowledgments

Author Introduction

My name is Shannon Porter; I was born and raised in Kamloops, BC, Canada. Upon graduation from high school I completed 2 years of a BSc degree with a major in Biology before transferring into a 4 year BSN programme at Thompson Rivers University in Kamloops, which I graduated from in 2008.

I moved to Vancouver, BC to begin my career in nursing as an RN at Vancouver General Hospital in the Leukemia/BMT programme. This was both a challenging and extremely rewarding place to work, however after meeting my husband in 2010, I relocated to the UK in 2011. Although I had always planned on pursuing further education, the delay in getting my nursing license in the UK led me to apply for the Masters in Nursing Programme at the University of Edinburgh and my completed thesis was titled The Professional Socialization of Student Nurses. During this time, my UK nursing license was granted and I began work part time as a RGN in a surgical setting.

Once I had completed my MSc I was interested in continuing research in this topic area and I was a successful applicant for a PhD studentship at Edinburgh Napier, which I started in January 2014.

My interest in my PhD topic stems from personal experiences that I had as a nursing student and new graduate, both positive and negative, as well as my work during my MSc. I was lucky enough to have been mentored by some truly amazing nurses who have inspired me to work towards providing that same positive experience for student nurses. The negative experiences I had as a student and a new graduate nurse left me feeling frustrated and have also inspired me to push for improvements in the student experience and to look at ways to incorporate technology to support students which led to the design and conduction of the current study.

Abstract

Objective: This study aimed to investigate the perceived levels of stress and resilience of first year nursing students prior to and during their first clinical placement as well as their experience of using a stress management app delivered by smartphone.

Methods: A mixed methods, convergent parallel design was used. All first year adult nursing students in a public higher education institution beginning their first clinical placement in January 2016 (n= 330) were invited to take part in this study and to use a tool delivered by smartphone, designed to help student nurses manage stress and build resilience. Fifty-two of these first year nursing students completed two questionnaires, Stress in Nursing Students (SINS) and Resilience Scale (RS) before and during (January and March, 2016) their first clinical placement. Seven of the 52 participants that completed both questionnaires took part in a semi-structured interview, and 3 of those 7 had used the stress management app. Data analysis included descriptive analysis, paired samples t-test analysis, Pearson's r correlation analysis and use of Cohen's *d* effect size for comparison of mean scores. Thematic analysis was used to analyse the qualitative interview data. In following with convergent parallel mixed methods design, data integration took place once both quantitative and qualitative data sets had been analysed separately and this involved narrative and joint displays.

Results: The overall SINS mean score were, pre-clinical placement 2.83(0.52) and during clinical placement 3.07(0.51); while scores for the highest level of stress in different dimensions were: *clinical* pre: 2.85(0.59), during: 3.02(0.51) *education* pre: 3.19(0.60), during: 3.32(0.60), *confidence* pre: 2.29(0.54), during: 2.76(0.52) and *finance* pre: 3.19(1.03), during: 3.46 (0.85). There was a significant increase in levels of perceived stress with the most common stressors both prior and during the initial placement belonging in the clinical and education sub dimensions and significant increases in stress were found in the confidence and finance sub dimensions. There was no significant change in levels of resilience (RS) prior to and during the initial clinical placement. A moderate negative correlation was found between levels of resilience and perceived levels of stress prior to the initial clinical placement (p=0.009, r=-0.375). The qualitative thematic analysis uncovered three themes: sources of stress, coping and resilience and C-SMARTT App. The process of data integration resulted in expansion, clarification and confirmation of findings highlighting the impact of mentorship and social support on students' placement experience.

Conclusions: First year nursing students experienced an increase in levels of perceived stress during their initial clinical placement. The most common stressors were related to clinical and educational dimensions. There was a correlation between levels of resilience and perceived stress prior to the initial clinical placement however this was lost during the initial clinical placement suggesting that further research is needed in investigating the role resilience plays in

managing stress. First year nursing students showed interest in a stress management app and provided suggestions for improvements and this study supports the need for future research into the development and evaluation of a stress management app delivered by smartphone for use within clinical placements.

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Chapter 1: Introduction

1.0 Preamble

Experience in the clinical setting is an essential part of nursing education, however this has also been found to be a major contributor to perceptions and levels of stress in nursing students (Labrague et al. 2016; Chernomas & Shapiro 2013; Shaban et al. 2012; Consolo et al. 2008). It is essential that nursing students are supported to use and develop resilience as a means in which to cope with the inevitable stressors they will face during their education and nursing careers (Reyes et al. 2015; Thomas & Revell 2016). This study aims to investigate perceptions of stress and levels of resilience of first year nursing students before and during their initial clinical placement, in combination with evaluating a stress management tool delivered by smartphone. A mixed method approach was utilized, using two instruments to collect quantitative data before and during the first clinical placement. This was followed by conducting semi-structured interviews during the first clinical placement that were used to collect qualitative data to answer the following research questions:

1) **What are nursing students' perceptions of stress and levels of resilience before and during their first clinical placement?**

2) **What are nursing students' experiences of stress and resilience during their first clinical placement?**

3) **What are nursing students' experiences of using a stress management app delivered by smartphone?**

Stress in nursing students can be caused by a multitude of factors, many which are experienced by the student population in general and include examinations and poor work-life balance (Gibbons et al. 2010). However, the main sources of stress in nursing students are related to experience in clinical placement (Labrague et al. 2016; Thomas et al. 2012) and high levels of perceived stress can

have a damaging impact on areas such as personal career satisfaction and student retention (Pines et al. 2012; Clements et al. 2015).

1.1 The Research Problem: gaps in the knowledge

Sources of stress and perceptions of stress in nursing students are well documented (Labrague et al. 2016; Alzayyat & Al-Gamal's 2014; Galbraith & Brown 2011), with stress caused by clinical placement often featuring as one of the foremost causes (Gibbons et al. 2010, Timmons & Kaliszer 2002, Gorostidi et al. 2007, Blomberg et al. 2014, Shaban et al. 2012)

A review of the current literature revealed that there are few studies that focus on the initial clinical placement, and how to improve this experience for nursing students. There is a paucity of research that aims to reduce stress and develop resilience, particularly in the context of the first clinical placement experience. Of these studies that look at interventions to reduce stress and build resilience, there was only one found that used a modern platform for information delivery, for example by smartphone or online (Stephens 2012). O'Connor and Andrews (2015) review of mobile technology in clinical nursing education suggest that new methods are needed to help students address the theory-practice gap and that one way to improve this is to improve access to information. Furthermore, few studies look at contributing factors to perceptions of stress, such as resilience and how these elements interact to affect the students experience in clinical placement and their perception of stress.

Also, there were no mixed methods studies that looked at causes or perceptions of stress and resilience in the initial clinical placement, or with investigation into a support tool for information delivery. This topic area warrants further study as the detriments of high levels of stress include poor engagement with clinical placements and less confidence (Shaban et al. 2012), physiological and psychological ill health (Rios-Risquez et al. 2016; Beauvais et al. 2014), poor job satisfaction and poor quality of patient care, as well as contributing to attrition (Williamson et al. 2013; Crombie et al.2013)

1.2 Methodology & Context

A convergent parallel, mixed methods design was used which allowed for implementation of the quantitative and qualitative strands of the study during the same phase. Each method was prioritized equally and analysed separately before data integration of the two strands occurred. Fifty-two first year nursing students beginning their clinical placement in January 2016 took part in the quantitative strand. Two instruments were used for quantitative (QN) data collection at two intervals (2 months apart), prior to and during the first clinical placement (Stress in Nursing Students and Resilience Scale). Participants who had completed both questionnaires were then invited to take part in an interview (n=7). All first year students starting their clinical placement in January 2017 were invited to use the stress management tool regardless of whether they decided to take part in this study. Integration of the QN and qualitative (QL) data sets was conducted using several approaches and allowed for confirmation, clarification and expansions of the research findings. Lazarus and Folkman's (1984) Transactional Model of Stress and Coping was used as the theoretical framework for this study, following with most research in this topic area. Sharples Theory of Mobile Learning (Sharples et al. 2006; 2009) was used to guide the development of the stress management app with added initial guidance from the Medical Research Council's Developing and Evaluating Complex Intervention guidelines (Craig et al. 2008).

An attempt to pilot the stress management app was made in January 2015, which had limited success, but did allow for adjustments to be made in terms participant recruitment and engagement.

1.3 Audience

The findings from this study are aimed at student nurses, nursing educators and practice mentors. The results will benefit both of these groups because the information will help inform educators of areas they can improve support and there is a potential for further stress management tool development, which would not only benefit the students who have access to it but also the educators as they could potentially have a new platform to deliver information to students.

This thesis will discuss the current literature in regards to stress in student nurses, stress management interventions, resilience in student nurses, and interventions aimed at developing resilience. This will be followed by a detailed account of the methodology, quantitative findings, qualitative findings, the results of data integration, discussion and conclusion.

Chapter 2: Literature Review

2.0 Introduction

This literature review has been designed to include three linked but distinct literature reviews which build on each other in a staged approach. The first review investigates the literature based on stress in student nurses during clinical placement. This naturally progresses to the second review of the stress management and reduction interventions literature, specifically directed at student nurses. Finally, the third review explores the role of resilience in student nurses in regards to managing stress.

2.1 Background

2.1.1 Stress

Stress in student nurses is widely reported (Labrague et al. 2016; Alzayyat & Al-Gamal's 2014; Galbraith & Brown 2011) and it is suggested that students might form unconstructive attitudes towards seeking help for stress during their education and training as a result. Furthermore, stress has been identified to be a factor in the high levels of burnout and attrition of nurses and nursing students (Evans 2001, Deary et al. 2003, Aiken et al. 2001, Pines et al. 2012), as well as some studies reporting a negative relationship between stress and academic performance (Struthers et al. 2000). All of these factors are cause for concern and highlight the importance of continued study into stress management and reduction in the student nurse population.

It is suggested by the literature that clinical placements are a large source of stress for student nurses (Labrague et al. 2016). With issues such as pre-placement anticipation, the realities of the clinical environment (theory-practice gap), clinical learning, 'becoming a nurse' and academic concerns as consistent themes identified (Thomas et al. 2012, Chernomas & Shapiro 2012). Further sources of stress more specific to clinical placement include fear of making mistakes, issues related to death and dying, witnessing pain and suffering,

relationships with teachers and mentors, being observed and evaluated (Chernomas & Shapiro 2013) and balancing academic, clinical and personal responsibilities (Consolo et al. 2008).

2.1.2 Stress management and reduction interventions

Labrague's et al. (2016) review of stress and coping strategies in nursing students highlights that coping mechanisms students employ to manage stress are crucial and that the most common coping behaviours used by nursing students is problem solving, which supports the use of stress management interventions for nursing students. Although several stress reduction and management interventions have been successful, such as stress reduction workshops (Russler 1991, Jones & Johnston 2000, McDonald et al. 2012, Bittman et al. 2004, Sharif & Armitage 2004)), new curriculum design (Jones & Johnston 2006), use of imagery (Stephens 1992), use of deep breathing (Consolo et al. 2008), and mindfulness (Beddoe & Murphy 2004) there have been issues with the generalizability of small sample sizes, high dropout rates and limited follow up studies to provide evidence of sustainability.

In Galbraith and Brown's (2011) systematic review of stress reduction interventions in student nurses, it was found that although many successes were reported, there were many weaknesses identified in evaluation and methodology, which has led to a lack of consistency of stress management interventions (Galbraith & Brown 2011).

Furthermore, there are few stress management interventions aimed to target students at times when they are experiencing the most stress; for example, during clinical placements, when they are likely to be alone and without the support of peers or tutors. In this study, it is proposed that nursing students would benefit from an intervention that would be immediately accessible to them, therefore the current study will involve utilizing up-to-date technology and deliver a stress management intervention by smartphone at a time right for the student in clinical placement.

2.1.3 Resilience

        The impact of nurses and nursing students' personal resilience on issues such as attrition (Jackson et al. 2007), managing stress in the workplace or clinical environment (Reyes et al. 20115) and developing coping skills to overcome adversity (Rice & Liu 2016) has resulted in increased interest in this area. The concept of resilience has been described as being constructed broadly (Rutter 1985) which includes the ability to problem solve (Polk 1997), to grow and move forward in the face of adversity, resourcefulness, confidence and flexibility (Giordano 1997). Jackson et al. (2007) state that there are two key related concepts visible in the literature, which are vulnerability and adversity and Giordano (1997 pg. 1032) describes resilience as an active process that is "a shifting balance between vulnerability and resilience." A commonly accepted definition suggested by Fleming and Ledogar (2008) is that of Luthar (2006), which states that resilience is positive adaptation in spite of adversity requiring two dimensions: significant adversity and positive adaptation. Rutter's work (1999; 2000) defines resilience as the relative resistance to psychosocial risk experiences, but with various possible outcomes, not just positive. Hunter & Chandler (1999) conceptualizes resilience as a continuum with two limits: less optimum resilience and optimum resilience. Furthermore, contemporary researchers suggest that resilience factors vary in different contexts, which has contributed to the idea that resilience is a process (Fleming & Ledogar 2008). Over time, three main resilience models have been developed: the compensatory, the protective and the challenge model (Ledesma 2014; Fleming & Ledogar 2008; O'Leary 1998).

        The Compensatory model views resilience as a factor that counteracts an individuals' exposure to risk (Ledesma 2014). This model best explains a situation where a resilience factor counteracts or operates in an opposite direction to a risk factor (Fleming & Ledogar 2008). Compensatory factors that have been identified in the literature are optimism, empathy, insight, intellectual competence, self-esteem, determination and perseverance (Ledesma 2014; Steinhardt & Dolbier 2008). In this model, risk factors and compensatory factors independently contribute to an individuals' resilience (Ledesma 2014).

The Challenge model suggests that interaction with a risk factor can potentially prepare and enhance an individuals' response to stress, as long as the risk factor is not too extreme (Ledesma 2014; O'Leary 1998). Fleming and Ledogar (2008) term the association between a risk factor and the potential outcome as "curvilinear'', and suggest that interaction with either low or high levels of a risk factor are associated with negative outcomes, while interaction to moderate levels of risk are related to more positive outcomes.

The Protective Model suggests that there is an interaction between protective factors and risk factors, and this can reduce the chance of negative outcomes and lessens the effect of exposure to risk (Ledesma 2014; O'Leary 1998). Protective factors may function in several ways to influence outcomes as stated by Fleming and Ledogar (2008): they may help neutralize the effects of risk; they may weaken the effects of risk; or they may enhance the positive effect of another protective factor. Investigating how certain protective factors interact with risk factors and other protective factors has been an important development in resilience research (Fleming & Ledogar 2008). Fleming and Ledogar (2008) highlight the work of Rutter (1979) and Garmenzey et al. (1984) as first describing three general levels of protective factors- the individual, the family and the community. However, with growing awareness of the social dimensions of resilience, the list of protective factors has become extensive (Ledesma 2014; Steinhardt & Dolbier 2008; Fleming & Ledogar 2008). These protective factors include but are not limited to: hardiness, self-esteem, social support, optimism and positive affect (Steinhardt & Dolbier 2008), intrapersonal reflective skills, academic and job skills, planning skills and problem solving skills (Ledesma 2014).

Findings show that resilience is not stable over time and is influenced by both internal and external factors (Rice & Liu 2016). Internal variables are defined as self-factors, personality factors or individual resources and have been shown to have a significant impact on how an individual manages in a crisis (Ledesma 2014). Ledesma (2014) highlights that there are many possible internal factors which include: hardiness, use of personal resources cognitive resources, threat appraisal and self-efficacy, positive self-esteem, sense of being effectual, and being in control

of one's surroundings. According to Ledesma (2014), a well-supported finding is that individuals who have high levels of optimism, self-belief in attaining their goals and positive expectations are more likely to grow positively in response to stress and demonstrate resilience.

There are several influential external variables that can impact a person's ability to be resilient during adversity and the ones most commonly identified in the literature are caring relationships and social support (Ledesma 2014). The importance of relationships has been singled out as a significant factor for the individual facing adversity and Ledesma (2014) references the work of O'Leary (1998), which states that social resources are a critical factor in resilience. The external variables that are associated with resilience have been consistently based on the availability of external support through caring relationships that encourage and reinforce coping skills (Ledesma 2014).

In the literature the distinction and/or relationship between the constructs of resilience and coping is not always clarified. Rice & Liu (2016) refer to Gleenie's (2010) distinction of the two concepts which states,

> "Although coping and resilience are related constructs, they are distinct in that coping refers to a wide set of skills and purposeful responses to stress, whereas resilience refers to positive adaptation in response to serious adversity (pg. 169)".

Like resilience, coping changes both developmentally and experientially across an individuals' lifespan (Diehl et al. 2014). However, while resilience refers to the *result* of positive coping mechanisms, coping refers to the direct actions taken to deal with a type of stress (Rice & Liu 2016). Coping skills can be positive and/or negative and therefore do not necessarily leading to improved functioning (Rice & Liu 2016). Rice and Liu (2016) further point out that some coping techniques may be helpful or harmful in terms of the both the short-term situation as well as to the individuals' psychosocial health in the long term. Furthermore, using coping skills does not equate to being resilient, as all people use some type of coping skills but are not necessarily resilient (Rice & Liu 2016). This suggests that developing effective coping skills could lead to improvements in a person's level of

resilience. Coping strategies fall in to a variety of categories which can be both helpful and harmful to the individual such as: problem focused, emotion focused, avoidance, transformative and regressive coping (Rice & Liu 2016).

In terms of resilience in a nursing student population, Stephens (2013) conducted a concept analysis of nursing student resilience and proposed a definition that is specific to addressing resilience in nursing students:

> "… nursing student resilience is an individualized process of development that occur through the use of personal protective factors to successfully navigate perceived stress and adversities. Cumulative successes lead to enhance coping/adaptive abilities and well-being."
> (pg.130)

Interestingly, Jones and Johnston (2000) report that distressed students reported the same sources of stress as non-distressed students, but they suffered them more intensely; which points to the concept of personal resilience as a contributing factor to successfully managing stress. As discussed above, high levels of stress can contribute to attrition in student nurses and Jackson et al. (2007) raise the question- why are some nurses/nursing students able to manage or even thrive in challenging situations while others do not? They suggest that personal resilience plays an important role in allowing nurse to cope with adversity in the clinical setting (Jackson et al. 2007) and this is further supported by Thomas & Revell's (2016) review of resilience in nursing. Therefore, introducing and promoting personal resilience in student nurses as a useful strategy to help students cope with stress in clinical placements. Thomas & Revell's (2016) review identifies the main factors affecting resilience as: support (family and friends), passage of time (Taylor & Reyes 2012, Stephens 2012) and empowerment (Pines et al. 2012). This review highlighted several strategies used to promote resilience, which were reflection (Hodges et al. 2005), simulation and debriefing (Pines et al. 2014 and Delaney et al. 2016) and resilience messages delivered through twitter (Stephens 2012)

Resilience has been suggested as crucial for nurses in their everyday work, and therefore students, in their clinical practice (Reyes et al. 2015; Tusaie & Dyer 2004; Hodges et al. 2005). Building personal resilience is a means for nursing

students to cope with the stress of clinical practice (Bright 1997; Girodano 1997) and Bright (1997) highlights the importance of allowing an element of self-care in building resilience.

The literature supports the idea that resilience can be developed and strengthened (Thomas & Revell 2016) and Jackson et al. (2007) suggest specific self-development strategies to encourage personal resilience to workplace adversity, which will be utilized in partnership with strategies from the stress reducing interventions for development of the proposed tool in this study. Jackson et al. (2007) acknowledge that clinical environments will always contain stressful elements, which further highlights the significance of intervening at the level of first year students in order to provide a strong foundation. This will help students' combat adverse effects of stress and work to develop resilience to maximize student's success during their first clinical placement.

This study aims to understand first year nursing student's experience of stress and resilience during their first clinical placement and their experience of using a stress management tool through the use of a mixed methods approach.

2.2. Methods

2.2.1 Aims

The aim of this literature review was to review studies related to stressors experienced by student nurses during their clinical education, specifically the initial clinical placement, in order to focus the results to the population of interest for this study. Also, types of stress reduction interventions directed at this population and the role of personal resilience in managing stress were reviewed. By aiming to identify the causes of stress during clinical placement, types of successful and non-successful stress management interventions and the impact that personal resilience has on stress management, this literature review will provide support for the current research study.

2.2.2 Search strategy

For the purposes of this review, three linked but separate search strategies were used in order to provide clarity and distinction among the related themes in the current research study.

The searches have been divided into the first search, which aims to look at stress in student nursing during clinical placement and the second, which specifically focus on interventions to manage the stress of student nurses, both with further aim to focus on the initial clinical placement. The third search focused on resilience and interventions aimed at developing resilience in a student nursing population.

Four databases were searched for this literature review: MEDLINE, CINHAL, PsychINFO and PubMed. Keywords included stress, nursing students, student nurses, undergraduate nurses, nursing education and clinical training, clinical education, clinical practice, clinical experience and *initial* clinical education, training, practice, experience, which were searched in different combinations.

The second search included the same keywords as search one, with the addition of the terms: intervention, reducing stress, stress reduction and stress management used in different combinations.

The third search included the keywords nursing students, student nurses, undergraduate nursing, resilience, building resilience, developing resilience and intervention used in different combinations.

2.2.3 Inclusion and exclusion criteria

There was several inclusion criteria for this review for search one: articles published between 2000-2017, published in English, include focus on stressors in student nurses, specifically addressing clinical placements. Studies that focused on stress reduction interventions were noted for search two but not included in this part of the review. Articles were then deemed appropriate based on design, quality of findings and fittingness of research focus. The main reasons for article exclusions were: duplicates, a focus on stress in nursing rather than in nursing students, unclear or poor research design and article accessibility. The total number of

articles found was 404. Out of these, 14 were chosen to include in this review. When searching for articles that also included initial clinical placement in relation to nursing student stress only 3/14 articles were identified.

In the second search, inclusion criteria for the review were: articles published between 2000-2017, published in English and included a focus on interventions directed at student nurses to manage or reduce stress, specifically experienced in clinical placement. Articles were then deemed appropriate based on design, quality of findings and fittingness of research focus. The main reasons for exclusion of articles were: duplicates, area of focus of the intervention, poor design and lack of clarity in the proposed intervention and inaccessibility. The total number of articles found was 192. Of these articles, 10 were chosen to include in this review. When searching for the initial clinical experience in relation to stress management interventions only 2/10 articles were identified.

In the third search, inclusion criteria for the review were: articles published between 2000-2017, published in English and included a focus on resilience in student nurses, relationship between resilience and stress in student nurses and interventions aimed at developing resilience in student nurses. Articles were then deemed appropriate based on design, quality of findings and fittingness of research focus. The main reasons for article exclusion were: duplicates, resilience in nursing and not student nursing, lack of clarity of intervention design and purpose and inaccessibility. The total number of articles found was 145. Of these articles, 16 were chosen for this review. When searching for interventions aimed to build resilience in nursing students 4/15 articles were identified.

Fig 2.0 Search Strategy Diagram (CINAHL, PubMED, Medline, PsychINFO)
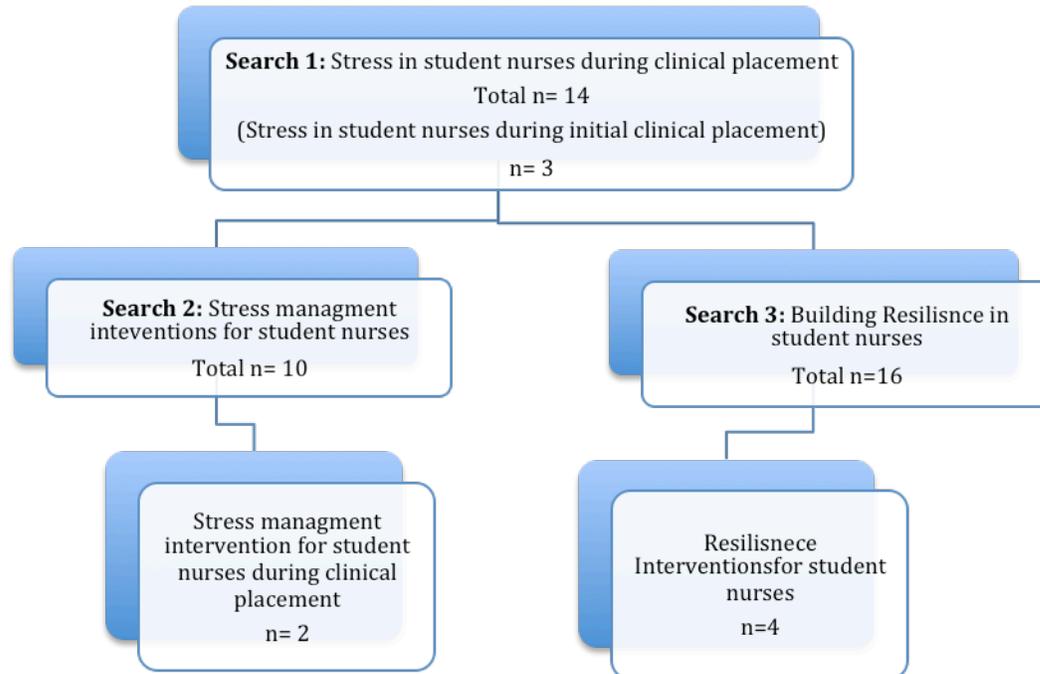
Fig 2.0 shows the search strategy used in this literature review. Search 1 focused on stress in student nurses during clinical placement which yielded 14 articles, 3 of which focused on the initial clinical placement experience. Search 2 focused on stress management interventions for student nurses, which yielded 10 articles, 2 that focused on interventions for stress management during the initial clinical placement. Search 3 focused on resilience in student nurses and yielded 15 articles, 4 that were interventions aimed to build resilience in student nurses. ***Total number of articles for search one was 14*** *(of these 14, 3 were found to include initial placement)**: for search two was 10** (of these 10, 2 were found to include intervention for student nurses on clinical placement): **and for search three was 16** (of these 16, 4 articles were found to include resilience interventions for student nurses).

2.3 Results of Search One: Stress in Student Nurses

As stated by Alzayyat & Al-Gamal's (2014) review of stress among nursing students in clinical education, there were several difficulties found when comparing studies in this topic area. This was due to variations in sample size and characteristics, instruments, and general differences in undergraduate nursing programmes both within the UK and worldwide. However, the findings of this review are reported in terms of the subsequent themes: Initial clinical experience,

academic vs. clinical stressors, cross-cultural comparisons, experience of stress across academic years, organizational stress and coping, and psychosocial and physiological effects. Table 2.0 summarizes the studies identified in the first review.

Table 2.0: Summary of the studies investigating stress among nursing students during clinical placement

Author(s) and Setting	Target Nursing Students and Sample Size	Design	Data Collection method or instrument	Underlying Theory	Type of Clinical Stressor	Operational Definition of Stress	Strengths and Limitations	Implications
Blomberg et al. (2014), Sweden	Students who had completed final year n= 184	Cross-sectional, evaluative design	Numerical rating scale used to measure degree of stress experience during various aspects of clinical practice (At one and two weeks after completion) QN methods	Not Specified	*Degree of stress* increased in hospital placements, ward overcrowding, national clinical final exam, varying or more than one supervisors	Definition 1: "a particular relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her own resources and endangering his or her well-being." P.19 Lazarus & Folkman 1984)	*Strengths:* Discuss clinical setting characteristics and organizational stressors *Limitations:* convenience sample, no intrapersonal factors considered	Supports further development of stress management interventions Educators to be aware of increased stress during clinical to provide support
Burnard et al. (2008), Albania, Brunel, Czech Republic, Malta & Wales	Students year 1-3 n=1707	Descriptive, comparative, longitudinal cross-sectional QN methods	Stress in Nurse Education Questionnaire (Rhead 1995), 32 item, Likert scale	Not specified	Patient suffering, death of a patient, emotional issues surrounding death and dying	Definition 1	*Strengths:* large, international sample *Limitations:* cultural and curriculum differences between student groups may impact generalization	Indicates that student nurses worldwide share many commonalties relating to stress
Chen & Hung (2014), Taiwan	3rd year students (from a 4 year programme) n= 101	Descriptive, cross-sectional	Perceived Stress Scale (Sheu et al. 1997), 29 items with 6 dimensions(as well as a Coping behaviour Inventory, Lai's Personality Scale, physio-psycho-social responses scale) QN methods	Transactional model of Stress (Lazarus & Folkman 1984)	Care of patients, assignments and workload, instructors and nursing staff.	Definition 1.	*Strengths:* includes coping strategies and physio-psycho-social relationship with stress *Limitations:* convenience sample, one location	Significant positive relationship found between perceived stress and physio-psycho-social responses Suggested that students who need additional support should be identified, consider unique personality traits, develop stress management interventions

Author(s) and Setting	Target Nursing Students and Sample Size	Design	Data Collection method or instrument	Underlying Theory	Type of Clinical Stressor	Operational Definition of Stress	Strengths and Limitations	Implications
Edwards et al. (2010), UK	Students year 1-3 n= 169	Descriptive, longitudinal and prospective QN methods	Stress in Nurse Education Questionnaire, 32 item, Likert Scale (Rhead 1995) The Culture Free Self-Esteem Inventory-2, 40 item	Not specified	Fear of making a mistake, watching a patient suffer	Definition 1. Self-esteem refers to the extent to which individuals value themselves (Reber & Reber 2001)	*Strengths:* longitudinal design allowed comparison/identification of changes in stress experience *Limitations:* attrition of highly stressed students from the cohort over time, results reflect stressors of one programme	Results show variation in student psychological well-being and stress levels across different years. 3rd year students had highest levels of stress. Further research needed to develop stress interventions.
Gibbons et al. (2008), UK	Final year students n=16	Phenomenological study QL methods	Focus Groups	JDCS model (Karasek & Theorell 1990)	Attitudes of staff, working on under-staffed wards, student status. *Initial placements stressful d/t pace, intensity & disillusionment*	"stress can be the result of too much or too little arousal resulting in harm to mind and body" p.14 (Schwarzer 1992) *Optimal level of stress or arousal is called 'eustress'*	*Strengths:* QL approach provides in-depth data. Focus on positive impact of stress *Limitations:* convenience sample may effect representation and generalizability	Stressful experiences can cause distress and eustress Social support systems crucial coping source
Gibbons et al. (2010), UK	Final year students n= 171	Descriptive, cross-sectional	Index of Sources of Stress in Nursing (Gibbons et al. 2009), 29 items (as well as Generalize self-efficacy scale, General Health Questionnaire, Marlowe-Crown Social Desirability, Brief COPE)	Transactional model of Stress (Lazarus & Folkman 1984)	Placement demands and support opportunities were found to be factors of eustress.	"Stress can be the result of too much or too little arousal resulting in harm to mind and body" (Schwarzer 1992 p 14.)	*Strengths:* unique examination of beneficial outcomes of clinical stress *Limitations:* using final year students with more experience is likely to affect response to stress compared with earlier stages	Self-awareness of coping styles should be encouraged. Both hassles and uplifts are predictors of responses to stress.

Author(s) and Setting	Target Nursing Students and Sample Size	Design	Data Collection method or instrument	Underlying Theory	Type of Clinical Stressor	Operational Definition of Stress	Strengths and Limitations	Implications
Gorostidi et al (2007), Spain	Students year 1 n= 69	Descriptive, longitudinal	KEZKAK questionnaire (Zupiria et al. 2003), 41 items STAI questionnaire, measures anxiety (Spielberger et al. 1970) QN methods	Transactional model of Stress (Lazarus & Folkman 1984)	Lack of competence, nurse-patient relationships, lack of control/uncertainty	Not Specified	*Strengths:* discusses the changes in stressors throughout the three year period *Limitations:* small sample size for quantitative study	Highlight the importance of reflection groups stress awareness and developing health approach to stress to increase coping
Jimenez et al. (2009), Spain	Students year 1-3 n= 357	Descriptive, cross-sectional, comparative QN methods	The Perceived Stress Scale (Sheu et al. 2002). *Modified to consider intensity rather than frequency of stress* The Bio-psychosocial Response Scale	Transactional Model of Stress (Lazarus & Folkman1984) Pollock's Adaptation Nursing Model (Pollock 1984)	Seeing pain & suffering of patients/relatives, inability to answer questions from patients, teachers & doctors, inability to help patients with biopsychosocial problems	Definition 1.	*Strengths:* good sample size, includes psychometric factors *Limitations:* study design: longitudinal would provide information on patterns	Stress in clinical practice is due to clinical stressors not academic or external stressors Attention needs to be paid to both academic performance and biopsychosocial status Re-examine curricula demands
Karabacak et al. (2012), Turkey	Students during initial clinical experience n= 52	Experimental	Clinical Stress Questionnaire (Pagana 1989), Likert scale Inventory of the styles for coping with Stress (Hisli & Durak 1995), 30 item Likert Scale	Not specified	*Measured degree of stress* Clinical stresses were found to be moderate for test and control group	" stress, which emerges as response of the body to a situation threatening physically and psychologically or non-conforming conditions, is considered an ordinary part of daily life" (Karabacak et al. 2012 p. 596)	*Strengths:* experimental and control group present *Limitations:* no pre-test done, small sample size, limited generalizability	Encourage positive methods for coping with stress, more time provided for lab simulation practices

Author(s) and Setting	Target Nursing Students and Sample Size	Design	Data Collection method or instrument	Underlying Theory	Type of Clinical Stressor	Operational Definition of Stress	Strengths and Limitations	Implications
McKenna & Plummer (2013), Indonesian	Novice Students n= 6	Interpretive, hermeneutic phenomenology QL methods	Telephone semi-structured Interviews, thematic analysis QL methods	Transactional Model of Stress (Lazarus & Folkman 2984)	Feelings of pressure related to: clinical assignments, procedures, evaluation and initial experience Challenging relationships with: staff, patients, peers	Definition 1.	*Strengths:* QL design allows for in depth investigation of themes of clinical stress from students perspective *Limitations:* interviews conducted over the phone don't allow for interpretation of body language or student reaction, small sample size from one location	Promote stress reduction techniques, assess the number of assignments to be completed during clinical rotations
Shaban et al. (2012), Jordan	Students year 2, initial clinical experience n= 270	Descriptive, cross-sectional QN methods	Perceived Stress Scale (Sheu et al. 1997), 29 item Likert scale Coping Behaviour Inventory (Sheu et al. 2002), 19 item Likert Scale	Not specified	Too many assignments, study overload, unwelcoming clinical environment, nursing staff and teachers	Not specified	*Strengths:* good sample size with statistical calculations done to decrease the likelihood of false outcomes *Limitations: convenience sample*	Results showed that students were not satisfied with clinical components and clinical environment. Students also experienced stress with regard to academic pressures
Sheu et al. (2002), Taiwan	Students during initial Clinical experience n= 561	Descriptive, cross-sectional	Perceived Stress Scale (Sheu et al. 1997), 29 item Likert Scale (as well as Physio-Psycho-Social Response Scale and Coping Behaviour Inventory)	Transactional model of Stress (Lazarus & Folkman 1984)	Lack of professional knowledge & skill, taking care of patients, providing care and making judgments, unfamiliarity with terms,	Not Specified	*Strengths:* large sample size *Limitations: convenience sample*	Suggest increased simulation time in lab, educators to promote optimistic attitude and help develop problem solving skills

Author(s) and Setting	Target Nursing Students and Sample Size	Design	Data Collection method or instrument	Underlying Theory	Type of Clinical stressor	Operational Definition of Stress	Strengths and Limitations	Implications
Suresh et al. (2012), Ireland	n= 120 newly qualified nurses n= 128 final year student nurses	Descriptive, comparative, cross sectional survey design QN with *One open ended question*	The Nursing Stress Scale (Gray-Toft & Anderson 1981), 34 item scale.	Not specified	For student nurses: unmet clinical learning needs, combining academic demands with clinical placement, relationship difficulties	Definition 1. "Stress also regarded as a stimulus, a response and the intervening process between both (Le Blanc et al 2000)	*Strengths:* focus on transition from student to qualified nurse adds valuable info for intervention design *Limitations:* small sample size, convenience sample, lack of demographic/personal characteristic data	Support educators to identify and prevent stress and focus on stress awareness, management and prevention.
Timmons & Kaliszer (2002), Ireland	Third year nursing students n= 110	Descriptive, cross-sectional, comparative	Designed 12 item questionnaire based on the literature review	Not specified	Involved with death and dying, relationships with staff on ward	Not specified (states lack of consensus regarding the definition of stress)	*Strengths:* pilot study was conducted prior, examined both academic and clinical stressors *Limitations:* small exploratory study, only considered 12 common stressors	Academic commitments and financial constraints are greatest source of stress. Recommended that student counselling services are made available.

2.3.1 Initial clinical experience

The literature highlights that the initial clinical experience is stressful for student nurses. Sheu's et al. (2002) descriptive cross-sectional study of 561 Taiwanese nursing students (response rate of 91%), examined the degree of perceived stress, types of stressful events and the effect of different coping behaviours on students' physio-psycho-social health. The Perceived Stress Scale (Cohen et al. 1983), Physio-Psycho-Social Response Scale (Sheu et al. 1997) and Coping Behaviour Inventory (Litman et al. 1983) were utilized as instruments. The results indicated that students in the initial clinical placement have moderate levels of stress and that the initial clinical experience can have an effect on how nursing students approach clinical practice. Results showed that stress came mainly from lack of professional knowledge and skills as well as caring of patients as seen in table 2.0 (pg. 12). Furthermore, it is suggested that how students cope with stress in their initial clinical placement will impact their experience of nursing education in general.

McKenna & Plummer's (2013) was one of few qualitative studies found, and this study used a phenomenological interpretive design. Thematic analysis was used to evaluate semi-structured telephone interviews (15-25 minutes) to gain understanding of the lived experience of stress during the clinical experience of six novice Indonesian student nurses. The results were three main themes and ten sub themes related to clinical practice. The first theme to emerge was "feelings of pressure", with different types of stressors perceived as pressure namely "clinical assignments", "clinical procedures", "clinical evaluation" and "initial clinical experience"

The second theme to emerge was "challenging relationships", which all six participants described. This was broken down into sub themes: "relationships with patients", relationships with clinical staff", "relationships with peers", and "relationships with community" (McKenna and Plummer 2013). The initial clinical experience was frequently perceived as a stressor by participants; with lack of experience, perceived lack of laboratory (clinical skills simulation) preparation,

performing interventions on patients for the first time and fear of making mistakes cited as potential causes.

Karabacak et al. (2012) experimental study intended to evaluate the stress experienced by nursing students as they began clinical practice and found that these students experienced stress on their first day of clinical practice. A randomly assigned experimental group (n= 26) and control group (n=25) were used with the control group beginning clinical practice after one clinical simulation session and the experimental group beginning clinical practice after five days of clinical simulation sessions where they could repeatedly practice skills. This study used the Clinical Stress Questionnaire (Pagana 1989) and The Inventory of the Style for Coping with Stress (Karaback et al. 2012). Although it was found the laboratorial exercises decrease stress in the experimental group, Karabacak et al. (2012) recognize that it is inevitable that students experience some stress in the hospital setting and there was no pre-test used to confirm that both groups had similar starting points. However, findings did suggest that those students who had more opportunity to practice skills had an increase in positive methods of coping with stress, with the mean score of sub-dimension of optimistic approach of the students in the control group (M= 8.26, SD=2.34) was higher than that of the students in the test group (M=6.34, SD=1.89) in a statistically significant way (p=0.005)

Shaban et al. (2012) descriptive cross-sectional study aimed to identify the level and types of stress perceived by nursing students and their coping strategies during their initial clinical placement. This study used the Perceived Stress Scale (Cohen et al. 1983) and the Coping Behaviour Inventory (Litman et al. 1983) with a sample size of 181 (response rate of 67%), of second year students in their first clinical placement. The degree of stress perceived by students ranged from 11-105 (M=55.6, SD= 20.2). The most common stressors perceived by nursing students during the initial clinical training was stress from assignment work (M=2.34), from the clinical environment (M=1.88) and stress from nursing staff and teachers (M=1.77). With further stressful events found that included; worrying about grades (M=2.81), having to be on duty early in the hospital (M=2.80) and experience

pressure from the nature and quality of clinical practice (M=2.46) (Shaban et al. 2012).

Several studies had reported notable stress and anxiety associated with the initial clinical placement experience of first year students although agreement in the literature that the initial clinical placement is the most stressful time for student nurses remains inconclusive. However it can be logically concluded that students in the initial clinical experience would benefit from support in managing stress early on in their education in order to promote coping skills that will help them manage stress throughout their nursing programmes and careers. This is further supported by the current literature that highlights that levels of attrition are high in the first year, averaging around 25% for nursing students in the UK (Clements et al. 2015).

2.3.2 Eustress

Alzayyat and Al-Gamal's (2014) review highlights two studies (Gibbons et al. 2008, Gibbons et al. 2010) that are distinctive in their inclusion of the concept of *eustress* (beneficial stress). The results of these studies would suggest that further research measuring eustress is required as it is implied that focusing on positive outcomes of stress may be beneficial in regards to how students respond to stressful situations. Further research in this area could provide nurse educators with a new perspective on how to assist student nurses in developing coping strategies.

Gibbons et al. (2010) highlight that most of the research in the topic area of stress in student nurses does not take into account the possibility that stressors can at times, contribute to positive outcomes or *eustress* and enhance levels of performance. Furthermore, it is suggested that most existing instruments measuring stress ignore the possibility that stressors could contribute to eustress and instead focus on measuring stressors in relation to how much distress they cause (Gibbons et al. 2010) Gibbons et al. (2010) descriptive, cross-sectional study of nursing students in their final year of study, aimed to explore relationships between sources of stress, coping resources and psychological status and how these factors impact well-being. The sample size was 280 with a response rate of 61%, resulting in a final sample of 171. The General Health Questionnaire (Goldberg et al. 1978), Index of

Sources of Stress in Nursing (Gibbons et al. 2008), Generalized Self-Efficacy Scale (Schwarzer & Jerusalem 1995), Marlow-Crowne Social Desirability (Crowne & Marlow 1960) and Brief COPE (Carver 1997) were used as measurements. The results indicate that placement demands and support opportunities are capable of providing eustress experiences that help students learn and achieve. As the factors of learning and teaching demands, placement demands and course organization demands (rated as hassles) increased, so did GHQ scores. When the factors were rated as uplifts, GHQ scores fell. Furthermore, it is suggested that self-efficacy acts as a buffer, which can protect the individual against the effects of sources of stress on well-being and is a factor in personal resilience (Gibbons et al. 2010).

This study is a complement to Gibbons et al. (2008) work, which is one of the few qualitative studies focused on stress and nursing students. This study aimed to identify experiences that lead to both distress and eustress as well as identify ways to help students cope with stress. This study used a semi-structured focus group of final year nursing students with a sample size of 16 and used thematic analysis to reveal four themes related to stress and eustress; clinical experience; levels and sources of support; learning and teaching experience and course structure. The findings indicate support systems were a key element of students' coping resources. The students' perspectives and coping style were critical in determining a successful placement experience and managing course demands. It is possible that since participants were in their final year, their experience may have influenced their response to stress in comparison to students in earlier or initial stages of nursing education.

Gibbons et al. (2008) conclude that to only identify sources of distress when exploring stress in nursing students offers only a partial depiction of the student experience and misinterprets what is meant by the concept of stress. It is important to consider sources of eustress and recognize that academic, clinical and personal sources of stress can variously lead to distress and eustress. The only other mention of positive impacts of stress was by McKenna and Plummer's (2013) phenomenological interpretive qualitative study, which found that for some, the impacts of stress could motivate them to study harder and that stress in clinical

education can challenge students to identify and evaluate their weaknesses which can lead to improved performance.

2.3.3 Academic vs. clinical stressors

This literature review found several studies that looked at stress in student nurses in terms of academic and clinical stressors. Timmons & Kaliszer's (2002) descriptive cross-sectional comparative study, aimed to investigate factors that cause stress to nursing students. There was a sample size of 120 participants with a response rate of 100%. Ten students were randomly selected to form a pilot group for the purpose of testing the questionnaire and a panel of six nurse experts ensured the content validity of the questionnaire. This study found that both academic and clinical factors are sources of stress to nursing students, however in contrast to some of Burnard et al. (2008) findings discussed below, they found that academic commitments and financial constraints were the greatest sources of stress (Timmons & Kaliszer 2002). In terms of clinical placement, dealing with death and dying patients and relationships with staff on the ward were the main reported stressors with teachers and clinical placement coordinators caused stress in one third of students.

Burnard et al. (2008) descriptive cross-sectional longitudinal comparative study explores the sources of stress among nursing students across five countries, throughout their course of study and to determine whether they were more stressed by academic or clinical factors. The Stress in Nurse Education Questionnaire (Rhead 1995) and modified Nurse Stress Scale (Gray-Toft & Anderson 1981) were used as measurements, with a sample size of 1707, and response rates over the three years varying from 62% (Albania Tirana) to 97% (Wales). The results showed that students in Brunei and Malta found academic stressors greater than clinical, while Czech Republic and Albania Tirana found clinical stressors to be greater than academic stressors. Finally, students in Wales and Albania Korce had no significant difference between the two stressors.

In contrast to the above findings of Timmons & Kalsizer (2002) and Burnard et al. (2008), Jimenez et al. (2009) descriptive cross-sectional comparative study

found that students perceived clinical stressors with more intensity than academic and external stressors. There was a sample size of 37 with a 71% response rate. The Perceived Stress Scale (Cohen et al. 1983) was adapted for this study to measure intensity rather than frequency of stress and The Biopsychosocial Response Scale (Sheu et al. 2002) to measure symptoms relating to the students' physical, psychological and social health, were used as measurements. The results of this study showed that stress suffered by nursing students during clinical practice comes mainly from clinical stressors with academic and external stressors rarely found.

The various findings in the literature highlight that clinical elements cause stress in student nurses, but whether clinical elements cause more stress than academic pressures during the period of clinical practice remains inconclusive. This could be due to differences in course structure and emphasis of the various programmes in these studies, as it can be assumed that different programmes would have different expectations of students regarding the balance of academic activity and clinical placement.

2.3.4 Cross cultural

Burnard et al. (2008) was the only study found to compare student nurses across several cultural contexts. This study provides an example of a longitudinal cross cultural comparison study with a large sample of 1707 with percentages of questionnaire return over the three years varying from 62% (Albania Tirana) to 97% (Wales). This study examined the sources of stress among nursing students throughout their course of study using The Stress in Nurse Education Questionnaire (Rhead 1995) and a modified Nurse Stress Scale (Gray-Toft & Anderson 1981) to incorporate academic stressors to determine whether academic or clinical stressors were greater.

This study took place across five different countries, with six groups of students (Albania Tirana, Albania Korce, Wales, Czech Republic, Brunei and Malta). The results showed that for Malta, Wales and Brunei that the top stressor was revising and sitting examinations, while Albania T. & K was death of a patients and Czech Republic was continuous pressure to meet deadlines for assignments. When

looking at overall stress levels, students in Wales scored the lowest while those in Brunei had the highest, with the remaining countries having similar scores. Burnard et al. (2008) study broadens the scope of current literature by investigating stress during clinical placements among nursing students from an international perspective, which does allow for increased generalizability of findings worldwide. However, as Alzayyat and Al-Gamal (2014) point out, it is not possible to assume that all cultural variations among student groups can be accounted for in this study; such as experiences of education, relationships with teachers and variations in programme design, which probably have impacts on stress levels.

2.3.5 Experience of stress across academic years

Comparisons of student nurses stress throughout different stages of their studies found conflicting results. Gorostidi et al. (2007) used a descriptive longitudinal study to evaluate the evolution of nursing student' perception of stress associated with clinical practice. The questionnaires include components from KEZKAK (Zupiria et al. 2003) and State Trait Anxiety Inventory (Spielberger et al. 1983) questionnaires, with a sample size of n= 130 with final response rate of 53%. This study used participants from various points throughout their education and data was collected at four points throughout the three-year programme, which included: students prior to clinical training, at the end of first year (end of first clinical placement), at the end of second year (end of third period of clinical placement) and at the end of their studies (at the end of clinical training)

The findings suggest that the factors that appear to be most stressful at the beginning of studies remain the most stressful at the end, and with the same order of importance. However, a general decrease in scores can be observed during the course of studies. This is likely due to increased exposure to clinical work, supervised clinical training and the general acquisition of skills. These reductions in stress occurred in five out of nine factors during the course of studies accompanied by a slight increase in the corresponding ratings from the end of second year to end of third year (uncertainty and impotence, emotional involvement, lack of control in relationships with patients, contact with suffering and overload). Gorostidi et al.

(2007) explain that this may be caused by some insecurities and fears resurfacing upon finishing training and starting in a professional role.

Suresh's et al. (2012) cross-sectional survey design study explored the differences between levels of perceived stress and job –related stress between forth year nursing students and newly qualified nurses with a sample size of 128 for fourth year students with a response rate of 33% and a sample size of 120 for newly qualified nurses with a response rate of 26% with a pilot study carried out a month prior. The Nursing Stress Scale (Gray-Toft & Anderson 1981) was used along with and one open ended question (thematic analysis) as measurements.

The quantitative results revealed that perceived stress is not higher in newly qualified nurses than fourth year nursing students, however stress in relation to workload and conflict with physicians is perceived to be higher in newly qualified nurses. The qualitative results from an open-ended question reveal several themes: Excessive workload, difficult working relationships, unmet clinical learning needs and combining academic demands with clinical placement. Excessive workload was cause for concern for both newly qualified nurses and students nurses, with both groups feeling there was not enough time to attend to the emotional needs of their patients. Difficult relationships with other nurses was identified by both groups with student nurses focused more on difficulty with preceptors, nurses and supervisors and newly qualified nurses citing a wide range of healthcare workers. Student nurses felt that unmet clinical learning needs resulted in stressors with dissatisfaction with preceptors and limited hands- on learning opportunities while newly qualified nurses expressing mixed emotions about the transition from student to qualified nurse, with a mix of results showing that some embraced this change while others found this to cause stress. The final theme was exclusive to fourth-year students with many students finding that having to work full-time while meeting academic demands on placement was very difficult.

Suresh et al. (2012) states that stress remains a cause for concern in the clinical environment. Stress frequency was considered high by both groups and comparatively high in relation to other studies and that the transition from student to newly qualified nurse is met with a mix of anxiety and excitement.

In Burnard et al. (2008) cross cultural study found no difference in the total stress score by year of study for Albania T and K, Malta and Wales while students in Burnei were found to have higher overall stress scores in year three compared with year one. This contrasts with the findings of, Gorostidi et al. (2007). Although third year students should be more experienced at coping with academic stressors it can be argued that third year students may experience greater stress than students from earlier years for several reasons. First, they are perceived to be more knowledgeable and skilful and given more responsibility in comparison to students in earlier stages of training. Secondly, students that are close to qualification may place higher expectations on themselves to perform, which could lead to an increase in stress. Finally, an increase in stress may be caused by their higher level of experience as this could result in greater insight and empathy into patients' situations (Burnard et al. 2008).

Jimenez et al. (2009) cross-sectional study looked at identifying the differences in novice and experienced nursing students' reports of stress and health. They identified three types of stressors: clinical, academic and external stressors as well as two categories of symptoms: physiological and psychological, which are linked to clinical practice. The findings revealed that experienced students perceived more academic stressors linked to clinical placement than novices, while nurses from all three years perceived moderated stress at similar levels. Stress from assignments and workload was greater in second year, while stress from the environment and relationships with teaching and nursing staff was greater in experienced than novice students. In first and second years of study, students perceived clinical stressors more intensely with academic and external elements perceived at the same intensity. In contrast, third year students perceived clinical and academic stressors at similar intensities while external stressors were less intense. This study revealed that differences between novice and experienced students only for academic stressors.

Edwards et al. (2010) longitudinal study explored changes of nursing students' experiences of stress and self-esteem during the three years of their undergraduate programme. Two questionnaires were used at each time point

throughout a three year programme with a sample size of n= 169 and response rates varying each collection period from 49% to 75%. The Stress in Nurse Education (Rhead 1995) questionnaire and The Culture Free Self-esteem Inventory - 2 (Battle 1981) were used as measurements. The results of this study found that stress levels were highest at the beginning of the third year (final year) of training and that these levels were significantly higher than levels reported at any other time in their education/training and that self-esteem levels were lowest at the end of training (Edwards et al. 2010)

2.3.6 Organizational stress

Several studies focused on the impact of course organization on student stress levels during clinical placement. Gibbons et al. (2010) state that course organization is an important factor in student success and it is more likely that it will contribute to distress when it is perceived as ineffective.

Blomberg et al. (2014) used a cross-sectional evaluative design to describe nursing students' experience of stress during clinical practice. This study also aimed to evaluate the risk of stress in relation to the clinical setting characteristics and the organization of the clinical education. A numerical rating scale (NRS-10) was designed by researchers as a measurement tool, with its reliability tested prior to use. A sample size of 185 students was used across three locations with a varied response rate in each location (80%, 93% and 93%). Students performed their clinical practice in a variety of clinical settings: hospital (67%), community based (21%), primary health care (7%) and psychiatric care (5%). Students received supervision from a named personal supervisor and also from other nurses (58%), from a named personal supervisor only (29%) and the last group worked with a specific patient and had different supervisors depending on what nurses were on shift (13%). It was found in this study that almost half (43%) of students were considered to have high levels of stress. The findings showed that levels of stress were greater for those working in hospital departments, especially in departments where clinical nurses worked in a team or tandem with a nursing assistant. Students following patients reported more stress than those who had a personal supervisor

assigned, and those with only one supervisor had less stress than those with one or more (Blomberg et al. 2014).

Gibbons et al. (2010) study found that there were a number of factors that related to the structure of the course that were seen as a source of stress. This was partly related to how information was communicated at an organizational level, the pace and intensity of the course and finally the demands of the course. Gibbons et al. (2010) found that these factors were pushing many students to the edge of their ability to cope; to the point that additional stressors were felt to cause disproportionate distress, especially in those students with dependents.

Furthermore, Gibbons et al. 2010 found that the teaching and learning experience was mixed, with all respondents feeling that their learning was adversely affected by the disruptive behaviour of other students in lecture, cancelled classes at short notice was widely commented on as a source of stress.

These findings suggest that course design and clinical practice environment greatly impact the student experience and resulting stress levels. It is suggested that nurse educators need to be aware of the impact of organizational stressors and take in to account this factors in course design and choosing appropriate clinical placement areas for students.

2.3.7 Coping with stress and psychosocial & physiological effects

Sheu et al. (2002) found that the most common coping behaviour in response to stress of nursing students during their initial clinical experience was to stay optimistic, followed by transference (the redirection of emotions to a substitute) and problem solving. Ineffective coping behaviours such as avoidance behaviour were found to be the least frequently employed response. The five most common coping behaviours of students were; to cry, to feel moody, sad and helpless; to keep optimistic and have a positive attitude in dealing with everyday life; to have confidence in performing; to save time for sleep and maintain good health in order face stress and to relax (Sheu et al. 2002). Among the coping behaviours exhibited by nursing students during the initial period of clinical practice, avoidance behaviour was found to have a negative effect on student's physio-psycho-social

status while both problem solving behaviour and an optimistic attitude had positive effects (Sheu et al. 2002). Sheu et al. (2002) found that the physio-psycho-social response occurred during the initial clinical placement ranging from 'rare' to 'sometimes with social behavioural symptoms being the most common response to stress followed by emotional symptoms and physical symptoms (Sheu et al. 2002)

Shaban et al. (2012) study had similar findings to those of Sheu et al. (2002). The most common coping behaviours utilized by students during the initial clinical placement were problem solving followed by staying optimistic and transference, with avoidance behaviour found to be used least often. Shaban et al. (2002) found that avoidance coping actually had a positive effect on stressors, in relation to stressors in the clinical environment, patient care and daily life. Shaban et al. (2012) explains that these findings suggest that even though students may be informed about potentially effective coping strategies there is no guarantee that they will use them in an appropriate manner (Shaban et al. 2012).

In contrast to Shaban et al. (2010) findings, Gibbons et al. (2010) found that avoidance coping and the 'hassle' factors were predictors of less healthy well-being. They suggest that even when used infrequently, avoidance coping can have adverse effects and that students should be taught to become aware of their coping styles along with strategies to promote effective coping. Gibbons et al. (2010) suggests that even small positive changes in awareness and reaction to stress can help to improve student well-being (Gibbons et al. 2010)

Furthermore, Gibbons et al. (2010) study highlights the role of tutors in helping students cope with stress. Interestingly, students commented that tutors that were seen to be more effective in helping students manage their stress did not give excessively or any more time, but rather it was the quality of the interaction that made the difference. Negative comments regarding staff where most likely due to staff seeming unapproachable to students and instead of feeling supported, it was a feeling of being criticized, which students found further added to the stress of course demands.

The third theme of McKenna and Plummer (2013) qualitative study's was "using coping strategies", and this was further divided into two sub-themes:

"responses to stress" and "coping strategies". Individual responses to stress varied, but generally students would respond physiologically and psychologically. Sleep deprivation, altered appetite and headaches were common physiological responses, while panic, anxiety, sadness, sensitivity, withdrawal, mood changes and being upset were psychological responses. In regards to coping strategies, a variety of approaches to dealing with stressful experience were reported; such as, using social support by talking and expressing feelings, practicing relaxation techniques, spiritual activities as well as ignoring assignments and turning to avoidance coping (McKenna & Plummer 2013)

Chen & Hung's (2014) descriptive cross-sectional study explored the relationships between perceived stress, coping behaviours, personality traits, and physio-psycho-social responses. Lai's personality scale (Lai & Lai 2004) The Perceived Stress Scale (Cohen et al. 1983) The Coping Behaviour Inventory (Litman et al. 1983) and the Physio-Psyhco-Social Response Scale (Sheu et al. 1997) were used as measurements with a sample size of 105 and response rate of 96%. This study found that perceived stress, gender and personality were the predictors of nursing students' physio-pyscho-social responses during clinical placement; with a significantly positive relationship noted between perceived stress and physio-psycho-social responses. This may indicate that when students perceive a high level of stress they are at risk of suffering from physical or psychiatric illnesses or demonstrating poor social behaviours (Chen & Hung 2014). Interestingly, this study also found significant differences in physio-pyscho-social responses across the four different personality categories, which might be a useful technique for students in terms of improving self-awareness of how they respond to stress. In terms of coping behaviours, students were found to use problem solving the most, followed by optimism, transference and lastly, avoidance coping.

Jimenez et al. (2009) study found that the most common responses to stress concerned 'psychological symptoms' (psychiatric anxiety, cognitive symptoms and depressive symptoms), whereas 'physiological symptoms' (common symptoms, somatic anxiety and neuro-vegetative symptoms) were less frequently described. It was then reported that the three most common symptoms reported during clinical

practice were; 'I tend to be worried and nervous', 'I am not optimistic about my future' and 'I tend to be nervous and anxious lately', with second year students found to have more psychiatric anxiety and displaying worse health as well as scoring higher on physiological symptoms than those in first and third year. Jimenez et al. (2009) suggest that this finding could be explained by second year students having a perceived heavier workload during clinical practice and perhaps struggling to balance academic and clinical demands. This finding is significant as it highlights a vulnerable stage for students during their programme, one which nurse educators should be aware of in order to support these students.

In support of Jimenez et al. (2009), Edwards' et al. (2012) study demonstrates that students at the end of their training had lower levels of self-esteem compared to when they were 8 months in to their training, and students with lower self-esteem were found to have higher stress levels. When encountering stress, those with higher self-esteem have a higher sense of personal worth, which acts as a buffer against the negative impact of stress.

This section highlights the importance of nursing students developing effective strategies to cope with stress, as it can be seen that negative physio-pyscho-social symptoms can occur. Furthermore, it is argued that support in acquiring these strategies should be initiated early on in nursing education. This could allow students time to develop these strategies in order to effectively combat potentially increasing stressors and maximize eustress throughout their studies and nursing careers.

2.4 Discussion and Critical Overview

2.4.1 Operational definition of stress

For those studies that have supplied an operational definition of stress which can be seen in Table 2.0, Lazarus and Folkman's (1984) definition was cited by most, defining stress as "a particular relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her own resources and endangering his or her well-being (p 19)." One study used Schwarzer (1992, p. 14) definition that stress can be the result of "too much or too little arousal

resulting in harm to mind and body" (Gibbons et al. 2008). A common operational definition of stress is useful when comparing studies, as there is clarification of the main concept of the study.

2.4.2 Context

This review illustrates that most of the studies done in this topic area have been primarily conducted in the UK/Ireland and Europe (8/14) and can be seen in Table 2.1. There were several studies from North America that were of interest, however they were excluded due to inaccessibility. Several studies from Asia were found, however there was a lack of studies in this area noted in locations such as the Middle East and Australasia. Burnard et al. (2008) cross-cultural study does demonstrate some globalization of findings with students experiencing similar stress experiences internationally, however it is difficult to deduct the impact of all potential cultural and contextual differences. Further research into the influence of cultural factors in terms of perceived stress and coping behaviours are needed to further support this finding.

Table 2.1 Location of Studies

Location of Studies
UK (3) Gibbons et al. (2008), Gibbons et al. (2010), Edwards et al. (2010) **Ireland (2)** Suresh et al. (2012), Timmons & Kaliszer (2002) **Spain (2)** Jimenez et al. (2009), Gorostidi et al. (2007) **Sweden (1)** Blomberg et al. (2014) **Turkey (1)** Karabacak et al. (2012) **Jordan (1)** Shaban et al. (2012) **Taiwan (2)** Sheu at al. (2002), Chen & Hung (2014) **Indonesia (1)** McKenna & Plummer (2013) **Multiple (1)** Burnard et al. (2008)

2.4.3 Methodological considerations

Type of study

Most studies have had a quantitative focus and, although there are clear benefits to using a quantitative approach in this area of research, there is also a need to complement quantitative findings by using qualitative measures for furthering our understanding (Gibbons et al. 2010). The majority of studies were descriptive, cross-sectional and quantitative. One study was experimental and two studies were qualitative, with one study noted to use mixed methods by the use of one open ended question and thematic analysis combined with survey results (Suresh et al. 2012). The use of quantitative measures are useful for objective measures such as sources of stress, but are unable to investigate the student experience and may restrict the in-depth understanding of the student's reaction to stress. Therefore, future studies should pay more attention to qualitative approaches for investigating clinical stress among nursing students. In particular, using a mixed methods design would address one notable gap in the literature and provide a more robust picture of the student experience with stress during clinical placement. Most of the studies were cross-sectional, and only two were longitudinal. This indicates that the changing nature of clinical stress has not been explored fully in the current literature. Future studies should aim to address this gap; however, the varying and constantly developing nature of nursing programmes does make designing effective longitudinal studies challenging as this would require consistency of both the participants and the programme.

Sample size and response rate

Sample size and nature were varied in these studies, ranging from 6 to 1707 nursing students, with many being convenience samples. This implied that the generalizability of the literature findings is limited in those studies with small sample sizes. It is highly recommended for nursing researchers by Labrague et al. (2016); Alzayyat and Al-Gamal (2014); Galbraith and Brown (2011) that sample sizes must be statistically significant so that the results can be transferred and applied in other similar settings. Response rates were also found to be highly

variable ranging from 26-33% in one study (Suresh et al. 2012) to 100% in another (Timmons & Kaliszer 2002)

Instruments

There was much variability in the selected instruments and measurements used as can be seen in table 2.2. Only four tools were used twice or more with two studies choosing to use researcher designed questionnaires. The variability is also evident in the structure and content of the instruments that were used; however, all instruments did aim to report on clinical stressors among nursing students.

Table 2.2 Instruments and Reported Reliability and Validity

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Instruments

Quantitative

The Stress in Nurse Education Questionnaire (2): reliability and validity not reported

The Culture Free Self-Esteem Inventory: not reported

The Perceived Stress Scale (3): Cronbach's α= 0.89 and one week retest reliability of 0.60 (p< 0.01)

The Bio-Psychosocial Response Scale: Cronbach's α= 0.09 and one week test-retest reliability was 0.72 (p<0.001), Guttman reliability coefficient = 0.83 (p<0.001)

Modified Nurse Stress Scale: Cronbach's α = 0.92. Spearman-Brown split half method used for reliability = 0.80 (p>0,001)

Nurse Stress Scale: Cronbach's α= 0.89-0.93 and test retest reliability 0.81 (p<0.001)

Clinical Stress Questionnaire: reliability and validity not reported

KEZAK : reliability and validity not reported

STAI: reliability and validity not reported

Lai's Personality Scale: Cronbach's α= 0.62 reported by Chen & Hung (2014)

The Coping Behaviour Inventory (2): Cronbach's α=0.76 and one week retest reliability of all for factors 0.57, 0.57, 0.59, 0.55 (p<0.001)

The Physio-Psyhco-Social response scale (2): Construct validity supported by factor analysis and Cronbach's α= 0.90 and one week retest reliability was 0.72 (p,0.001)

General Health Questionnaire: Internal validity and test-retest reliability demonstrated in numerous studies

Index of Sources of Stress in Nursing: Cronbach's α exceeded 0.7 for all factors and deemed to have face validity

Generalized Self-Efficacy Scale: Cronbach's α= 0.75-0.92 and is supported from multiple studies

Marlow-Crowne Social Desirability: adequate reliability and validity demonstrated from multiple studies

Brief COPE: Cronbach's α exceeded 0.8 for all factors and deemed to have face validity

Research Designed Questionnaire (2): Timmons & Kaliszer (2002), reliability and validity not reported. Blomberg et al. (2014) reported reliability of scale based on intraclass correlation coefficient (0.81) and standard error of measurement (0.90) reported satisfactory reliability.

Qualitative Methods:

Semi-structured focus Group, thematic analysis

Semi-structured telephone interviews, thematic analysis

Open ended question

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This table highlights that the majority of instruments used reported acceptable reliability and validity, with the exception of Timmons & Kaliszer (2002) questionnaire and KEZAK & STAI (Gorostidi et al. 2007).

Theoretical perspective

The most commonly used theoretical underpinning found in the literature is Lazarus & Folkman (1984) Transactional Theory. In the studies that discuss a theoretical framework McKenna & Plummer (2013), Sheu et al. (2002), Jimenez et al. (2009) & Gibbons et al. (2011) the Transactional Theory is used exclusively. Jimenez et al. (2009) integrates Pollock's Adaptation Nursing Model (Pollock 1984) along with the Transactional Theory (Lazarus & Folkman 1984) and Sheu et al. (2002) further developing their own framework from the Transactional Theory (Lazarus & Folkman 1984) to formulate a hypothesis. Furthermore, for those studies that provide an operational definition of stress, Lazarus & Folkman's (1984) definition is almost exclusively used with the exceptions of Gibbons et al. (2008) as mentioned previously.

In Lazarus & Folkman's (1984) Transactional model of stress, stress can be interpreted through primary and secondary appraisal. The primary appraisal refers to the initial perception about a stressor and whether it is judged to be positive (leading to eustress), negative (leading to distress) or neutral. The secondary appraisal refers to the coping responses the individual draws on. Interacting between the perception of stressors and the individual's response are a number of moderators, which include self-efficacy, perceived control, support and coping styles (Jimenez et al. 2009).

According to this theory, a stressor is perceived as stressful when the situation is appraised by the person as taxing or exceeding his/her resources and endangering his/her well-being (Sheu et al. 2002). Stress is not categorized as good or bad, but rather it is classified according to the degree, types, and situations in which it arises. Coping is thought of as the changing cognitive and behavioural efforts made in response to demands that are appraised as taxing or exceeding the resources of an individual, which can then affect health in physical, psychological and social aspects (Sheu et al. 2002).

The functions of coping include managing or altering the problem causing the distress (problem-focused coping) and regulating the emotional response to the problem (emotion-focused coping). Problem-focused coping includes defining the

problem, generating alternative solutions, weighing, and choosing the alternatives in terms of their costs and benefits, as well as action. Whereas, emotion-focused coping, which includes either lessening or increasing emotional distress. However, no single coping strategy is considered superior to any others. Sheu et al. (2002) highlight Lazarus and Folkman's (1984) view that physical, emotional and social behavioural responses are the results of a person's evaluation and adjustment to stress.

McKenna & Plummer (2013) illustrate that using primary and secondary appraisal can be applied to student nurses coping with stress in clinical education. Through primary appraisal, nursing students are able to recognize the presence of stressors in the clinical environment that could jeopardize their resources and wellbeing. During the process of secondary appraisal, nursing students experiencing stress in clinical education reduce or eliminate stressors by making efforts to change the stressful conditions, so that they are not perceived as stressors.

Although the studies that did make a point of outlining a theoretical underpinning chose to use Lazarus & Folkman's (1984) theory, many still chose not to disclose what theory, if any were used. This lack of transparency can result in misinterpretation of many aspects of research, as application of a theoretical perspective gives context to how the researcher interprets and reports their findings.

2.5 Commonly Reported Stressors

The results of several studies provided reports on the most commonly reported stressors found. Burnard et al (2008) found a number of common stressors in their international study that were noted in all locations. The most commonly reported academic stressor appears to be revising and sitting for examinations. Also having continuous pressure to meet deadlines for assessments and/or having to pass assessments before moving to the next stage of the course were ranked amongst the top five stressors for students in four of the countries studies. The most commonly reported clinical stressors include watching a patient suffer, death of a patient or listening or talking to a patient about his her

approaching death. The emotional issues surrounding death/dying were found to be primary work place stressors for nursing students across all the countries studied (Burnard et al. 2008)

Jimenez et al. (2009) study had similar results with the most stressful aspects of clinical practice relating to seeing pain and suffering, being able to provide appropriate responses to doctors', teachers', and patients questions and not knowing how to help patients with psycho-social problems as well as lack of knowledge and skills and providing patient care. This study found that academic and external stressors were perceived as less stressful (Jimenez et al. 2009).

The results of Edwards et al. (2012) found a balance between academic and clinical stressors with the students across all years finding that revising for and sitting examinations, continuous pressure to meet deadlines for assessments, having to study after a day's work, fear of making a mistake in caring for a patient and watching a patient suffer caused the highest levels of stress.

Gibbons et al. (2010) findings revealed additional stressors to the previous studies and found that the most common clinical sources of stress included the attitudes of some staff; working on under-staffed wards and student status on placement. Initial placements were very distressing and the sheer pace and intensity on the ward was an experience that meant some became disillusioned with nursing as a career

In Sheu et al. (2002), study the most common stressors were lack of experience and ability to provide nursing care and in making judgments, insufficient knowledge regarding proper treatment of illness, unfamiliarity with medical history, terminology and medical terms, uncertainty about how to help patients with the psychological and social problems and worrying about bad grades. Interestingly, Sheu et al. (2002) found that stressors from assignments, workload, nursing staff, clinical environment, peers or daily life were rarely found with stressors coming mainly from lack of professional knowledge, skills and experience of care giving.

In contrast, Chen & Hung (2014) found the most common stressful events perceived by the students were from the care of patients, assignments and workload, and instructors and nursing staff.

In terms of clinical placement, dealing with death and dying patients and relationships with staff on the ward were the main reported stressors with teachers and clinical placement coordinators caused stress in one third of students as found by Timmons & Kaliszer (2002).

These common reported stressors in nursing students are frequently found echoed in the literature based on attrition rates in nursing students. As attrition is often cited as being due to discrepancy in expectation and practice (Last & Fullbrook 2003; O'Donnell 2011) and the interaction with peers and mentors forms an essential part of their professional development and these interactions have been shown to impact students decisions to leave or stay in programmes (Bowden 2008; Williams 2010) Furthermore, Crombie et al. (2013) study findings imply that students experience in clinical placement emerged as the most important factor in student retention.

It appears from the literature that both academic and clinical factors contribute to student nurses stress throughout clinical placement, however the literature provides conflicting reports on which elements cause the most stress. In regards to clinical factors, the most commonly cited stressors can be seen in table 2.3 below.

Table 2.3 Most common clinical stressors

Most common *clinical* stressors
-Coping with patient suffering and/or pain
-Coping with death and dying patients
-Lack of knowledge and skill
-Fear of making mistakes
-Relationships with nurses, teachers, doctors

2.6 Suggestion of Interventions

Most of the studies in this review came to the conclusion that the development of stress management interventions is required as the next logical step in helping students cope with the stressors nursing education and clinical practice. The importance of taking steps to reduce the negative consequence of stress in this

population is crucial for students' success (Blomberg et al. 2014). Suresh et al. (2012) states that although stress will always exist in nursing, strategies to proactively manage stress and encourage students to develop coping skills early on in their nursing careers is essential. They further suggest that interventions such as an induction period for newly qualified nurses, stress management interventions and counselling support would be beneficial (Suresh et al. 2012).

Chen & Hung (2014) and Blomberg et al. (2014) suggest workshops in stress management and reduction, and relaxation could improve coping skills and Gorostidi et al. (2007) highlights the importance of student's stress being alleviated if they are made aware of potential stressors they may experience during clinical training. It is also suggested that development of appropriate stress management competences will facilitate a healthier way of working, contributing to the nurses remaining healthy and providing better quality of caring (Gorostidi et al. 2007). Edwards et al. (2012) supports this by stating that future research into student stress would need to concentrate on effective stress interventions.

2.7 Conclusion

This review reveals that clinical placements are a stressor to student nurses, and that the initial clinical placement is often a stressful time and placement experiences can influence the high, as well as costly, estimated attrition rate of 25 % in UK nursing students (Clements et al. 2015). Although evidence is inconclusive as to which year of study and area of clinical placement causes the most stress, it is argued that further study into both of these areas is indicated. Both academic and clinical stressors were found to impact student nurses, and it is argued that these stressors are often intertwined, as is the nature of nursing education with clinical placements, assignments and examinations taking place simultaneously. These findings support the current research project investigating stress in first year students during their first clinical placement using a mixed methods approach as illustrated in Table 2.4. Furthermore, the findings provide support for a further review into the stress management literature for student nurses.

Table 2.4 Summary of Literature Review 1

What is known about this topic?
-student nurses face a variety of stressors
-student nurses report higher levels of stress than other university students
- the clinical environment is a source of stress for student nurses
-stress in student nurses is experienced globally (although limited studies) with students reporting similar experiences.

Gaps in the literature
-Few studies utilized a mixed methods design, therefore many studies focused on the sources of stress but a lack of understanding the student experience
-Small sample sizes often led to un-generalizable results
-Inconclusive evidence of which year of study and sources of stress are most problematic for student nurses
-Resilience is cited as important for managing stress, but the correlation of stress and resilience in student nurses has not been well documented

Implications
-The literature highlights importance of educators supporting student nurses to manage stress at an early stage in their nursing education
-Further research into stress in student nurses is required, especially during the initial clinical placement
-There is a need for further investigation into how resilience impacts stress in a student nursing population
-Support for research and development of stress management interventions
-Establishing and redefining a standardized instrument for assessing stress during clinical placement is needed

2.8 Results of Search Two: Stress Management Interventions

        One of the significant findings of the first literature review was the support for stress management interventions to be researched and developed for student nurses. This identified need led to this second search, which focused on stress management interventions for student nurses, during clinical placement. Galbraith and Brown 's (2010) review highlights the recognized importance of tackling nurses' stress early in their careers with more investigations into the effectiveness of interventions for student nurses growing in recent years. Although stress interventions for this population can be successful, published studies vary in approach and effectiveness and it is suggested that sources of stress for nurses are ever changing (Galbraith & Brown 2010). Galbraith and Brown (2010) support the work of Jones and Johnston (2000) who argue that stress management interventions aim to address one or more of the following targets. Target 1: the intervention aims to reduce the intensity of number of stressors. Target 2: the intervention aims to improve students' cognitive reappraisal of potential stressors and Target 3: the intervention is aimed to improve students' coping with the consequences of stress. The findings of this review are reported in terms of type of intervention design as well as in terms of the intervention targets mentioned above and can be seen in Table 2.5.

2.8.1 Types of Intervention Design

2.8.2 General stress management programme

        Sharif & Armitage (2004) study used a quasi-experimental pre & post-test, follow-up and control group design with a sample size of 100 second & fourth year students (n= 50 control group, n= 50 experimental group). The Hamilton Anxiety Scale (Hamilton 1959) and the Coopersmith Self-esteem Inventory (Coopersmith 1967) were used as instruments of measurement and these instruments are focused specifically on anxiety and self-esteem as opposed to general levels of stress. This study used a stress management intervention programme that consisted of weekly, two-hour sessions, for twelve weeks. Topics included anxiety, anxiety control, breathing, relaxation, assertiveness, worrying thoughts/rational/irrational beliefs,

time management and study skills. This study also included pre & post intervention focus group (n= 7 pre intervention group n=9 post intervention group) for those students taking part in the stress management course. It was found that a reduction in students' anxiety and increase in self-esteem in the experimental group occurred, however there was also a reduction in anxiety found in the control group, which could be due to the gradual development of skills and awareness (Sharif & Armitage 2004). The experimental group also showed improvement in grade point average while the control group remained unchanged at final grade point average.

The result of the focus group discussion showed that second-year nursing students experienced more initial clinical anxiety in the second year than the fourth year students, with more experiencing physical symptoms such as insomnia. This study found that when comparing pre and post focus group discussions, there was an indication of reduced anxiety in the experimental group especially in the second year students, with the intervention shown to be effective in reducing anxiety in experimental group overall while increasing self-esteem (Sharif & Armitage 2004)

Yazdani et al. (2010) parallel-group randomized quasi-experimental study with a sample size of 76 (n=38 intervention group, n= 38 control group) used a stress management training programme which utilized cognitive-behavioural techniques merged with cognitive-behavioural stress management methods as a stress management intervention. This study used the Depression, Anxiety and Stress Scale (DASS-42) (Lovibond & Lovibond 1995) as a measurement before, after and one month post intervention. This intervention programme had two-hour session, twice weekly, for eight weeks. The activities of the sessions included; muscle relaxation, mental imagery, relaxation, diaphragmatic breathing and linking thoughts and emotions. The results of this study indicated that the anxiety level of the nursing students had reduced through the implementation of the intervention. Although there was some success reducing anxiety, there are several practical issues to be noted in implementing this intervention; such as, the cost of hiring a trained professional to conduct the training and the impact of such a large time commitment on participant recruitment and retention.

Jones and Johnston (2000) intervention was developed from a pilot study of 26 students from a previous nursing class. This study had an experimental treatment group, control-group, pre-post-test, follow-up design. A screening study was carried out twenty weeks prior using the General Health Questionnaire-30 (Goldberg et al. 1978) with students reporting a significant level of stress contacted by letter and offered stress reduction and management training. This study had a sample size of 79 (control group n= 39 treatment group n= 40). This intervention was aimed to reduce the level of emotional distress experienced by student nurses who were identified to have significant levels of stress from the initial hospital placement, during a second series of hospital placements. The GHQ (Goldberg et al. 1978), State-Trait Anxiety Inventory (Spielberger et al. 1983), Beck Depression Inventory (Beck et al. 1961), Derogatis Stress Profile (Derogatis 1987), Beck and Srivastava Stress Inventory (Beck & Srivastava 1991), the 'Ways of Coping Questionnaire' (Coyne et al. 2981) and Objective Performance Measures (examination performance, absence from academic or clinical setting) were used as instruments to measure several variables. This intervention targeted the situational stressors, cognitive appraisal and coping strategies of student nurses at both the individual and organizational level (Jones & Johnston 2000).

This stress management intervention was comprised of six, two-hour sessions with information on specific coping skills. The coping skills presented included self-monitoring of distress symptoms, the use of problem solving, use of situational reappraisal, the development of time and self-management and reflection practices. The results of this study included an increased ability to manage anxiety, to balance conflicting demands from home and work, to problem solve, to develop time and task management skills and to use a range of emotion-focused and problem-directed coping strategies in a flexible and responsive matter.

2.8.3 Mindfulness-based stress reduction (MBSR)

MBSR programmes have been studied, and scientific evidence has been generated demonstrating that they can have a profound benefit via the mind-body connection; the practice of mindfulness results in an increase of awareness, by

purposefully paying attention in the present moment, and nonjudgmentally unfolding experiences, moment by moment (Song & Lindquist 2015). MBSR was developed in a behavioural medicine setting by Jon Kabat-Zinn in 1979 for populations with a wide range of chronic pain and stress related disorders and a standard MBSR programme is conducted as an eight-ten week course, meeting two-two and a half hours weekly coupled with home practice most days (Song & Lindquist 2015). An all-day intensive mindfulness session for seven-eight hours in one day is held around the sixth week. Several mindfulness meditation skills are taught including the body-scan, sitting meditation, hatha yoga and practice mindfulness for walking, standing and eating (Song & Lindquist 2015)

Song & Lindquist (2015) study highlights that MBSR programmes have been shown to be effective; however the potential benefits of MBSR to decrease depression, anxiety, stress and increased mindfulness are less-well established in Korea. Therefore, their study was designed to examine whether MBSR is effective and has potential as an intervention to decrease depression, anxiety and stress, and to improve mindfulness of Korean nursing students. The Depression, Anxiety and Stress Scale-21 (Lovibond & Lovibond 1995) and The Mindfulness Attention Awareness Scale (Park 2006) were used as measurements. The result of their two-group randomized controlled, pre-test-post-test design was that those students that participated in the MBSR programme had significantly greater decreases in depression, anxiety and stress and increases in mindfulness. This study provides evidence that an MBSR programme can help to improve mindfulness as well as manage and decrease depression, anxiety and stress of nursing students.

Van der Riet et al. (2014) state that interventions designed to assist individuals to respond more effectively to stressors increasingly incorporate a focus on mindfulness practice as a key stress management strategy. Kabat-Zinn's (2003) description of mindfulness as 'paying attention in a particular way: on purpose, in the present moment and non-judgmentally and the intentional cultivation of non-judgmental moment-to-moment awareness"

Van der Riet et al. (2014) study used a sixty minute semi-structured focus group to examine the results of their seven week stress management and

mindfulness programme, which was developed as a pilot study with a focus on first year nursing students. The intervention comprised seven one-hour sessions in which practices commonly utilized in MBSR were taught that included sitting mindfulness and the body-scan. Students were also encouraged to practice these exercises at home. The findings of this study revealed three main themes; attending to self, attending to others and attending to the programme. The analysis found descriptions of the positive impact of mindfulness that extended beyond the individual to their intimate relationships, wider social networks and clinical work. These first year nursing students were able to clearly identify the benefits of mindfulness upon therapeutic nursing practice describing an enhanced ability to 'be-with' others and to 'imagine' future benefits of mindfulness as they developed as clinicians, and improvements in personal, academic and professional functioning were also reported (van der Riet et al. 2014). It was noted that attending to the programme proved to be a major challenge for all participants due to other commitments and the demands of other academic and clinical responsibilities (van de Riet et al. 2014).

Beddoe & Murphy's (2004) pilot study explored the effects of an eight-week MBSR course on stress and empathy. This study used a pre-test-post-test design without a control group, where 16 students attended eight two-hour sessions, as well as following a thirty minute guided meditation audiotapes at home five days per week. Mindfulness was presented using various techniques including the body scan, sitting meditation, hatha yoga and walking meditation. The course also explored the use of mindfulness in daily life, the psychological and physiological effects of stress and journal keeping. The Interpersonal Reactivity Index (Davis 1980) and Derogatis Stress Profile (Derogatis 1987) were used as measurements.

Common journal themes included feeling anxious and worried about schoolwork (particularly examinations), uncertainty of success in nursing school; and noticing difficulties with concentration. Students cited examinations, quantities of material to be studied, clinical experiences and jobs as major stressors. Journal entries and narrative portions of the questionnaire reflected perceived benefits of the MBSR course such as; students valued and sought personal time for themselves,

experienced increased awareness and acceptance of thoughts and feelings, returned to their breathing at stressful moments as a successful coping strategy, felt more patient and had a greater appreciation for small aspects of daily life. Furthermore this study found a significant decrease in mean anxiety scores from pre-test-post-test as well as a promising trend in Time Pressure Scale scores. The findings of this study suggest that being mindful may reduce anxiety and decrease tendencies to take on other's negative emotions (Beddoe & Murphy 2004)

2.8.4 Autogenic training

Autogenic training is a relaxation technique that involves repetition of a set of visualizations that are based on passive concentration of the body for example heaviness and warmth of arms and legs, which are facilitated by self-suggestion (Kanji et al. 2006). Kanji et al. (2006) study used a randomized controlled trail with three parallel arms with a sample size of 93 of third year students. Students were invited to participate, then randomized into group A (AT training), group B (laughter therapy) and group C (no intervention). Students were then asked to keep diary entries, but data from these was not included in this study (field notes were taken during each session and participants were interviewed). The treatment group received eight weekly sessions of AT training, the attention control group received eight weekly session of laughter therapy, and the time control group received no intervention. Measurements were conducted using the State-Trait Anxiety Inventory (Spielberger et al. 1983), the Maslach Burnout Inventory (Maslach & Jackson 1981), blood pressure and heart rate at baseline levels, two months (end of treatment), five, eight and eleven months post intervention. Autogenic training was developed by Schultz (1932) and consists of six standard exercises. The first exercise aims at muscular relaxation, which is achieved mainly by repeating a verbal formula to encourage feelings of heaviness, warmth, calming cardiac activity and slowed respiration and this technique is usually taught over a period of eight weeks with home practice at least three times a day encouraged. The results of this study found that an eight week course of AT training caused a reduction in state and trait anxiety

greater than those given laughter therapy or in untreated controls, blood pressure and pulse were reduced compared with untreated controls (Kanji et al. 2006)

2.8.5 Biofeedback

Rantanasiripong et al. (2012) randomized controlled study utilizes biofeedback training, the process of becoming aware of the body's physiological functions to help the participant learn to modify physiological activity to improve health and performance. This study used the Perceived Stress Scale (Cohen et al. 1983) and State Trait Anxiety Inventory (Spielberger et al. 1983) as measurements pre-intervention as well as five weeks post-intervention. They specifically targeted students in the clinical setting and identified that portability and ease of use are two important factors for intervention success. Students were required to wear a device that measured heart rate variability (HRV), which required placement of the thumb on the pulse sensor of the device. In three steps, HRV biofeedback training helps the individual to (1) become aware of the involuntary HRV (2) learn to control the HRV through slower breathing and positive emotions and (3) achieve a heart-rhythm pattern associated with lower stress and anxiety-related symptoms (Rantanasiripong et al. 2012).

Students in the biofeedback group were trained in using the device over two sessions and then instructed to use the device for five weeks, three times a day and log their practice time. This study found that the biofeedback group had a significant decrease in the state anxiety scale score over the five-week period while the control group had a moderate increase. Rantanasiripong et al. (2012) state that stress and anxiety levels are expected to increase for students when they begin their first clinical training if they do not receive interventions and the results from this study demonstrate that the five-week biofeedback intervention not only kept the nursing students' stress levels from increasing but also significantly reduced their levels of anxiety.

2.8.6 Recreational music making

Bittman et al. (2004) study used a controlled prospective cross-over design with two 6 weekly sessions. The sample consisted of 75 first year nursing students completing the intervention (group one, weeks 1-6 = 38 students, group 2, weeks 7-12 = 37 students). The Maslach Burnout Inventory (Maslach & Jackson 1981) was used as a measurement. The aim of this study was to explore psychosocial impact of a group-based music making intervention offered to first year nursing students with the goals of reducing burnout and improving mood states. Interestingly, participation in this study was presented as a clinical requirement, although students were given the option not to participate in the data collection. Group Empowerment Drumming, a comprehensive, well-established, multi-faceted RMM protocol, was utilized for this study (Bittman et al. 2004). This study demonstrated that a RMM intervention revealed statistically significant improvements for multiple parameters associated with burnout, mood states and total mood disturbance. This study also reported difficulties engaging participants, with a number of students expressing that their time would be better spent studying or practicing skills or spending time with friends and family.

2.8.7 Diaphragmatic breathing

Consolo et al. (2008) experimental, no control design with a sample size of 21, introduced a simple stress reduction method of diaphragmatic or deep breathing prior to a cognitive test and prior to a clinical test to see if stress reactivity, through measurement of heart rate, could be reduced by deep breathing and if better performance in both a cognitive and clinical test would be noted. Students were instructed to listen to a five- minute tape that described how to perform diaphragmatic breathing. The breathing relaxation was performed prior to a cognitive test and then on a separate day prior to a nursing skill test. On a different day, these tests were done without the deep breathing. On all days, students were instructed to take their own resting heart rate before and after the both tests, as well as before the deep breathing (if applicable that day). The Life Experiences Survey (Sarason et al. 1978) and the Stress Vulnerability Questionnaire (Miller &

Smith 1985) were used a measurements. The pre-test questionnaires revealed that the nursing students are vulnerable and experience stress, and that an intervention was required. In comparing test scores and heart rates after deep breathing relaxation, this study found that the results were inconsistent and that an attempt to decrease the students' stress levels by deep breathing exercises before stressful testing situations was not successful based on the measurement of heart rate and test scores. It is argued that due to the lack of a control group and post-test questionnaire, this research design has several limitations that have impacted the ability to interpret results.

Table 2.5 Summary of the studies reporting on stress management interventions in nursing students

Author(s) and setting	Target nursing students and sample size	Design	Study period	Intervention Techniques	Results	Strengths and limitations	Implications
Beddoe & Murphy (2003), USA	Students year n= 16	Pilot study, pre & post-test design with no control group Interpersonal Reactivity Index, Degrogatis Stress Profile, Homework Questionnaire Journal kept throughout	2 –hour sessions held weekly for 8 weeks Follow a 30 minute guided meditation audiotape at home 5 days a week	Mindfulness based stress reduction (MBSR), includes body scan, sitting meditation, yoga, walking meditation	Significant decreases in anxiety from pre to post test. Journal themes: feeling anxious & worried about workload, difficulty with concentration with academic pressures, clinical experiences and outside jobs as major stressors	*Strengths: journal provides insight into experience of MBSR and why/why not successful. MBSR programmes have demonstrated effectiveness Limitations: no control group, small sample size*	Indicate that nurse anxiety decreased through MBSR and that this type of programme should be further studied and tailored for nursing students.
Bittman et al. (2004), USA	Students year 1 (during clinical practice module) n= 75	Cross over control design Intervention 1: week 1-6, Intervention 2 weeks 7-12. Group A Intervention, Group B No Intervention Maslach Burnout Inventory, Profile of Mood states, Total Mood Disturbance	Two separate groups took part in a 6 week programme.	Recreational Music Making (RMM), group empowerment drumming (an established RMM protocol)	Intervention group showed significant improvements for multiple parameters associated with burnout, mood states and total mood disturbance	*Strengths: control group allows for robust data Limitations: Difficult to replicate due to uniqueness and consistency teaching, Participation was presented as clinical requirement*	Highlight the importance of developing rational and cost effective strategies that address negative mood states of nursing student

Author(s) and setting	Target nursing students and sample size	Design	Study period	Intervention Techniques	Results	Strengths and limitations	Implications
Consolo et al. (2008), USA	Student year not specified

n= 21 | Experimental Design Life Experiences Survey and Stress Vulnerability Questionnaire | Unclear and not specified | Diaphragmatic breathing Student instructed using tape recording. Methods used prior to a cognitive test and nursing skills test. Methods not used prior to similar tests. Students asked to measure resting HR prior and after to both scenarios | Initial questionnaires found nursing students had high levels of stress. Comparison of HR on cognitive and clinical exam before and after intervention showed no significant difference. | *Strengths:* Suggests importance of accessible and usable intervention *Limitations:* survey only used pre-intervention, students self-report HR, timescale and student year not specified | Highlight educators role in helping students recognize stressors. Deep breathing was not significantly successful to reduce stress based on this design, but further research is warranted. |
| Jones & Johnston (2000), UK | Student year not specified

n= 79 | Experimental with treatment and control groups, pre and post-test and follow up measures QN measures: General Health Q., The State-Trait Anxiety Inventory, Beck Depression Inventory, Derogatis Stress Profile, Beck and Srivastava Stress Inventory and Ways of Coping Q. | 6, 2 hours sessions, 15 min didactic presentation in relation to coping skills | Coping skills presented: self-monitoring of distress symptoms, problem solving, time, time management, and reflection. Applied relaxation component each session | Experimental group showed increase in task-orientated coping, reduction in anxiety Increase in coping not confirmed. | *Strengths:* broad range of measures of anxiety, depression and symptomatology allow for generalization of effects *Limitations:* cannot rule out some/all of treatment effect had association with other variables, small sample size, no specification of student year | Indicates participation in intervention group demonstrated benefits: manage anxiety, balance demands, problem solve, time management skills, develop coping skills Suggest further extensions of this study and development of this programme |

Author(s) and setting	Target nursing students and sample size	Design	Study period	Intervention Techniques	Results	Strengths and limitations	Implications
Kanji et al. (2006), UK	Students year 3 of diploma or year 2-4 of BSc. Nursing (during clinical practice) n= 93	Randomized controlled trial, with 3 parallel arms. Group A= autogenic intervention Group B= laughter therapy Group C= no intervention -State-Trait Anxiety inventory, Maslach Burnout Inventory, BP & HR (baseline, 2, 5,8,11 & 14 months)	8 weekly, hour long sessions (follow up for questionnaires and BP, HR at 5,8,11,14 weeks post intervention) *Experimental group kept personal diary of experiences with AT*	Autogenic Training (relaxation technique developed by Schultz (1932) consists of 6 standard exercises aimed at muscle relaxation)	AT experimental group showed a greater reduction in state-trait anxiety and reduced systolic & diastolic BP	*Strengths:* design: randomized controlled trial with 2 comparison groups allows for effects of AT to be seen to be due from AT exercise. *Limitations:* high dropout rate at all stages, did not discuss findings of students diary	Indicates AT is effective and further research in this area is justified
Ratanasiripong et al. (2012), Thailand	Students year 2 n= 60	Randomized controlled trial (2 groups Biofeedback group and control group) Pre & post intervention survey: Perceived Stress Scale & State Anxiety Scale	2 training sessions on biofeedback device 5 weeks, instructed to use device 3 times a day a record practice time in a log	Biofeedback device measured HR. Students taught to control HR through slower breathing and positive emotions. Biofeedback device provided immediate visual and auditory feedback	Biofeedback group maintained levels of stress with a reduction in anxiety levels (control group had sig. increase in stress during this period)	*Strengths:* design: RCT gives robust results. HR measurement measurable *Limitations:* self-reporting of HR data, significance of commitment (3 x day for 5 weeks), further follow up for long term effects	Highlights responsibility of nursing educators role to help students manage stress and anxiety and this biofeedback device may be another tool they can use

Author(s) and setting	Target nursing students and sample size	Design	Study period	Intervention Techniques	Results	Strengths and limitations	Implications
Sharif & Armitage (2004), Iran	Second and fourth year students 2nd year n= 23 4th year n= 27	Quasi-experimental pre-, post-test follow up and control design. Methodological triangulation using semi-structured focus groups & Hamilton Anxiety Rating Scale	12 weeks, 2 hour session weekly, with theory and practice components	Use of lectures, exercise, discussion role-play and active learning. Topics included: anxiety control, breathing, relaxation, time management & study skills	Questionnaire showed most nursing students experience anxiety Focus groups themes: fear of failure & making mistakes, lack of knowledge in clinical practice, feelings of incompetence	*Strengths:* pre-post-test, follow up, mixed method design using triangulation provides robust data Limitations*:* length of study may lead to higher attrition rate	Indicates that participation in intervention group decreased anxiety, increase in self-esteem and relaxation techniques were found useful. Support for this type of intervention programme
Song & Lindquist (2015), Korea	Students year n= 44	Randomized controlled trial (2 groups MSBR group and control group) Pre & post-test intervention survey: Depression, Anxiety and Stress Scale, Mindfulness Attention Awareness Scale	2 –hour sessions held weekly for 8 weeks 1 all day intensive 7-8 hour sessions at week 6	Mindfulness based stress reduction (MBSR), includes body scan, sitting meditation, yoga	Intervention group showed significant decreases in depression, anxiety and stress and increases in mindfulness. Control group showed little change	*Strengths:* RCT gives robust results, MBSR programmes demonstrated effectiveness. *Limitations:* limited generalizability due to small and no-representative sample. 'Homework' completion of intervention group was not confirmed	Indicates MSBR programmes can improve mindfulness as well as decrease depression, anxiety and stress and should be considered for further research, as the techniques are always available/portable for students

Author(s) and setting	Target nursing students and sample size	Design	Study period	Intervention Techniques	Results	Strengths and limitations	Implications
Van der Riet et al. (2014), UK	First year students n= 10	Descriptive, 60 min semi-structured focus group using thematic analysis	7 weeks, one hour sessions weekly, with didactic and experiential component	Stress management and mindfulness-based stress reduction (MSBR)	Three themes: Attending to self, Attending to others and Attending to the stress management and meditation programme	*Strengths:* Rich data captured *Limitations:* pilot study so intervention not been previously used & irregular attendance limits generalizability. Mixed methods design may have been more beneficial	Indicates potential benefits for stress reduction with overall reported increased concentration clarity of thought, awareness. Suggest a briefer intervention & further development
Yazdani et al. (2010), Iran	Students in 2nd and 3rd year n= 76	Randomized quasi-experimental design with 2 parallel groups (Intervention group and control group) Depression, Anxiety and Stress Scale (complete before, after and 1 month post intervention)	8, 2 hour sessions, twice a week	Cognitive-behavioural stress management techniques included topics: muscle relaxation & imagery, diaphragmatic breathing, linking thoughts & emotions	Intervention group showed significant reduction in depression, anxiety and stress. The reduction in anxiety and stress remained at 1 month post intervention	*Strengths:* RCT design gives robust results *Limitations:* possible transferring of learned information from intervention to control group, limited generalizability	Suggest that this type of stress intervention can promote mental health and improve academic achievement and should be considered as useful addition to nursing curricula

2.9 Targets of Stress Management Intervention

The results of this second literature review will also be reported in terms of how they target stress and coping as suggested by Jones and Johnston (2006) and supported by Galbraith and Brown (2010) as this highlights how the interventions can be linked to Lazarus & Folkman's (1984) Transactional Model of Stress and Coping mentioned in the first literature review. Target 1 interventions focus on reducing the intensity or number of stressors, Target 2 interventions focus on the cognitive reappraisal of potential stressors and Target 3 interventions focus on effective coping with the consequences of stress, with most studies using interventions that target a combination of these three.

2.9.1 Effective coping with the consequences of stress (Target 3)

A majority of interventions in this category were not underpinned by theoretical models of stress, but instead, designs were justified on the basis of previously successful techniques. All of the interventions were focused upon providing student nurses with the skills to alleviate the effects of stress.
Most of the studies addressing only target 3 combined a variety of techniques to address stress; however, all interventions employed either relaxation/meditation or breathing exercise. Imagery, exercise, awareness and music-making (Bittman et al. 2004), diaphragmatic breathing (Consolo et al. 2008), autogenic training (Kanji et al. 2006) and biofeedback device were used (Ratanasiripong et al. 2012)

Improvements in psychometric measures of stress were found by several studies. Bittman et al. (2004) reported improvements on the Maslach Measure of Burnout (Maslach & Jackson 1981) and on a measure of mood disturbance. Ratanasiripong et al. (2012) reported a decrease in the State-Trait Anxiety Inventory (Spielberger et al. 1983) as well as a non-significant increase in the Perceived Stress Scale (Cohen et al. 1983) for the intervention group compared to a significant increase in the PSS for the control group. Kanji et al. (2006) found reduction in anxiety using the State-Trait Anxiety Inventory (Spielberger et al.

1983), however no difference was noted between control and intervention groups using the Maslach Burnout Inventory (Maslach & Jackson1981).

Improvements in physiological measures: Although Ratanasiripong et al. (2012) intervention taught students to control variations in their heart rate by using a biofeedback device, however this wasn't measured as an increase or decrease in heart rate variability. Consolo et al. (2008) study used a diaphragmatic breathing intervention and measured student heart rates during cognitive and laboratory examinations, before and after the intervention revealed no significant difference in heart rate, however this study had a small sample size of 21 which may have contributed to insignificant statistical results. In contrast, Kanji et al. (2006) study found significant reductions in systolic blood pressure and heart rate immediately following the autogenic training intervention.

Improvements in Academic Performance: Consolo et al. (2008) attempted to measure improvements in academic performance, however this study was unable to demonstrate the ability to do so.

2.9.2 Cognitive reappraisal of potential stressors & effective coping with consequences of stress (Target 2 & 3)

In the previous section, the interventions focused upon skills, which would enable student nurses to cope with the consequences of stress. In this section, the intervention included an additional feature; cognitive reappraisal of stress related thinking. All of the studies in this section however combined cognitive reappraisal with other techniques. Traditional relaxation training was included in all interventions and was often augmented by mild exercise such as walking as well as with more advanced techniques such as yoga (Beddoe & Murphy 2004) and mindfulness-based stress reduction techniques were used by several studies.

Inclusion of techniques to encourage cognitive reappraisal, reflect the stronger theoretical basis for the intervention reported in this section, with some interventions based on Lazarus & Folkman's (1984) Transactional model which emphasizes the importance of interpretation and cognition (Galbraith & Brown 2010). Three studies (Beddoe & Murphy 2004 and Song & Lindquist 2004, van der

Riet et al. 2014) based their intervention upon mindfulness (Kabat-Zinn 1990) drawing on the notion that stress may be reduced through self-reflection and reappraisal and through meditation and relaxation. Yazdani et al. (2010) used both cognitive behaviour techniques combined with imagery, muscle relaxation and diaphragmatic breathing in a stress management-training course.

Increases in mindfulness were found by Song & Lindquist (2004) using the Mindfulness Attention Awareness Scale (Park 2006). van der Riet et al. (2014) qualitative study reporting on a mindfulness based intervention supports the findings of Beddoe & Murphy (2004) and Song & Lindquist (2004); with thematic analysis of the focus groups revealing positive impacts of mindfulness that extend beyond the individual and to the intimate relationships, wider social networks and clinical work and indications of potential benefits for stress reduction (van der Riet et al. 2014).

Improvements in state anxiety were reported by Yazdani et al. (2010), Song & Lindquist (2004) while *Improvements in post intervention depressions* were found by Song & Lindquist (2004) using the Depression, Anxiety and Stress Scale (Lovibond & Lovibond 1995); however this was not supported by Yazdani et al. (2010) as both the control group and intervention group had a parallel decrease in depression scores. Improvements in post intervention attitudes towards stress, time pressure and self-reported stress were reported by Beddoe and Murphy (2004)

2.9.3 Reduction in the intensity or number of stressors, cognitive reappraisal of potential stressors & effective coping with consequences of stress (Targets 1, 2 & 3)

All of the interventions within this category employed relaxation as a method for coping with the consequences of stress and also incorporated cognitive reappraisal of stress related thinking. In addition to these approaches, they employed methods designed to reduce the intensity or number of stressful events or to prevent them from arising. For example, Sharif and Armitage (2004) used time management as a strategy for reducing the occurrence of stressful situations.

Sharif and Armitage (2004) reported reduction in state and trait anxiety and improvements in self-esteem. They were also the only study to report

improvements in academic performance. Jones and Johnston (2000) found reductions in distress and improvements in well-being. Furthermore, they measured coping and reported improvements in problem-focused coping. Jones & Johnston (2000) also found a reduction in the number of situational and course-related stressors; however, no improvements in sickness or absences were found following the intervention. Both Sharif and Armitage (2004) and Jones and Johnston (2000) reported sustained improvements in state anxiety at 18 months of follow up (Jones & Johnston 2000) and in anxiety and self-esteem after 3 months follow up (Sharif and Armitage 2004).

In summary, of the studies addressing only target 3, all interventions utilized relaxation, breathing or imagery, but those that reported post-intervention improvements used a combination of these techniques. The success of the interventions in this category was measured across a range of psychometric and physiological outcomes (Galbraith & Brown 2010). Of the interventions that addressed targets 2 and 3, all combined relaxation with cognitive reappraisal. The most commonly reported improvements were in state anxiety, although reductions in depression, reported stress and attrition were found, as was an improvement in attitudes to stress. Finally, in the interventions that addressed targets 1, 2 and 3, all combined relaxation and cognitive reappraisal with skills to help prevent or reduce the occurrence of stressors. These interventions demonstrated improvements across a range of psychometric measure particularly state and trait anxiety and self-esteem. Reductions were also found in depression, attitudes to stress reported stress and the number of stressors experiences. The evidence suggests that a combination of cognitive reappraisal and relaxation is necessary for improvements in stress (Galbraith & Brown 2010).

2.10 Discussion and Critical Overview

2.10.1 Context

This review illustrates that most intervention studies in this topic area have been conducted in the UK (3) and the USA (3), and there were several issues with accessibility noted for some North American studies found, for example several

articles were only available at a high cost. There were no studies noted from Europe or Australasia, with two studies from Iran, and two from Asia included. This limited variability of location of studies does limit the generalizability as all studies were limited to one geographical location and no cross-cultural comparisons were made.

Table 2.6 Location of Studies

Location of Studies
UK (3) Kanji et al. (2006), Jones & Johnston (2000), van der Riet et al. (2014)
USA (3) Bittman et al. (2004), Consolo et al. (2008), Beddoe & Murphy (2004)
Iran (2) Yazdani et al. (2010), Sharif & Armitage (2004)
Thailand (1) Rantanasiripong et al. (2012)
South Korea (1) Song & Lindquist (2015)

2.10.2 Methodological considerations

  Galbraith and Browns' (2010) review criticized that lack of RCTs and lack of follow up included in designs. However, this more recent literature review has found that there has been a noticeable shift in research design, with several studies using RCTs (Kanji et al. 2006; Ratanasiripong et al. 2012; Song & Lindquist 2015). Furthermore, many studies were designed using an experimental pre-post-test control follow up design (Yazdani 2010; Jones & Johnston 2000 and Sharif & Armitage 2004). Although most studies used quantitative methods to measure intervention success (7/10), van der Riet et al. (2014) provided the only study to use exclusively qualitative methods, a semi-structured focus group and Sharif & Armitage (2004) was the only study to utilize a mixed methods approach with both questionnaires and a semi-structured focus group. Kanji et al. (2006) did mention in their study that data were collected via field notes, interviews and student diaries throughout the intervention period, however this data was not included in their report. Beddoe & Murphy (2004) pilot study used a pre-post-test design with no control group, while Consolo et al. (2008) used an experimental design with no

control group. Bittman et al. (2004) used a controlled prospective cross-over design with a control group.

In contrast to Galbraith and Brown's (2010) review, this review found that the variety of research methods used was not particularly diverse and many studies have chosen to use control groups as well as follow up testing. This does allow for further generalizability of the results as well as increase in validity, and although the type of interventions used are diverse, the increased similarities in methods allow for improved ability to compare studies. However, there is notable variation in the instruments used to measure outcomes, which can be seen in Table 2.7, with the State- Trait Anxiety Scale used the most at three times and only three other instruments used more than once.

The sample size of most of the studies in this review were small, ranging from 10 to 100, with many studies not reporting the response rate or number of total students approached for the intervention. For those studies that did, the results were noticeably small with Song and Lindquist (2015) reporting 50/460 students or a 10.9% response rate and Kanji et al. (2006) reporting 93/235 or a 35% response rate. The small sample sizes result in a very limited ability to generalize results and it is suggested that future studies confirm what sample size is required to provide results with statistical significance (Galbraith & Brown 2010)

Furthermore, only a minority of the studies reviewed in this paper incorporated significant follow-up periods, with Galbraith & Brown (2010) suggesting that appropriate follow up times in this area of research should be six months to two years, with length of course and stage of training to be noted as considerations. Although many studies used a pre-post-test design, only two were noted to provide follow up testing, with only one study (Kanji et al. 2006) providing follow up results past the 6 month mark (five, eight, eleven, and fourteen months respectively.)

Future studies should aim at addressing this so that the sustainability of effects may be assessed as without this inclusion of follow up tests, it cannot be demonstrated if the effects of an intervention are sustainable over time. It is suggested that a longitudinal design could be beneficial to provide evidence of

sustainability, however this does imply other design difficulties due to the nature of many nursing programmes.

There is also a wide variety of stages of nursing students noted in this review, which does limit the comparisons that can be made between studies as students at different stages of their nursing education will be affected by different stressors as seen in the first literature review. Only two of the studies targeted first year nursing students, with only one targeting first year students during clinical practice (Bittman et al. 2004). One other study was found to target students specifically during clinical practice, however this was with third year students (Kanji et al. (2004)

Many of the studies in this review discuss the difficulty of maintaining their sample size and having high dropout rates due to the time commitment required to complete many of the stress management intervention programmes, with many requiring a weekly or twice weekly commitment from five-twelve weeks. Only one study was found which required limited time commitment, however Consolo et al. (2008) did not actually specify the time required for students to complete the intervention. Furthermore, it should be noted that approaches to delivering interventions have remained relatively unchanged, with classroom sessions being the preferred choice for intervention implementation. It is argued that the use of new technologies for information delivery in this context is largely underused and under researched, highlighting a gap in the current literature that supports the current study.

Table 2.7 Instrumentation & Reported Reliability and Validity

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Quantitative Instruments
Hamilton Anxiety Scale: not reported
Coppersmith Self-esteem Inventory: not reported
GHQ-30: reliability and validity well documented, not reported specifically.
The State-Trait Anxiety Inventory (3): Cronbach's a= 0.93 pre intervention and 0.91 post intervention
Beck Depression Inventory: Cronbach's a ranging from 0.82-0.87 across various factors
Derogatis Stress Profile (2): Cronbach's a ranging from 0.59-0.70 across various factors
Beck and Srivastava Stress Inventory: Cronbach's a ranging from 0.85-00.90 across various factors
The 'Ways of Coping Questionnaire': Cronbach's a ranging from 0.51-0.89 across various factors
Objective Performance Measures: not reported
The Maslach Burnout Inventory (2): Not reported
Systolic/Diastolic BP measurement: n/a
Perceived Stress Scale: Cronbach's a= 0.77 pre intervention and 0.80 post intervention
Depression, Anxiety and Stress Scale (2): Cronbach's a ranging from 0.72-0.81 across various factors
Mindfulness Attention Awareness Scale: Cronbach's a= 0.93
Profile of Mood States: not reported
The Life Experiences Survey: not reported
Stress Vulnerability Questionnaire: not reported
Demographic Questionnaire: n/a
Homework Questionnaire: not reported

Qualitative Instruments
 Semi- structured focus groups (2)
Diary entries (not reported)

This table highlights that many of the intervention studies in this review did not report the reliability and/or validity of instruments used for data collection.

Table 2.8 Summary of Literature Review 2

What is known about this topic
-several attempts at helping student nurses manage and reduce stress through the development of a variety of interventions have been successful

Most common **clinical** *stressors*
-coping with suffering
-coping with death/dying
-lack of knowledge and skills
-fear of making mistakes
-relationships with teachers, nurses, doctors

Gaps in the literature
-lack of mixed methods approaches
-lack of follow up in research design
-approaches to intervention delivery have remained relatively unchanged overtime and haven't utilized new technologies
-many approaches to intervention deliver require large time commitments that contribute to high attrition levels from the intervention itself

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2.11 Conclusion

This literature review of the stress management intervention literature highlights several important factors. First of all, many stress management programmes aimed at reducing stress in student nurses have been shown to be effective, however there are several methodological issues that need to be addressed in future research such as follow up testing and ensuring the sample size is adequate for statistically significant results and problems with participant attrition rates. It is suggested in the study to follow, that one way to address this issue is to utilize technology to deliver a stress management intervention, which would allow students to access the information confidentially and at their convenience instead of requiring a significant time commitment.

Furthermore, this review indicates that all nursing students, in particular first year students, have been shown to have increased stress levels, with both clinical placement stressors and academic stressors having a significant impact. This

further supports the development of a stress management intervention aimed at first year students during clinical placement using a mixed methods approach, as this will allow for new knowledge about stress interventions to be obtained via the data integration process. This review has also highlighted that further exploration into the topics of resilience an developing resilience of student nurses would be useful to further inform the design of this project's stress management intervention

2.12 Results of Search Three: Resilience and Interventions to build Resilience

The stress management and intervention literature, in the context of a student nursing population, suggests that personal resilience can have an impact on a student's ability to manage stress, which in turn can improve academic and clinical outcomes and student retention. Several recent reviews of the resilience literature in student nurses have been conducted (Reyes et al. 2015; Thomas & Revell 2016; McGowan & Murray 2016) and these reviews stress the importance of understanding resilience in nursing students due to high levels of stress, academic pressure, and the fact that nursing students are exposed to many 'firsts' in the clinical area; such as, their first interaction with patients and performing clinical skills.

Resilience is considered to be an important attribute in nursing and enables professionals to flourish and thrive in the midst of challenging work environments (Thomas & Revell 2016) and Reyes et al. (2015) review highlights the crucial role that resilience has in nursing education and how this can assist students during their clinical placements and future nursing careers. Stephens (2013) has provided concept clarification of resilience in relationship to student nurses and this will be used as a guide for reporting the results of this final literature review. The results of this final review will be reported in terms of the subsequent themes; concept clarification of resilience in nursing students, resilience in nursing education, resilience as a trait vs. process and strategies to promote resilience. Table 2.9 summarizes the studies identified in the third review.

Table 2.9 Summary of studies investigating resilience and resilience based interventions for nursing students

Author(s) and setting	Target Nursing students and sample size	Design	Data collection method or Instrument	Underlying Theory	Operational Definition of Resilience	Strengths & Limitations	Relevant Findings
Beauvais et al. (2014) USA	Undergraduate nursing students N=73 Graduates n=51	QN, descriptive correlational Describe relationship between emotional intelligence, psychological empowerment, resilience, spiritual well-being and academic success	Mayer-Salovey-Caruso Emotional Intelligence Test Spreitzer Psychological Empowerment Scale Wagnild & Young Resilience Scale Spiritual Well-Being Scale	Not specified	Not specified	Strengths: comparison of students and graduates, including several elements Limitations: Relatively small convenience sample. Participants enrolled at Catholic university which may influence generalizability of spiritual well-being scores	Combined sample found academic success was correlated with spiritual well-being, empowerment and resilience Significant relationship found between academic success and resilience in graduate nurses
Carroll (2011) USA (unpublished doctoral thesis)	Baccalaureate nursing students within 2 months of graduations n= 11	QL, phenomenological	Semi-structured interviews Reductionary coding process	Not specified	"resilience refers to the construct that the nursing student will be equipped with internal qualities and/or be supported by external forces that promote academic success in spite of stressful circumstances (pg. 13)'	Strengths: In depth analysis of role of resilience in nursing students Limitations: unpublished work, relatively small sample size, large amount of final themes (query more work in analysis to combine themes?)	Nine themes emerged from a reductionary coding process: support, perseverance, autonomy, empathy, high expectations, sense of purpose, optimism, honesty, and critical thinking

Author(s) and setting	Target Nursing students and sample size	Design	Data collection method or Instrument	Underlying Theory	Operational Definition of Resilience	Strengths & Limitations	Relevant Findings
Chen (2012) Taiwan	n/a	Theoretical	n/a	Problem Based Learning (PBL)	"resilience enables students who are from a disadvantaged background to successfully adapt to, mature and thrive in any situation; it also develops a capacity in them to rebound from adversity, conflict, failure or even positive events and to progress and take up increased responsibility(pg.231)"	n/a	PBL has potential to increase students' sense of responsibility and control over their own learning Allows students to build resilience by encouraging them to engage in self-reflection.
Crombie et al. (2013) UK	Second year nursing students (adult programme) n=28	QL, ethnographic case study Understand the factors that influence attrition and completion rates	Document review, non-participant observation, focus groups and interviews (thematic analysis)	Not specified	Not specified	Strengths: in –depth exploration of student experience Limitations: small sample size from one location	Factors found to impact retention were student identity & organization, fostering resilience and clinical support. Clinical placement experience emerged as most important factor
Delaney et al. (2016) USA	Junior nursing students n= 40	Explanatory sequential mixed methods design With follow up 4 months post intervention Pilot study aimed to evaluate the feasibility and efficacy of a stress management programme based on simulation	Perceived stress scale Brief Resilience Scale Self-Reported Knowledge NLN Student Satisfaction and Self-Confidence in Learning Scale GPA Attrition Rates Simulation Session Learning Outcomes Intervention session	Watson's (2008) theory of human caring	Not specified	Strengths: mixed methods design, follow up 4 months post intervention Limitations: small sample size from one location. Reported technical difficulties during one simulation session may have resulted in loss of student engagement	Evidence from mixed methods approach provide evidence that the intervention is highly feasible QN results showed no statistically significant differences between intervention and control group, although resilience showed a trend toward increasing in the intervention group

Author(s) and setting	Target Nursing students and sample size	Design	Data collection method or Instrument	Underlying Theory	Operational Definition of Resilience	Strengths & Limitations	Relevant Findings
Hodges et al. (2005) USA	n/a	Theoretical	n/a	Parse's human science theory, the Human Becoming School of Thought	"resilience consists of suffering and perseverance, working through emerging difficulties and integrating crisis experiences into ones' sense of well-being (pg. 550)"	n/a	Parse's framework provides a model of teaching-learning in undergraduate nursing education. It promotes professional resilience by purposefully engaging students in reflective practices to explore personal meanings from experiences and create strong personal identities.
Pines et al. (2012) USA	Baccalaureate nursing students n= 166	QN, descriptive, correlational Correlation of stress resiliency, psychological empowerment, selected demographics and conflict management styles	Stress Resiliency Profile Psychological Empowerment Instrument Conflict Mode Instrument Demographic inventory	Neuman Systems Model	"stress resiliency and psychological empowerment are human traits, combining to strengthen the capacity of an individual to response to stressors."	Strengths: use of theoretical framework, relatively large sample size with multifactor correlations Limitations: convenience sample limits generalizability	Empowerment scores were significantly correlated with stress resiliency scores
Pines et al. (2014) USA	Baccalaureate nursing students n= 60	QN, pre-test, post-test, quasi-experimental Intervention pilot study Determine whether nursing students who participate in simulated training exercises that manage disruptive behaviour of others have increased perceptions of resiliency, psychological empowerment, and conflict managing styles	Thomas-Kilmann Conflict Mode Instrument The Stress Resiliency Profile The Psychological Empowerment Instrument	Neuman Systems Model	"resiliency is the ability to bounce back. The personal attributes of resilient people include an internal locus of control, pro-social behaviour, empathy, positive self-image, optimism and the ability to organize daily responsibilities (pg. 1483)"	Strengths: theoretical framework, pre-test-post-test research design Limitations: small sample size for generalizability, intervention may require further repetitions in order to make an impact	Only one subscale of the resiliency scale (necessitating) was statistically significant after the intervention. A significant decrease in accommodating and an increase in compromising, as conflict management styles were found after the intervention

Author(s) and setting	Target Nursing students and sample size	Design	Data collection method or Instrument	Underlying Theory	Operational Definition of Resilience	Strengths & Limitations	Relevant Findings
Rios-Risquez et al. (2016) Spain	Nursing students in final academic year n=113	QN, descriptive, cross-sectional Examine relationship between resilience, academic burnout and psychological health	Connor-Davidson Resilience Scale Maslach Burnout Inventory Scale General Health Questionnaire	Not specified	"Resilience as a personal capacity to manage setbacks challenges and pressures effectively. That is a dynamic process that the individual as activate and that leads them to adapt and recover in adverse situations (pg. 431)"	Strengths: multifactor correlational study Limitations: low internal consistency obtained in subscale of academic efficacy Cross-sectional design restricts possibility of casual relationships between variables	Resilience was associated with lower levels of psychological discomfort and academic burnout
Smith & Yang (2017) China	1538 Chinese undergraduate nursing students	QN, cross-sectional Examine the relationship between stress and resilience on psychological well-being	Stress in Nursing Students Wagnild & Young Resilience Scale GHQ-12	Lazarus & Folkman (1984) Transactional Model of Stress and Coping	"In relation to the student nurse experience, resilience has been defined as the capacity to recover from extremes of trauma, deprivation, threat of stress pg. 91:	Strengths: Large sample size Limitations: convenience sample taken over a short period of time	Resilience Scale scores were negatively correlated with stress and psychological well-being
Stephens (2012) USA	Junior-level baccalaureate nursing students n=70	QN, experimental interventional Measured at 3 intervals Determine effectiveness of educational intervention delivered over Twitter to increase resilience	Perceived Stress Scale Sense of Support Scale Connor-Davidson Resilience Scale	Not specified	"process of adaptation to risk that incorporates personal characteristics, family and social support and community resources (pg. 3)"	Strengths: 2 locations, only intervention found to utilize new technologies, pre-test, post-test and follow up Limitations: interpretation of results is limited due to lack of research using this type of technology in this topic area.	Both intervention and control group showed decrease in perceived stress Initial increase in resilience found in the intervention group but this was not found at the follow up point. Survey of participants suggest intervention had been helpful

Author(s) and setting	Target Nursing students and sample size	Design	Data collection method or Instrument	Underlying Theory	Operational Definition of Resilience	Strengths & Limitations	Relevant Findings
Stephens (2013) USA	n/a	Concept Clarification	n/a	Norris Method of Concept Clarification (5 step)	"Nursing students' resilience is an individualized process of development that occurs through the use of personal protective facets to successfully navigate perceived stress and adversities. Cumulative success lead to enhanced coping/adaptive abilities and well-being (pg. 130)	Strengths: systematically conceptualizes unique phenomena and provides operational definition Limitations: despite clarification of this concept, the existing literature uses large variety of conceptualizations	Provides operational definition of resilience in nursing students and Nursing student Resilience Model as well as implications for nursing students and educators
Taylor & Reyes (2012) USA	Baccalaureate nursing students n= 136	QN, pre-test, post-test, quasi-experimental Conducted over 16 week period (1st week of term and final week of term)	Wagnild & Young Resilience Scale General Self-Efficacy Scale	Not specified	"Resilience in individuals has been defined as the ability to rise above difficult situations; adapt better than expected in the face of significant adversity; and recover from difficulty and overcome adverse circumstances in one's life (pg2)"	Strengths: pre-post-test design. Relatively large sample for this type of design in this topic area Limitations: conducted over a short period of time so may not reflect changes in self-efficacy and resilience over the entire programme Small number of students in 2nd year don't allow for analysis and interpretations to be made between different years of study	No significant difference in overall resilience score between the first and last week of the semester. Test scores weekly correlated with resiliency and self-efficacy

Author(s) and setting	Target Nursing students and sample size	Design	Data collection method or Instrument	Underlying Theory	Operational Definition of Resilience	Strengths & Limitations	Relevant Findings
Waddell et al. (2015) part I	Total n=72 (33 intervention group, 39 in control group)	Two part intervention study with 12 month follow up Mixed methods RCT design with repeated measures pre-test and post-test to evaluate Career Planning and Development Intervention	Part I: The Career Planning Activities Measure and the Career Decision-Making Self-Efficacy Scale Short Form), focus groups and telephone interview were used to assess the CPD intervention CPD was employed by a career coach and offered in workshop format 6 interventions in total)	Not specified	"defined as the capacity and confidence to capitalize on change and utilize professional knowledge, skills, and attitudes to create a work environment that is personally meaningful, productive, and satisfying (pg.164)"	Strengths: lengthy follow up period Limitations: small sample size in 12-month follow up. The use of different methodologies for each part of this study makes comparison of results difficult	Results of part I found that the intervention group reported higher perceived career resilience than the control group Results of part II reflected these findings and the intervention group (need graduates at the time of follow up) were able to sustain the skills they had gained in CPD
Waddell et al. (2015) part II	12 months post-graduation n=9 (5 intervention group, 4 control group)		Part II: Focus group and thematic analysis				
Williamson et al. (2013) UK	Staff n= Current third year students n= 8 Ex-student nurses n= 4	QL, Action Research To understand students' and staff concerns about programmes and placements as part of developing a retention strategy	Focus groups (face to face and virtual) Telephone interviews	Not specified	"Resilience has been identified as a complex characteristic of individuals encompassing the personal qualities that enable a person to thrive in the face of difficulty"	Strengths: results link to existing international literature in this area Limitations: small volunteer sample size from one university	Three themes: academic support, placement and mentors, stresses and the reality of nursing life Vocation, friendship and resilience instrumental in retaining students

2.13 Resilience in Nursing Students: a Concept Clarification

Stephens (2013) conducted a selective review of the resilience literature in nursing students and utilized the Norris method of concept clarification (Norris 1982) to analyse and clarify the concept of resilience. This allowed for the development of a definition of resilience in regards to the unique context and perspective of nursing students, this operational definition can be found in table 2.9, pg. 66.

Several elements are identified by Stephens (2013) as being common within definitions of resilience; such as, reference to a state of recovery, or return to a previous state after a time of stressful transition or an adverse event and Stephens (2013) highlights the agreement in the literature discussed in section 2.1.3 that resilience can be developed and enhanced at any time during a person's life and that resilience is an essential skill needed by nurses and nursing students to find meaning in their experiences, both positive and negative.

Stephens (2013) states that in order for resilience to occur, there must be a presence of perceived stress and/or adversity and describes student nurse resilience in terms of attributes and consequences. Attributes refer to characteristics commonly seen in individuals who identify as resilient; such as flexibility, strong social support system, effective coping, perseverance, and positive emotions. Stephens (2013) summarizes that there are two categories of attributes for the nursing student (a) personal characteristics (self-efficacy, humour, competence, positive emotions etc.) and (b) social support.

Consequences or results of developing resilience include effecting coping, positive adaptation, self-esteem, physical and mental health status, career success, confidence and sense of well-being and these illustrate the value of continued study of resilience in the student nursing population.

Through the Norris methods, two conclusions were drawn in regards to resilience in nursing students (Stephens 2013):

1) all nursing students are vulnerable to episodes of perceived adversity and stress

2) there are certain characteristics (both individual and sociocultural) that can be identified, enhanced, and/or developed in nursing students to assist them in the development and enhancement of resilience.

And Stephens further (2013) hypothesizes:

"as nursing students learn to identify, enhance, and/or develop their protective factors, they will be better equipped to effectively manage perceived adversity and stress. The cumulative success of these events will lead to increased resilience demonstrated by enhanced coping/adaptive abilities and well-being (pg. 130)"

Stephens (2013) work conceptualizes resilience in nursing students as essential and suggests that it is a personal trait which can be developed over time through processes This concept clarification of resilience in nursing students provides a valuable perspective in which to view the current literature and has been used as guide to discuss resilience in nursing education, factors affecting resilience and strategies to promote resilience.

2.14 Resilience in Nursing Education

Resilience in nursing education was highlighted as a theme from Reyes et al. (2015) review and there are several studies that suggest that resilience is a necessary factor in the academic lives of nursing students. These will be reported in terms of resilience and attrition, and resilience and academic performance.

2.14.1 Resilience and attrition

Crombie et al. (2013) qualitative ethnographic case study aimed to understand the factors that influence the attrition and completion rates of year two students in an adult nursing programme. Participants were self-selected (n=28) to take part in focus groups, interviews and observation in their practice settings. The themes from this study were: being a student nurse, student identity and the organization, fostering resilience, having your eye on the finishing line, support (or not) in clinical practice and the impact of mentorship. There was agreement in the

focus groups that social support was needed from peers and family as well having the end goal of a career in mind. However the major factor, which emerged from this study that impacted attrition, was the students' experience in the clinical setting.

Williamson et al. (2013) qualitative action research study used content analysis to analyse data from focus groups (face-to-face and virtual), and telephone interviews to understand students' and staff concerns about programmes and placements as part of developing retention strategies (n= 18, with six staff members, eight third year nursing students and four former students who left programme early).

The main themes were identified as academic support, placements and mentors, stresses and the reality of nursing life and dreams for a better programme. This study found that nursing staff often used the term 'resilience' to describe characteristics of students' personality that enabled them to face challenges, adapt and continue with their nursing programme.

Carroll's (2011) qualitative, phenomenological study was conducted to better understand the role of resiliency in promoting academic success and understanding student nurses' lived experience. A pilot study was conducted with three students and the interview protocol was revised. Eleven degree nursing students who scored highly on a Sense of Coherence Tool (Antonovsky 1987) and were doing well academically were interviewed, within two months of graduation, and a total of nine themes were identified from a reductionary coding process; support, perseverance, autonomy, empathy, optimism, high-expectations, sense of purpose, honesty, and critical thinking.

The impact of social support, both from mentors and university staff, and friends and family was highlighted by these three studies as an essential contributing factor to student nurses' resilience and decision to stay in their programme of study.

2.14.2 Academic performance

Taylor & Reyes (2012) used a quasi-experimental pre-test-post-test research design to explore self -efficacy and resilience in relation to test scores of

136 (response rate= 46%) baccalaureate nursing students over a sixteen-week semester. Data collection took place during week one and again during the final week of the semester. This study used the Resilience Scale (Wagnild & Young 1993) and the General Self-Efficacy Scale (Schwarzer & Jerusalem 1995). The findings of this study showed that although there was not significant differences found in perceived self-efficacy or resilience total scores between early semester and late semester there were in fact significant differences found on the resilience subscales of perseverance and existential aloneness. It was also found that test scores were weakly correlated with resilience and self-efficacy, suggesting that having increased resiliency and self-efficacy can positively impact academic performance (Taylor & Reyes 2012)

Rios-Risquez et al. (2016) descriptive cross-sectional study examined the relationships between resilience, academic burnout and psychological health in nursing students (n= 113, response rate 97.4%) assessed resilience with the Connor-Davidson Resilience Scale (Connor & Davidson 2003). Academic burnout was measured by using the Spanish version of the MBI-SS (Maslach Burnout Inventory Student Survey; Maslach & Jackson 1981). Psychological health was measured using the General Health Questionnaire (Goldberg et al. 1978). The results of this study found a significant correlation between resilience and academic burnout and between resilience and psychological health, with students who expressed higher levels of resilience less likely to experience academic burnout and showed fewer symptoms of psychological distress.

Beauvais et al. (2013) descriptive correlational study aimed at describing the relationship between emotional intelligence, psychological empowerment, resilience, spiritual well-being and academic success. A convenience sample of 244 undergraduate nursing students and 272 graduate nursing students from a university in New England was used, with an ultimate response rate of 24%. There were 123 total participants, 73 undergraduate students and 50 graduate students. The Spreitzer Psychological Empowerment Scale (Spreitzer 1995), the Resilience Scale (Wagnild & young 1993), the Spiritual Well-Being Scale (Paloutzian & Ellison

1982) and the Mayer-Salovey-Caruso Emotional Intelligence Test (Mayer et al. 2004) were used.

The results found that resilience was strongly related to academic success in graduate nursing students suggesting that individuals with high resilience show better academic performance and success. Furthermore, it was found that in the combined sample of undergraduate and graduate students, academic success was correlated with overall spiritual well-being, empowerment and resilience.

2.15 Factors Affecting Resilience

The literature highlights several factors that affect resilience in student nurses: correlation of resilience with empowerment, stress, resilience as a personal trait and/or a process and the impact of social support.

2.15.1 Empowerment

Pines et al. (2012) correlational study aimed to determine the relationships between stress resiliency, psychological empowerment and conflict management styles. One hundred and sixty six undergraduate nursing students participated in this study and the data collection instruments used were: the Stress Resiliency Profile (Thomas & Tymon 1992) the Psychological Empowerment Instrument (Spreitzer 1995), The Thomas-Kilmann Conflict Mode Instrument (Thomas & Kilmann 1974) and demographic data. The results of this study showed that empowerment scores were significantly correlated with resiliency scores and that as a group, participants in this study most often used avoiding and accommodating coping styles compared with competing and collaborating. The findings indicate that students could benefit from learning preventions techniques to better manage interpersonal conflict in the clinical setting or workplace.

2.15.2 Stress and resilience

Although most of the studies found in this literature review make reference to sources of stress that nursing students face, there was only one study identified

that attempted to correlate levels of perceived stress and resilience. Smith and Yang (2017) cross sectional study examined the relationship between stress and resilience on psychological well-being in a cohort of Chinese undergraduate nursing students (n=1538). Instruments used for data collection were the Stress In Nursing Student –Chinese Version (Liu et al. 2015), General Health Questionnaire (Goldberg 1978) and the Resilience Scale (Wagnild & Young 1993). This study found that students in their final year report the highest levels of perceived stress and moderate levels of resilience were found across all four years of the nursing programme. Resilience scores were negatively correlated with total perceived stress scores, where an increase in resilience score resulted in a decrease in total perceived stress scores. Furthermore, total perceived stress scores were negatively correlated with psychological well-being, meaning that increases in total perceived stress scores resulted in a decrease in psychological well-being.

2.15.3 Resilience as a trait vs. process

Resilience as a trait

The literature tends to describe resilience as a character trait (Pines et al. 2012, 2014, Williamson 2013, Waddell et al part 1. 2015, and Carroll 2011). Pines et al. (2012) describe stress resiliency as a human trait, which in combination with empowerment can improve an individual's response to stressors. They further describe personal attributes of resilient people to include: internal locus of control, pro-social behaviour, empathy, positive self-image, optimism, and the ability to organize daily responsibilities (McAllister & McKinnon 2009). Waddell et al. part 1(2015) focus on career resilience as having confidence in one's own ability to capitalize and influence personal knowledge, skills and attitudes. They further state that development of this is essential for nurses to effectively respond to and influence their work environment. Williamson et al. (2013) study highlights nurse educators view of their nursing students, and found that resilience is often used to describe the personal characteristics of successful nursing students and Carroll

(2011) suggests that their research findings support that personal resilience is based on individual characteristics.

Resilience as a process

Several studies present resilience is a process rather than a personality trait. Stephens (2012) intervention study suggests that resilience as a process and this is further supported by Stephens (2013) concept clarification, which is based on the idea that resilience is a dynamic process that can be learned and taught. Hodges et al. (2005) states that there is no final endpoint in resilience in nursing practice and that instead, resilience should be thought of as an ongoing process of struggling and overcoming hardship. Rios-Risquez et al. (2016) go on to describe resilience as both a trait and process by stating that resilience is a person's capacity to manage challenge and pressures however doing so is a changing and dynamic process that individuals choose to participate in.

2.15.4 Social support

Crombie et al. (2013) ethnographic study found that there was agreement in their focus group sessions regarding the importance of support from friends and family in terms of fostering resilience throughout difficult times in their nursing course. Caroll (2011) qualitative study found that social support featured as a key theme and both of these studies (Crombie 2013 & Caroll 2011) found that peer support from other nursing students was important as well as support from faculty members. These two qualitative studies found that family, peer and faculty support impact resilience however quantitative work has not been done to correlate resilience with these factors. Furthermore, Williamson et al. (2013) states that resilience can be learned and can be strengthened by family bonds and social support systems and further suggest that resilient individuals actively seek the support of others. Thus highlighting the importance of caring relationships on an individuals' resilience but also implying that those individuals who are already

resilient further foster this behaviour by seeking and maintaining these relationships.

2.16 Strategies to Promote Resilience: Theoretical and Interventional

The literature review of resilience in student nurses highlighted that there has been recent efforts to develop and improve nursing students' levels of resilience through several types of interventions. Hodges et al. (2005) and Chen (2012) provide theoretical support for the use of resilience in nursing education and further development of interventions based at increasing resilience of student nurses. Several interventions have been designed to improved resilience in student nurses are discussed in this literature review according to the type of intervention: scenario simulation, online and career planning and development programme.

2.16.1 Theoretical: personal reflection and resilience

Hodges et al. 2005 paper uses Parse's Human Becoming Theory (Parse 1981) as a framework for developing professional resilience in undergraduate nursing education by engaging students in intentional reflective practices. Hodges et al. (2005) suggest that a teaching model based on Parse's work can provide a framework for purposefully involving student nurses in a model of learning in which resilience and professional stamina are expected learning outcomes. Hodges et al. (2005) states that the challenge is for nurse educators to recognize their role in supporting students and that they can promote resilience by intentionally engaging students to explore personal meanings from their experiences and to create strong professional identities. Hodges et al. (2015) suggests that introducing students to a teaching-learning model that aims to develop resilience prior to and during challenging experience can improve student's ability to persevere. They further state that it is crucial for nurse educators to help students focus not on what they have done wrong, but what they have done right and more importantly, focusing on reflection and what can be learned from and changed (Hodges et al. 2015).

Chen's (2012) report suggests that student nurses can build resilience from problem-based learning and that educators should encourage students to build resilience through engagement in self-reflection. Chen (2012) states that problem-based learning (PBL) is one of the "environmental catalysts of resilience" and that problem-based learning allows students to develop a deeper understanding of a topic through involvement.

Chen (2012) describes PBL as a learning environment in which students are immersed in a practical activity where they participate in giving and receiving constructive feedback, guidance and support. Chen (2012) outlines several environmental factors for development of resilience, with educators providing support and exposure to group work cited as helping students learn life skills which in turn can help develop crucial resilience traits. Chen (2012) continues by stressing that PBL teaches students how to work with others by setting and achieving goals and success in doing so helps to foster key elements of resilience such as confidence and self-reliance. Furthermore, being able to function effectively in groups involves organization, distribution of responsibility and tasks and this can develop students' confidence and leadership skills (Chen 2012).

Although these two articles take different approaches to investigating the development of resilience in student nurses, both theoretical standpoints emphasise the importance of reflective practice and the impact that this has on the development of personal and professional resilience in student nurses.

2.16.2 Types of intervention design

Scenario simulation

Pines et al. (2014) conducted a pilot study with a quasi-experimental design to determine whether nursing students who participated in simulated training exercise aimed at improving management of intimidating and disruptive behaviour had increased perceptions of resiliency, psychological empowerment, and conflict management styles. This study used a convenience sample from two cohorts of nursing students in their second year of study, one group enrolled in 2010 and the

next group in 2011, with a total of 60 participants. The pilot project provided simulated training using a variety of scenarios for learning resiliency skills, enhancing perceptions of empowerment and increasing knowledge of personal styles of conflict management.

The course content consisted of four modules conducted over two consecutive semesters of course work and was based on the Reaching Out and Reaching In curriculum which is based on the PENN resiliency programme and TeamSTEPPS (Pines et al. 2014). Modules focused on principles of resilience, behaviours of resilient nurses, engaging students in professional empowerment, advantages and disadvantages of various conflict management styles. These were presented in class-room sessions with each module ranging from two weekly, three-hour class periods (module one), to five-one and half hour class periods for module three, and one three-hour class period for module four (Length of module two was unspecified).

Three instruments were used to collect data prior to the intervention and after the intervention had been completed. These were: the Thomas-Kilmann Conflict Mode Instrument (Thomas & Kilmann 1974), which assesses personal behaviour in regards to assertiveness and cooperativeness, the Stress-Resiliency Profile (Thomas & Tymon 1992) focuses on the development of effective mental habits for coping with stressors and the Psychological Empowerment Instrument (Spreitzer 1995) assesses motivational constructs of meaning, competence, self-determination and impact.

This study found little to no significant changes in empowerment and stress resiliency in nursing students after training. However Pines et al. (2014) state that integration of conflict resolution skills throughout the curriculum, with repeated opportunities to practice conflict management styles in relevant scenarios may be beneficial to students.

Delaney et al (2015) explanatory sequential mixed methods design was used in a pilot study aimed to evaluate the feasibility and potential efficacy of an innovative stress management programme in two undergraduate nursing programmes (total n= 37 with intervention n=19 and control n=18) named NURSE

(Nurture nurse, Use resources, foster Resilience, Stress and Environment management) that assist nursing students to develop stress management plans.

Development of the intervention was based on Watson's et al. (2008) theory of human caring and was based on evidence using an innovative combination of strategies applied successfully in previous studies. Each NURSE intervention session was presented in two, two and a half-hour sessions in simulation laboratories. The five-hour training programme combined a pre-brief, simulation and debrief.

This study was conducted in two phases (QN and QL). The QN strand was conducted with a two-sample randomized pilot design. Data were collected through the Perceived Stress Scale (Cohen et al. 1983), the Brief Resilience Scale (Smith et al. 2008), Self-Reported Knowledge and the NLN Student Satisfaction and Self-Confidence in Learning Scale and Simulated Session Learning Outcomes (Jeffries & Rizzolo 2006), GPA and attrition rates immediately following the NURSE Intervention and four months following the intervention. In the QL strand, data were obtained through student interviews four months following the intervention. QN and QL data were collected and analysed separately and later integrated during data interpretation.

QN findings show no significant differences between intervention group and control group in psychological outcomes of perceived stress and resilience immediately following the intervention and four-month post intervention. Resilience, although not statistically significant, showed a trend toward increasing in the intervention group students over the course of the study when compared to the control group.

QL interview findings (n=7) were from a purposive sample of students who took part in the NURSE intervention resulted in five themes; Stress and Out of Balance, Remembering to Hit the Pause Button, Individualizing Strategies and Techniques, the Power of Group Sharing and Integrating New Ways of Doing and Being.

The results of integrated findings of this study provided evidence that a stress management educational programme using simulation is highly feasible and

acceptable within this population of students, and identified areas for refining and strengthening the intervention in preparation for the next phase.

Online: Twitter

Stephens (2012) multisite experimental repeated measured intervention study was designed to determine the effectiveness of an educational intervention delivered via Twitter to increase resilience and sense of support, as well as decrease perceived stress, and to describe the personal characteristics of the nursing students participating in the study, in a sample of adolescent baccalaureate nursing students. Participants were a sample of 70 randomly assigned junior-level baccalaureate nursing students, ages 19-23, at two university locations. Three instruments were used in this study: the Perceived Stress Scale (Cohen et al. 1983), Sense of Support Scale (Dolbier & Stienhardt 2000), and Connor-Davidson Resilience Scale (Connor & Davidson 2003) at three times of measurement.

Students in the experimental group received four educational messages and/or questions (tweets) each week that were designed to promote resilience. Students in the attention placebo control group received four tweets that mimicked the time and attention given to the experimental group without intended effect. These tweets consisted of nursing trivia or questions related to basic nursing knowledge. Tweets to the control group were designed to mimic the style of those sent to the experimental group (e.g. questions or statements). Tweets were sent on varying days of the week and at varying times to avoid a predictable schedule and participants could chose whether to respond or not to any tweets.

The results of this study revealed that both groups showed a decrease in perceived stress, and no statistically significant difference was detected between groups in regards to sense of support. There was an initial increase found in the intervention group in regards to resilience from pre-test to post-test but this was no longer found during the follow up data. However, an email survey provided encouraging information from students to suggest that the intervention had been helpful.

Integration of career planning and development programme

Waddell et al. part I & II (2015) used a mixed methods randomized control trial design with repeated measures at pre- and post-test to evaluate a CPD (Career Planning and Development) intervention with nursing students.

In part I of this study, 120 students in their first year in the programme consented (cohort 1) however due to attrition in year two of the programme, a second recruitment phase was undertaken in year two (cohort two). A final sample size for QN analysis was 50 participants from cohort 1 (Intervention =29, control =21) and 22 participants from cohort two (intervention =4, control= 18) for a total of 72 participants, 33 in the intervention group and 39 in the control group.

As well as quantitative measures (The Career Planning Activities Measure (McGillis Hall et al. 2004) and the Career Decision-Making Self-Efficacy Scale Short Form (Taylor & Betz 1983)), focus groups and telephone interview were used to assess the CPD intervention. The CPD programme was employed as an intervention and was conducted by an experienced career coach who introduced the intervention group participants to the CPD Model in a three-hour workshop in the first term of Year Two (of a four year programme). Following that introduction, the programme included one, three hour, year-specific intervention workshop at the beginning of each academic term in programme years two- four for a total of six intervention sessions (eighteen hours). The control group did not receive the CPD intervention during the four years of their academic programme but were offered it, along with individual career coaching, after the twelve-month follow up. Results of this study found that the intervention group reported higher perceived career resilience than the control group and recognized the value of a CPD programme.

The second part of this study was to report the follow up results for new graduate nurses twelve months post-graduation, with both an intervention group that had completed the CPD intervention and a control group. There were nine participants, five who had been in the intervention group and four in the control group. A focus group was used to collect data and thematic analysis was conducted. The results for the intervention group were: seeking support with a reciprocal

relationship, taking strategic proactive approach and actively seeking out opportunities. The control group themes were: looking to others for support, focusing on career development specific to job requirements, and taking a reactive approach to CPD. The longitudinal follow-up reflected earlier findings from the overall study in that new graduate nurses from the intervention group were able to sustain and adapt the CPD attitudes and skills they had gained as students.

2.17 Discussion and Critical Overview

2.17.1 Context

This review highlights that most of the recent studies have been conducted in North America (10/15) and primarily in the United States (9/15). Two studies were found in the UK, one from Spain, one from China and one from Taiwan. There were no studies found that used a cross-cultural comparison and this is an area that could be utilized to enhance globalization of findings of the concept of resilience in nursing students. As most of these studies have a North American context, there will be some differences expected in nursing student's experiences as nursing programmes in North America will have variations to those in the UK. Further research into resilience in UK nursing students is needed to determine the role of resilience in a UK context.

Table 2.10 Location of Studies

USA (9) Delaney et al. (2016), Beauvais et al. (2013), Carroll (2011), Hodges et al. (2005), Pines et al. (2012), Pines et al. (2014), Stephens (2012), Stephens (2013), Taylor & Reyes (2012) **UK (2)** Crombie et al. (2013), Williamson et al. (2013) **Canada (1)** Waddell et al. (2015) **Spain (1)** Rios-Risquez (2016) **China (1)** Smith & Yang (2017) **Taiwan (1)** Chen (2011)

2.17.2 Methodological considerations

Types of study

Most studies used a quantitative approach (9/15), with a variety of study design including: descriptive cross-sectional, correlation, pre-test and post-test. Three studies use qualitative methods and two of the intervention studies employed mixed methods approaches. Several of the QN studies used similar approaches to correlate several elements, by using a variety of instruments, such as resilience, empowerment, academic performance and psychological well-being (Table 2.11) and one study used Action research (Williamson et al. 2013).

Two articles found were aimed at understanding theoretical underpinnings of resilience (Hodges et al. 2005; Chen 2012) in nursing students which agreed on the importance of engaging in reflective practices to build resilience and one article based on concept clarification of resilience in nursing students (Stephens 2013). Only three of the articles chosen for this review outline a theoretical framework (Pines et al. 2012; 2014 and Delaney et al. 2015) and the rest of the articles did not specify a theoretical perspective or framework. Each article found used a different operational definition of resilience (Table 2.9) and despite Stephens (2013) work to clarify this concept, a definition for resilience in nursing students has not yet been agreed upon.

The intervention studies, with the exception of Stephens (2012) used classroom or workshop style designs when implementing their interventions, an issue which was highlighted in the stress management intervention literature. These methods of implementation require large time commitments from students as well as trained professionals to conduct the sessions, which can assumed to be costly although these costs are not reported in the current literature. Stephens (2012) was the online intervention found to utilize online methods of implementation, which supports the need for further development and research of portable, accessible intervention methods. However, compared to the stress reduction intervention literature, the interventions highlighted in the third review did employ follow-ups in

their methodology at various intervals, which shows an attempt to strengthen the research design of these studies.

Again, as discussed in regards to the methods used in review 1 and 2, there is a lack of mixed methods approaches used in this topic area therefore identifying another gap in the current literature. Much of the current research has focused on correlation of other personal characteristics, or academic performance and correlations with resilience, without further investigation into these results by using QL methods.

Furthermore, there was only one study found that focused on the correlation of stress and resilience (Smith & Yang 2017) suggesting that this is an area in need of further exploration in a nursing student context. None of the studies found focused on nursing students in their first clinical placement, which is a notable gap in the knowledge base.

Sample size and response rate

Sample size and nature varied largely in the studies found, ranging from 11-1538, with most studies using convenience samples. This suggests that the generalizability of some of the findings may be limited in those studies with small sample sizes, however; some of the studies with small sample sizes were qualitative in nature and provide in-depth exploration of phenomena as can be seen in Table 2.9. Response rates were also found to be highly variable ranging from 24% (Beauvais et al. (2014) and 97.4% (Rios-Risquez et al. 2016)

Instruments & measurements

It can be seen in table 2.11 that a wide variety of instruments and measurements were used, and many studies employed several instruments at once for correlation purposes Reliability and/or validity were reported for instrument use for all instruments used.

Table 2.11 Instrumentation and Reported Reliability and Validity

Quantitative

Thomas-Kilmann Conflict Mode Instrument (2): Reliability and validity reported in numerous studies, and reported test-retest and internal consistency ranging from 0.61-0.68
The Stress Resiliency Profile (2): Internal consistency with Cronbach's α ranging from 0.70-0.84 across subscales.
Perceived Stress Scale: Reliability and Validity has been reported in numerous studies
Brief Resilience Scale: Internal consistency with Cronbach's α ranged from 0.80-0.91
NLN student satisfaction & self-confidence in learning scale: Reliability using **Cronbach's** α= 0.83 and 0.92 for two factors.
Self-Reported Knowledge: internal consistency with Cronbach's α = 0.86
Simulation Session Learning Outcomes: reliability and consistency between sessions obtained by conducting mock sessions at 2 locations
Grade Point Average: n/a
Attrition rates: n/a
Mayer-Salovey-Caruso Emotional Intelligence Test: Deemed to have face validity and split half reliability coefficient of r= 0.91
Stress in Nursing Students (Chinese)
Spreitzer Psychological Empowerment Scale (3): Reliability and validity have been reported in numerous studies. Internal consistency reported ranged from Cronbach's α 0.77-0.83 across various subscales
Wagnild and Young Resilience Scale (3): Content and construct validity have been verified in numerous studies, reliability α coefficient reported ranged from 0.85-0.94
General Self-Efficacy Scale (1): Cronbach's α reported ranged from 0.76-0.90
The Spiritual Well-Being Scale: Deemed to have face validity and reliability α coefficient ranging from 0.73-0.99 across various factors
Connor-Davidson Resilience Scale: Internal consistency, Cronbach's α= 0.85
Maslach Burnout Inventory Student Survey: Internal consistency, Cronbach's α ranged from 0.55-0.90 across various factors
General Health Questionnaire (2): Internal consistency, Cronbach's α= 0.93
Sense of Support Scale: Internal consistency, Cronbach's α ranged from 0.65-0.95 across various factors

Qualitative
Focus groups (3)
Interviews (4)
Telephone Interviews (1)
Participant observation (1)

This table highlights that all the studies used in the third review reported reliability and/or validity of the instruments used.

Table 2.12 Summary of Literature Review 3

What is already known about this topic?
- Resilience is a trait/process that can be developed in nursing students
- Increased resilience could have multitude of positive impacts including increased retention, better academic performance and decrease in levels of stress.
- Interventions aimed to improve resilience have shown some success but further research in this area is needed

Gaps in the Literature
- Few studies have used mixed methods approaches, resulting in a focus on correlations with resilience but a lack of understanding of the student experience
- Interventions are mainly based on classroom sessions or workshops, which highlights a similar finding of the stress management intervention literature and have implications for retention of participants.
- No studies focused on resilience of nursing students in the first clinical placement, where logically students may be anticipated to experience increased levels of stress

Implications
- Further research into the correlations of levels of stress and resilience are needed in a student nursing population
- There is support for further research and development of resilience based interventions for nursing students
- Interventions which focus on accessibility, portability, and autonomy are needed

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In order to look across the findings from each literature review, Table 2.13 was created to merge and summarize the key findings from each:

Table 2.13 Combination summary of Literature Review 1, 2 & 3

What is already known about this topic?
- Student nurses from all years perceive clinical placement as stressful, Addressing this issue during the first year could help student develop strategies to cope throughout their education
- Resilience can be developed and this can contribute to the overall student experience and improve retention, academic performance and stress levels

Gaps in the literature/ What does this literature review add?
- Students in their initial clinical placement can be particularly vulnerable to the effects of stress
- Resilience is important for managing stress but these two concepts have been infrequently linked in a nursing student population
- most studies used quantitative approach, resulting in potential missed opportunity for in-depth understanding of topic
- inconsistencies regarding what causes more stress, academic vs. clinical, however aspects of stress during clinical placement are well researched and proven to cause increased stress in student nurses
- Some success with both stress management and resilience intervention, however, most interventions require time commitments that many students find inconvenient which contributes to high dropout rates and only one intervention was found to utilize accessible technology
- Cost of design and implementation of interventions are not clarified in the literature.
- Follow up of intervention sustainability remains problematic in research design, and therefore once the intervention is finished there is no further support for students
- Using a mixed methods design to incorporate qualitative data will address the lack of in-depth investigation of these topics
- No studies have utilized nursing students during their first clinical placement as a population when investigating stress and resilience.

What are the implications of this literature review?
- Correlation of resilience and stress in first year nursing students during clinical placement requires further study
- Development and implementation of stress management and reduction intervention is required
- Interventions should be developed with cost effectiveness in mind and should provide accessible, convenient and confidential support
- A mixed-methods approach would be beneficial
- Further inventories of sources of stress are not required at this time as this area has been well researched

2.18 Conclusion

This final literature review highlights that encouraging and developing resilience in nursing students is has several implications. It has been shown to improve the overall student experience as well as academic performance and importantly contributes to retention of students. There is support from the literature that nursing educators can play a role in promoting resilience in nursing students and the results from the intervention studies further support the need for future research and development of interventions to promote resilience and manage stress in nursing students.

2.19 Expected Contribution to Knowledge following the Initial Review of Literature

This study is expected to contribute to the current knowledge identified in the literature review in several ways. By addressing the gaps identified in the literature, the use of a mixed methods approach will allow this study to provide in-depth discussion regarding students' experience and relationship between stress and resilience during their initial clinical placements, a perspective that is limited in the current literature.

This study will attempt to utilize technology that is current and not previously used in this area of research before by developing a stress management app delivered by smartphone. The research aims at this point are to investigate student nurses' experience of using this app and qualitative data will provide further understanding of why or why/not this tool was found useful to students.

Overall, this will allow for a unique perspective and knowledge to be gained regarding student nurses experiences of stress, resilience and use of a stress management app during their first clinical placement. The theoretical underpinnings, development of the stress management app and study design will be discussed in the next chapter

Chapter 3: Methodology

3.0 Introduction

It is known that student nurses experience high levels of stress especially during clinical placement and this has been related to burnout, high attrition rates and poor academic success (Evans 2001, Deary et al. 2003, Aiken et al. 2001 & Struthers et al. 2000). Furthermore, the initial clinical experience has been reported as a cause of high levels of perceived stress (Sheu et al. 2002, McKenna & Plummer 2012 and Karabacak et al. 2012). The literature review presented in Chapter 2, highlights the potential impact that personal resilience can have on nursing student's ability to manage stress, as well as improve retention and academic performance (Taylor & Reyes 2012; Reyes et al. 2015; Thomas & Revell 2016)

Therefore, it is argued that students taking part in their first clinical placement as well as those students further along in their education would benefit from stress management and resilience building support, as personal resilience has been cited as playing an important role in nurse's ability to cope with challenges in the clinical setting (Jackson et al. 2007). As reported in the literature review in the previous chapter, there have been limited stress management interventions targeting students at times when they are experiencing increased stress thus calling for further research into the development and implementation of stress management interventions.

The development of a stress management tool delivered by smartphone app is well supported as the use of smartphones in daily life has become essential, especially to those of student age (Donker et al. 2013) and the demand for mental health apps is strong, with one study concluding that 76% (n=399) of 525 respondents would be interested in using their mobile phone for self-management and self-monitoring (Proudfoot et al. 2010).

The literature review also highlights the absence of using a mixed methods approach in this topic area and it is argued that this can help provide a more in-depth investigation into the phenomena of stress, resilience and stress management for first year nursing students during their first clinical placement.

This chapter will outline the theoretical foundations used to guide the design of this study, illustrated in fig 3.3, as well as how these frameworks were applied in the development of the stress management tool. The mixed methods research design will be discussed in depth along with ethical issues and limitations.

3.1 Theoretical Foundations

3.1.1 Transactional Model of Stress and Coping

The Transactional Model of Stress and Coping (Lazarus & Folkman 1984), is a framework for evaluating processes of coping and stressful events and is often used a framework for research in this topic area (Jimenez et al. 2009, Gorostidi et al. 2007, Sheu et al. 2002, Gibbons et al. 2010, Chen & Hung 2014, McKenna & Plummer 2013), and has been used as the overarching guiding framework for this study as illustrated in fig. 3.3 (pg.122). Glanz et al. (2006) define this model as follows:

"Stressful experiences are construed as person-environment transactions, in which the impact of an external stressor, or demand, is mediated by the person's appraisal of the stressor and the psychological, social and cultural resources at his or her disposal. When faced with a stressor, a person evaluates potential threats or harms (primary appraisal), as well as his or her ability to alter the situation and manage negative emotional reactions (secondary appraisal) Actual coping efforts, aimed at problem management and emotional regulation, give rise to outcomes of the coping process." (pg. 213)

Fig 3.0 Transactional Model of Stress and Coping (taken from Glanz et al. 2006)
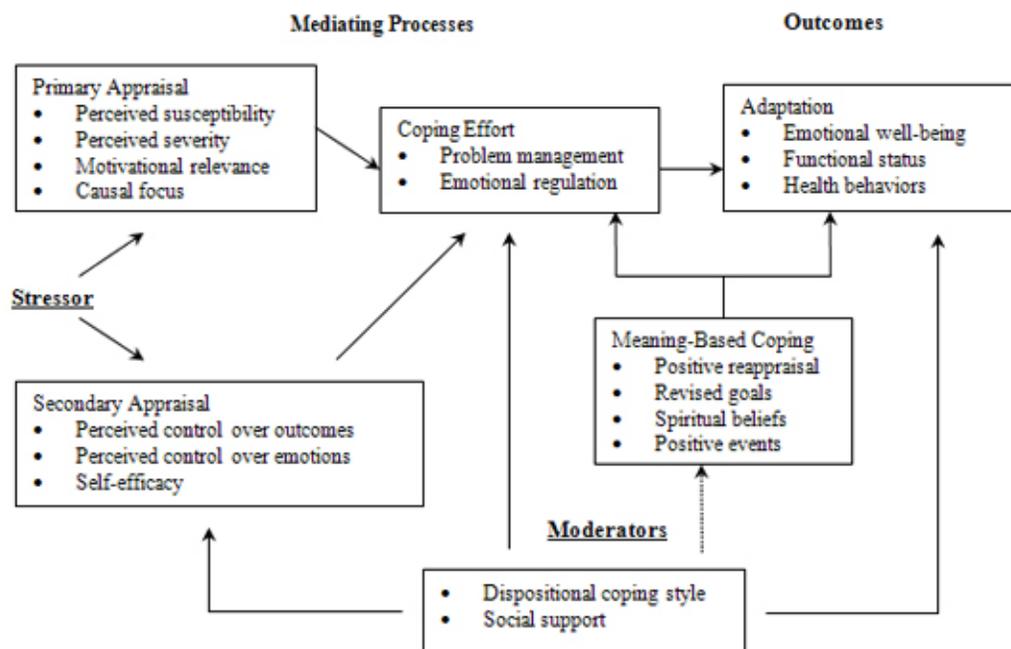
Glanz et al. (2006) identify the use of the Transactional Model of Stress and Coping (Lazarus & Folkman 1984) in developing and designing interventions as a gap in the research and suggest that using the transactional model of stress and coping can help provide useful information when designing interventions. They suggest that because responses to perceived threats are largely influenced by the individuals' interpretations, an improved understanding of individuals' primary and secondary appraisals and coping strategies can help inform what can improve or impede stress management (Glanz et al. 2006). This supports incorporating coping skills training techniques into both the mobile stress management tool designed for this study, as well as future standardized interventions for managing stress.

Another implication for this model is using it to focus on dispositional coping styles (Glanz et al. 2006). Coping strategies are most likely to be advantageous when they fit the individual's need in regards to information, control and optimism (Glanz et

al. 2006). It is suggested by Glanz et al. (2006) that incorporating an assessment of individual coping styles will help to tailor these stress management strategies to meet the individual's needs, which can be most effective for improving coping, reducing stress and improving health behaviours. In the current study, individual coping style assessment was not obtained, however, it is arguable that the use of a mobile stress management tool can help students evaluate their stress (primary appraisal) and provide accessible information (secondary appraisal) which will appeal to individual who use information seeking as a coping style.

It was found in the literature review that there have been few mixed methods approaches used in studying this topic area. There has been a notable focus on using quantitative approaches (Burnard et al. 2008, Jimenez et al. 2009, Edwards et al. 2010, Shaban et al. 2012, Karabacak et al. 2012, Blomberg et al. 2014, Gibbons et al. 2010 and Chen & Hung 2014), which have resulted in a focus on the sources and causes of stress in nursing students, but consequently there is a lack of understanding of the student experiences with stress while on clinical placement. Furthermore, this study aimed to understand student's specific experience of using the stress management tool, which required qualitative research methods.

The Transactional Model of Stress and Coping framework (Lazarus & Folkman 1984) provides a guide for the design of this study in investigating both the causes of stress (primary appraisal: QN methods) as well as reactions to stress and coping (secondary appraisal: QL methods). Furthermore, this framework supports the development of the stress management tool for this study, which directly addresses a gap in the knowledge. Under the transactional model of stress and coping, Sharples' theory of mobile learning (Sharples et al. 2006) was also used to support the mixed methods research design as well as the development of the C-SMARTT app. The Medical Research Council (MRC) framework for developing and evaluating complex interventions (Craig et al. 2008) was initially used to help inform the design of the C-SMARTT App, however as the app is not a complex intervention, detail on how this was utilized can be found in Appendix (S).

3.1.2 Sharples Theory of Mobile Learning

Sharples et al. (2006) theory of mobile learning was developed to inform and support the design of new environments and technologies to support mobile learning and is guiding by several assumptions. Firstly, learners are on the move and that focusing on the mobility of the learner/learning it is possible to better understand how knowledge and skills can be transferred across context and this is particularly applicable to student nurses on clinical placement (Sharples et al. 2006). The second assumption is that a substantial amount of learning takes place outside the classroom environment as it is becoming more common for students to structure their learning around their daily activities and responsibilities (Sharples et al. 2006). The third assumption assumes that effective learning practices are utilized by learners and lastly, there is an assumption that there is an abundant use of personal technology and that learners will have access (Sharples et al. 2006)

There are several important elements of Sharples et al. (2006) theory that are particularly influential to this study; (1) that learning is interwoven with other activities as a part of everyday life and (2) that mobile learning can both complement and conflict with the formal education. This suggests that learning cannot be easily separated from everyday life, and this is both true in terms of the learning that occurs on clinical placement as well as how modern students use technology in a variety of ways including education. However, though mobile learning can offer accessibility this may also lead to conflicts as students may be distracted by mobile devices for personal use, which must be taken into account when encouraging the use of mobile devices in learning.

Sharples et al. (2006) continue by describing their theory of mobile learning in terms of control, context and communication. Control refers to the control of learning, and how technology can assist the way in which learning is delivered, the access of material and the style of interaction (Sharples et al. 2006) Context refers to the change in learning environments which occurs with mobile learning, from a traditional classroom in a fixed location to the adaptable and mobile learning environment that can occur when using mobile technologies (Sharples et al. 2006). Lastly,

communication which refers to how the learners adapt their communication and learning based on how they use technology and thus becoming familiar with the technology may lead to new ways of interacting and communicating with it (Sharples et al. 2006).

These assumptions and theoretical elements of mobile learning have been taken into account and have been used in combination with the Transactional Model of Stress and Coping (Lazarus & Folkman 1984) to provide a theoretical base for the development of the mobile stress management tool in this study, which has implications for transferability and the replicability of this study are supported.

3.2 Mobile Stress Management tool Development

The stress management tool developed for this study is called C-SMARTT and stands for Clinical Stress Management and Resilience Tips and Techniques. The C-SMARTT App is a tool that has been developed as part of this study in order to provide nursing students accessible information on stress and resilience in relation to clinical practice. The use of an app was chosen in response to the literature review in Chapter 2 of interventions used for stress management and resilience, which has shown that there is a lack of utilization of modern technology, especially in regards to the use of mobile phones in delivering this type of information and intervention.

3.2.1 Background of mobile technology in clinical nursing education

It has been reported that 90% of 16-24 year olds own a smartphone and these have become integrated into personal, social and occupational routines (Ofcom 2017) and it is suggested that average use is nearly two hours a day (Ofcom 2017). Donker et al. (2013), suggests that this high level of use, of up to 150 times a day for average users reflects how smartphone apps can maintain strong habits and are even capable of implementing behaviour change. Furthermore, as smartphones are not constrained by geography and are privately used, apps developed for smartphone use can be flexible and confidential in their use (Donker et al. 2013).

It is argued that the use of technology in nursing education is already happening, with most students having access to smartphones and therefore internet access which allows them to search for topics at the touch of a button. A review of the literature conducted by O'Connor and Andrews (2015) has identified that use of mobile technologies in nursing education, specifically in the clinical setting is becoming more apparent. However, out of the 24 studies they identified, all use PDAs (personal digital assistants) and only two use other methods, namely iPod and a tablet computer. It is argued that this highlights that current methods of using mobile technology to deliver information are behind the technology that is available. The use of PDAs is not accessible for students, as they would need to be supplied by the university at a large cost. Instead, mobile technologies should be focused on utilizing a tool that most students already own and carry with them: a smartphone.

When the initial literature review for this study was conducted, no studies were found to have used either a smartphone as a method of delivery or an app designed specifically for students. However, O'Connor & Andrews (2015) review identifies several studies that report a lack of computer knowledge and access as problems for students. It is argued that these issues could be easily avoided if the information was delivered via smartphone and that expecting either students or universities to provide a tablet or other form of PDA is unrealistic and thus unsupportive of using technology as a tool in nursing education, especially while on clinical placement. This is a large gap in the knowledge as well as an untapped resource for the design of an educational tool that students could have access to on clinical placement that would be of no cost to students and limited cost to universities once the design of the app has been completed.

Interestingly, O'Connor & Andrews (2015) review did uncover four studies which noted a reduction in stress which is especially pertinent as well as several other notable benefits such as, enhanced clinical learning and knowledge retention, improving decision-making capacity and increased confidence. Unfortunately, only two of these studies were accessible. Jamieson et al. (2007) did report a decrease in Clinical Information Stress (CIS) within their intervention group; however also suggest that having to learn how to use the PDA may have contributed to an increase in CIS pre-test. Secco et al. (2010) reported a decrease in stress among students using the PDA as a

result of having information quickly available. The benefit of having access to information was found to be increasingly important for students on community placement where there was no computer access, further supporting that the use of mobile phones as a method of information delivery addresses a gap in the current research.

3.3 Design and Development Process of the C-SMARTT App

The design process of the C-SMARTT app began by examining the literature review and summarizing the top 5 causes of stress for student nurses. The results of this were: (1) clinical skill development, (2) the theory-practice gap, (3) time management & work overload, (4) relationships with mentors & co-workers and (5) caring for suffering and/or dying patients. Then the literature was further investigated for tips and techniques that have been successfully used to reduce stress and increase resilience that could be translated to a mobile platform and the results of this were: imagery, mindfulness, breathing, exercise, and information on building personal resilience.

A software development team from Edinburgh Napier (Merchiston Campus) called "GearedApp" were contacted and several meetings with this team were conducted from September 2015-January 2016 in order to come up with a design strategy based on the 5 causes of stress and the tips and techniques form managing stress and developing resilience, and thus the name C-SMARTT: Clinical Stress Management and Resilience Tips and Techniques was developed. The role of the software team was to use their expertise in app design in order to transfer the text to an accessible and easy to use platform. This was reviewed by the researcher prior to completion and a reflective account of the C-SMARTT development process can be found in Appendix A.

The app opens and asks users to rate their level of stress from 0-5 and once they have done this they have the option to choose one of the above options (clinical skill development, theory-practice gap, time management & work overload, relationships with mentors and co-workers, and caring for suffering and/or dying patients) as a cause of their stress. This self- assessment is a simple and useful tool for students to

become aware of the level and cause of their stress, which can be helpful in managing stress (Glanz et al. 2006). This opens to the home page, which contains the introduction, purpose, how to use, causes of stress, and tips and techniques as seen in figure 3.1 below, with the full C-SMARTT app content included in Appendix B.

Students are then able to choose what area they would like to learn about and find information about each of these causes for stress, and tips and techniques in relation to a clinical placement context.

Fig 3.1 Illustrations of the C-SMARTT App as it appears when downloaded. This figure shows the opening screen, which allow for the participant to rate their stress level, choose a cause of stress (if required) and then the home screen of the app.
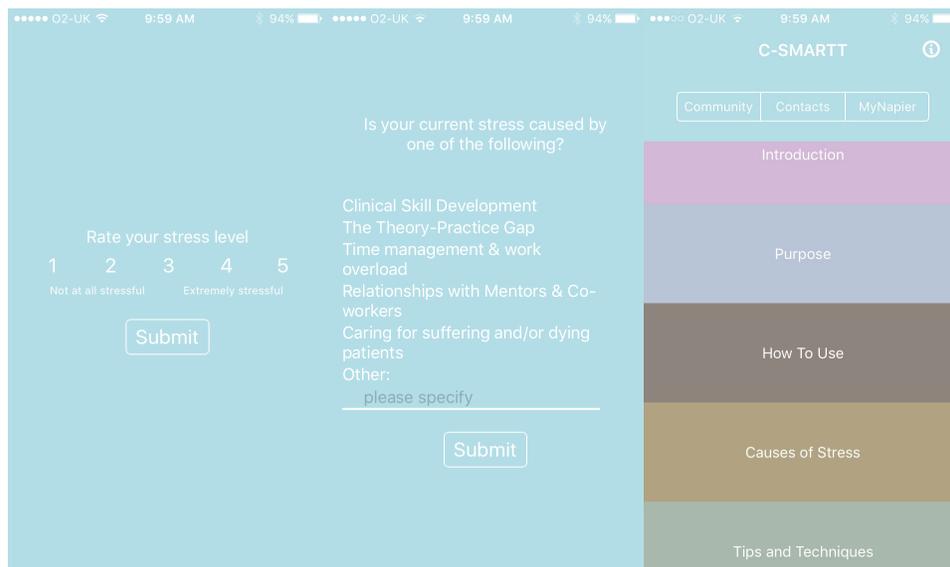
The following section will discuss the application of the Transactional Model of Stress and Coping (Lazarus & Folkman 1984) and Sharples et al. (2005) Theory of Mobile Learning in respect to how these guided the design and development of the C-SMARTT App.

3.3.1 Application of the Transactional Model of Stress and Coping in the development of the C-SMARTT App

The Transactional Model of Stress and Coping (Lazarus & Folkman 1984) is a framework for evaluating processes of coping with stressful events and has been used to support the development of the C-SMARTT App. The development of the C-SMARTT App was focused on the students' secondary appraisal, or her or his ability to manage the stressful situation as well as their reactions which then leads to actual coping efforts (Table 3.0). The C-SMARTT App was designed for students who have already deemed an experience to be stressful (primary appraisal) and are looking to find ways to problem solve and to utilize information as a coping process.

Techniques such as relaxation and visual imagery can be conceptualized as coping efforts directed at emotional regulation, which is consistent with the original formulation of the Transactional Model of Stress & Coping (Lazarus & Folkman 1984). Furthermore, helping participants understand the link between their cognitive appraisals (interpretation of a situation) and of their responses to stress address several key elements of the Transactional Model; (1) identifying stressors (2) recognizing the stress response and (3) understating the role of cognitive appraisals (Glanz et al. 2006).

Table 3.0 Application of the transactional model of stress and coping in the development of the C-SMARTT App. This table illustrates how the Transactional Model of Stress and Coping (Lazarus & Folkman 1984) provides a theoretical framework for the development of the C-SMARTT App.

Transactional Model of Stress and Coping

Concept	Definition	C-SMARTT
Primary Appraisal	**Evaluation of the significance of a stressor or threatening event**	**Student experiences stress and logs onto app to rate level of stress and cause of stress**
Secondary Appraisal	Evaluation of the controllability of the stressor and a person's coping resources	Provide accessible, information at students fingertips allowing for autonomy and personal control over use
Coping Efforts **-Problem Management** **-Emotional regulation**	Actual strategies used to mediate primary and secondary appraisals Strategies directed at changing a stressful situation Strategies aimed at changing the way one thinks or feels about a stressful situation	Accessing app allows students to acknowledging their stress (primary appraisal) and provide options for coping and information based specifically in regards to stress in clinical placement (secondary appraisal)
Outcomes of Coping	Emotional well-being, functional status, health behaviours	Outcomes of coping not measured by the app
Coping Styles (Information Seeking Optimism, avoidance)	Generalized ways of behaving that can affect a person's emotional or functional reaction to a stressor Attention styles that are vigilant (monitory) versus those that involve avoidance Tendency to have generalized positive expectancies for outcomes	Accessing app allows students to seek information which can be a natural coping style for some Students have privacy to use app how they wish to suit their coping styles

3.3.2 Application of Sharples Theory of Mobile Learning in the development of the C-SMARTT App

Sharples et al (2006) theory of mobile learning highlights the change in assumption that learning occurs in a fixed location, over a set period of time to how modern education extends across locations, times and topics with the help of mobile technologies. Sharples et al. (2009) provides further insight to the designing process of mobile learning and states, "the central task in the design of technology for mobile

learning is to promote enriching conversations between learners and teachers within and across contexts (pg. 5.)"

Sharples et al. (2009) follow up work on mobile learning, relies on Naismith and Corlett (2006) to identify five critical success factors for mobile learning as follows; access to technology, ownership, connectivity, integration and institutional support. These success factors were applied to the design and development of the C-SMARTT App as illustrated in table 3.1 These factors for mobile learning were applied as best as possible in the context of this study; however it should be noted that integration and institutional support were difficult to achieve in this study due to limited time and resources, the context of a PhD study and nursing programme contextual factors.

Table 3.1 Application of Sharples Theory of Mobile Learning to the development of the C-SMARTT App. This table outlines and describes the five elements of successful mobile learning and how these were applied to the design of the C-SMARTT App.

Principle	Description	Application
Access to technology	**Successful projects provide technology that can be used on personal devices or by providing learners with the device**	**The C-SMARTT App was available for free individual download for iPhone and android phones to all students, whether they wished to participate in the study or not.**
Ownership	Important that learners own the technology or are able to treat it as if they do	Learners were able to individual and autonomously access the app on personal devices
Connectivity	Based on wireless or mobile phone technology, allow students to share resources	Students required internet connection to download the app but the app could then be used without signal to allow for use on all placements
Integration	Successful mobile learning projects are integrated into the curriculum or student experience	Although this app could not be integrated into the curriculum at this stage of development, students were encourage to make it part of their clinical experience
Institutional Support	Successful projects also need strong institutional support	There was limited institutional support for the app at this stage in development

Fig 3.2 Summary of the applications of theory and frameworks in the C-SMARTT App design. This figure provides an illustration of how the Transactional Model of Stress and Coping acted as the overarching theory and Sharples Theory of Mobile Learning was used under this to provide support and justification for the research design and particularly the design and development of the C-SMARTT App.
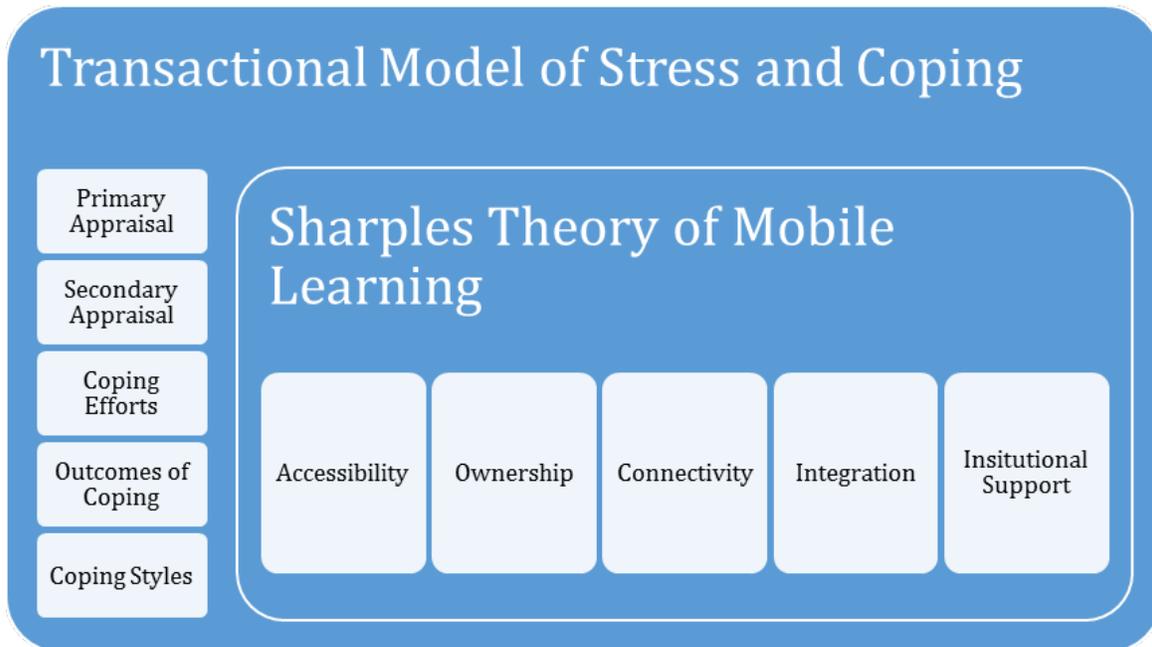
3.4 Mixed Methods Methodology: An overview

Mixed methods is a relatively new research approach with the beginnings dating back to the late 1980s (Creswell & Plano Clark 2011). This development is attributed to the complexity of research problems requiring an answer beyond what can be provided by quantitative or qualitative data alone but a combination of both forms of data, which can provide the most complete analysis of problem (Creswell & Plano Clark 2011).

3.4.1 Definition of mixed methods

The definition of mixed methods research has evolved from a description of using both qualitative and quantitative research methods to including multiple viewpoints, paradigms and research design. For this study, Creswell & Plano Clark (2007 pg. 5) definition will be used at it encompasses both of these elements.

"Mixed methods research is a research design with philosophical assumptions as well as methods of inquiry. As a methodology, it involves philosophical assumptions that guide the direction of the collection and analysis and the mixture of qualitative and quantitative approaches in many phases of the research process. As a method, it focuses on collecting, analysing, and mixing both quantitative and qualitative data in a single use study or series of studies. Its central premise is that the use of quantitative and qualitative approaches, in combination, provides a better understanding or research problems than either approach alone"

3.4.2 Philosophical foundations

Creswell and Plano Clark (2011) provide arguments for several approaches to paradigm selection for mixed methods research and give rationale for choosing either one or multiple worldviews. They describe four different stances that a researcher can take when choosing the best suited paradigm for mixed methods and are as follows; (1) one world view (2) multiple worldviews (3) worldviews relate to the type of mixed methods study and (4) worldviews depend on the scholarly community (Creswell & Plano Clark 2011). Although they state that multiple paradigms can be used in mixed methods designs and that worldviews related to types of designs, and the worldview can change during the study to match different phases of the project, they also suggest that if a mixed methods researcher collects both QL and QN data in the same phase of the project and merges the two databases, then an all-encompassing worldview would be best (Creswell & Plano Clark 2011). Therefore, the best approach for this study was to choose one world-view: pragmatism. Pragmatism enables the researcher to adopt a pluralistic stance of gathering all types of data to best answer the research questions (Creswell & Plano Clark 2011), and is typically associated with mixed methods research. It is also appropriate for this study in order to address challenges in recruiting first year students at numerous intervals while they are on a variety of clinical placements. Furthermore, pragmatism is described as practical or "what works" approach (Creswell & Plano Clark 2011) with focus on the research questions which

allows for some amount of flexibility for the researcher to use methods and perspectives which can best support these.

3.4.3 The use of mixed methods in the current study

Interest in a mixed methods approach was initially due to the lack of mixed methods studies conducted in this topic area as identified by the literature review. Although there was also a notable lack of qualitative studies in this area, using a mixed methods design for this study was chosen for several reasons. The first reason to use mixed methods was to allow for the research questions to be addressed completely and this will be discussed in detail in Chapter 6. The research questions in the study are best answered by using both QN and QL methods and using both can allow the limitations of one method to be offset by the strengths of the other (Creswell & Plano Clark 2011). McKim (2017) highlight that mixed methods is often used as a way to address the criticisms of QN and QL methods. They state that QL methods are often criticized for a lack of objectivity and generalizability and QN for lacking the participants' voice and meaningful interpretation (McKim 2017). In this case, using mixed methods allows for the student's voice to be included along with the questionnaire results, which provides the opportunity for meaningful interpretation of the results through the data integration process.

Secondly, using mixed methods allows for confirmation of the results from both QN and QL strands providing a balanced perspective, which help address these criticisms of QN and QL methods (McKim 2017). Furthermore, the combination of QN and QL data provide a more complete understanding of the research problem (Creswell & Plano Clark 2011). By using a mixed methods approach, the data from both strands of this study can be confirmed to provide a robust picture of student nurses' experience of stress and resilience and use of a mobile app during their first clinical placement. Another reason is to use the second data set (QL) to help explain the first database (QN). As the QN results have given a general explanation for the relationships between variables, the QL results allow for further explanation and understanding into these results. In this case, sources of stress for participants and their levels of resilience during clinical placement can be further developed and understood by the QL results.

Finally, the merging of QN and QL data sets allows for the data to be analysed in the context of this study, which explores perceptions of stress and resilience during the initial clinical placement while aiming to further understand the students' experience in clinical placement and the use of the C-SMARTT App. This allows for new knowledge to be created through the process of data integration, which is unique to mixed methods and this can help to cultivate ideas for future research (McKim 2017).

In this study, the first research question has focused on QN methods, which use questionnaires to investigate sources of stress and levels of resilience in student nurses during the first clinical placement. The second and third questions are focused on the QL strand which will use semi-structured interviews. This is aimed at understanding the participants' experience of stress and resilience as well as their experience of using a stress management app during their first clinical experience. The different techniques used to answer these questions as part of a mixed methods approach allow for the concepts to be more completely understood, confirmed and an opportunity for new knowledge to be created. A detailed discussion regarding further rationale for using mixed methods in this study is included in Chapter 6 (Integration of Quantitative and Qualitative Methods).

3.4.4 Advantages and challenges in mixed methods

There are many advantages to using a mixed methods research design, such as minimizing weakness of QN and QL research, answering questions that QN or QL couldn't answer alone, and mixed methods is practical as the researcher is free to investigate various methods to best answer the research questions (Creswell & Plano Clark 2011). These advantages were all apparent in the current study. The QN strand allowed for the causes for stress and levels for resilience to be studied however this did not allow for further understanding into the student experience. The QL strand then allowed for these elements to be studied in further depth. Furthermore, using a mixed methods design allowed the researcher to ask and answer both QN and QL research questions in one study, which was especially significant in understanding the impact and student experience of the C-SMARTT App. Since this app was designed specifically

for this study, use of both QN and QL methods was essential in order to maximize the type of data collected, in the relatively short time scale of PhD research, in an attempt to understand how and why students used the app.

However, there are also several challenges when using mixed methods identified by Creswell and Plano Clark (2011) such as: skill of the researcher, time and resources, and convincing others. These challenges were found to exist in the current study as the research has had some prior research experience during a MSc degree, however no experience conducting mixed methods research. Also, there were time challenges in terms of both the time constraints of a PhD project but more noticeably there was difficulty in finding time within the programme when all the first year nursing students were together in order to find opportunities for participant recruitment. There were no issues noted with convincing others in regards to using mixed methods as this approach was chosen in order to address a knowledge gap.

3.5 Research Design

When deciding on what mixed methods design to choose for this study, there were several options identified; these were the exploratory design, the explanatory design and the convergent parallel design. (Creswell & Plano Clark 2011)

An exploratory design is conducted by first collecting qualitative data, analysing it and then developing a follow-up phase of data collection, often with the purpose of instrument development. These two strands are independent from each other and usually do not use the sample participants for both strands (Creswell & Plano Clark 2011).

An explanatory design first involves collecting quantitative data, analysing the data and using the results to inform the follow up questions for the qualitative strand. The dependence of these two strands requires the same participants to be used in both strands (Creswell & Plano Clark 2011).

The convergent parallel design involves collecting both quantitative and qualitative data concurrently, analysing the information separately, and then merging the two data sets. This can use either a different or the same sample for both strands,

depending on the purpose. It is suggested that when the purpose is to directly compare or relate two sets of findings about a topic that the same participants are used in both strands (Creswell & Plano Clark 2011).

When these three options were investigated as potential options for the research design there were several factors that lead to choosing the convergent parallel design. The explanatory design, which first collects and analyses quantitative data to then inform the follow up questions was potentially a good choice for this study. The sequential timing would suit how the timing of the data collection took place; however, the restriction on the timing of data collection for this population was problematic. The collection of data prior to the first clinical placement as well as allowing time to complete the quantitative analysis prior to conducting the qualitative interviews wasn't realistic. This was due to the limited availability of the first year students to conduct data collection during their first clinical placement as they were only together as a group for two dates through this term. Furthermore, the various schedules and commitments of the students' while on clinical placement would make it difficult to ensure that QN data collection and analysis was completed before the QL data collection.

The exploratory is often aimed at designing a quantitative instrument based on QL results, which was not the aim of the current study. Furthermore, this design uses different participants in each strand in order to generalize the results to a population. Although there could have been value in this type of design, specifically because of the increase in attempts for recruitment, it does not fit with the research questions, which focus on first year nursing students in the first clinical placement.

Both the exploratory and explanatory designs are based on the relationship between the QN and QL strands, which allows for the data integration process to be built into the design by purposefully designing the second strand based on the first strands results. However, this puts restrictions on the timing in which the second strand of data collection can occur as this is based on the analysis of the first strand.

The convergent parallel design allows for collection of both data sets to occur independently which allowed for flexibility in organizing data collection and time to complete the data analysis. Furthermore having the opportunity to directly compare

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the findings of the two data sets by using the convergent parallel design was deemed appropriate for the current study.

For this study, the type of research design that was chosen was the convergent parallel design. Using concurrent timing to implement the QN and QL strands, prioritizing the methods equally, keeping the strands independent during analysis and mixing results during the overall interpretation was the best fit for this study. The purpose of this design is to obtain complementary data on the same topic to best understand the research problem with the intent to bring together the different strengths and non-overlapping weaknesses of each method (Creswell & Plano Clark 2011). Creswell and Plano Clark (2011) suggest that use of pragmatism is well matched for a convergent parallel design as it provides an 'umbrella' paradigm, which is appropriate when merging the two approaches in the process of data integration.

 Specifically for the current study, having the ability to focus on the QN data collection was necessary as organizing the dates to both present the project and collect data proved challenging. This was due to the limited amount of time that the first year students were on campus and the difficulty in gaining the support of the university to access the students at other times, such as during their seminar groups. Having some flexibility in the data collection and analysis of the two strands allowed for the necessary arrangements to be made try and maximize student's participation, especially in terms of organizing the QL interviews.

Table 3.2 The convergent parallel mixed methods research design. This table illustrates the use of pragmatism as a worldview and how a convergent parallel mixed methods design has been applied to the current study.

Pragmatism		Use of one worldview, pragmatism: focuses on the consequences of research and what works to best answer the research questions
Convergent Parallel Mixed Methods	Strand	QN- Stress in Nursing Students (SINS) & Resilience Scale (RS) questionnaires delivered prior and during the first clinical placement QL- Semi-structured interviews during the first clinical placement
	Level of Interaction	Independent level of interaction between strands was used. The QN and QL strands were implemented independently and the data collection and analysis were kept separate. The two strands were be mixed during the integration process
	Priority	The relative importance of each strand is equal as both the QN and QL strand play an equally important role in addressing the research problem
	Timing	Although the QN data collection occurred prior to the QL data collection, analysis of both occurred during a single phase, therefore concurrent timing was used
	Mixing	Merging of the QL and QN strands occurred during interpretation, after the collection and analysis of both sets of data.

3.5.1 Participants

All first year bachelor of nursing students (adult programme) beginning their first clinical placement in January 2016, from one of the largest providers of nursing education in Scotland, were invited to take part in this study, which was approximately 300-350 students. Sampling for the questionnaires and interviews was done using non-probability volunteer sampling. To some degree the sampling for this study has the characteristics of a convenience sample as volunteer sampling refers to a sample of people who self-select to participate while a convenience sample is made up of people who are easy to reach (Parahoo 2006). So although participants self-selected to take part in this study, the population was chosen as it was a known group that fit the characteristics of first year nursing students beginning their first clinical placement needed for this study. Although it is suggested by Parahoo (2006) that volunteer sampling is a relatively weak form of sampling, the nature of the target population required that this approach was taken. Furthermore, self- selection to participate avoided pressurizing students to participate in the study, which was an important ethical consideration (Fuller discussion of ethical considerations can be found on pages 128-129)*.* A detailed description of the sample sizes is discussed in the procedures section of this chapter.

3.5.2 Procedure

As previously discussed, a convergent parallel mixed methods design was utilized and this study was designed in two phases. The first phase was the collection of the QN data. An information page about the study was sent to the public online learning platform so that students were aware that the study was taking place and could read more about it if they chose to do so. For the first round of data collection (January 19, 2016), the researcher was given a short window of time during the lecture to introduce the project and to invite students who wished to take part to stay for a few minutes after the lecture was complete to fill out the questionnaires. During this time, the C-SMARTT App was also introduced and links to an information page (www.csmartt.webs) was given and students were encouraged to utilize this information. The questionnaires were bundled with an information sheet (Appendix D)

and a consent form (Appendix E) which consented the participants to take part in the questionnaire as well as to gain permission to email them in future regarding participation in the interview process.

The second round of QN data collection was very similar to the first, a notice was put up on an online platform and students who were interested were asked to spend a few minutes after the class session to fill out the questionnaires, which took place March 15, 2016.

In the first instance the researcher presented the questionnaires in a paper format to allow students to look at the consent form and questionnaire while the study was being explained in order to encourage students who were interested to complete the questionnaire at this time. This was due to concerns that busy students could forget or not find time to fill out a questionnaire for a study that they did not feel engaged with. Also, the first round of quantitative data collection had to occur prior to the first clinical placement and there was only one time that the students would be together in a lecture theatre between returning from their winter break and beginning their clinical placement. With the limited opportunity to engage with the students it was important to present the project in person to try and maximize student interest in the study. For the second round of quantitative data collection, there was an option for students to complete this in either paper form after their lecture or online to encourage all students who completed the first questionnaire to also complete the second.

The second phase of this study was the QL strand, in which all students who completed both rounds of questionnaires were emailed (with their permission) and invited to take part in an interview. Out of the 52 students emailed, 12 responded and ultimately, 7 took part in the interview process. The interview guide had 10 questions (Appendix F) in order to allow for some congruency of questioning among the interviews, and to insure that particular questions of interest to the researcher were asked and then the interviews were conducted in a semi structured manner in order for the individual experiences of each student to be discussed

Simultaneously to these two phases, the C-SMARTT App was available to be downloaded and used by students. Students used their matriculation number to log into the app so that usage could be tracked via Google Analytics, which was set up by

the GearedApp team and then monitored by the researcher. Originally it was planned to track information on student's levels of stress and which cause of stress they chose when opening the app; however, due to time and budget the software team was unable to provide this function. It was decided that by tracking how often and which student used the app would allow for another layer of data to be added to those students who completed questionnaires and the interview, as this group that used the app could be compared to those who did not use the app, in order to see if there were decreases in stress and/or increases in resilience between these two groups.

3.5.3 Instruments

Stress in Student Nurses (SINS): the SINS scale was developed by Deary et al. (2003) and comprises of four subscales (factors): clinical, confidence, education and finance. The SINS is a 43- item questionnaire with questions asking, on a five-point Likert scale, how stressful various aspects of being a student nurse are. The item scales run from 1= "not at all stressful" to 5= "extremely stressful". The SINS scale was first developed for use with nursing students in Scotland and of the original 43 items, 33 were distributed across the four factors. This structure has since been supported (Watson et al. 2008, Watson et al. 2013, Liu et al. 2015 and Smith & Yang 2016) with both Watson et al. (2008) and Deary et al. (2003) studies showing that stress measured using the SINS increased over the course of nursing programmes and the increase in stress was associated with negative aspects of coping.

The validity of the SINS has been established in previous studies (Watson et al. 2013 and Liu et al. 2015) with Cronbach's alpha coefficients ranging from 0.67-0.94 for the four sub-dimensions and 0.82 (Liu et al. 2015) and 0.96 (Watson et al. 2013) for the overall instrument. In the current study, Cronbach's alpha was tested during the quantitative data analysis and for SINS pre-clinical placement was 0.926 and SINS during clinical placement was 0.922. A test-retest reliability (2 week interval) was 0.82 for the overall SINS instrument and 0.79-0.88 for the sub dimensions (Liu et al. 2015), supporting reliability of the SINS. The confirmatory factor analysis (Watson et al. 2013) supports the original four dimension structure of the SINS obtained by Deary et al. (2003) and over the course of several studies (Deary et al. 2003, Watson et al. 2008,

Salomonson et al. 2011 and Liu et al. 2015) the SINS has proven to be a valid and reliable instrument to measure stress in student nurses.

The Resilience Scale (RS): The resilience scale was developed by Wagnild and Young (1990) based on a qualitative study of older women who had adapted successfully following a major life event as well as a review of the literature on resilience up to that time. The initial RS consisted of 50 items but after initial analysis was reduce to 25 items reflecting five characteristics of resilience. After repeated applications of the RS with a variety of samples, scores greater than 145 indicated moderately high to high resilience, 125-145 indicated moderately low to moderate levels of resilience and scores of 120 and below indicated low resilience. The Resilience Scale is an instrument designed to measure resilience, is simple to use and reliable and valid in a variety of populations (Wagnild 2009) and has been used in student and student nurses populations (Taylor & Reyes 2012; Beauvais et al. 2014; Smith & Yang 2017).

Wagnild's (2009) review of 12 completed studies that have used the Resilience Scale (Wagnild & Young, 1990) found that Cronbach's alpha coefficients ranged from .72 to .94 supporting the internal consistency reliability of the RS. In the current study, Cronbach's alpha for RSpre was 0.893 and RSd was 0.662. This review reports the RS being used with a wide range of populations and has performed as a reliable and valid tool to measure resilience (Wagnild 2009). Hypothesized relationships between the Resilience Scale and study variables identified in the literature review (e.g., forgiveness, stress, anxiety, health promoting activities) were supported strengthening the evidence for construct validity of the Resilience Scale (Wagnild 2009).

It can be seen in Chapter 2 (sections 2.4.3 and 2.10.2), that there are a large variety of instruments and combination of instrument used for measuring both stress and resilience in the literature. The decision was made to focus on one instrument for measuring stress, and one for measuring resilience in order to simplify the data collection and analysis process. The SINS scale provides clear distinction of clinical and education elements of stress which was deemed useful in answering the research questions. Wagnild and Young's Resilience Scale has been used successfully in a variety

of populations as well as in relationship to levels of stress. Smith and Yang (2017) recent study has used both the SINS scale and RS as instruments to measure and correlate stress and resilience in the context of student nurses with encouraging results.

3.5.4 Pilot study

The MRC framework (Craig et al. 2008), describes phase 1 as "modelling, however Craig et al. (2008) suggest that often researchers focus on building interventions and on determining acceptability, without using simulation or other methods to model the intervention as recommended by the framework guidelines. Although primary data gathering is recommended by the MRC (Craig et al. 2000, 2008) in this phase of intervention development, no specific guidance is provided as to the focus that researchers should have when gathering data for the purpose of 'modelling' an intervention.

In following with this advice, an attempt was made to run a pilot study of the C-SMARTT App with first year nursing students in December 2014. This was designed in order to allow for changes to be made to the app itself as well as address issues with implementation and research design. However, due to unforeseen circumstances with student availability and problems with recruitment, there was not enough participants to make this pilot useful in regards to changes to the C-SMARTT app. The main difficulty that occurred was the lack of support from faculty when contacted in regards to finding times to engage students with the app. There was a short time between completing the C-SMARTT App and the conducting the first attempt at data collection (mid-January 2015) due to needing to complete this before the students started their first clinical placement. The aim was to run a small pilot in December 2014 in order to pass on the amendments to the app to the software team so that the app would be ready for the mid-January 2015 deadline. However, the mix of a tight timeline, time of year (end of term) and unresponsiveness from faculty led to this pilot study not being successful. When the first attempt at participant recruitment was conducted in January 2015, a miscommunication between the timing of when the researcher would introduce the study to potential participants resulted in a disappointing number of

students being present to hear about the app and take part in the study. Although this process was unproductive, it was found to be extremely useful in terms of changing recruitment tactics and strategies of presenting the project to potential participants, which proved important to the success of this study. A reflection on the pilot process can be found in the reflective account of the C-SMARTT development in Appendix A.

Table 3.3 Outline of the phases of the research design. This table illustrates how the two phases were used to collect QN and QL data while the C-SMARTT App was used throughout both phases.

Phase One	Questionnaire #1 (19/01/16) Questionnaire #2 (15/03/16)	CSMARTT APP - available to download and use throughout both phases
Phase Two	Interviews (05/16-07/16)	

3.5.5 Quantitative data collection and analysis

A volunteer sample of all first year nursing students beginning their first clinical placement in January 2016 (n=330) were identified as the population for this study. Students were made aware by their instructor that a presentation of the project and opportunity to be involved would take place at the end of their scheduled session. This took place both before the students had been to their first clinical placement (January

19, 2016) and again at the mid-point (March 15, 2016). Only those who completed both the RS and SINS at each interval were included in the final data analysis. Each questionnaire was then uploaded onto SPSS version 24 for analysis.

The aim of the quantitative statistical analysis was to allow for comparison of what types of clinical related stress increased or decreased and if levels of resilience increased or decreased before and during the participant's first experience in a clinical placement. Also, these data provide a general picture of how the first clinical placement has impacted causes of stress and levels of resilience in the participants, which can then be complimented with more in-depth data collected during the qualitative strand.

A paired samples t- test was used to compare the resilience scale scores and the SINS scores before and during the first clinical placement. The SINS scale contains 4 sub dimensions; clinical, education, confidence and finance which were further analysed using a paired sample t-test to determine which, if any, sub dimensions had significant changes before and during the first clinical placement. Elements of the SINS subscales were compared using Cohen's *d* to determine changes in the mean scores. The top 10 most common stressors were extracted from the before and during clinical questionnaires for further analysis. Finally, Pearson's correlation was used to determine any correlations between the RS and SINS scale data. Although a small sample size prevented any formal statistical testing to be conducted with the data from students who used the C-SMARTT App, descriptive statistics and comparisons of the mean change scores for SINS and RS between app users and non-users was completed.

3.5.6 Qualitative data collection and analysis

Participants who had completed questionnaires at both intervals (n= 52) were then invited by email to volunteer to participate in a semi-structured interview (n=7). The aim of the qualitative study analysis was to understand the participants experience with stress and resilience while on clinical placement as well as to understand their experience with the C-SMARTT app and what improvements (if any) they would like to see in the app. The interview schedule is included in Appendix F.

The interviews took place in a private meeting room at the university. Each interview was recorded using a digital recorder and the researcher then transcribed

these recordings. Each transcript was read several times prior to beginning thematic analysis and an example of one transcript from this study can be found in Appendix R. Thematic analysis was chosen as the best approach to qualitative analysis for this study because it is a foundational method of qualitative analysis for beginner researchers and allows for flexibility of use across a range of theoretical and epistemological approaches (Braun and Clarke 2006), which is appropriate for use in a mixed methods approach. Braun and Clarke's (2006) 6-phase guide to thematic analysis (Appendix G) was used to direct the analysis of the interview in this study, which will be discussed in detail in Chapter 5.

Figure 3.3 Use of frameworks in the research design process. This figure shows that the Transactional Model of Stress and Coping is the overarching theoretical framework for this study and that the MRC Framework was initially used for guidance. Below this is Sharples Theory of Mobile Learning, which guided the design and development of the C-SMARTT App as well as the convergent parallel mixed methods design.

Transactional Model of Stress and Coping (MRC Framework utilized initially for guidance, see Appendix S)	
⬇	
Sharples Theory of Mobile Learning	
⬇	
C-SMARTT App	
⬇	
Convergent Parallel Mixed Methods	
⬇	
QL data collection: semi-structured Interviews ⬇	QN data collection: SINS & RS ⬇
QL data analysis: Thematic analysis ⬇	QN data analysis: paired sample t-test, Pearson's correlation, Cohen's d ⬇
Data Merging and Integration	

3.6 Ethical Issues

In order to comply with FHLSS ethical standards, several steps were taken in the design of this study in regards to sampling, consent and confidentiality and the FHLSS ethical approval letter can be found in Appendix C.

As previously mentioned, a volunteer method of sampling was used and students self-selected to take part in the study to ensure that participants did not feel under pressure to participate. Participants who had taken part in both questionnaires were invited to take part in an individual interview

Written consent forms and information sheets were provided to all participants and participants signed this form in order to indicate consent (Appendix D & E). Furthermore, a brief introduction to the project was provided to all students prior to taking part in the questionnaires and students were encouraged to access further online information about the project.

Consent for the app is included in the main research consent form but the students who accessed the app were also required to consent to the terms and conditions of the app when they registered (Appendix B). The researchers email address and the independent advisors contact details were made available to participants to answer any further questions or concerns that they may have regarding the study.

A short debriefing session took place at the end of the interviews. This gave the students an opportunity to discuss how the interview went and to discuss any further questions or concerns. Students were offered copies of transcripts and of the final study results if they wished to receive them.

This study does have a potential risk to the participants. This risk is psychological in nature and is due to the potential sensitive nature of discussing and sharing stressful experiences and emotions. This may cause emotional distress in some participants and is noted to be a potential risk to participants in this study. Furthermore, a risk is noted in that the app may identify students suffering with high levels of stress during their clinical placement. The ethical issues specific to this study are illustrated below in table 3.4

Table 3.4 Ethical Issues and their Management. This table provides a detailed description of potential ethical issues specific to the current study and how the researcher managed them.

Ethical Issue/Question	Management of Ethical Issue
There is a potential for participants to feel vulnerable when discussing personal experiences in the clinical setting that involve stress and difficult emotions. How will this be managed?	-Use interview schedule to re-focus the conversation -Offer contact information of known support systems for students (i.e. Pastoral support) to all participants following each phase of the research, this will be done by providing a written list of contacts and resources. -Brief participants before the interviews in regards to the researcher's role, aim of the interview, available support systems (as above) and a reminder that participants may choose to withdraw from the interview at any time.
Arguably, the researcher will know which students are accessing the app. Those that use it several times may indicate stress and lack of coping. How will this be managed?	The app is designed so that if a student self-assesses their stress level a 5/5 they will be advised to contact a member of the support team at Edinburgh Napier. Furthermore, each information category of the app will highlight the appropriate contact person to provide support.
By completing the self-assessment of stress and by frequent usage of the app, a student may feel that they are in distress. How will the researcher manage this?	The self-assessment is partly meant to help students become self-aware of their stress levels. Students will be encouraged to contact support persons throughout the app and this will be reinforced during the information sessions, C-SMARTT website and information sheets.
How will the researcher support students in using the app and understanding its functionality?	Visual instruction will be used during the QN data collection and further instruction and information will be available on the C-SMARTT website.
How will the researcher respond to and support students who identify themselves as highly stressed prior to the first clinical placement?	At the bottom of the 2 questionnaires students will be encouraged to contact support persons if they wish.
How are the usual avenues for support built into the app? (i.e. PDT, module leader etc.)	The app is designed to help make the existing contacts at Edinburgh Napier more accessible to students while they are on clinical placement. Email addresses and phone numbers (if applicable) will be provided throughout the information section as well as on a formal contact list.

Are there any confidentiality issues between the app providers and the researcher? How will this be managed?	Participants will be required to register for the app with their Edinburgh Napier student number. The providers of the app do not have access to student lists and therefore will not be able to connect student names with the student numbers provided. The researcher will have access to student names/numbers with participant's consent.
What happens in the interview if a participant discloses information of a serious nature i.e. Bullying, clinical errors or abuse?	In the unfortunate event that a student discloses information of a serious nature the student will be encouraged to escalate the issue to their PDT or module leader. In order to keep students identity confidential, it would be inappropriate for the researcher to intervene.

3.7 Limitations

There were several limitations noted that may affect both the internal and external validity of this study. Firstly, asking students to stay after their classroom session was finished for the day proved to be challenging and resulted in the number of students available for recruitment to drop dramatically this was further impacted by students leaving before the lecture was over. However, due to ethical considerations and concerns about students feeling pressured to take part in the study if presented during allocated class time, it was decided that it was crucial for students to take part in the study on their own time and by their choice. The resulting students therefore were judged to be only half of the original size of what was thought to be the full sample size (n=~ 150)

Furthermore, retention of participants proved difficult as once student began their clinical placement, they were not together as a group on campus, which made it difficult to contact and engage students in face to face. Also, the researcher did not have access to the online platform, Moodle, in order to remind students to use the app and only one out of several attempts at contacting a staff member to assist in doing so was successful. Ideally, there would have been a much larger sample size in order to allow for successful use of principal component analysis of the SINS scale as well as for

comparison of data between students that used the C-SMARTT app and those who did not.

3.8 Conclusions

Understanding the perceptions of stress and resilience in student nurses is crucial to providing supportive learning environments in order to help students succeed in their clinical placement, as well as in the rest of their course and career (Jackson et al. 2007; Labrague et al. 2016, McGowan & Murray 2016). The literature supports the use of a mixed methods research design to address the gaps in the knowledge as described above as well as the design and development of the C-SMARTT App as a stress management tool. The use of the Transactional Model of Stress and Coping (Lazarus & Folkman 1984) as well as the MRC developing and evaluating complex interventions framework (Craig et al. 2008) and Sharples et al. (2006; 2007) Theory of Mobile Learning as guiding frameworks for this study provides a robust theoretical backbone for the methodology and design of this study. The following chapter will discuss the results of the quantitative data collected by the SINS and RS scales.

Chapter 4: Quantitative Findings

4.0 Introduction

The purpose of this study is to explore and understand first year nursing students' experience of stress and resilience during their first clinical placement. Furthermore, this study aims to investigate the usage of a mobile stress management tool. Using a mixed methods approach allows for use of both quantitative and qualitative methods to be used in order to best answer the research questions which is in line with a pragmatic worldview (Creswell & Plano Clark, 2011). Two instruments were used to collect quantitative data, the Resilience Scale (Wagnild & Young 1990; 1993) and the Stress in Nursing Students Scale (SINS) (Deary et al. 2003) at two intervals, before the initial clinical placement and during the first clinical placement. The second round of data collection was done 2 months into the student's clinical placement, as this was only opportunity to access all of the students, due to the design of their module. At this point, students were also given the opportunity to complete the questionnaires online. Resilience connotes emotional stamina and has been used to describe people who display courage and adaptability in the face of life's misfortunes (Wagnild and Young 1990). The purpose of the Resilience Scale is to identify the degree of individual resilience. Stress is described by Lazarus and Folkman (1984), as a normal part of life that is a response to changing stimuli in the forms of events and circumstances. The Stress in Student Nurses (SINS) scale measures how stressful various aspects of being a nursing student are and this scale is further divided into four sub dimensions; clinical, education, confidence and finance.

This chapter will present the quantitative results of these two instruments in relation to the following research questions:

1) **What are nursing students' perceptions of stress and levels of resilience before and during their first clinical placement?**

2) **What are nursing students' experiences of stress and resilience during their first clinical placement?**

In order to answer the research questions, several approaches to quantitative data analysis were used:

1) Determine any associations in the results of the Resilience Scale before and during the first clinical placement
2) Determine any associations in the results of the SINS Scale before and during the first clinical placement
3) Compare the results of the four SINS subscales (clinical, education, confidence and finance) before and during the first clinical placement.
4) Explore the correlation between Resilience Scale results and SINS results before and during the first clinical placement
5) Determine any associations with users vs. non-uses of the C-SMARTT app and the Resilience Scale and SINS results

Please note that in this chapter Resilience Scale will be abbreviated as RS and the Stress In Nursing Students scale will be abbreviated as SINS. RS used before the first clinical placement will be abbreviated **RSpre** and RS used during clinical placement will be abbreviated as **RSd**. SINS used before the first initial clinical placement will be abbreviated as **SINSpre** and SINS used during clinical placement will be abbreviated as **SINSd**

4.1 Population and Sample

First year nursing students were approached in January 2016 several weeks prior to their first clinical placement to complete the RS and SINS questionnaires and again in late March 2016 to complete the same questionnaires. This was based on the students schedule and when they would be all together, on campus, in order to provide an optimal opportunity to recruit participants. All students were invited and encouraged to use the C-SMARTT app, however only those who also completed both questionnaires could be included in the study.

This sample was a volunteer sample of 1st year nursing students beginning their first clinical placement (n= 52). Full participation was determined retrospectively as students were required to complete the RS and SINS questionnaires at two separate intervals. There were 17/52 students who used the C-SMARTT APP, however only 9

had also completed the questionnaires at both intervals. (Table 4.27 pg. 159) The participants were overwhelmingly female (98.1%) with the majority of participants aged between 17-28 (76.9 %). Demographic characteristics of participants can be seen in Table 4.0.

Table 4.0 Demographic data (n= 52)

Demographic characteristics	No.	%
Gender		
Female	51	98.1
Male	1	1.9
Age		
17-22	20	38.5
23-28	20	38.5
29-34	7	13.5
35-40	4	7.7
41-50	1	1.9
50 +	0	0
Relationship status		
Single	19	36.5
Partner	29	55.8
Married	4	7.7
Employment status		
Unemployed	15	28.8
Part-time employed	37	71.2
Full-time employed	0	0

4.2 Addressing Missing Data

Missing data is common in quantitative research, with an average amount of 15-20% of missing data found in social science research (Dong & Peng 2013). There are several reasons why managing missing data properly is important; such as, introducing bias in parameter estimation, weakening generalizability of results and loss of information which can decrease statistical power (Dong & Peng 2013).

Missing data can occur at either the unit-level or the item level (Dong & Peng 2013), in this study only missing data at the item level occurred with some students

missing on or two questions on the surveys but answering the rest. In order to manage missing data, Dong & Peng (2013) suggest that the proportion of missing data, the missing data mechanisms and the pattern of missing data are addressed.

According to Dong & Peng (2013) the proportion of missing data is directly related to the quality of statistical inferences. Although there is no established rule in the literature which states what percentage of missing data is acceptable, this study will follow the suggestions of Schafer (1999) who asserted that a missing rate of 5% of less is inconsequential and of Bennet (2001) who maintained that statistical analysis is likely to be biased when more than 10% of data are missing.

Based on the mechanism of missing data and the proportion of missing data, a multiple imputation method was used to account for missing data in the Resilience Scale. The Resilience Scale data set was found to have 15% of cases missing, and this resulted in a significant loss of data when automatically case wise removed by SPSS (Dong & Peng 2013),

The SINS scale data were found to have 5% of cases missing, which can be viewed as inconsequential (Dong & Peng 2013), and a comparison of the original data to that of the expectation maximization data set revealed insignificant changes to the data. Therefore, with the agreement of the statistical support team it was decided that using case wise deletion for the missing data was within acceptable limits for the SINS data set.

There are mechanisms in which missing data can occur; Missing at Random (MAR), Missing Completely at Random (MCAR) and Missing Not at Random (MNAR) (Dong & Peng 2013). In this study, Little's (1988) multivariate test found to be non-significant for both RS (Chi-squared = 381.3, p = .572) and SINS data (Chi-squared= 22.8, p= 0.258), and therefore it was determined that the missing data from the RS and SINS scale were missing completely at random. This means that there is no relationship between the missingness of the data and any values and that the missing data points are a random sub-set of the data (Grace-Martin 2013) Using multiple imputation and case-wise deletion both assume that data is Missing Completely at Random (Grace-Martin 2013) therefore making this distinction crucial for dealing with missing data appropriately.

It is important to note that because of the case-wise deletion that occurred in the SINS scale data, the total sample numbers for some data sets will vary as any missing data will result in a complete deletion of that participants' data.

4.3 Resilience Scale

The resilience scale (RS) was initially developed from a qualitative study of 24 women who had been found to successfully adapt to a major life-changing event (Wagnild & Young, 1990; 1993) and the purpose of this scale is to identify the degree of individual resilience, considered a positive personality characteristic that enhances individual adaptation. The RS is a 25 item, self-administered questionnaire with questions asking, on a seven point Likert type scale, if the participants agree or disagree with each item (Appendix H). The item scales run from 1= strongly disagree to 7= strongly agree. Possible scores range from 25 to 175 with higher scores reflecting higher resilience. The Resilience Scale has been used successfully in a variety of populations including student nurses (Taylor & Reyes 2012: Beauvais et al. 2014 & Smith & Yang 2017). RS reliability and validity are discussed in Chapter 3, section 3.5.2.

In the present study, the total scores of the RS were obtained for each participant pre-clinical and during the first clinical placement. These results were then analysed using a paired samples t-test.

4.3.1 Resilience scale findings

1) Resilience scale results before and during the first clinical placement

Null hypothesis: There is no difference between levels of resilience of first year nursing students before and during their initial clinical placement.

There is lack of consensus in the literature in regards to the best methods of analysing Likert scale data (Frost 2016) with the main concern being that parametric tests assume a normal distribution. Therefore, tests of normality were conducted to show that data collected from the resilience scale are normally distributed (Laerd Statistics, 2013). The Shapiro-Wilk test was used to test normality of the data with both the RSpre (p= 0.423) and RSd (p=0.906) data having a p value greater than 0.05,

supporting that the data is normal (Appendix I). Furthermore, RSpre and RSd have a Normal Q-Q plot (Appendix J) which shows that the data points are close to the diagonal line which supports that the data are normally distributed (Laerd Statistics, 2013). Finally, the histogram illustrates a good fit (Appendix K) and this supports a parametric paired sample t-test to be used for data analysis (Frost 2016), which allows statistical difference to be tested between a matched pair at two time points. A description of the paired samples t-test can be found in Appendix N.

Table 4.1 RSpre and RSd summary estimates and dispersion measures
This table illustrates the frequencies of the RS data both before and during the first clinical placement.

		RSpre	RSd
N	Valid	52	52
	Missing	0	0
Mean		129.490	133.783
Median		127.692	133.000
Std. Deviation		16.406	19.579
Percentiles	25	121.10	121.00
	50	127.69	133.00
	75	139.00	146.75

There was a non-statistically significant difference in the RS scores pre initial clinical placement (M=129.63, SD= 16.46) and RS scores during initial clinical placement (M=134.13, SD=19.7); t(51)= -1.88, p= 0.065

These results suggest that although there is an increase in the mean of the RS during the initial clinical experience compared to the scores prior to the initial clinical

experience, the difference cannot be claimed as statistically significant therefore the null hypothesis cannot be rejected.

Table 4.2 Paired samples statistics of RSpre and RSd
This table shows the paired sample t-test statistics for RSpre and RSd questionnaire data, which shows an increase in the mean, suggesting students had an increase in resilience during clinical placement.

	Mean	N	Std. Deviation	Std. Error Mean
RSpre	129.490	52	16.406	2.284
RSd	133.783	52	19.579	2.734

Table 4.3 Paired samples t-test of RSpre and RSd
This table shows the paired sample t-test results which show a non-significant difference between the RSpre and RSd with p= 0.065

	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the difference		T	Df	Sig 2(tailed)
				Lower	Upper			
RSpre-RSd	-4.500	17.188	2.383	-9.285	0.285	-1.888	51	0.065

4.4 Stress in Nursing Students Scale

The Stress in Nursing scale (SINS) is a 43 item, self-administered questionnaire with questions asking, on a five point Likert type scale, how stressful various aspects of being a student nurse are (Appendix L). The item scales run from 1= not at all stressful to 5= extremely stressful. Deary et al. (2003) developed this scale for use with nursing students in Scotland in a longitudinal study and the original factor structure was investigated using exploratory factor analysis. Of the SINS's original 43 items, 33 were distributed across four factors related to the following aspects of stress: clinical, confidence, education and finance (Deary et al. 2003). This structure has been

supported using further exploratory analysis and congruence analysis in a longitudinal study of nursing students in Hong Kong and a confirmatory factor analysis (Watson et al. 2013; Watson et al. 2008; Liu et al. 2015). SINS reliability and validity are discussed in Chapter 3.

Since completion of a factor analysis was not possible in the present study due to lower number of participants than expected, the factor analysis of Deary et al. (2003) and Watson et al. (2008) were used to determine the placement of elements into the four subscales: clinical, confidence, education and finance. The overall SINS mean scores pre-clinical placement and during clinical placement were calculated, as well as the pre and during clinical mean scores for each of the four dimensions, as conducted by Liu et al. (2015). The SINSpre and SINSd total scores and each dimensions scores were then analysed using a paired samples t-test.

4.4.1 SINS scale findings

2) SINS scale results before and during the first clinical placement

Null hypothesis: There is no difference in perceived levels of stress of first year nursing students before and during their first clinical placement

As stated in the above section regarding the resilience scale, tests of normality were conducted to determine that best analysis of the data. The Shapiro-Wilk test was used to test normality of the SINSpre (p=0.647) and SINSd (p=0.731) data (Appendix I), the results of this as well as a normal Q-Q plot, which shows the points are close to the diagonal line (Appendix J), and histograms that illustrates good fit (Appendix K) supports that the SINSpre and SINSd data are normally distributed (Frost 2016). Therefore, a paired samples t-test was used to investigate any significant connections between the SINSpre and SINSd questionnaires.

Table 4.4 SINSpre and SINSd summary estimates and dispersion measures
This table illustrates the frequencies of the SINS data both before and during the first clinical placement.

		SINSpre	SINSd
N	Valid	47	48
	Missing	5	4
Mean		121.915	132.188
Median		122.00	133.50
Std. Deviation		22.411	21.739
Percentiles	25	104.00	115.500
	50	122.00	133.50
	75	135.00	150.00

There was a statistically significant difference in the SINS scores for pre-clinical (M=121.33, SD=22.80) and during clinical (M=130.81, SD= 20.17); t(42)= -3.488, p= 0.001 (Table 4.5). These results suggest that students perceived higher levels of stress during their initial clinical placement than they did before they began; therefore the null hypothesis is rejected.

Table 4.5 Paired samples statistics for SINSpre and SINSd
This table illustrates the paired samples summary statistics of the SINSpre and SINSd questionnaire data, which reveals that there is an increase in the mean (which relates to increased level of perceived stress) for the SINSd data.

	Mean	N	Std. Deviation	Std. Error Mean
SINSpre	121.325	43	22.798	3.476
SINSd	130.814	43	20.171	3.076

Table 4.6 Paired Samples t-test of SINSpre and SINSd
This table shows the results from a paired-samples t-test of the SINSpre and SINSd questionnaire data. These results show that there is a statistically significant difference with p=0.001 supporting that students felt an overall increase in perceived levels of stress during their first clinical placement.

	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the difference		T	df	Sig 2(tailed)
				Lower	Upper			
SINSpre-SINSd	-9.488	17.838	2.720	-14.978	-3.98	-3.488	42	0.001

1) *Compare the results of the four SINS subscales before and during the first clinical placement*

In following with Liu et al. (2015) methods of SINS analysis, each of the four subscales, as determined by Deary et al. (2003), Watson et al. (2008) and Watson et al. (2013), were isolated and investigated to determine changes in the overall SINS scale and the four sub dimensions between the pre-clinical and during clinical data sets. A paired samples t-test was conducted to determine any significant associations between each sub dimension pre and during the first clinical placement.

The overall SINSpre mean score was 2.83(SD=0.52) and overall SINSd mean score was 3.07(SD= 0.51) suggesting an overall increase in perceived stress during the initial clinical placement. The scores for the different dimensions pre-clinical placement and during clinical placement were: clinical pre 2.85(SD= 0.59) and clinical during 3.02 (SD= 0.51), education pre 3.19(0.60) and education during clinical 3.32 (SD=0.60), confidence pre 2.29(SD=0.54) and confidence during clinical 2.76(SD=0.52) and finance pre-clinical 3.19(SD=1.03) and finance during clinical 3.46(SD=0.85). The means of each sub dimension were compared using Cohen's *d* (Appendix N) and effects size were calculated which revealed that the overall SINS score, confidence and finance subscale were found to have a small effect size, as both differences were between 0.2 and 0.5 (Table 4.7)

Table 4.7 Comparison with overall SINS and sub-dimensions pre and during the initial clinical placement. This table illustrates the mean for the overall SINS score, each sub dimension as well as the difference in the mean (Cohen's *d*) between the pre-clinical and during clinical scores, with the confidence sub dimension showing the largest change.

	Mean Score (SD)		
	Pre-Clinical	During Clinical	Cohen's *d*
Overall Scale	**2.83 (0.52)**	**3.07 (0.51)**	**0.24**
Clinical	2.85 (0.59)	3.02 (0.55)	0.17
Education	3.19 (0.60)	3.32 (0.60)	0.13
Confidence	2.29 (0.54)	2.76 (0.52)	0.47
Finance	3.19 (1.03)	3.46 (0.85)	0.27

4.4.2 Clinical sub dimension

The clinical dimension of the SINS scale is the largest with 13 elements, which can all be found in Appendix L. The mean scores for each clinical element were taken pre-clinical and during clinical placement to determine Cohen's d and the effect size was calculated (0.2= small, 0.5= medium and 0.8= large). Table 4.8 illustrates that most clinical elements experienced an increase in the mean, with medium effect size changes found in element 14 "being interrupted on clinical duties" and 15 "not having enough staff or equipment to meet patient's needs."

The mean of the aggregate scores for the clinical sub dimension is M=37.07 (SD=7.69) pre and 39.25 (SD=7.21) during, showing an overall increase in perceived stressed caused by clinical elements during the first clinical placement. A paired samples t-test was conducted to investigate if they was a significant change in the clinical sub dimension pre and during the first clinical placement (Table 4.9)

There was no statistically significant difference in the overall clinical sub dimensions of the SINS scale for pre-clinical 37.07 (SD=7.69) and during clinical 39.25(SD=7.21); t(49)= -1.543, p=0.129

Table 4.8 Breakdown of individual elements of the Clinical sub dimension. This table illustrates all the clinical sub dimension elements and the mean scores pre and during the initial clinical placement, as well as Cohen's *d* effect size. N=52 unless otherwise stated.

Element		Pre	Mean (SD) During	Cohen's d
8	**patient's attitude towards me**	**2.09(0.9)** N=51	**2.48(0.96)**	**0.39**
9	fear of making a mistake in clinical placement	3.83(0.92)	3.69(1.04)	-0.14
10	competition from fellow students	2.23(1.00)	2.28(1.04)	0.05
11	relations with staff in the clinical area	2.73(0.93)	2.92(0.99)	0.19
12	caring for the emotional needs of patients	2.69(0.96)	2.90(0.92) N=51	0.21
13	the attitudes and expectations of other professionals	3.12(0.89)	3.03(1.03)	-0.09
14	being interrupted in clinical duties	2.71(0.94)	3.25(1.03)	0.54
15	not having enough staff of equipment to meet patient's needs	3.21(1.09)	3.79(0.82)	0.58
20	dealing with un-cooperative, anxious, abusive or otherwise difficult patients of relatives	3.08(1.23)	3.17(0.99)	0.09
32	patient's attitudes towards nursing	2.25(0.95)	2.61(0.84)	0.36
39	feeling responsible for what happens to patients	3.52(0.92)	3.31(1.02)	-0.21
40	speaking to patient's relatives	2.70(0.96)	2.84(1.04)	0.14
43	coping with suffering or death of patients	3.06(1.10)	2.91(1.00)	-0.15

Table 4.9 Paired samples statistics for clinical sub dimensions pre and during the first clinical placement

This table illustrates the paired samples summary statistics of the clinical sub dimension pre and during clinical placement, which reveals that there is an increase in the mean for the clinical sub dimensions scores during the first clinical placement.

	Mean	N	Std. Deviation	Std. Error Mean
Clinical pre	37.20	50	7.727	1.092
Clinical during	39.060	50	7.147	1.010

Table 4.10 Paired Samples t-test of clinical sub dimension pre and during the first clinical placement.

This table shows the results from a paired-samples t-test of the clinical sub dimensions pre and during the first clinical placement. These results show that although there was an increase in the mean during clinical placement, there is no statistically significant difference, with p=0.129.

	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the difference		t	df	Sig 2(tailed)
				Lower	Upper			
Clinical pre- Clinical during	-1.860	8.521	1.205	-4.282	0.562	-1.543	49	0.129

4.4.3 Education sub dimension

The education sub dimension of the SINS scale has 10 elements, which can all be found in Appendix M. The mean scores for each education element were taken pre-clinical and during clinical placement to determine Cohen's *d* and the effect size was calculated (0.2= small, 0.5= medium and 0.8= large). Table 4.11 illustrates that most education elements experienced an increase in the mean with a small effect size, with the largest change of 0.48 for element 29, "meeting deadlines for coursework."

The mean of the aggregate scores for the education sub dimension is M=31.80 (SD=5.89) pre and 33.14 (SD=5.93) during, showing an overall increase in perceived stressed caused by education elements during the first clinical placement. A paired samples t-test was conducted to investigate if they was a significant change in the education sub dimension pre and during the first clinical placement (Table 4.12)

There was no statistically significant difference in the overall education sub dimension of the SINS scale for pre-clinical 31.80 (SD=5.89) and during clinical 33.14(SD=5.93); t(48)= -1.708, p=0.094 (Table 4.13)

Table 4.11 Breakdown of individual elements of the Education sub dimension.
This table illustrates all the clinical sub dimension elements and the mean scores pre and during the initial clinical placement, as well Cohen's *d* effect size. N=52 unless otherwise stated

Element		Mean (SD)		
		Pre	**During**	**Cohen's d**
1	**The amount of classwork material to be learned**	**3.5(0.85)**	**3.60(0.89)**	**0.1**
2	Relationships with family members	2.46(1.21)	2.71(1.16)	0.25
3	Having too much clinical responsibility	2,67(0.96)	2.62(0.87)	-0.05
4	The difficulty of the classwork material to be learned	3.08(0.86)	3.08(0.96)	0
5	Personal problems other than health	2.71(1.3)	3.00(1.29)	0.29
7	Examinations and placement gradings	3.65(0.93)	3.58(0.92)	0.07
18	Having too much to learn	3.27(1.09)	3.54(0.94)	0.27
23	Not being sure what is expected in the course	2.90(0.94) **N=51**	3.15(0.91)	0.25
29	Meeting deadlines for coursework	3.35(1.1)	3.83(0.94)	0.48
33	Fear of failing in the course	4.14(0.97)	3.83(1.04)	-0.31

Table 4.12 Paired samples statistics for education sub dimensions pre and during the first clinical placement

This table illustrates the paired samples summary statistics of the education sub dimension pre and during the first clinical placement, which reveals that there is an increase in the mean in the education sub dimensions scores during the initial clinical placement.

	Mean	N	Std. Deviation	Std. Error Mean
Education pre	31.918	49	5.982	0.855
Education During	33.163	49	5.987	0.855

Table 4.13 Paired Samples t-test of education sub dimension pre and during the first clinical placement

This table shows the results from a paired-samples t-test of the education sub dimension pre and during the first clinical placement. These results show that although there is an increase in the mean, there is no statistically significant difference with p=0.094.

	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the difference		t	df	Sig 2(tailed)
				Lower	Upper			
Education pre- Education during	-1.245	5.101	0.728	-2.710	0.220	-1.708	48	0.094

4.4.4 Confidence sub dimension

The confidence sub dimension of the SINS scale has 11 elements, which can all be found in Appendix L. The mean scores for each clinical element were taken pre-clinical and during clinical placement to determine a Cohen's *d* and the effect size was calculated (0.2= small, 0.5= medium and 0.8= large). Table 4.14 illustrates that all of the confidence elements experienced an increase in the mean, with a medium effect size

change (d= 0.51) in element 38, 'personal health problems' and the second largest change (d= 0.48) found in element 21, 'conflicts with staff in placements'

The mean of the aggregate scores for the confidence sub dimension is M=25.18 (SD=5.95) pre and 30.25 (SD=6.13) during, showing an overall increase in perceived stressed caused by confidence elements during the first clinical placement. A paired samples t-test was conducted to investigate if they was a significant change in the confidence sub dimension pre and during the first clinical placement (Table 4.15)

There was a statistically significant difference in the overall confidence sub dimensions of the SINS scale for pre-clinical 25.18(SD=5.95)) and during clinical 30.35(SD=6.13); t(49)= -6.048, p<0.001 These results suggest that students perceived higher levels of stress in the confidence sub dimensions during their initial placement than they did before they began (Table 4.16)

Table 4.14 Breakdown of individual elements of the Confidence sub dimension.
This table illustrates all the confidence sub dimension elements and the mean scores pre and during the initial clinical placement, as well Cohen's d effect size. N= 52 unless otherwise stated

| Element | | Mean (SD) | | Cohen's d |
		Pre	During	
17	**Conflicts with peers**	**1.94(0.80)**	**2.21(0.98)**	**0.27**
19	The atmosphere created by teaching staff	2.23(1.02)	2.40(0.98)	0.17
21	Conflicts with staff in placements	2.35(1.08)	2.83(1.09)	0.48
25	Not having enough time for friends and family	3.40(1.33)	3.42(1.19)	0.02
26	The college response to student needs	2.75(1.06)	3.02(0.94)	0.27
27	Conflicts with administrators or managers	2.19(0.91)	2.50(1.00)	0.31
30	Relations with other professionals	2.37(0.89)	2.50(0.92)	0.13
31	Not having anyone to talk to about course problems	2.60(1.00)	2.77(1.02)	0.17
34	Not being sure what is expected on placements	3.43(0.99) **N=51**	3.29(0.94)	0.14
36	Conflicts with college staff	1.92(0.86)	2.23(0.99)	0.31
38	Personal health problems	2.55(1.44) **N=51**	3.08(1.34)	0.53

Table 4.15 Paired samples statistics for the confidence sub dimensions pre and during the first clinical placement
This table illustrates the paired samples summary statistics of the confidence sub dimension pre and during the first clinical placement, which reveals that there is an increase in the mean in the confidence sub dimensions scores during the initial clinical placement.

	Mean	N	Std. Deviation	Std. Error Mean
Confidence pre	25.180	50	5.947	0.8411
Confidence during	30.360	50	5.780	0.8175

Table 4.16 Paired Samples t-test of the confidence sub dimension pre and during the first clinical placement. This table shows the results from a paired-samples t-test of the confidence sub dimension pre and during the first clinical placement. These results show a significant difference in the confidence sub dimension with a p<0.001

	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the difference		t	df	Sig 2(tailed)
				Lower	Upper			
Confidence pre- Confidence during	-5.180	6.056	0.856	-6.901	-3.459	-3.459	49	<0.001

4.4.5 Finance sub dimension

The finance sub dimension of the SINS scale is the smallest with 6 elements, which can all be found in Appendix L. The mean scores for each finance element were taken pre-clinical and during clinical placement to determine Cohen's *d* and the effect size were calculated (0.2= small, 0.5= medium and 0.8= large). Table 4.17 illustrates that all the finance elements experienced an increase in the mean, with the largest

changes found in element 41(*d*= 0.49), 'making less money than friends who are not nurses' and 37 (*d*= 0.42), 'surviving on low income.'

The mean of the aggregate scores for the confidence sub dimension is M=19.15 (SD=6.13) pre and 20.75 (SD=5.09) during, showing an overall increase in perceived stressed caused by finance elements during the first clinical placement. A paired samples t-test was conducted to investigate if they was a significant change in the confidence sub dimension pre and during the first clinical placement (Table 4.18)

There was a statistically significant difference in the overall finance sub dimension of the SINS scale for pre-clinical 19.15(SD=6.13) and during clinical 20.75(SD=5.09); t(50)= -2.210, p=0.032. These results suggest that students perceived higher levels of stress in relation to the finance sub dimension then they did before they began (Table 4.19)

Table 4.17 Breakdown of individual elements of the Finance sub dimension. This table illustrates all the finance sub dimension elements and the mean scores pre and during the initial clinical placement, as well Cohen's *d* effect size. N= 52 unless otherwise stated.

Element		Pre	Mean (SD) During	Cohen's *d*
22	**The lack of free time**	**3.13(1.40)**	**3.5(1.11)**	**0.37**
25	Not having enough time for friends and family	3.40(1.33)	3.42(1.19)	0.02
28	Not having enough money for entertainment	3.25(1.37)	3.46(1.23)	0.21
35	Having no time for entertainment	3.06(1.18)	3.13(1.16)	0.07
37	Surviving on low income	3.83(1.29)	4.25(0.88)	0.42
41	Making less money than friends who are not nurses	2.49(1.33) **N=51**	2.98(1.39)	0.49

Table 4.18 Paired samples statistics for the finance sub dimensions pre and during the first clinical placement
This table illustrates the paired samples summary statistics of the finance sub dimension pre and during the first clinical placement, which reveals that there is an increase in the mean in the finance sub dimensions scores during the initial clinical placement.

	Mean	N	Std. Deviation	Std. Error Mean
Finance pre	19.137	51	6.184	0.865
Finance during	20.745	51	5.094	0.713

Table 4.19 Paired Samples t-test of the finance sub dimension pre and during the first clinical placement. This table shows the results from a paired-samples t-test of the finance sub dimension pre and during the first clinical placement. These results show a significant difference in the finance sub dimension with a p= 0.032.

	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the difference		t	df	Sig 2(tailed)
				Lower	Upper			
Finance pre-Finance during	-1.608	5.196	0.727	-3.069	-0.146	-2.210	50	0.032

4.5 The Top Ten Stressors

In order to highlight the areas first year nursing students found to be most stressful, both before and during the first clinical placement, the top ten common stressors were examined, an approach also used by Liu et al. (2015). Among the top ten common stressors, almost all of them were clinical and education related stressors. These results are similar to the top ten common stressors found by Liu et al. (2015),

with 6/10 of the same results in the top ten in the SINSpre and 6/10 of the same results in the top ten for the SINSd. It can be seen 5/10 of the top 10 common stressors remain the same in both the SINSpre and SINSd (element 1, 7, 9, 18, 33) and these are the common stressors shared with Liu et al. (2015) findings. Although there are changes in the rankings of these elements, it is illustrated by tables 4.20 and 4.21 that clinical and education dimensions are perceived to cause the most stress both before and during the first clinical placement.

These results illustrate several specific clinical and education elements that can be focused on and further investigated during integration with the qualitative data.

Table 4.20 – Common Stressors perceived by nursing students prior to the first clinical placement (n= 47)

Item No.	Stressor	Dimension	Rank	Mean (SD)
33	Fear of failing the course	Education	1	4.13(0.97)
37	Surviving on low income	Finance	2	3.83 (1.23)
9	Fear of making mistakes in clinical practice	Clinical	3	3.83 (0.92)
7	Examinations and placement gradings	Education	4	3.65 (0.93)
39	Feeling responsible for what happens to patients	Clinical	5	3.52 (0.92)
1	The amount of classwork material to be learned	Education	6	3.50 (0.85)
34	Not being sure what is expected on placements	Clinical	7	3.43 (0.98)
25	Not having enough time for friends and family	Confidence	8	3.40 (1.33)
29	Meeting deadlines for coursework	Education	9	3.35 (1.10)
18	Having to much to learn	Education	10	3.27 (1.09)

Table 4.21 Common stressors perceived by nursing students during the first clinical placement (n= 48)

Item No.	Stressor	Dimension	Rank	Mean (SD)
37	**Surviving on low income**	**Finance**	**1**	**4.25 (0.88)**
29	Meeting deadlines for coursework	Education	2	3.83 (0.94)
33	Fear of failing the course	Education	2	3.83 (1.04)
15	Not having enough staff or equipment to meet patients' needs	Clinical	4	3.79 (0.82)
9	Fear of making a mistake in clinical placements	Clinical	5	3.69 (1.04)
1	The amount of classwork material to be learned	Education	6	3.60 (0.89)
7	Examinations and placement gradings	Education	7	3.59 (0.92)
18	Having too much to learn	Education	8	3.54 (0.96)
22	The lack of free time	Finance	9	3.50 (1.11)
28	Not having enough money for entertainment	Finance	10	3.46 (1.23)

The result of the analysis of the four SINS sub dimensions suggests that there was a significant increase in perceived stress in the confidence and finance sub dimensions during the first clinical placement. However, the highest rated common stressors that students perceived before the initial clinical placement were found in the clinical and education sub dimension and this trend continued during the initial clinical placement.

4.6 Correlations between RS and SINS Findings

4) Correlations between Resilience Scale results and SINS results before and during the first clinical placement

Likert scale data is described as ordinal data, and there is discussion in the literature in regards to the use of parametric tests with ordinal data (Sullivan & Artino, 2013) However, because it has been shown that the data are normally distributed with the Shapiro-Wilk test as well as normal Q-Q, histograms and scatter plots that reveal linear data (Appendix I, J & K)(Laeard Statistics 2013); there is support for the use of Pearson's correlation coefficient was used (Sullivan & Artino, 2013 and Statistics Solutions 2017) to determine any relationship between RSpre and SINSpre and RSd

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and SINSd. A description of Pearson's correlation coefficient can be found in Appendix N.

The recent work of Smith & Yang (2017) used the RS and SINS, along with the GHQ-12, to determine the relationship of resilience and perceived stress on Chinese nursing students' psychological well-being and found that there was a weak negative correlation between RS scores and mean total scores for stress for nursing students during all four years of their programme. Taylor & Reyes (2012) study found moderate positive correlations between RS scores and Self-Efficacy scores pre and post- test during a 16-week term.

Correlation of RS and SINS prior to initial clinical placement

Null hypothesis: there is no correlation between RS and SINS data before first clinical placement

There is a statistically significant relationship between RSpre and SINSpre, p= 0.009 with a moderate association of r= -.0.375 (Table 4.22). The direction of relationship is negative meaning that increases in one variable tend to lead to decreases in another (Fig 4.0). An increase in resilience before clinical placement is associated with corresponding decrease in stress, therefore the null hypothesis is rejected.

Table 4. 22 Pearson's correlation of RSpre and SINSpre. This table shows that there is moderate negative association r= -.375 between RSpre and SINSpre

		RSPre	SINSPre
RSPre	Pearson Correlation	1	-0.375**
	Sig. (2-tailed)		0.009
	N	52	47
SINSpre	Pearson's Correlation	-0.375**	1
	Sig. (2-tailed)	0.009	
	N	47	47
**. Correlation is significant at the 0.01 level (2-tailed)			

Fig 4.0 Scatter plot of SINSpre and RSpre

This figure shows the linear, negative relationship between SINSpre and RSpre that suggests an increase in RSpre is correlated with a decrease in SINSpre
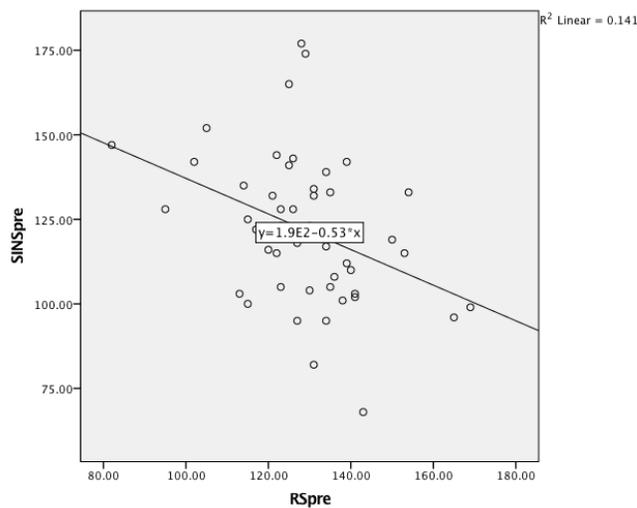
Correlation of RS and SINS during the initial clinical placement

Null Hypothesis: there is no correlation between RS and SINS during the first clinical placement

There is no statistically significant relationship between levels of resilience and perceived stress during the first clinical placement (p= 0.745, r=-.048), therefore the null hypothesis cannot be rejected (Table 4.23). The inverse relationship between resilience and perceived stress found prior to the initial clinical placement appears to disappear during clinical placement (Fig 4.1).

Table 4. 23 Pearson's correlation for RSd and SINSd. This table shows that there is a no correlation between RSd and SINSd with p=0.745

		RSPre	SINSPre
RSd	Pearson Correlation	1	-.048
	Sig. (2-tailed)		0.745
	N	52	48
SINSd	Pearson's Correlation	-0.048	1
	Sig. (2-tailed)	0.745	
	N	48	48

Figure 4.1 Scatter plot of SINSd and RSd
This figure shows that there is no relationship between SINSd and RSd
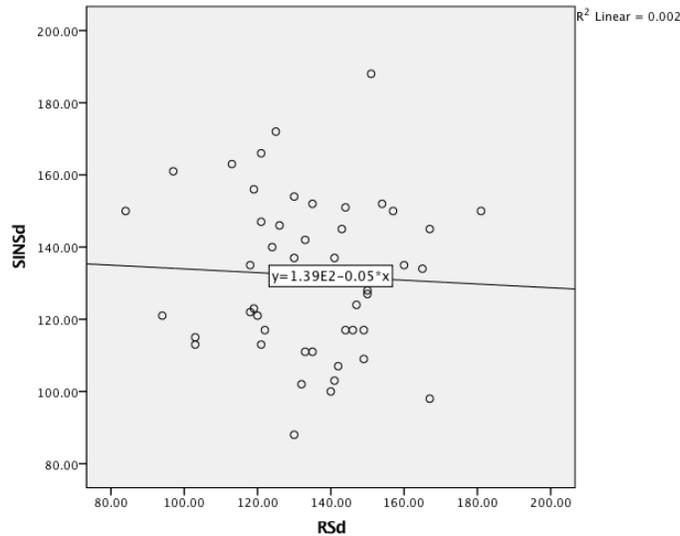
4.7 C-SMARTT App

The original plan was to compare students who had used the C-SMARTT app with those who didn't and with their RS and SINS scores. However, due to the small sample size of students who had filled out both questionnaires and had used the app, only 9 participants were eligible for use in quantitative data analysis in regards to the C-SMARTT app. Therefore, no formal statistical test could be used to analyse the data. The advice of the statistical support team was to look at the data conservatively and present the descriptive analysis for the means and changes scores for the students who used the C-SMARTT App as well as the overall SINSpre, SINSd, RSpre and RSd scores for app users and non-users.

Table 4.24 Change scores for SINS and RS data for individual students that used the C-SMARTT App. This table illustrates the SINSpre, SINSd, RSpre and RSd scores and differences in each score for the 9 participants that used the C-SMARTT App

	SINSpre	SINSd	Difference	RSpre	RSd	Difference
1	109	145	36	142	167	25
2	101	113	12	138	121	-17
3	105	140	35	123	124	1
4	117	100	-17	134	140	6
5	119	117	-2	150	149	-1
6	122	115	-7	117	103	-14
7	123	145	22	130	143	13
8	125	124	-1	115	147	32
9	132	117	-15	131	122	-9

Table 4.25 Mean and Change scores for SINSpre, SINSd, RSpre and RSd for C-SMARTT App users and non-users. This table illustrates the average SINSpre, SINSd, RSpre and RSd scores for C-SMARTT app users and non-app users.

C-SMARTT App Users (N=9)				Non App Users			
SINSpre	SINSd	RS pre	RSd	SINSpre (N=39)	SINSd (N=39)	RSpre (N=43)	RSd (N=43)
118.0 (10.32)	124.0 (15.87)	131.1 (11.49)	135.1 (19.29)	122.7 (24.17)	134.1 (22.63)	129.3 (17.42)	133.9 (20.03)
Mean Change Score: 6		4		11.4		4.6	

This table illustrates that for the C-SMARTT App users (n=9) there was an increase in stress of 6, while non-app users had a mean increase of stress of 11.4. C-SMARTT App users had an increase in resilience of 4 while non-app users had an increase in resilience of 4.6.

C-SMARTT app users had a lower SINSpre (M=118.0, SD=10.32) compared to non-app users (M=122.7, SD=24.17) and a higher RSpre (M=131.1, SD=11.49) compared to non-app users (M=129.3, SD=17.42)

4.8 Conclusion

The findings of the quantitative results suggest that there is no significant change in levels of resilience in student nursing pre-clinical and during the initial clinical placement. However, there is an increase in levels of perceived stress in first year nursing students during their first clinical placement and that the most common stressors are related to clinical and education dimensions, with significant increases in stress in the confidence and finance sub dimensions. There are correlations between levels of resilience and perceived levels of stress that suggest that higher levels of resilience result in lower levels of perceived stress pre-clinical placement; however, no relationship was found between resilience and perceived levels of stress during clinical placement. The sample size for analysis of the data for students who used the C-SMARTT App was too small for formal statistical analysis and therefore the second research question identified at the beginning of the chapter was not answered. The descriptive and changes in mean scores from the C-SMARTT data provide slight support for further research into the possible benefits that an app can have in stress management. The instruments chosen for use in this study are widely used and have been proven to be reliable and valid as discussed in the methodology chapter, with the current study results supported by the literature (Smith & Yang, 2017, Liu et al. 2015; Taylor & Reyes 2012). Table 4.27 (pg. 155) illustrates the participants who have taken part in the QN data collection and clarifies which participants have taken part in the QL data collection, which will be discussed in the next chapter. Chapter 5 will present the findings of the qualitative strand of this mixed methods study, which will be followed by the merging of both the quantitative and qualitative results in the discussion chapter.

Table 4.26 Summary of Key Findings

1) No significant change in levels of resilience before and during the initial clinical placement

2) Significant increase in levels of perceived stress in first year nursing students during their first clinical placement

3) Most common stressors found to be related to clinical and education sub dimensions of SINS, both pre and during the first clinical placement

4) Statistically significant changes found in confidence and finance sub dimensions of SINS

5) Correlations:

    a. RSpre and SINSpre: An increase in resilience before placement is associated with corresponding decrease in stress: Moderate Significant negative relationship between RSpre and SINSpre,

    b. RSd and SINSd: No statistically significant association was found between RSd and SINSd

6) C-SMARTT App data results provided some support for further research into the potential for an app to benefit students on clinical placement in regards to stress management. However, the limited student use of the app results in a cautious approach to these findings. It appears that C-SMARTT App users had a lower level of perceived stress prior to the initial clinical placement compared to non-users. Both users and non-users had an increase in perceived stress during clinical placement, however non-users were found to have a higher mean score and higher mean change score. Both app users and non-users had similar groups has changes in resilience scale scores.

Table 4.27 Number QN and QL participants and C-SMARTT App users

- QN Participants n= 52

- Total number of C-SMARTT App users in the QN sample= 9/52

- QL participants n=7

- Number of C-SMARTT users in the QL sample 3/7

Chapter 5 Qualitative Results

5.0 Introduction

It is to be expected that beginning clinical placement can be a source of stress for student nurses, however students' ability to manage and cope with stress can impact their experience during clinical placement. Developing and building resilience in student nurses has been identified as an important element in successful stress management (Jackson et al. 2007). The quantitative strand of this study used the Stress in Student Nurses (SINS) scale (Deary et al. 2003) and the Resilience Scale (RS) (Wagnild & Young 1990; 1993) to investigate perceived levels of stress and resilience in student nurses before and during the first clinical placement and the qualitative strand utilizes semi-structured interviews.

This study has used a mixed methods approach in order to optimize the strengths of both quantitative and qualitative data analysis, in order to best answer the following research questions:

2) **What are nursing students' and perceptions of stress and resilience during their first clinical placement**

3) **What are nursing students' experiences of using a stress management app delivered by smartphone?**

In this chapter, the qualitative findings resulting from semi-structured interviews will be presented. Interviews were used for collection of qualitative data in this study in order to obtain various perspectives of first year nursing students in regards to their first clinical experience and use of the C-SMARTT App. The interviews took place after the collection of the questionnaire data; however, the questionnaire data had not been analysed at the time of the interviews. Therefore, the interview schedule (Appendix F) was not based on any particular findings from the questionnaires, but based on understanding the participants experience in clinical placement and how this was related to stress, resilience and the C-SMARTT App.

The method of analysis chosen for the interviews was thematic analysis, which is widely used in qualitative research for analysing interviews in the social sciences (Braun & Clark 2006). The conceptual framework used for the thematic analysis of the interviews was that of Braun and Clarke (2006), which provides clear guidelines on how to conduct thematic analysis (Appendix G & O), which helps support rigorous qualitative analysis.

5.1 Participants

Participants that had completed the two questionnaires at both periods of data collection in the quantitative element of this study were contacted by email to volunteer to take part in an interview at the end of April 2016. Out of the 52 students that completed the questionnaires at both intervals 7 students completed the interview. All the participants were female, with ages varying between 17-40, most were employed part time outside their full time university commitments and were in a relationship, with 6/7 participants having no previous experience in the hospital setting. The initial clinical placement is divided into 3 different placements, and at the time of the interviews, students were in their second of the three placement options. Interviews were challenging to schedule due to the students' clinical placement commitments, so the time period for the interviews ran from the middle of May 2016 until the start of July 2016.

Table 5.0 Demographic Characteristics (n=7)

Age		
17-22	**2**	
23-28	**3**	
29-34	**1**	
35-40	**1**	
Relationship Status		
Single	3	
In a relationship	2	
Married	2	
Employment (outside full time university commitment)		
Unemployed	1	
Part-time	6	
Full-time	0	
Previous Hospital Experience		
Yes	0	
No	6	
Didn't specify	1	

5.2 Thematic Analysis

Thematic analysis (TA) is a method for identifying, analysing and reporting patterns (themes) within data and is widely used in the social sciences and in nursing research (Braun & Clarke 2006). TA was chosen as the best method for analysis for several reasons and is summarized in table 5.1. Firstly, it does not required expert theoretical and technical knowledge, and is identified as a foundational method of qualitative analysis, which makes it appropriate for early career researchers (Braun & Clarke 2006). Secondly, TA is not tied to a specific theoretical framework making it flexible for use in a variety of paradigms and frameworks (Braun & Clarke 2006). Therefore, TA is suitable for use within a pragmatic worldview, with a similar focus being on the outcome of the research and what works best to answer the research questions (Creswell 2013). Finally, in this study, TA is applied under the overarching framework of Lazarus and Folkman's (1984) Transactional Model of Stress and Coping and this is illustrated in table 5.3.

One of the essential steps of Braun and Clarkes (2006) guidelines to TA is that researchers are clear and explicit regarding several important decisions that influence

how the researcher uses and interprets the data set (Table 5.1). These five decisions are as follows:

1) ***What counts as a theme****:* According to Braun & Clarke (2006), "a theme captures something important about the data in relation to the research questions, and represents some level of patterned response or meaning within the data set (Pg.10)". Braun & Clarke (2006) stress that an important question to address is what counts as a pattern or theme and what size does the theme need to be, keeping in mind that more instances of a theme does not necessarily mean it is more important.

2) ***Description of data set or detailed account of one particular aspect:*** It is important to decide whether to provide thematic description of the entire data set or provide a more nuanced and detailed account of one particular theme/group of themes (Braun & Clarke (2006). This will help determine what type of analysis and claims can be made about the data set.

3) ***Inductive vs. theoretical thematic analysis:*** Themes or patterns can be identified as inductive or theoretical (deductive). In an inductive approach, the process of coding the data occurs without trying to fit into a pre-existing coding frame or the researchers' preconceptions (Braun & Clarke 2006). A thematic analysis would tend to be driven by the researcher's theoretical or analytic interest in the area, and is thus more explicitly analysis-driven (Braun & Clarke 2006). This choice also effects how the coding process is conducted, with inductive analysis resulting in research questions evolving from the coding process and with theoretical analysis resulting in coding for specific research questions (Braun & Clarke 2006)

4) ***Semantic or latent themes:*** Braun and Clarke (2006) suggest that there are two possible levels at which themes can be identified; semantic or latent. With a semantic approach the themes are identified within surface meanings of the data and the researcher is not looking for anything beyond what a participant has said; however this still involves a progression from description to include a level of interpretation of the data (Braun & Clarke 2006). In contrast, TA at the latent levels goes beyond semantic content of the data and starts to identify or

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examine the underlying ideas, assumptions and conceptualizations (Braun & Clarke (2006).

5) ***Epistemology:*** Braun and Clarke (2006) argue that TA can be conducted within both a realist/essentialist and constructionist paradigms and the choice of paradigm will guide what the researcher can say about their data. An essentialist/realist approach allows for straightforward TA because there is a unidirectional relationship assumed between meaning, experience and language. In contrast, TA from a constructionist perspective, meaning and experience are theorized in regards to social context.

Table 5.1 Thematic Analysis. Braun and Clarke's (2006) decisions for thematic analysis applied to the present study

What counts as a theme?	**Themes were initially coded for any mention of causes of stress, resilience, or C-SMARTT app. There was no requirement for how many times each theme was mentioned for the initial coding process**
Description of entire data set or one particular aspect	Detailed and nuanced account of one particular group of themes within the data, related to a specific question or area of interest within the data. In this case stress in clinical placement, use of the C-SMARTT App and resilience
Inductive or theoretical TA	Theoretical TA- driven by researcher's interest in the area (stress in clinical placement). Coding is done based on the specific research questions.
Semantic or latent themes	Semantic themes- themes identified within surface meanings of the data and the analyst is not looking for anything beyond what a participant has said/has been written. * this process still involves interpretation
Epistemology	Realist/essentialist epistemological paradigm allows for interpretation of motivations, experience and meaning in straightforward manner, which is suited to the pragmatic worldview used in this study.

5.3 Data Analysis and Coding

Upon completion of the interviews, all interview recordings were transcribed onto a word document and then each transcript was read several times before the coding process began. Common keywords and ideas were highlighted in each transcript and memos were made in a journal to keep track of commonalities between participants for later reference. In keeping with the strategy for thematic analysis, all potential codes were kept and put into a mind map format and this was used to help identify sub-themes and items that could be combined

In order to ensure rigorous TA, Braun and Clarke's (2006) 6-phase guide to thematic analysis (Appendix G) was used as a framework for theoretical thematic analysis. *Phase one*, familiarization to the data was completed by reading and re-reading the data and conducting the verbatim transcription. *Phase two* was the process of generating initial codes. This was done by creating a list of initial ideas from the data that were related to stress, stress in clinical placement, resilience and the C-SMARTT App and how participants viewed this experience (Table 5.2). Initial themes were: lack of preparedness, lack of experience, expectations of staff, feeling scared/useless, amount of information/knowledge, difference in mentors, balance, lack of time, missing out/family/children, clinical skills, social support, resilience, not coping, denial, visual learning/video and relaxation/breathing.

Table 5.2 Development of initial themes. This table provides clarification of the initial themes positive or negative impact on student's experience.

Negative Impact	Positive Impact
- Mentor - Interpersonal relationships - Placement preparation - Inexperience - Clinical skills - Burden - Location of placement - Childcare - Balancing act - Time management - Short staffed - Inflexibility of work days - Personal problems	- Resilience - Mentor - Pastoral services - Family - Friends - Activities - Relaxing/deep breathing - Crafting - Exercise - Horses
Not coping	**C-SMARTT App**
- Hard when you are having a bad day - Stress gets too high can "explode" - When I hit a high dose (high level of stress), I can hit the roof	**Likes** - Breathing exercises - Coping mechanisms - Accessibility - Prompts - Autonomy **Wants** - Videos - Definitions - Student perspectives of different placements - Student experience

Phase 3 is searching for themes, and this involved taking the long list of initial codes and sorting them into potential themes and collating all the relevant coded data extracts within the identified themes and considering how different codes may combine to form an overarching theme. Another mind map was used to visualize all potential codes and help group them together and recognize patterns. This was further divided into two mind maps, one for stress (Fig. 5.0) and one for the C-SMARTT App (Fig. 5.1). At the end of this phase, there was a collation of possible themes and subthemes: (Stress) preparedness, expectations, experience, balance, social support, coping & resilience, and not coping; (C-SMARTT App) coping, likes, suggestions. At this

point, review of these two mind maps resulted in a third and final mind map, which was made to distinguish Resilience & Coping as the final theme (Fig. 5.2)

Fig 5.0 Mind Map 1: Sources of Stress

Fig. 5.1 Mind Map 2: C-SMARTT App
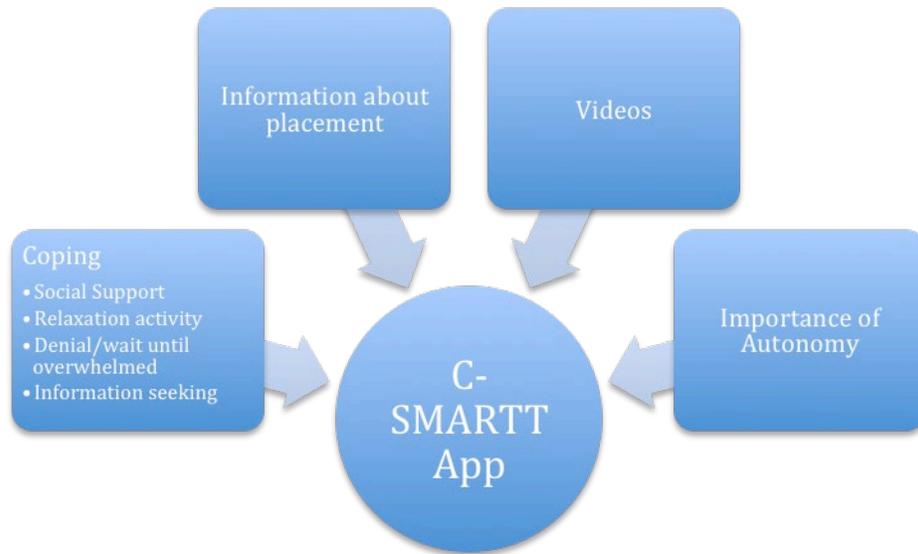
Fig 5.2 Mind Map 3: Resilience and Coping

Phase 4: this phase takes the set of candidate themes and begins revising these themes. This phase involves two levels of reviewing and refining themes. Level one involves reviewing at the level of the coded data extracts for each theme and deciding if they form a pattern. There were patterns in each interview that separated the data into three overarching themes; causes of stress, resilience and coping and C-SMARTT App, this was partly due to the design of the interview schedule. The second level requires the same process but in relation to the whole data set, and it was found that the individual themes as well as those of the whole data set were reflected in these three themes, and subsequent subthemes.

Phase 5: Define and further refine themes for analysis. This is done by going back to collated data extracts for each theme and organizing them into a coherent and inconsistent account (Braun & Clarke 2006). For each individual theme, a detailed analysis needs to be conducted and Braun and Clarke (2006) stress the importance of considering how each theme fits into the overall story in relationship to the research questions (table 5.3). The final phase is the reporting phase that is presented in the next section, 5.4.

Table 5.3 Final outline of themes and subthemes. This table outlines the final themes and subthemes in relation to Lazarus and Folkman's (1984) Transactional Model of Stress and Coping (highlighted in grey)

Sources of Stress	Resilience & Coping	CSMARTT App
Primary and Secondary Appraisal	**Coping Effort and outcomes**	**Coping style: information seeking**
Course - Clinical skills - Placement Preparation - Course management	**Social Support** -Family and friends -Friends on course - Mentors - Uni staff	**What worked** -Autonomous -Breathing exercises -Coping mechanisms -Quick to access
Relationships -Mentors - Nursing staff - Family	**Recreation** -Exercising - Relaxing -Hobbies	**What didn't work** -Difficult to navigate -Unsure how to use -Lack of information
Personal Stress - Time management - Feelings of expectation - Inexperience - Feeling like a burden - Developing interpersonal relationships	**Not Coping** - Denial - Overwhelmed - Exploding **Resilience** - Yes or No - Effected by: personal life, taking on too much, not enough time	**Improvements** -Easier to use - Videos of skills -Student perspective of placements - Definitions of nursing terms

It became obvious that each interview followed a similar pattern and the qualitative data from this study was categorized into three themes; Sources of Stress, Resilience and Coping and C-SMARTT App. Through the process of coding, searching for themes, reviewing themes and defining and naming themes as described above, there were several subthemes which were found to fit under each of the three main themes and a reflective account of the TA process can be found in Appendix P. Each of the themes will be illustrated below with direct quotations taken from the transcripts.

5.4 Report of Qualitative Results

The themes that were revealed during the qualitative data analysis will be discussed below and illustrated with quotes from the interview transcripts. Table 5.4 highlights the individual characteristics of each interview participant.

Table 5.4 Interview Participant Characteristics. Participants that used that C-SMARTT app are highlighted.

Participant Number	Gender	Age	Previous hospital experience	Relationship Status	Employment status (outside university commitments)
1	Female	23-28	None	Partner	Part time
2	Female	29-34	None	Married	Part time
3	Female	23-28	Unspecified	Married	Part time
4	Female	35-40	None	Single	Part time
5	Female	17-22	None	Single	Part time
6	Female	17-22	None	Single	Part-time
7	Female	23-28	None	Partner	Not employed

5.4.1 Sources of stress

The data analysis revealed that there was significant stress caused among the participants from the course and clinical placement. Many participants reported feeling overwhelmed by the amount they needed to learn, and felt that their lack of experience caused stress both before and during clinical placement. Not all participants had issues with relationships with mentors and/or nursing staff however, for those that did have issues it was found to be a large source of stress. Each participant had personal causes of stress and many of these related to the clinical setting in terms of time management, feelings of expectation and feeling like a burden. All the participants with children felt that they missed out of family time and experiences, which caused guilt and stress.

Clinical skills

One of the focuses of the interviews was on the participants experience in clinical placement, as this is directly related to the research questions. There was a general consensus from students that performing clinical skills and being directly involved with patient care for the first time was a source of stress when combined with their own expectations and those perceived from their mentors and other health care workers.

> "My first placement…. I loved every single day. And I went into the care home and they, it was like a baptism of fire. It was hellish… and the patient was end of life care and died while I was doing the bed bath. And then they're like oh, just move on and do this patient instead." (P2)

> "So it was quite, because they were so busy it was quite scary because I'm still learning and new. I was saying oh gosh, I hope I'm going to be quick enough and stuff. Plus you don't want to rush people. It was older people and they you feel really bad because you're taking the time to, because you think it's the right thing to do because they're old and you don't want to rush them and then there's somebody saying oh blah-blah-blah, this needs doing, that needs doing, you need to… breakfast is being served, and such-and-such needs a shower. It's like, well, I'm trying my best here!" (P4)

> "And it was like go and do obs on such-and-such with and without the oxygen on. It was like that's quite a big deal if they are needing oxygen and if I say the wrong thing. So I found it a bit stressful because I'd not done it before." (P4)

> "I'm really stressing about that because the whole thing of not wanting to rush people because again it's older people, but it's going to be a lot busier environment, plus you're going to be doing more nursing skills. I'm a bit daunted what to expect of how much are they going to expect you to go in and do it yourself." (P2)

When the participants were discussing clinical skills, there was a general consensus that learning and doing skills was a source of stress. Some participants were focused more on their personal role, for example, doing skills incorrectly or not knowing how to do a particular skill. However, others were more concerned with the impact their clinical skills had on patient care, for example, making patients feel rushed or not cared for.

Placement preparation

Feeling unprepared for clinical placement was a common sentiment from the participants, with issues such as poor communication contributing to feeling unorganized and resulting in increased stress.

> "I think this course is really poorly managed. I find that, I just found out today where I'm going on placement, when I start next Monday. So to try and organize things like that is, for childcare and things like that, it's virtually impossible." (P3)

> "Because that's when I get really frustrated, is when I don't feel prepared because I haven't seen enough. So I get really nervous, like I would be really nervous going into community because I haven't seen it before." (P1)

> "It kinds of adds anxiety into what you're doing. I think. And then I've heard a lot of people didn't even manage to get hold of people before their first day So they're going into a ward where they actually have no idea if anyone knows they're coming or they don't know they're meant to be coming. They don't know they're meant to have students." (P1)

There was agreement among participants that they didn't feel prepared for clinical placements. Some participants were concerned with a lack of preparation for what they were going to expect during their placement, for example on a community placement vs. a hospital ward. However, some participants expressed no concern for this but found that the practicalities of each placement, such as the location, transport to get there and finding flexible childcare had a large impact on their personal lives and levels of stress.

Relationships

Developing relationships with mentors and other nurses was found to be both a source of support and sources of stress for the student nurses interviewed. Those that had supportive relationships with their mentors continued on to discuss a more positive experience in their clinical placement, whereas those who were unable to develop a positive relationship with their mentors or other staff, for a variety of reasons, described their clinical placement in a much more negative manner.

> "…Because everyone is still supporting you and wanting to make sure that you did do well. So I think in a way I was quite lucky that my mentor was really supportive." (P1)

> "I've had conversations with friends where they don't feel as supported and it's literally like, across from where I am, in a different ward. They don't feel like they're getting the same experience. "(P1)

> "But I do feel like it's the interpersonal relationships personally that I struggled with because they were so set in their ways." (P2)

> "My mentor, although she seems like a lovely person, doesn't seem like she really can be bothered with a student." (P3)

> "Some people are just like, look at you like you're an idiot. But other times I do think I should know this, and then that makes you feel really uncomfortable and then you get really uptight and think should I ask, should I not ask? And then if somebody random does make you feel like an idiot, than it makes you even more anxious about that." (P4)

> "My first placement, she was great. She was on it and for my first placemat I couldn't have asked for a better mentor… and then my second one, she , I didn't' really spend much time with her as what I'd like to, to be honest, because I was just left with the care workers because in a care home, she was just mainly doing paperwork." (P5)

"(the staff and my mentors) They were so encouraging and helpful, even though I was a student they acknowledge that but also they didn't put me down for being the student." (P7)

Overall, the interview participants had generally positive experience with their mentors and building relationships with them. However, several participants mentioned feeling lucky about this or referencing fellow students who have struggled with relationships with mentors. This suggests that students are prepared for and almost expect negative experiences with mentors.

Personal stress

One consistent theme across the interviewees was the influence of their personal lives and how this impacts their perceived levels of stress and experience in clinical placement. Many participants mentioned the difficulty they had finding a balance of schoolwork, clinical placement and time for friends/family, with little or no time for self-care or maintaining their own interests. Participants with children especially struggled with missing out on important events and managing childcare with shift work.

"I think it's the balance of everything. I work two jobs as well as being at uni, as well as doing placement, because I'm an adult returner. So it's quite difficult when you already have a life that you have to support at the same time." (P1)

"At the moment I'm working part-time. I work every weekend, so yeah, it's hard, and definitely my sons suffering. He's been playing up the last wee while because he's not happy that I'm gone and is crying." (P3)

"Definitely a lot harder that I thought it was going to be. Not even the work itself but the management of childcare and my time is definitely hard going." (P3)

"It is hard. I do struggle at times. Sometimes it's all right, but I feel like even working three days on shift from placement, the rest of the days is just, there's always something to do for uni, there's always something to do at

home. Housework this, that, and they you know, it's a bit of a pain to balance. And then obviously I feel like I lack sleep as well." (P5)

"It seems to be my hours are always put on things when, I know they can't help it because they've got to fit me it and other students as well, and I always just tend to be missing out on stuff for my daughter. Like Gala Day, I'm missing it. She's in it. Her sports day, and it's just stuff like that, that does get to me. That does upset me a bit." (P5)

"That was really difficult actually, like for during my first placement we had a case study due, so you have your case study, you are working thirty odd hours a week, you are exhausted and then you also have all your activities to do in your book and trying to find tie with your mentor on a busy ward and then like you want to enjoy yourself too but you are too tired, it was very hard to balance everything." (P7)

All participants found that the balance of personal life with clinical placement and course work was challenging and stressful. There were noticeable differences in perspectives in those participants with children as they were less focused on how to manage completing all their course requirements and more concerned with missing out on important life events with their children and partners.

5.4.2 Resilience and Coping

The importance of having social support to help cope with stress was identified as crucial for all participants, and many stated that they relied heavily on their partner or family for support. It was also clear that having a social network within the course provided participants with support in terms of having friends who could understand exactly what they are experiencing in their course and placements. Many participants felt that exercising or taking part in other hobbies they enjoyed was important in managing stress. However, several participants highlighted that recreational activities were the first to get cancelled if they felt they had a lack of time due to course demands. There was also some mention of not coping or lack of coping skills by some participants, in response to feeling of being overwhelmed. Participants were asked

directly if they felt they were resilient, and individuals' descriptions of personal resilience were often connected to ability to cope with stress.

Social support

Support from family, friends and other students on the course were essential for helping the participants cope with issues of stress from both clinical placement and other areas of their lives. This is further supported by McIntosh & Shaw's (2017) recent report on student resilience as social support was found to be a key external factor in promoting students resilience. It was important for students to not feel isolated in their feelings and to know that they have an outlet to discuss common issues with other students.

> "Yeah it was nice to have another student to talk to and have that, well it's nice to not be the only one there." (P2)

> "I do have friends that I talk to, and it's good to vent to your friends." (P2)

> "We have a group chat, and we talk a lot on that when we're on different placement, because it's quite hard to see each other. … so our group chat massively helps the fact that if one of us has had a really bad day, the rest of us are like, come on." (P1)

> "I think that helps everybody kind of know that they're not alone, that there are going to be times that everything is really difficult. You're learning things you've never thought before." (P1)

> "My PDT helps me a lot, he's great. If I had a question about something on placement or about the module I just email the lecturer and they usually get back to you, or people on Facebook group are always posting the same questions so you can get information that way as well." (p7)

> "One of the girls is really supportive of me. Certainly, I have a learning difficulty, so she's really supportive of the theory side of things if I need anything I can phone her, even if it's just to have a rant." (P3)

Social support is an essential factor for improving student's resilience and managing stressful experiences (McIntosh & Shaw 2017; Crombie 2013) and most of the interview participants found that having friends to talk to, particularly fellow nursing students was an important way to debrief about difficult experiences and helped them to de-stress in regards to clinical placement or course work.

Recreation

Recreational activities and hobbies were important for participants in managing balance in their lives and to help manage stress. However, some participants felt that although they would like to have time for themselves, it was the first thing to be excluded. This was especially relevant to those participants with children.

> "I've got a horse. So that's my hobby. So every day I'll get to go and see him for a little while, and then obviously I have got time I'll go for a nice little ride. So that's my time" (P5)

> "I play rugby, I enjoy singing, playing my ukulele eat chocolate or even just hang out with" (P7)

> " I just want to sit down but I'm feeling too wound up, having that, here's something you can do to calm down, sitting and crossing-stitching, I do try and do it when I can" (P2)

> "I don't have time. I have no time" (P3) * in regards to having any hobbies

Many of the participants had hobbies or recreational activities that they enjoyed, however found it difficult to maintain during clinical placement. Although several participants mentioned specific activities they enjoyed to de-stress, most followed this up with a caveat of 'when/if they had time'. This suggests that maintaining recreational activities, although important for stress management and personal well-being, is difficult and often disregarded.

Not Coping

Many of the participants mentioned times when they felt overwhelmed by school work/clinical placement, personal issues or both. This often appeared to occur when student felt they did not have enough time to complete everything they felt was expected of them, often leading to denial and/or breakdowns.

> "I've not been, people have said to me to go, but I've never gone. As I've said, I've got so much on to try and even find a minute just to go and see anybody about anything is hard enough" (P3) * in regards using university support systems

> "There have been a couple of things…I did like 3 night shifts and then stayed up the next day so I could sleep at night time. One of the boys in my building came in, and I live on the sixth floor, and he was going to the first one. He pressed all the buttons on the lift, so I had to stop. And that really ticked me off; I didn't speak to him for 2 months… I had a bit of a shout at the guy in Asda, but that's as far as my stress levels would go." (P6)

> "But sometimes it will get on top of me, like if I've got assignments or I've got a placement, I've got this, I've got that. Sometimes I'll just have a little meltdown." (P5)

Resilience

Resilience is associated with how students cope with stress and due to the role of resilience in this study; each participant was asked directly if they felt they were resilient. Although 5/7 participants answered yes, many of the participants then contradicted themselves in their answer with several then suggesting that they didn't cope particularly well with stress and there is a possibility that not all participants had an understanding of the meaning of resilience.

> "I like to think I'm resilient. Sometimes if someone catches you on a bad day, it can still affect you." (P2)

"I try to be but I think, like most people, when it gets too much, you're just kind of like, ah no! Everything like... I need pressure to do stuff." (P1)

"No, I take on a lot and then I buckle under and I am like 'oooo' which is probably not the best thing to do... yeah I take on a lot of things and then can get overwhelmed." (P7)

"Yeah...but I won't relax all day ...sometimes it will get on top of me." (P5)

"Yeah, I think I am very good at (moving forward in a positive way in response to stress), and I think you know, sometimes I get to the point when I am too stressed." (P6)

Interestingly, there appeared to be a lack of confidence in the answers that participants gave when asked if they felt they were resilient. Even in those participants that said yes, they often followed up with a 'but' or another example of how they still get too stressed or felt they were not managing.

There were several references from the participants to times when they felt that they were not coping with their stress and felt overwhelmed, however, most participants did not give specific examples of how this manifested. For some students, they felt they didn't have enough time to access the universities resources even though they felt they might benefit from them. While other students admitting to having 'meltdowns' they did not mention reaching out to support resources.

5.4.3 C-SMARTT App

Not all interview participants had used the C-SMARTT App; however, they were able to provide insight into why they chose not to use it and what type of app they would like to see developed. For the three students who did use the app, what appealed to them was that using the app was private and quick to access. The breathing techniques and information on coping mechanisms was found to be helpful. There were several complaints that the app was difficult to navigate and that students were not sure how they were supposed to use the app. Also, it was mentioned that the information on the app was not what a particular participant was looking for. The

suggestions for improvement for the app were similar from most participants. They suggested that the most helpful element to be included would be short videos of clinical skills and a student perspective of different clinical placements that would help them prepare for being on different placements. It was also suggested that having common nursing terms and abbreviations would be helpful as some students felt overwhelmed by the amount of abbreviations and new words encountered on placement. The overall consensus was that the CSMARTT App requires some changes and improvements but all students felt that accessing information via an app on their smartphone was useful and something that they would be interested in. The reflection in section 7.7 (page 223) provides a detailed reflection on some of the issues identified in designing and collecting data with the C-SMARTT App.

What worked

> "I like the coping mechanisms it had there. I had a look at them. And the way you could go for help if you needed to (P2)"

> "Sometimes it doesn't occur to you to do something really simple, and having seen, its common sense. You think you should know to do that, to try and calm down or try and unwind or whatever, but seeing it on the screen, it's prompting you to think a bit, which is quite good (P2)"

> "Quite often in breaks on placement and you know all the staff know each other and you're sitting there and I think the default position when you're feeling awkward and embarrassed is you're on your phone. So it's quite nice, because when you're alone with your thoughts in your break and you think oh no, and if it's been a bad day, it's an opportunity to log in." (P4)

> "It's in your own control and you're not feeling as though you're demonstrating weakness or you're not coping by going to somebody else you know?" (P4)

What didn't' work

> "I downloaded it and had a quick look, but I didn't really understand how to work it or nothing (P5)

"I think that some of those things would be really good, I didn't know much about it and how to work it (P4)

Suggestions for Improvement

"Information on how to do clinical practice… videos would be helpful because I'm a visual person (P3)"

"I think videos for student nurses are really good because I think as a nurse you're really practical." (P1)

"Maybe even a thing under, maybe where you put a search, whether you type something in for a search, and maybe that thing at the bottom having comments on it. So people that know about it or that's tried a clinical skill to add comments. So it's a reflection thing." (P5)

"Something like the student's experience in that area of where you are going to because it can kind of help you if you are feeling a bit anxious about what to expect." (P7)

5.5 Conclusion

Using thematic analysis of interview data served the purpose of the qualitative strand of this study. Following Braun and Clarke's (2006) guidelines for thematic analysis and checklist of criteria for good thematic analysis (Appendix G & O) have resulted in a clear description of how TA was conducted. The three themes of Causes of Stress, Coping & Resilience and C-SMARTT App separated the data and allowed for in-depth analysis of each theme, which addressed the research questions of this study. This thematic analysis has highlighted several concepts related to stress in the first clinical placement which will be merged with the QN results in chapter 4 for a complete mixed methods analysis and discussion of results in the next chapter.

Table 5.5 Summary of Key Findings

The 3 main themes to come from the interviews were: **Sources of Stress, Coping & Resilience** and the **C-SMARTT App**

Sources of Stress were found to be related to

-Performing clinical skills

-Feeling unprepared/inexperienced

-Difficulty balancing coursework/clinical placement and personal life

-Challenges with mentors or other staff, however most participants revealed that there experience was positive compared to their expectations

Coping & Resilience

-Social support was essential for coping, particularly having friends from the nursing course

- Recreation was cited by most participants as being important for managing stress however this was viewed as an extra which was often dropped when there were issues with time management

-Participants admitted to not coping, or feeling overwhelmed, however not much detail was given regarding the outcome of 'not coping'

-5/7 participants stated they were resilient, however this was often met with a contradictory or inconsistent description

C-SMARTT App

-Not all participants used the app but all liked the idea of having an app for use in clinical placement

-Those that used the app liked the autonomy, accessibility and relaxation techniques, but thought it could be easier to use

-Suggestions for improvement from both users and non-users were: videos of clinical skills, student experience of placements, definition of terms and overall improve ease of use.

Chapter 6: Integration of Quantitative and Qualitative Analysis

6.0 Introduction

One of the most crucial steps in a mixed methods study is the process of data integration, which allows for final conclusions to be drawn from the merging of both the QN and QL strands (Guetterman et al. 2015). In this study, data were collected in a parallel convergent design; therefore, both the QN and QL data were collected and analysed separately prior to data merging and integration. This was done using the Resilience Scale (Wagnild & Young, 1993) and the Stress in Student Nursing Scale (Deary et al. 2013) before and during the first clinical placement and semi-structured interviews. This chapter will discuss the specific purposes for utilizing a mixed methods approach, a framework and rationale for data integration and finally the results of merging the QN and QL strands of this study.

6.1 Rationale for Mixed Methods

In recent years mixed methods research has joined quantitative and qualitative research methods as the third methodological approach in the social sciences (Bergman 2010). Although there is much debate in the literature about the role of mixed methods research, it can be argued that the use of a mixed methods approach can address a variety of research questions and this can allow for interpretations to be made about the study that could not be achieved by the use quantitative or qualitative data alone (Bergman 2010).

There were several purposes for utilizing mixed methods in this study, the overall purpose was to provide completeness, as the aim of mixed methods research is to provide more complete understanding than could be obtained by the QL and QN strands alone (Bergman 2010). However, using a mixed methods approach in this study was also done in order to provided complementarity, expansion and confirmation, these concepts are illustrated below in table 6.0.

Table 6.0 Purposes for mixed methods with examples from the current study, based on several sources (Bergman 2010, Bryman 2006 & Greene et al. 1989).

Purpose	Description
Completeness	Used in order to make sure a complete picture of the phenomenon is obtained. The full picture is more meaningful than each of the components *Example: Data integration joint display (Table 6.4) illustrates connection of top common stressors, stressors with the most dramatic change score and how these connect to the QL themes with the use of participant quotes.*
Complementarity	Used in order to gain complementary views about the same phenomenon or relationships. Seeks elaboration, enhancement, illustration and clarification of the results from one method with the results from the other method *Example: stressor with dramatic change score 'having too much to learn' is further enhanced by direct quotation "it just feels like there is so much to know and it's quite overwhelming"*
Expansion	Used in order to expand or explain the understanding obtained in a previous strand of the study *Example: use of common stressors i.e. 'fear of making a mistake' in clinical practice (QN) expanded upon by use of direct quotation from interviews (QL) and connection to QL theme*
Confirmation	Used in order to assess the credibility of inferences obtained from one strand *Example: statistically significant increase in confidence & finance sub dimensions during clinical placement (QN) confirmed by student experiences using direct quotations from interviews*

6.2 The Process of Integration

The process of data integration was conducted in order to meet the goals set out in table 6.1. There are several levels of integration that can be utilized and these are outlined by Fetters et al. (2013) as; integration at the study design level, the methods level and the interpretation and reporting level.

6.2.1 Integration at the design level

At the design level, a convergent parallel design was used therefore, integration is planned to occur after the data collection and analysis of the QN and QL strands have been completed.

6.2.2 Integration at the methods level

Integration at the methods level can occur in several ways, outlined by Fetter et al. (2013) as; (1) connecting (2) building (3) merging and (4) embedding.

Table 6.1 Integration through Methods, based on Fetters et al. (2013)

Approach	Description
Connecting	One data set links to the other through sampling
Building	One database informs the data collection approach of the other
Merging	The two databases are brought together for analysis
Embedding	Data collection and analysis link at multiple points

In this study, integration occurred through several of these approaches. According to Fetters et al. (2013), integration through *connecting* occurs when one type of data links to the other through sampling. This occurred as the participants invited to participate in the qualitative interviews were selected from the population of participants who had taken part in both questionnaires. Integration then took place through *merging* of data, which requires the two databases to be brought together for

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analysis and comparison (Fetters at al. 2013). This was done by comparing the results of the RS scale and SINS scale (the top 10 common stressors and the stressors found to have significant differences before and during clinical) to the themes of the qualitative interviews.

6.2.3 Integration at the interpretation and reporting level

Integration of QN and QL data at the interpretation and report level can occur by using several approaches as outlined by Fetters et al. (2013); (1) integrating through narrative (2) integrating through data transformation and (3) integrating through joint displays. The integration process of this study will be done through narrative and joint displays.

Integration through narrative can be done in several ways; weaving, contiguous approach or the stage approach (Fetters et al. 2013). Although in reporting of this study, QN and QL findings are reported separately, following the contiguous approach (where QN and QL findings are reported in different sections), the narrative description of the integration will be done by the weaving approach in this chapter, as this involves writing both QL and QN findings together on a theme-by theme or concept –by concept basis (Fetter et al. 2013). Integration will also be demonstrated through several joint displays. This allows data from the QN and QL strands to be brought together visually to illustrate how new insights are gained beyond that of the information gained from the separate QN and QL results. This is most commonly done by a statistics-by theme and side-by-side comparisons (Guetterman et al. 2015) and in this study has been done by a statistics-by-theme approach for the SINS, RS and C-SMARTT app and then by using a side-by-side comparison to integrate all of this data together.

6.3 Interpretation of data integration

Fetter et al. (2013) discusses the importance of coherence between the QN and QL results and this assessment can lead to three outcomes; confirmation, expansion and discordance which are closely linked to the purposes of conducting mixed methods research as described earlier in this chapter. *Confirmation* occurs when the findings

from both the QN and QL data confirm the results of each other, which leads to greater credibility of the results (Fetter et al. 2015). *Expansion* occurs when the findings of the QN and QL data expand on the insights of the research topic by addressing different or complementary aspects of the central phenomenon (Fetter et al. 2015). Finally, *discordance* occurs if the QN and QL findings contradict or disagree with each other. These three outcomes will be used in this study as a framework to discuss the integration findings. A summary of the data merging process is illustrated below in Fig 6.0.

Figure 6.0 Summary of the data merging process, from relating the purpose for utilizing a mixed methods approach to the interpretation of data integration.
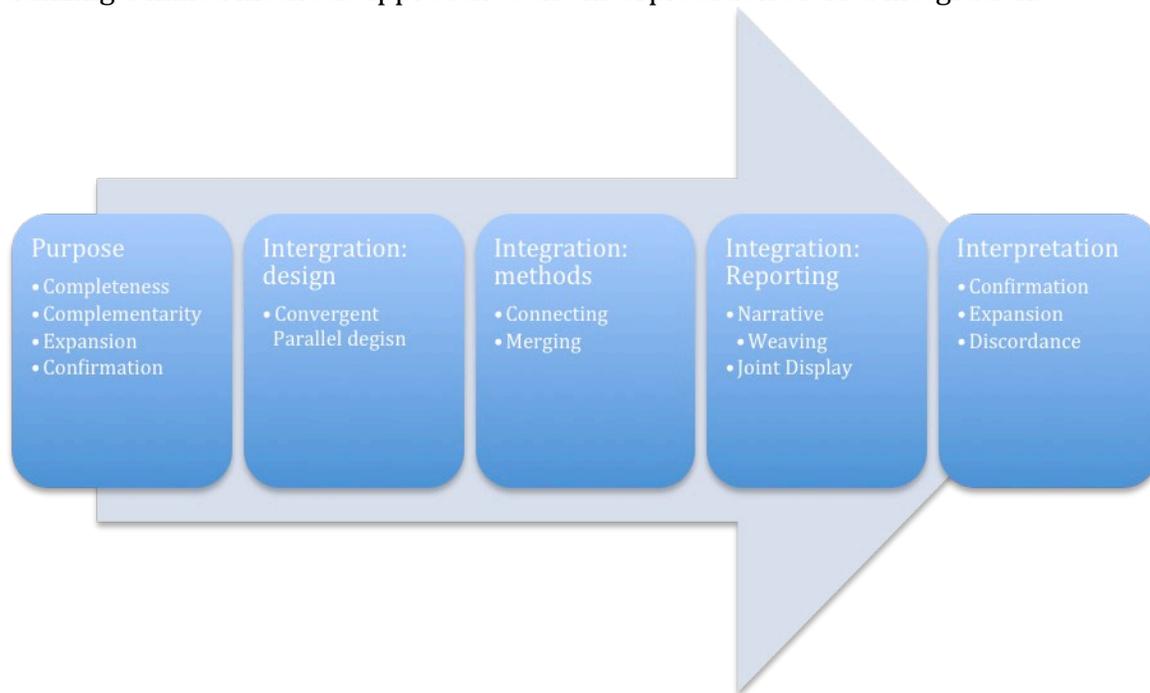
6.4 Integration of QL and QN strands

The method of merging the QN and QL strands of this study for integration began by using the findings of the quantitative data. This was done by focusing on the elements of the SINS subscales, from the QN findings, that were found to be in the top 10 common stressors. Then elements from the confidence and finance sub dimensions with the most significant change scores were included (as a paired t-test resulted in

statistically significant changes in these sub dimensions). The final layer included looking at which elements from all sub dimensions were found to have significant effect sizes. These were used as the starting point of the data integration process and then data from the qualitative interviews was then explored and used to confirm, expand, and identify any discordance based on these elements with the addition of all three themes from the QL findings. A reflective account of the integration process can be found in Appendix Q.

6.4.1 Narrative integration

The narrative integration was done by weaving the QN and QL data by discussing the findings using the framework of confirmation/expansion and discordance to discuss the themes of sources of stress, resilience and the C-SMARTT app.

6.4.2 Confirmation and expansions

Increase in perceived stress

Increase in perceived stress during the first clinical placement was found during the QN data analysis, with clinical and education elements being the most frequent in the top 10 causes of stress both pre and during clinical placement. This was confirmed by analysis of mean change scores and effect sizes for the clinical and education sub dimensions and further expanded upon during the analysis of the QL interviews which described issues such as; learning clinical skills, placement preparation, the amount of coursework and time management as sources of stress.

Although clinical and education elements were consistently in the top 10 common stressors both pre and during clinical placement, there was significant increase in stress in the confidence and finance elements. These areas include conflicts with staff, peers and university staff as well as the college response to students' needs as well as worries over surviving on low income and lack of free time. These concepts were confirmed and expanded upon during analysis of the QL interviews with participants referring to lack of time, conflicts with staff and mentors and lack of support while on their clinical placement.

Resilience and coping

Of the 7 interview participants, 5/7 identified as being resilient, and 4/5 of them were found to have increases in their RS score. This was further expanding upon during the QL interviews in exploring participants coping mechanisms and resilience, which suggests that social support, particularly from other nursing students is an important source of support for almost all of the participants. Due to the how the interview questions were presented to participants, it is possible that not all participants understood the concept of resilience and this is discussed in the reflection in section 7.7 pg.223.

6.4.3 Discordance

Impact of mentor

Although most of the findings provided confirmation of the QN and QL results there were several areas of inconsistency. The first was the impact of the mentor on the student experience. This scored highly during analysis of the SINS scale as a source of stress, but the interview data revealed in fact many students had positive experiences with mentors and this had an overall positive impact on their clinical experience.

Resilience

The process of data integration also revealed that those students (5/7) who identified as resilient had increases in their levels of perceived stress during clinical placement while the 2 participants who did not identify as resilient had decreases in their levels of perceived stress during clinical placement. This is contradictory to the QN findings, which suggest that students with a higher level of resilience have a lower perception of stress during clinical placement.

6.4.4 Joint display

Four joint displays were designed in order to provide illustration and clarification in regards to the integration process. Furthermore, these visual tools

complement the narrative discussion. Two joint displays were designed for sources of stress and the SINS scale, and this was due to the in-depth analysis of the subscales of the SINS. Table 6.2 shows the participants SINS results and change scores from pre-clinical and during clinical along with an excerpt from their interview, which supports the QL theme: sources of stress. Table 6.3 provides a detailed look at the subscales of the SINS and how these results are integrated into the subtheme of sources of stress which are: course, relationships and personal stressors.

The next joint display, table 6.4, illustrates the results of the RS for each interview participant and how this fits with the QL theme of Coping and resilience.

Finally, the last joint display shows participants views on the C-SMARTT app and what improvements they would like to see and which participants used the app while on placement (table 6.5). It is important to note that conducting data integration for data on the C-SMARTT app was not possible because there was no QN data collected. However, a joint display was designed for the C-SMARTT data (table 6.5) to illustrate the results of the QL strand. This was done so that this data could be seen alongside the other joint displays to allow data from all parts of this study to be viewed together resulting in a full picture of this study.

Table 6.2 Data integration joint display: SINS Scale and Theme: Sources of Stress.
This is cross-case comparisons using the 7 interview participants to integrate the QN scores and QL assessment based on the SINS results and the QL theme of: sources of stress with examples of excerpts from the interview data

	P1	P2	P3	P4	P5	P6	P7
Theme Sources of stress							
Course	"Because that's when I get really frustrated, is when I don't feel prepared because I haven't seen enough, so I get really nervous"	"We've got the practice information sheets that they give us, but sometimes they're lacking quite a bit of information"	"I don't think you're prepared for placement at all"	"becaus e they were so busy, it was quite scary because I'm still learning and new"	"just feels like there is so much to know and it's quite over-whelming" you just think how am I even going to get to this point to know enough"	"I had quite good relationship s with my mentors at the hospital and my community placement as well"	"the staff and my mentors, they were so encouragin g and helpful"
Relation-ships	"Everyone that worked there just seemed to want to help us…everyone there seemed like they wanted us to do well"	"I don't know how to improve it. It was just a, you're doing this wrong. Not how to fix it. It was all negative, she couldn't say a positive thing about me."	"I think this course is really poorly managed. I find that, I just found out today where I'm going on placement, when I start next Monday, so to try and organized things for childcare and things like that, it's virtually impossible"	"I was quite nervous about some of the nursing stuff I did" "I didn't see a lot of my mentor, but she was there (if I needed her) but I didn't' really work with her"	"I'm just worried for the future of whether I get put in a placement far away, just because of childcare you know?" "It is hard. I do struggle at times…there's always something to do for uni…housewor k, this ,that, and then you know, it's just a bit of a pain to balance. And then obviously I feel like I lack sleep as well.	"For my first placement, I couldn't have asked for a better mentor… and then my second one, she, I didn't really spend much time with her as what I'd like to…she was mainly doing paperwork"	"you have your case, study, you're working 30 hours a week, you are exhausted … and then like you want to enjoy yourself too, but you are too tired. It's hard to balance everything"
Personal	"I think it's still managing the balance of everything, and I think that's with everybody" "I work two jobs as well as being at uni, as well as doing placement…it's quite difficult when you already have a life that you have to support at the same time"	"I do feel it's the inter-personal relationship s personally that I struggle with because they (staff) were so set in their ways"				"I think time managemen t is really hard"	
SINSpre SINSd SINS change	123 145 +22	104 142 +38	103 127 +24	122 115 -7	100 126 +26	105 109 +4	142 88 -54

A higher SINS score equates to a higher level of perceived stress. Most participants had an increase in stress, and those with a decrease in stress tended to have a higher SINS score prior to clinical placement than those who had an increase in perceived stress. An increase in SINS score (+ change) represents an increase in stress during the initial clinical placement.

Table 6.3 Data integration joint display for Sources of Stress. This table illustrates the integration of QN and QL data in regards to causes of stress. The top 10 common stressors and stressors with Cohen's *d* > 0.2 found from QN analysis are shown in a side-by-side comparison to the themes (sources of stress) from the QL data analysis with example excerpts from interviews. This allows for a visual representation of the links between stressors from the QN data and the Sources of Stress theme from the QL data.

Top 10 Common Stressors (from both SINSpre & SINSd)	SINS Sub-dimension	Stressors with most dramatic change score (Cohen's *d* > 0.2)	Excerpts from QL Interviews	Sources of Stress (QL theme)
Fear of making a mistake in clinical practice Not having enough staff or equipment to meet patients' needs Not being sure what is expected on placements Feeling responsible for what happens to patients	**Clinical** ←→	Not having enough staff or equipment to meet patients' needs Being interrupted in clinical duties Patient's attitudes towards me Patient's attitude towards nursing Caring for the emotional needs of patients	" We've got the practice information sheets that they give us, but I don't, I feel that sometimes they're lacking quite a bit of information (P2) "It just feels like there is so much to know and it's quite overwhelming (P5) I'm a bit daunted what to expect of how much they are going to expect you to go in and o it yourself" (P4) "I'm still quite anxious about it (placements). You don't want them to think you're completely useless you know? (P4)	**Course** **Personal**
The amount of classwork material to be learned Examinations and placement gradings Having too much to learn Meeting deadlines for course work Fear of failing the course	**Education** ←→	Meeting deadlines for coursework Fear of failing the course Personal problems other than health Having too much to learn Not being sure what is expected on the course Relationships with family members	"It totally depended who was, what nurse of CSW was on. Some of them were really approachable, and then others you didn't feel that you could approach" (P3) "My mentor was really experienced…so it was good to have her as someone to like, be under her wing. Because it seemed really easy for her to teach me things (P1)"	**Personal** **Course** **Relationships**
Not having enough time for friends and family	**Confidence** ←→	Conflicts with staff in placements Personal health problems Conflicts with administrators or managers Conflicts with college	"So I think in a way I was quite lucky that my mentor was really supportive (P1)" "My mentor was quite, there was quite a large personality clash as	**Personal** **Relationships**

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	Finance			Personal
		staff The college response to students needs Conflicts with peers	well. She was not particularly positive about me (P2)	
Not having enough money for entertainment Surviving on low income The lack of free time	**Finance** ←→	Making less money than friends who are not nurses Surviving on low income The lack of free time Not having enough money for entertainment	"At the moment I'm working part-time. I work every weekend. and definitely my son's suffering (P3) "I know they can't help it because they've got to fit me in. and I always seem to be missing out on stuff for my daughter" (P5) "the placement itself, usually the people are lovely and I can get on with them; but definitely the balancing act of having a child, a family, work placement" (P3) -	**Personal**

QL Theme: Sources of Stress		
Course • Clinical skills • Placement preparation • Course management	**Personal** • Time management • Feelings of expectation • Inexperience • Feeling like a burden • Developing interpersonal relationships	**Relationships** • Mentors • Nursing staff

The 'Sources of Stress' theme contains three subthemes, Course, Personal Stress and Relationships and it is highlighted in this table that throughout the findings of the SINS scale, there is some overlap of the QL themes, specifically within the education and clinical subscales.

Table 6.4 Data Integration joint display for Resilience and Coping. This table shows each participants RS score, pre and during the initial clinical placement, and highlights interview data in relation to the theme of coping and resilience. This allows for the changes in RS score to be represented visually along with data from the QL interviews to highlight how participants identify as resilient, and how they perceive their coping skills in regards to stress.

	P1	P2	P3	P4	P5	P6	P7
Theme Coping & Resilience							
Identify as Resilient	Yes "I try to be but I think like most people, when it gets too much, you're just kind of like, ah no!" "So although it's tough now, I think you're just going to have to keep seeing the light at the end of the tunnel"	Yes "I like to think I'm resilient. Sometimes if someone catches you on a bad day it can still affect you, but it tends to be more personal things... like the kids will affect me"	Yes "Yeah, I think so, but sometimes there is a lot going on to manage it all."	No "no. not really. I don't know I guess. I can manage my stress ok but I am an anxious person... a bit of a worrier."	Yes "Yeah, I mean, I'm one of those... I won't relax all day... but sometimes it will just get on top of me.. I've got this, I've got that"	Yes "Yes I think I am very good at (managing stress and moving on in a positive way), sometimes I get to the point when I am too stressed."	No "No, I take on a lot and then buckle under and I am like 'ooo' which is probably not the best thing to do.... I am just sort of "I'll do it later, I'll do it later" and then"
RSpre RSd RSchange (possible scores 25-175 with higher scores reflecting higher resilience)	130 143 +13	130 133 +3	113 150 +37	117 103 -14	115 127 +12	117 103 -14	162 130 -32
Coping - Social Support	"I've got my friends from college here... we still have a group chat and we talk a lot on that when we're on placement	"It was nice to have other student to talk to. It's nice not to be the only one there" "My husband is incredibly supportive as well...my	"I would say I feel well supported in my social network" "I have a learning difficulty, so she's really supportive of the theory side of things if I need anything I	"Not really...because I'm older and they seem to be in groups. I did have two friends who my age, but they've just dropped out of the course"	"I've got a partner" "I've got a horse...so every day I'll get to go and see him... that's my	"About nursing and things, then I've got my friends here that I can talk to about it" "I've started going to the gym	"most of my friends are nurses" "my PDT helps me a lot...if I had a question about something or about the module I just email

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- Recreation		dad proofreads my essays for me	can phone her, even if it's just to have a rant.		time"	the lecturer and they usually get back to you"
		"I craft quite a lot. I like doing cross-stitching or sewing"	"I don't have time. I have no time"	"All of these things probably" (referring to talking to family, friends and exercising) "		"I play rugby here or just hanging out with my friends…I enjoy singing, playing my ukulele. Just taking time out"
- Not coping			"I'm one who it tends to hit a high does (stress). So if somebody says something to me that I find disrespectful in any way, I tend to hit the roof"		"Sometimes I'll just have a little meltdown	

5/7 participants had an increase in levels of resilience during their first clinical placement and 5/7 participants identified as being resilient. Social support was an important coping mechanism for managing stress as was recreational activities, although often these were abandoned due to lack of time. Not coping was often referencing in general terms to being overwhelmed by responsibilities to course, family, friends and self.

Table 6.5 Data Integration joint display for the C-SMARTT App. This table shows each participant's C-SMARTT App usage and highlights interview data based on participant suggestions for improvement of the app.

	P1	P2	P3	P4	P5	P6	P7
C-SMARTT App Usage	No	Yes	No	No	Yes	Yes	No
What Worked	n/a	"I like the coping mechanism it had there. and the way you could go for help if you needed to" "I find what the app was suggesting more helpful. I think turning to social media is perhaps bordering on, sort of blurring the lines of being professional" "I should know to do that (trying to calm down) but seeing it on the screen it's prompting you to think a bit which is quite good"	n/a	n/a	n/a	"the breathing exercises would be good, because you know if you are like, sitting in break at placement that is something….just a quick, like, refresher of how you are meant to be able to, like, calm yourself down or something like that."	n/a
What didn't work	"I don't know, I just didn't have time to look"		n/a	n/a	"I downloaded it and had a quick little look, but I didn't really understand how to work it or nothing"		n/a
Suggestions for improvement	"I think videos for student nurses are really good, because I think as a nurse, you're really practical" "a lot of us will watch our mentors		"Information on how to do clinical practice… videos would be helpful because I am a visual person"	"you would think that whatever problem or issue that you're scared to speak about or you've come across; somebody's experienced it before.. if there was a bank of topics and answer that you could	"be able to type in something about the clinical skills and perhaps have a demonstration or something that's explained in easy terms"	"Videos on skills and stuff like that, would probably be quite good" "Even you know, just like a little, you know, like say if I wrote for someone else, say like, this is what my first day in placement looks like"	"something like the student's experience in that area of where you are going to because it can kind of help you if you are feeling a bit anxious about what to expect"

	do it once or twice and be like, can I do it? Can I try So videos are really good"			(look up)"			

All the participants seemed interested in the prospect of a stress management app to use on clinical placement. Common suggestions for app improvement included: videos of clinical skills, student's perspective on different clinical placement and general improvement on ease of use.

6.5 New Learning

There is new learning to be gained from the data integration process of the QN and QL strands of this study and two of the three themes; Sources of Stress and Coping and Resilience uncovered in the QN analysis were further supported and expanded by the addition of the QL results. The three sub-themes of sources of stress from the QL strand; course, personal and relationship are well supported by the findings of the SINS scale during QN analysis. Students were found to consistently score the clinical and education sub dimensions as highly stressful both before and during the initial clinical placement and there was a significant increases in the confidence and finance sub dimensions during the initial clinical placement.

The participants revealed in their interviews that the role of their mentor played a large role in their overall placement experience and this is echoed in the increase in perceived stress caused by conflicts with staff, mentors, peers and administrators during clinical placement that perhaps did not register as a cause of perceived stress prior to clinical placement. Furthermore, although students described a positive placement experience when the mentor relationship was also positive, these participants were still found to have increases in levels of perceived stress during the initial clinical placement.

There was no significant change in levels of resilience before and during the initial clinical placement, and there were incongruences in participant's responses to their levels of resilience when compared to their RS scores. Although the QN findings

suggest a correlation between level of resilience and perceived level of stress prior to the initial clinical placement (an increase in resilience equates to a lower level of perceived stress), this correlation was lost during clinical placement. This could be due to a variety of reasons, the most simple perhaps being a lack of understanding of the concept of resilience and participants being unsure what was being asked of them in the interview in regards to this concept. Also the lack of clear definition in the literature means people have different interpretation of its meaning. In addition, individual differences in personal perception of resilience among participants must be taken into account. Resilience in nursing is well supported as a key concept for nurses and can be developed and strengthened (Jackson et al. 2007; Reyes et al. 2015; Thomas & Revell 2016; McGowan & Murray 2016); therefore, these findings suggest that adjustments to how the concept of resilience is explained to participants and investigation into other instruments to further evaluate resilience might be useful in future research.

The C-SMARTT App was used by a limited number of students, although based on student interest for improving the app this could be due to lack of advertising and understanding of the app's function, as there wasn't an opportunity for students to try the app under supervision prior to clinical placement. The results from the data integration provide some support of further development and evaluation of a stress management app for use on clinical placement with use of feasibility study. This could provide valuable information on what student nurses want in an app and as a result this could improve app usage. A reflective account of the data integration process can be found in Appendix Q.

Further discussion of these findings in relationship to the current literature will be conducted in the following Discussion chapter.

6.6 Conclusion

In order to provide quality data merging and integration, clarification of the purposes of using mixed methods along with guidelines for the process and interpretation of integration were followed (Bergman 2010; Fetters et al. 2013; Guetterman et al. 2015). The results of the data integration of this study has allowed for confirmation and expansion of several results as well as further investigation of areas

of discordance. The use of narrative and supporting joint displays provides clarification of the integration findings leading to the discussion in the next chapter and a summary of key findings is illustrated in table 6.6 below.

Table 6.6 Summary of Key Integration Findings

1) Increase in perceived level of stress during clinical placement is confirmed during the integration of QN and QL methods. Stress caused from clinical placement, course expectations, relationships is confirmed with further expansion and detail and description of these stressors from interview data

2) The identification of two of the three key themes from the QL analysis (Sources of Stress & Resilience and Coping) are supported by the findings of the QN analysis, as illustrated in table 6.4.

3) Impact of mentor on student's clinical experience:
   - *Positive*: Those participants who had a positive mentor experience (6/7), described an overall positive experience in clinical placement
   - *Negative*: Despite many participants describing their mentorship experience as positive, there was a significant increase in perceived levels of stress during the initial clinical placement in regards to conflicts with staff, mentors, managers and peers (SINS confidence sub dimension)

4) No significant changes in RS found in the QN results before and during the initial clinical placement. A moderate negative correlation was found between levels of resilience and perceived levels of stress prior to the initial clinical placement, but no correlation was found during clinical placement.
   - The data integration process revealed that there was discordance between RS scores and participants perception of their own resilience. These results support further research into the concept, as well as instruments to measure resilience in a student nursing population.

5) Social support was an essential factor for participants in regards to coping with stress, with support of other nursing students, family and modules leaders cited as most important

6) A limited number of participants utilized the C-SMARTT App, therefore the findings from this cannot be reported as significant. Participants provided suggestions for what they would find useful in an app for use on clinical placement. This suggests an opportunity for further research, into this area such as: student's perspective on various placements, videos of clinical skills and improve the usability.

Chapter 7: Discussion

7.0 Introduction

High levels of stress are an issue for student nurses and can often increase during clinical placement; resulting in negative perceptions of nursing, poor academic performance and burnout. (Galbraith & Brown 2011; Pines et al. 2012; Deary et al. 2003). The impact of resilience on managing stress has been well documented in the nursing population (Thomas & Revell 2016; Reyes et al. 2015) and importantly it has been shown that personal resilience can be developed and strengthened, potentially providing student nurses with the means for improved coping mechanisms (Rios-Risquez et al. 2016; Stephens 2012; Jackson et al. 2007). Recommendations from the research on nursing student stress reduction and resilience development supports the need for further research and development of interventions in this area to promote effective stress management and developing personal resilience (Song & Lindquist 2015;Crombie et al. 2013; Kanji et al. 2006; Jones & Johnston 2000). Furthermore, recent research into the area of mobile technology and nursing education suggests that the use of technology to provide accessible and autonomous information platform, such as a mobile app, is needed (O'Connor & Andrews 2015). The research presented in this thesis is the first to attempt to use a mobile app as a method for supporting student resilience and stress management and has gathered evidence to understand the student experience during the first clinical placement, using a mixed methods approach.

Lazarus and Folkman's (1984) Transactional Model of Stress and Coping was used as the guiding theoretical framework for the design of this study and has been commonly used in researching stress in student nurses (McKenna & Plummer 2013, Sheu et al. 2002, Jimenez et al. 2009 & Gibbons et al. 2010). Sharples Theory of Mobile Learning (Sharples et al. 2006; 2009) was utilized alongside this for development of the stress management app, with initial guidance from the MRC framework for developing complex interventions (Craig et al. 2008) (Appendix S).

A mixed methods approach using a convergent parallel design was used in this study and this allowed the implementation and analysis of the QN and QL to be done

simultaneously but separately with, data integration taking place once separate analysis was complete. This allowed for limitations of each method to be offset, further expansion and confirmation of each data set as well as provide a more complete understanding of the research (Creswell & Plano Clark 2011). The research questions addressed in this study were are follows:

1) **What are nursing students' perceptions of stress and level of resilience before and during their first clinical placement?**

2) **What are nursing students' experiences of stress and resilience during their first clinical placement?**

3) **What are nursing students' experiences of using a stress management app delivered by smartphone?**

The previous integration chapter discussed how the results of the QN and QL findings were integrated in order to present a cohesive and unified findings based on data integration. The interpretation of these findings will now be discussed in relation to the current literature, addition to knowledge, implications for practice and research and limitations.

Summary of Key Findings

1) Significant increase in levels of perceived stress in first year nursing students during their first clinical placement caused from expectations in clinical skills, course expectations and conflicts in relationships being prominent causes of stress.

2) Resilience levels did not change significantly before and during the initial clinical placement. There was a moderate negative association between levels of resilience and levels of perceived stress prior to the initial clinical placement, indicating that an increase in level of resilience was correlated to a decrease in level of perceived stress, but this correlation was not found during the initial clinical placement.

3) Mentors often had a positive impact on student's interpretation of their clinical placement experience, even though perceived levels of stress did increase.

4) Social support, particularly from other nursing students, and time for recreation are important coping mechanisms enabling students to manage stress

5) The limited usage of the C-SMARTT app suggests that there is an opportunity to make improvements in regards to participant recruitment and usage for this type of tool in clinical placement.

7.1 Interpretations of Findings

Clinical placement has consistently been identified as a source of stress for student nurses and this suggests continued research and work to understand the student experience in clinical placement will allow for improvements in this area to be made. The interpretations of these findings also support the need for further research into the role of resilience and how resilience can be developed as a coping mechanism for nursing students. Furthermore, to address some of the challenges of the recruitment and usage of the C-SMARTT App, conducting a pilot or feasibility study designed to develop and evaluate a stress management app could possibly increase student usage of the app and this is supported by the findings of this study. One of the key issues found in the current study as well as in the literature in regards to stress management interventions was small sample size and high dropout rates and this needs to be addressed. Finally, one of the interpretations from the findings of this study in order to improve the design and participant usage of an app is a proposed model for future app development.

7.2 Interpretations in context of literature

The findings of this study in regards to sources and levels of stress in student nurses in the initial clinical placement are consistent with the findings in the literature and in fact echo the findings of the 'Sources of Stress' theme highlighted from the QL findings; such as clinical skills, course preparation and academic pressures as well as the common causes of stress found in the QN analysis. In relationship to the current

literature, the interpretations of this study's findings can be applied to stress in regards to the initial clinical experience, academic vs. clinical, organizational stress and most commonly reported stressors. The findings can also be interpreted in relationship to resilience and its impact on stress in student nurses, stress management and resilience interventions, and mobile learning. An update of the literature review was conducted to further inform the findings of the comprehensive review presented in Chapter 2.

7.2.1 Initial clinical experience

Sheu et al. (2002) results indicate students in their initial clinical placement have moderate levels of stress and that the initial clinical experience can have an effect on how nursing students approach clinical practice. Furthermore, how students cope with stress in the initial clinical placement will impact their experience of nursing education. Although the current study did not focus on how stress in the initial clinical placement impacts nursing students experience of nursing education, it was found that having a positive placement experience was a major perceived influence on students overall course experience.

McKenna & Plummer's (2013) qualitative study used thematic analysis to understand lived experience of stress during clinical experience and found three main themes: feelings of pressure, challenging relationships and using coping strategies. The initial experience was frequently perceived as a stressor by participants, with lack of experience, perceived lack of laboratory preparation, fear of making mistakes, and performing interventions on patients for the first time as potential causes. Shaban et al. (2012) findings echoed those by McKenna & Plummer (2013), which suggested that the most common stressors perceived by nursing student during the initial clinical training were from assignment work, clinical environment and from nursing staff and teachers. Further stressful events included: worrying about grades, having to be on duty early in the hospital and from the nature and quality of clinical practice. The results from the current study support these findings.

Shaban et al. (2012) findings are consistent with the current study; which found that stress caused by relationships in the clinical setting increase significantly, and the fear of making mistakes and lack of experience were found to be commonly perceived

stressors. Furthermore, the findings of the current studies QL findings are broadly in line with the themes found in McKenna & Plummer's (2013) thematic analysis.

Karabacak et al. (2012) study suggest that stress in the hospital setting was inevitable, however students who had more opportunity to practice skills had an increase in positive methods of coping. The results of the current study found that there was an increase in stress throughout the first clinical experience, and that the QL findings revealed that feeling unprepared and lack of course organization was often a source of stress for students. The suggestion of having videos of clinical skills was a frequent recommendation for future app development, which broadly supports the idea that an increase in exposure to practice skills may impact how students respond to stress.

7.2.2 Academic vs. clinical

There is discussion in the literature in regards to whether academic or clinical pressures cause the most stress in student nurses. The findings of the current study would suggest that it is not a simple matter of separating these two elements, as they often occur simultaneously. For example, a student may feel increased stress when learning a new clinical skill on placement and at the same time have course work and assignments due that are causing increases in perceived stress. The current study's findings suggest that students find that managing their time effectively between clinical and academic responsibilities is challenging and can result in feelings of stress.

Timmons & Kaliszer (2002) found that academic commitments and financial constraints were the greatest sources of stress. These findings are compatible with the current study, which found that financial stressors were significant and that the ability to effectively manage time between academic, clinical and personal commitments was often cited as a source of stress. In contrast, Jimenez et al. (2009) study results showed that stress suffered by nursing students during clinical practice comes mainly from clinical stressors with academic and external stressors rarely found. These findings differ in several areas from the current study, which suggest that although stress is often a result of clinical placement, it is this stress in combination with academic and personal stressors which participants found the most difficult to manage.

7.2.3 Organizational stress

Gibbons et al. (2008) state that course organization is crucial to student success and it is more likely that it will contribute to distress when it is perceived as ineffective. This is further supported by Gibbons et al. (2010), which found a number of factors that related to the structure of the course that were seen as sources of stress, this was partly related to how information was communicated at an organizational level, the pace and intensity of the course and finally the demands of the course. Several of the interview participants in this study felt strongly that course organization could be improved, especially in regards to preparation for clinical placement, and lack of preparation was often mentioned in the interviews as a source of stress. Furthermore, the QN results found that "not sure what is expected on placements" from the clinical sub dimension of SINS, was the 7th highest source of stress for students prior to beginning their initial clinical placement.

Blomberg et al. (2014) found that almost half (43%) of students had high levels of stress and that stress was increased for those working in hospital settings. Interestingly, students who had one consistent supervisor/mentor were found to have less stress than those with two or more. This points to the value of students having the opportunity to build a relationship with one mentor and again highlights the importance of social support in stress management.

7.2.4 Commonly reported stressors

The most commonly reported stressors identified by the current literature are consistent with the top 10 common stressors found in this study. Fear of making mistakes, pressure to meet deadlines for assignments, lack of experience, knowledge and skill, attitudes of staff toward students, coping with sick/dying patients, relationships with doctors, nurses, and university staff were found to be common causes of stress in student nurses throughout the literature (Liu et al. 2015; Chen & Hung 2014; Edwards et al. 2012; Timmons & Kaliszer 2002; Gibbons et al. 2010; Sheu et al. 2002) and these sources of stress are found in the current study. The list of top ten

common stressors in both prior and during initial clinical placement had several similarities, namely: fear of making mistakes, amount of classwork, meeting deadlines for course work, and having too much to learn. There was also a significant increase in stress found in the confidence sub dimension of the SINS scale, which includes relationships/conflicts with nursing staff, mentors, other students and university staff. Furthermore, a significant increase in stress in the finance sub dimension is supported by Timmons & Kaliszer's (2002) findings, and this could be a result of students being unable to work due to increased time commitments due to clinical and academic work.

7.2.5 Role of resilience in stress management

Resilience does have a significant role to play in an individuals' ability to manage and cope with stress (Thomas & Revell 2016; Reyes et al.2015)) and resilience in nursing students has been correlated in the literature to multiple factors; such as academic performance (Taylor & Reyes 2012; Rios-Risquez et al. 2013), attrition (Crombie et al. 2013; Williamson et al. 2013) and empowerment (Pines et al. 2012); however, there is only one study noted (Smith & Yang 2017) that has used instruments to measure and correlate levels of perceived stress and resilience. There was a moderate negative correlation between the stress and resilience found in Smith & Yang (2017), which is supported by the current study's findings. Unexpectedly, the findings of the current study found that there wasn't a significant change in levels of resilience for students during their initial clinical placement, regardless of whether their level of perceived stress increased or decreased and this is supported by the findings of Taylor & Reyes (2012) who found no significant changes in resilience during a 16-week term. There was a correlation noted between stress and resilience prior to the initial clinical placement, as seen in by Smith & Yang (2017), however, this correlation did not continue during clinical placement. The significance of this finding is unclear, and this supports the need for further investigation into the relationship of resilience and stress in nursing students during clinical placement. When viewing resilience through the Protective Model the use social support as a protective factor against stress was an important element in how students aimed to neutralize the effect of risk, in this case

the risk being stress. Furthermore, social support is also identified as external variable that can impact resilience (Ledesma 2014) further highlighting the significant role that caring relationships and having reliable social support has for this population and how they develop resilience and manage stress. In contrast, when viewing resilience through the Challenge Model it can be argued that this exposure to risk, in this case stress, in clinical placement is actually necessary for both gaining experience in a practical sense but also in terms of building confidence and personal resilience in a clinical setting.

7.2.6 Suggestion for intervention development

Both the stress and resilience literature in student nurses suggest that the development of interventions should be a focus of future research. The types of stress management interventions used in previous studies were designed around face-to-face class room sessions or workshops which required significant time commitments from participants and contributed to difficulty in retaining participants and resulted in small sample sizes. Furthermore, there was often the need for specially trained coaches or professionals to deliver the material, and there is an assumed cost for this, although this was not mentioned in any of the research. There were no stress management interventions that used a mobile app for delivery of information and the current study is the first to do so. This highlights the untapped potential of using a mobile app in a nursing education context and the exciting developments that may come from further investigation into this area of information delivery.

The type of interventions aimed at developing resilience in student nurses was found to have similar issues to those aimed at stress management. For instance, the interventions were found to rely on lengthy classroom sessions delivered by individuals trained in career development or conflict management. There was one intervention (Stephens 2012), which used an online platform (Twitter) to deliver information and this addresses the issues of cost and expectation of time commitments from participants. Furthermore, this study did show promising results with an initial increase in resilience found in the intervention group. The resilience intervention literature strongly suggests that practicing self-reflection (Chen 2012; Hodges et al.

2005) is one of the key elements of building resilience in student nurses. Although the process of acknowledging one's level of stress, when opening the C-SMARTT App is a self-reflective process, there is more work to be done in continuing to encourage self-reflection in the design of the app and this is something that should be built on in any future developments of the C-SMARTT App.

The development of the C-SMARTT App was based on some of the successful stress management and resiliency developing interventions, including: mindfulness, diaphragmatic breathing and self-reflection. One unique aspect of the C-SMARTT App, besides content, was the innovative design and method of information delivery. However, it is important in this current study to note that the limited participant use of the C-SMARTT app has resulted in the data obtained about the app to be used conservatively in terms of the generalizability of the results. It is suggested that an appropriate sample size for interviews ranges from 5-25 (Creswell 1998; Morse; 1994), and although there was 7 participants in the QL strand of this study, only three had used the app. So, although data from the QL interviews was found to be encouraging in regards to students' interest in further development of an app for use on clinical placement, this will require additional research with a larger sample size to ensure any future app development is fit for purpose.

7.2.7 Social support & mentorship

One of the key findings of the current study was the positive impact that social support had on student's ability to manage stress, practice resiliency and perceive their clinical placement as a positive experience. These relationships were both personal: family and friends, and professional: mentors, nursing staff, tutors and friends made from the nursing course. This finding is supported particularly in the resilience literature (Williamson et al 2013; Crombie et al. 2013; Carroll 2011) while the stress in nursing student literature focuses more on the use of social support as a positive coping mechanism (McKenna & Plummer 2013; Gibbons et al. 2010).

Furthermore, Labrague et al's (2018) integrative review on coping skills in nursing students highlights that nursing students utilize a variety of coping strategies, both positive and negative which can be categorized into two categories: emotion

focused and problem focused (Lazarus & Folkman 1987). Emotion based coping is used to manage emotional responses to stress and include avoidance and self-distraction (Lazarus & Folkman 1987), while problem based coping is directed towards reducing the stress by targeting the root cause of the stress. Labrague et al's (2018) review found that student nurses reported problem-focused coping strategies as the most frequently used and that seeking social support was cited as the most common coping style when dealing with clinical stressors (Labrague et al. 2018). Interestingly, positive clinical experiences have been shown to be one of the crucial factors in student retention (Crombie et al. 2013; Carroll 2011) and this impact of social support and mentorship has important practical implications for nursing education. This is also an important element in terms of future app development, as there is a possibility to improve student's feelings of connectedness while on clinical placement through the app via discussion boards or personal accounts of student experiences while on placement. Investigation in to the impact of an app on promoting social support in students while on clinical placement could be significant in understanding how to improve student's clinical experience which could impact student retention (Williamson et al. 2013; Crombie et al. 2013; Carroll 2011).

7.2.8 Mobile technology & learning

The background of mobile technology discussed in Chapter 3 (section 3.2) provides a compelling argument for the benefits of utilizing mobile technology in nursing education and applying this technology to the development of stress management and resilience building interventions. The current study only found one intervention that used mobile technology (Stephens 2012) in this topic area with nursing students as its target population. There is a lack of using technology successfully as a platform of delivery, both in the literature and the current study. This suggests that investigation into developing strategies to increase engagement of students in using technology. Additionally, students having a more direct influence on the development and content of an app could be valuable next step.

7.3 Model for Future App Development

      The limited use of the C-SMARTT App in the current study along with the data from the QL interviews suggests that areas to focus on for further development of a stress management app are optimizing student input and engagement in the process. This would require further understanding in regards to what student nurses want to see in this type of app and a pilot study or feasibility study would be beneficial. This could hopefully improve participant recruitment and app usage in the future.

      A proposed model for future app development is one of the interpretations and products of the new learning based on the findings of this study. This aims to guide development of the next generation of stress management apps in order to achieve improvements in effectiveness. By using the theories and frameworks described in Chapter 3 for app development, the current study highlights that improvements to student engagement could be addressed by the use of a feasibility study to test future app development, and the proposed model is based on a feasibility study design.

      According to Bowne et al. (2009) feasibility studies are best used to determine appropriateness of further testing of an intervention and in this case is indicated for several reasons; (1) there are few published studies or existing data using a mobile app for stress management and building resilience in student nurses and (2) previous interventions that have employed a similar method have had limited success, but improved versions may be successful (Bowen et al. 2009)

      Bowen et al. (2009) outlines eight general areas of focus for feasibility studies but the three which are most pertinent to the future app development are: practicality, implementation and integration. These areas are also highlighted in the development of the current C-SMARTT app, as seen in Table 7.0, however, not all of these elements were achievable and require greater focus to promote effective interventions for stress and development of resilience. Practicality refers to the extent to which an intervention can be delivered when resources, time, commitment or some combination of these are constrained in some way. This is an area which proved challenging in the current study, with both financial resources affecting the content and functional ability of the app, and time and access to students to increase interest and participant retention should be

investigated in future attempts to ensure that both students and researchers received optimum benefit from the app.

Implementation concerns the degree, possibility and method in which an intervention can be fully implemented as planned (Bowen et al. 2009). The process of implementing an app for nursing students to use while on clinical placement during the current study was difficult and this could be improved in future with increased institutional support and by increasing the presence and engagement with the app; for example, more information sessions, online information or posters, and handing out information sheets to students at frequent intervals.

Integration refers to the assessment of the level of system change needed to integrate a new programme or process into an existing infrastructure or programme (Bowen et al. 2009). It would be ideal if there were a level of institutional support for future app development, as there could be opportunities for promotion of the app in other areas of the department, which could increase participation. Furthermore, access to videos and other clinical skills material would make the addition of these to the app simple and straightforward. However, it cannot be expected that the current version of the app would be integrated into curriculum, but that in future, there would need to be support for mobile technology as a means for information delivery. These three areas of focus highlight crucial stages of app development that may contribute to more effective versions in the future.

Table 7.0 Model for C-SMARTT App development in the current study. This table illustrates how the Transactional Model of Stress and Coping was used as an overarching framework, followed by the combination of the MRC guidance and Theory of Mobile Learning to provide guidance for the development of the current version of the C-SMARTT App used in this study.

Transactional Model of Stress and Coping
(Lazarus & Folkman 1984)

Primary Appraisal	Secondary Appraisal	Coping Efforts	Outcomes of Coping	Coping Styles
-Student experiences stress and evaluates significance of stress by rating level and cause of stress	- Controllability of the stressors and resources are evaluated. C-SMARTT app provides instantly accessible information	-Actual strategies used: problem management & emotional regulation. App provides mechanism to acknowledge stress and options for coping with information specific to stress in clinical placement.	-Outcomes of coping are not currently measured in this version of the app	-Information seeking, optimism and avoidance: accessing the app may suit students who tend toward information seeking as a coping style

MRC Developing and Evaluating Complex Interventions
(Craig et al. 2008)

Developing	Piloting & Feasibility	Evaluating the intervention	Reporting	Implementation
-The literature review supports the development of an mobile app aimed at managing stress and building resilience in nursing students	-Attempt at pilot study was unsuccessful but led to positive changes in participant recruitment and engagement	-Evaluation of the app was done during the QL interviews	- The reporting of the app was done during QL data analysis and the data integration process. Reports were done using tables and joint displays for clarification.	-App usage was monitored through online service set up by software team. This data was not presented in the current study as there was limited number of students who used the app.

Sharples Theory of Mobile Learning
(Sharples et al. 2006; 2009)

Access	Ownership	Connectivity	Integration	Institutional support
-App was free and easily accessible via smartphone (to all students whether participating in study or not)	-Students were given private ownership over how and when they used the app,	- Internet connection was required for the initial download of the app, but the app could be used without a Wi-Fi signal, which was essential for use while on clinical placement	-The nature of a PhD project didn't allow for the app to be integrated or supported in the curriculum at this time.	-Expected limited institutional support for the app at this stage in development

Table 7.1 Model for future App development. This table illustrates the evolution of the theories and frameworks used for the development of the C-SMARTT App, with the addition of a focus on feasibility study design and application of suggested design changes, to give a new model for future app development.

Rationale:	Focus:	Changes and Additions (based on the current research findings)	Evaluation:
1) The current study shows that students are interested in a mobile stress management app 2) No published studies exist using a mobile app for stress management and resilience development in nursing students while on clinical placement 3) Previous attempts (the current study) faced challenges particularly in regards to student engagement; The results of this study provide suggestions for improvements to app content as well as participant recruitment.	*1) Practicality* - Increase in financial resources would improve the final product. Access to students could be improved with more institutional support and more focus on recruitment and engagement in the early stages. *2) Implementation* -Improve engagement with students by increasing student's knowledge of and purpose of the app, in smaller class settings. Allow for opportunities for hands on experiential learning with app. *3) Integration* - Integration of the app into curriculum cannot be expected at this stage. However, a feasibility study may provide the support needed to begin this process and give evidence to the benefit of a mobile app for information delivery	1) Use app as method for data collection (i.e. record and measure level of stress and cause of stress) 3) Improve access to social support (i.e. Discussion page via online platform) 3) Videos of clinical skills 4) Student perspectives of experiences in different clinical settings 5) Provide ability for students to evaluate app once they have used it, as this will provide easy data collection to inform further improvements 6) Increase the focus of self-reflective practice for developing resilience	1) A cohort feasibility study would follow and compare the outcomes of individuals who did or did not use the app. The benefits would be the ability to establish directionality of effects over time and improve generalizability of the results; however, the need for follow-up means that the study takes longer to complete which can be challenging in a nursing student population 3) Addition of an in-app evaluation function to provide data regarding students experience with the app in real time

Table 7.1 outlines a model for approaching the future development of a stress management app. The current study provides some support for further research into this area and using the framework for the requirements of a feasibility study gives context to how this could be achieved in the future. This rationale is based on the frameworks used in the development of the app (Table 7.1) and the findings of the current study. Acknowledging the importance of focusing on practicality, implementation and integration will address some of the noted weaknesses of the current app.

Addressing the changes and making additions based on the current study's findings is crucial to give value to these findings as well as provide nursing students with a more useful and beneficial app. Finally, it is suggested that a cohort feasibility study design would be one way to provide an appropriate approach to evaluate the effectiveness of the next generation of app on student's perceived levels of stress and levels of resilience. This would hopefully result in changes in the design of the app that students would find valuable and improve student usage of the app; which in turn would allow for future attempts at data analysis to be generalizable to this population.

7.4 Implications

7.4.1 Implications for practice

The findings of this study have several practical implications for student nurses on clinical placement as well as academia. Firstly, the results in terms of the sources of stress are consistent with current literature and are further confirmed within the data integration of this study. The current study supports the large body of literature, which states that nursing students have high levels of stress, often as a result of clinical placement. Increasing awareness of the causes of stress in clinical placement and the impact of supportive mentors, nurses, tutors, family and friends can help both students prepare and educators to provide support.

Secondly, the positive impact of social support has important implications for nurse educators, nursing staff and mentors. Although nursing student's social network outside their course was found to be an important source of support in managing

stress, there is also a need for nurse educators and mentors to position themselves in an approachable supportive role. As this has been shown in the literature and the current study to have an impact on student nurses experience in clinical and potentially can affect student retention.

Furthermore, nurse educators should also be aware of the impact of self-reflection on developing resilience. The current literature suggests implementing reflective practice in the clinical setting may help students build resilience and consciously construct meaning from their experiences, both positive and negative. In terms of the current study, more work is needed to build in and evaluate self-reflective practices into the next version of the C-SMARTT App.

Finally, this study reinforces the recommendations for the development and application of stress management and resilience-building interventions found in the current literature, with an emphasis on the importance of increasing student involvement in the development process.

7.4.2 Implications for future research

There are several implications for future research resulting from the findings of the current study. Firstly, future studies would benefit from a mixed methods approach and the integration of a follow up in research design would address frequently mentioned methodological issues and allow for inferences to be made on the long term effectiveness of an intervention delivered by smartphone.

Secondly, future research could investigate how individual coping styles effect how a student views and uses a stress management app. This is supported by Lazarus & Folkman's (1984) transactional model of stress, in regards to methods of coping. They suggest that high levels of stress can lead to denial or avoidance methods of coping instead of productive coping methods such as information seeking. Understanding how student's coping mechanisms impact their interest in using an app and engaging in information seeking behaviour could provide useful information in regards to improving participant recruitment and retention in the future. Interestingly, the resilience literature in a nursing students context rarely mentions the use (if any) of a

theoretical framework in comparison to the research on stress in this population, which largely utilizes the work of Lazarus & Folkman (1984). This is an area that future research may be able to improve upon.

Thirdly, Investigation in the positive outcome of stress on resilience could provide an interesting and valuable viewpoint towards stress and resilience during clinical placement, as this area of the student experience that will undoubtedly cause some stress for students (Labrague et al. 2016). Looking into this area using the Challenge Model of resilience could provide some insight into the potential benefits of stress and how this could help student nurses develop resilience in clinical placement. The role of resilience in student nurses ability to cope and manage stress while on clinical placement requires further investigation, as the findings of the current study in this regard are unclear.

Finally, future attempts to introduce a mobile app for student use need to have an increase in focus on student input in regards to the app content and on strategies to increase student engagement. For example, a feasibility study could allow for meaningful statistical analysis at an institutional level for the development and use of an app for nursing students to use while on clinical placement.

7.5 Limitations

This is, to date, the only study that attempts to understand first year nursing students' experience of perceived stress and resilience with the introduction of a stress management app in the first clinical placement experience, within a mixed methods context. Its main strength therefore, stems from its originality and the utilization of a wide range of methods to address a complex phenomenon. Unlike many of the previous research in this area (McKenna & Plummer 2013; Karabacak et al. 2012; Sheu et al.2002; Chernomas & Shapiro 2012; Consolo 2008), which tend to focus on causes of stress, this study offers an in-depth and varied investigation on first year nursing student experiences of stress in clinical placement. However, caution must be applied and considerations given to the methods and study design. The strengths and weakness of each of the QN and QL methods and the overall design were acknowledged and

measures to minimize the threat of credibility to this work were taken (see Chapter 3, section 3.4)

This study has a number of limitations, the small sample size and its resulting effect on the generalizability of the study results being the most problematic. This was a result of difficulties in recruitment and the ability of the researcher to access this student population. Although all students were informed about the C-SMARTT App on several occasions, it was difficult to increase the engagement of the app once students had entered their clinical placements due to large student numbers and the varying geographical locations. Students appeared to be enthusiastic and interested in the prospect of the app but this didn't improve student usage, which therefore led to a small sample size for data analysis. Furthermore, the decision to not include questionnaire data about the C-SMARTT App may have resulted in a lack of data integration for this section of the study, which combined with the small sample of students that used the C-SMARTT App, resulted in a disappointing amount of data for the app.

In an ideal scenario, the app would have measured and recorded the students' level of stress, and cause of stress when they opened that app however due to financial constraints adding these elements to the app wasn't possible and this was a missed opportunity for unique data collection in regards to stress while students were on clinical placement.

Furthermore, limitations in the research design are noted in terms of the timing of the questionnaires and interview collection. The timing of the questionnaires was extremely restricted because of a lack of opportunity to engage first year students when they would all be together. The results might have been different if the second questionnaire was conducted after the entire clinical placement experience had been completed. The literature review highlighted the need for further follow-ups to be included and this PhD study wasn't able to address this and this was perhaps a missed opportunity to address a large gap in the knowledge.

Finally, the choice of instruments resulted in a much more detailed analysis resulting from the SINS scale and this somewhat overpowered the findings from the Resilience Scale. This continued into the structure of the QL interviews, which ended up

with more focus on stress and the C-SMARTT App. This led to an unbalanced representation of stress and resilience in the research findings.

7.6 Conclusion

The findings from the current study are largely consistent with the literature in regards to sources of stress resulting from clinical placement. However, the separation of clinical and academic stressors is not clear-cut in the current study. Although there were certainly clinical placement specific stressors identified, it was the combination of academic, clinical and personal stressors that was found to be a major contributor to perceived levels of stress.

There is more research needed to determine the role of resilience and stress in student nurses in the first clinical placement as the findings of the current study are unclear with no significant difference in resilience found prior to and during the first clinical placement, despite the increase in perceived levels of stress. Although, there was a correlation found between resilience and stress prior to clinical placement, this correlation was lost during clinical placement.

A proposed model for future app development aimed at stress management and developing resilience to use within clinical placements was one interpretation of the findings of this study, as there are both theoretical and practical guidance gained for the development of future app versions. The design of the C-SMARTT App aimed to deal with issues found in the education intervention literature. For instance, lengthy time commitments for participants and potential costly face-to-face workshop sessions are unrealistic to implement in many situations and the use of an app format provides a low cost, accessible alternative. However, despite attempting to address these concerns, the current version of the C-SMARTT App had limited success. This was mainly in terms of student engagement. There was input from students in regards to suggestions for an app and this provided valuable learning on how to proceed with future developments. In particular, the necessity of including students in the design process and placing more emphasis on student engagement. The potential for future

app development that supports student nurses while on clinical placement is promising, particularly if issues around recruitment are addressed.

7. 7 Reflection

This section will provide a detailed reflection on the process of conducting this study with discussion on the development of the C-SMARTT App, methodology, data collection and analysis, and the process of data integration. Identification and reflection on the researcher and participants' assumptions and biases will also be discussed.

7.7.1 C-SMARTT App

The development of the C-SMARTT App began in the autumn of 2014, once the majority of the literature review for this study had been completed and the decision was made to pursue this type of technology. I was introduced to working with the GearedApp team by one of my supervisors who had knowledge of their newly developed company. The content for the app was based on the commonly found stressors found in clinical placement and then several meetings with the GearedApp team were held to iron out details of formatting and functioning of the app. It was decided that it would be best if a group of students could pilot the app prior to the study in order to determine the usability and any major issues could be identified

The design of the C-SMARTT app itself was very time consuming and stressful, due to the time pressures to have it completed in time for a both a pilot and the winter semester (2015). Also, due to cost, only the very basic design was used in the end, which resulted in some missed opportunities for data collection. Also, student recruitment for a pilot of the app was completely unsuccessful. This could have been due to several factors, for instance, the pilot needed to be conducted right before the Christmas break, when students are overwhelmed with exams and other school commitments. In addition to the pilot failing, the first attempt at data collection in January 2015 was rushed due to the class ending early, which I'm sure didn't add to student's interest in the project

The initial attempt at data collection in Jan 2015 proved very challenging due to the organization of when and how I was going to present the study. It was arranged that I would speak to a large lecture hall of all first year students at the end of their classroom session; however, this class ended 45 min early. So although the instructor came to get me from my office, more than half the students (understandably) had

already left. The following year, I was able to present this study again and was able to stay in the lecture theatre throughout the student's lectures in order to begin presenting the project as soon as their class had finished

Overall, I think with the challenges I faced to design the content to the C-SMARTT app, I am happy with the result. However, I do feel frustrated over missing out on unique data collection opportunities (such as measurement of level of stress when student's open the app and cause of stress), which would have added a unique element to this study's data collection processes. Although the initial attempt to present the project and collect data was unsuccessful, there were many learning opportunities that allowed the next data collection attempt (January 2016) to be much more successful. For example, I was able to introduce myself to the students before their class began and let them know I would be staying after class to present the project. Also, I stayed in the room for the entire class in case it ended early. However, there is still more work to be done in order to improve participant retention and interest in using an app.

There are several elements of the C-SMARTT App that I could have improved, however I really felt that at the time, I needed to have it finished in order to allow time for the GearedApp team to finish the software and have it done in time for the winter semester. I would hope that in the future, without the time and budget constraints of a PhD project, I could have the time to run a proper pilot study and then design an app that was more suited to the needs of the students. However, there was so much that I learnt from the design process and failed attempts and piloting and data collection that even though at the time it was incredibly frustrating, I do think it has allowed me to develop some valuable research skills and realize the reality of conducting data collection.

On reflection, there are several changes I would have made to the design process and implementation of the C-SMARTT app. The main thing would be to invest more time on recruitment strategies because even once the app was finished, it doesn't help the project if students aren't aware of it or know how to use it. I think one of the difficulties I faced was that in the winter semester, first year students are infrequently on campus, which really limited my ability to access students more than a few times. In future, I might begin to engage students in the project in the autumn semester, in

smaller class sizes, to help promote the purpose of the app and familiarize students with the project. I would also be interested in applying for funding for the app development, as having such a minimal budget really did impact how much of the interesting and useful technology I was able to access.

I feel very strongly that this app has great potential to help students in clinical placement and although there have been several issues in the initial design and development, I have learned many valuable lessons in regards to how to engage students and I look forward to having another opportunity to do this in the future.

7.7.2 Methodology, data collection and analysis

During the process of conducting the literature review, it was decided by myself and my supervision team that using a mixed methods approach would be valuable not only to the type of data that this would hopefully generate on this topic but also as a way to address the lack of mixed methods studies found in the areas of stress and resilience in first year nursing students. Furthermore, the decision to design an app was made due to my own interest in designing a practical tool for students to use while on clinical placement but to also add a unique element to this study. As discussed in the methodologies chapter, there were several options when choosing what type of mixed methods design to use and due to the flexibility of the convergent mixed methods approach to collect and analysis the data of the QN and QL separately this was the most appropriate choice for several reasons. During this PhD study I was also working as and RGN part time and was on maternity leave twice, so it was important in practical terms for myself as a researcher to have flexibility especially to complete the data analysis when it suited me.

The QN data collection took place prior to the students' first clinical placement in January 2016 and again in March 2016. I felt that after the experience I had trying to engage students for the pilot study via email and the university's online portal which resulted in zero interest in the study, it was important that I put a face to the project and was able to speak to the students about what the study was about in order to increase participation. When I spoke to the class the second time in March, I did offer

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the chance to complete the questionnaires online as I felt more students might complete this if they were reminded in person about the project.

Once the quantitative data collection had taken place, all the results had to be put into an SPSS software system for data analysis to take place. This was the first time that I had attempted this and it proved to be quite an undertaking to learn how to input the data and use the software for data analysis. I spent a lot of time reading about statistics and watching videos on how to input data into SPSS for the particular test I wanted. At this point, I was introduced to Nadine Dougall, one of the statisticians for Edinburgh Napier who was able to provide guidance and advice on what types of tests to run and how to report these results. One of the challenges that I faced was that the number of students who had completed both questionnaires as well as used the app was very small, with a total of 9/52. This resulted in the data from these students not being able to be used in the way that I would have hoped. I would have like to compare the questionnaire results between app users and non- app users however this wasn't possible. I think that my collection and analysis of the QN data was successful and I am proud that I was able to learn and use new skills to complete this, however in future I would be more aware of the impact of a small sample size on what types of tests can be conducted and their meaning. As I have mentioned before, I think that I was so focused on completing the app and other parts of the research prior to data collection that I should have put much more energy into recruitment and worried about the other sections after the fact. Furthermore, looking back I realize that having questionnaire data about the app would have been useful but during the process of designing this research, I wanted to allow students time to use the app throughout the semester so that when I interviewed them there would be some good discussion. However, in reality, perhaps having questionnaire data at the end of the semester would have been a nice addition to the QL data about the app and this could have led to an opportunity for data integration about the app specifically.

All the students who took part in both questionnaires were emailed about taking part in the QL interviews. This resulted in 10 responses, however in the end only 7 students were able to complete the interviews. I found the interview process mainly enjoyable, as it was really interesting to hear about the student's experiences during

their clinical placement and what they thought about the C-SMARTT App or what ideas they had for further development of an app. It was difficult at times to separate my own assumptions and biases in regards to the students' experiences in clinical and this is discussed in detail in the section 7.6.4.

The interviews took place in the spring of 2016 and once all interviews had been completed, they were transcribed and read several times each before thematic analysis (TA) was used to analyse the data. Several large mind maps were made during the process to help visualize and untangle the different concepts that were appearing and these progressed into 2 mind maps (chapter 5) and the final themes and sub-themes.

I found the process of TA reasonably straightforward, as I would say I am naturally more comfortable with QL data analysis than I am with QN. However, the process of transcribing the interview was tedious and time consuming, I did try my best to view it as the first opportunity to engage with the data. The biggest challenged I faced was not place my own assumptions and experiences as a student nurse onto the participants. This was more difficult than I thought it would be and the use of mind maps did help me to visualize the participant's experiences separately from my own.

Due the design of this study, the interview schedule was designed to touch on certain areas in order to answer the research questions (stress, resilience and the C-SMARTT App), which resulted in these topics coming out from the interview data. I don't think there was any way around this, as in order to answer my research questions these areas had to be addressed. However, it did make the TA challenging in the sense that I didn't want to assume that these would be the final themes, so I worked hard to break down all the data and reconstruct it in order to feel confident that I hadn't simply followed structure of the interviews. Furthermore, because the interviews were designed to be semi-structured, most of the questions I had were general questions in hopes that the students would be able to elaborate and discuss issues that were important to them individually. However, at times it was difficult to direct the interviews back to the areas that I wanted to cover when the discussion has gone off on a tangent. I think this resulted in my asking more direct questions about the app in order to ensure that this was discussed.

I think initially, I thought that TA would be an easy process, because I am more comfortable with this type of data, however there were other challenges that hadn't occurred to me. For instance, the volume of data was overwhelming to start with. The first few mind maps that I created had so much information on them that it was difficult to see how I was going to make sense of it. Also, my own bias had to be dealt with in regards to how I organized and interpreted the data- it was tempting to try and make themes happen because it would suit the outcome that I wanted from the data. Also, it would have maybe been useful to use a software programme to organize and code data, which is something I would be interested to try in the future.

Overall, I feel happy with how I was able to conduct the thematic analysis of my QL data. Although the transcription process was time consuming it provided a useful learning experience. It was important for me to use my expertise as a nurse (and former student nurse) to guide how I interpreted the results; however, I had to be mindful not to assume that the participants held the same views/beliefs as I do in regards to this topic. If I decided to use thematic analysis again there are many aspects that I would repeat in future. The use of mind maps was extremely helpful, as well as following the guidelines from Braun & Clarke (2006).

7.7.3 Data integration

The process of data integration took place after the QN and QL data had been analysed separately. Types of data integration were researched and then the most appropriate methods of integration were chosen. The QN data results guided how the QL results were included in the integration. This took place in my office with print outs of the results of the QN and QL analysis and summary of key findings for reference. I found the integration process was particularly challenging. I felt that the success of the study was reliant on my ability to draw meaningful conclusions from the data integration. I often felt frustrated as I felt I would be close to making a connection between data sets only to realize that it didn't quite make sense. Also, the amount of data I had from the questionnaires, interviews and C-SMARTT app was overwhelming at times and I felt that some data was 'lost' due to it not fitting in with both QN and QL

results. I was extremely lucky to have the support of statistician Nadine Dougall, and she was able to provide clear guidance on how to navigate some of the issues I came across in analysis my QN data. Once I had decided on how I was going to approach integration, I did feel that I was able to follow a more thoughtful and organized process.

The data integration of my QN and QL results did allow me to confirm and expand on the individual QN and QL results, which was satisfying. The outlining of the integration process went well and was straightforward, however, actually conducting the integration of my own data took a lot of time and I think this could have been prevented if I had been more insightful to plan earlier parts of the study around the final step of integration, for example using more in depth interview questions about resilience that were directly related to questionnaire results. This was perhaps a result of my own assumption that students would have a clear understanding of resilience which I thought would lead to a more open discussion about their individual resilience. In order to get the most out of the data integration, the results of the QN data analysis (top 10 common stressors and stressors with statistically significant changes) were used to guide the areas of the QL interviews, which were investigated for congruencies and discordances. This worked fine, however was very time consuming. Interview excerpts often confirmed QN findings, however it was important to ensure that quotes were not taken out of context to simply confirm a QN finding and this required time and continued reflection on the interview data.

There are several areas for improvement that would make data integration more successful and easier to manage in the future. It would have been useful to have a more clearly defined concept of what areas of the study are going to be integrated, and this might lend itself better to a different type of mixed methods design where one strand is guided by the results of the first. This would allow for clear links between data sets to be part of the research design. However, in this case for using a convergent parallel design, better preparation for data integration from earlier on in the study would have been beneficial. For this project, I always knew that I would be combining the QN and QL data at some point, however it was always a plan for the future and could have been built into the study design much better. For instance, making sure that the interview

questions were more related to the questionnaires in order to make the connections/incongruences more obvious and easier to pull from all the data. I also think in future, I would try a different type of mixed methods design, where one strand was more clearly guided by the other in order to make the connections between the two data sets easier to achieve.

7.7.4 Assumptions and bias

There were several assumptions and biases that I have acknowledged and reflected on as a researcher throughout the process of designing and conducting this study and these are discussed below.

Assumption 1: A mixed methods design was the best suited to answer the research questions.

I am glad that I chose a mixed methods approach for this study, however, it is possible that for a first time researcher focusing on either QN or QL data collection and analysis would have resulted in more participants, as more time and energy could have been given to a single method. Furthermore, by choosing a population both prior to and during the first clinical placement placed a lot of restrictions on participant availability. I think that one of the main learning points for me during this study was that it would have been more useful to design a study that allowed for more opportunities for data collection.

Assumption 2: Students feel stressed on clinical/are not supported while on clinical placement and as a result would be interested in this study.

One of the main reasons why I am interested in this area of research is due to personal experiences as a nursing student where I felt both extremely unsupported and at other times very nurtured. I feel like during the time that I felt supported during my own clinical placement made such a different to my confidence and my development as a nurse. I wanted to create an opportunity for other students to feel supported and feel

that my own assumption that there are other students who are feeling overwhelmed and unsupported in clinical placement perhaps made me think that students would feel the same and be more interested in taking part in this study. Although I do think that students experience stress while on clinical placement, perhaps this stress isn't as disruptive to the students as it was for me personally and although my personal experience is what has made me passionate about improving the student experience it may also contribute to my assumptions that other student nurses have had the same experience as me.

Assumption 3: Students that are more resilient will manage their stress more effectively/have less perceived stress.

One of the aims of this study was to investigate the relationship between stress and resilience and one of my assumptions was that students who identified as being more resilient would manage their stress more effectively which would result in lower levels of perceived stress. Although the results of the QN data did show a correlation between levels of resilience and perceived stress (higher levels of resilience result in lower levels of perceived stress) prior to the first clinical placement this was not found in the data collected during clinical placement. This result surprised me as I assumed that the relationship between stress and resilience would be an obvious one. It also became clear during the interviews that the concept of resilience was not clearly understood by all participants. I wanted the interviews to be semi-structured in order to allow participants to talk freely and let the conversion flow in whatever direction the participant took it, however, I think looking back that it would have been better to give an introduction to the concept resilience during the interview in order to make sure that the participants had a clear idea of what I was talking about

Assumption 4: Students want help from an outside source to help decrease their stress while on clinical placement.

As I have mentioned, my interest in this study stems from my own experience as a student and the idea of having an app to access while on clinical would have been the ideal tool for me. The results of this study have confirmed the importance of personal relationships, whether friends, family or co-workers/mentors on managing stress and maintaining/improving resilience and perhaps a smart phone app only suits a particular type of person in regards to how the choose to cope with stress. Individuals who have an information seeking style of coping may potentially find the app useful, and perhaps I overestimated the amount of people who would use this type of coping style. Although using technology can connect people, it may be that having authentic relationships with others is what appeals to most students. However, I do also think that I didn't put enough focus onto making the app known to the students outside of the times I was presenting the study, and although I did have an advertisement on the online portal perhaps more effort at this level could have increased usage of the app.

Assumption 5: An app would be an interesting and effective tool for students to use while on clinical

While conducting the literature review for this study and talking with my supervisors about the direction that this study was going to take, I became really inspired by the idea of designing an app and providing a tool for students to use while on clinical. This coupled with the huge effort it took to design an app prior to data collect gave this app a personal significance to me and I felt that student nurses would feel the same way. Although I still do believe that students would be interested in this type of technology to use while on clinical placement, future studies would need to have more participant use the app for the data to be generalized to this population. As I have mentioned, finding the time and balance to design the app and then also put in the effort to advertise and recruit participants didn't work out how I would have hoped. Also, because I wanted the study participants to have completed both questionnaires as

well as used the app so that I could compare data, I missed out on some of the app users. In the end I wasn't able to use the data of the app users to compare prior to and during clinical because of the low numbers. So it would have been better to include all app users in order to collect more data about the app, but at the time I thought that I would be able to compare the QN data between app and no app users with statistical tests besides comparing mean and change scores.

In regards to these assumptions, several researcher and participant biases have to been identified to reflect on:

Researcher Bias:

1) *Confirmation bias*- when a researcher forms a hypothesis or belief and uses respondents' information to confirm that belief (Sarniak 2015). Confirmation bias can then extend into analysis, with the researcher tending to remember points that support their hypothesis and points that disprove other hypothesis (Sarniak 2015). As mentioned in the assumptions, I had a bias that student nurses would feel stress while on clinical placement and that they would find an app to be helpful tool. I found that this was it was complicated to manage confirmation bias in this study- part of the data integration process of using convergent mixed methods is to confirm findings so I was looking for areas of the QN and QL data that confirmed findings, however I also had assumptions and biases that students would find the initial clinical placement stressful and that having higher resilience would positively impact this.

2) *Leading questions and wording bias*- elaborating on a respondent's answer puts words in their mouth and while leading questions and wording aren't types of bias they, they lead to bias or are a result of bias (Sarniak 2015). This can occur because the researcher is trying to confirm a hypothesis, build rapport or overestimate their understanding to the respondent (Sarniak 2015). This study was the first time that I had conducted a QL interview on my own and felt that I was very conscious of trying to build rapport with the participants and my

approach to the structure of the QL interviews was intended to allow participants to lead the discussion. However, this did lead to me agreeing and having more of a conversation with the participants than asking questions at times and this might have been a result of my inexperience and my desire to create an environment where the students felt comfortable. I think that at times I was attempting to clarify and paraphrase what the participants had said in order to be sure that I had understood but that this could have led to the interview being focused on certain topics and potentially could have led to some participant bias (acquiescence bias discussed below)

3) *Relationship bias-* can influence respondents' answers if they are speaking to individuals with who they have direct relations- more respondents provide more candid, open and detailed information whey they are communication with an outside third-party (Sarniak 2015). Although I was a third party, there is potential to still have a student-instructor type of dynamic, in this case the researcher-participant, where students felt that they had to answer a certain way and were not able to be totally honest. I feel like the interviews did seem quite candid and that participants felt comfortable discussing their experiences on clinical placement and even if they hadn't used the app they were still able to say why and what they would like to see developed in an app in the future.

Participant Bias
1) *Acquiescence bias-* occurs when a participant demonstrates a tendency to agree with and be positive about whatever the researcher is saying (Sarniak 2015). The researchers should try and replace questions that imply there is a right answer with those that focus on the participants' true point of view (Sarniak 2015). I tried to address this by keeping interview questions open and allow the participants to discuss whichever area of their clinical placement they wanted to. I felt like I had to ask direct questions about the C-SMARTT app because I wanted to make sure that there was some discussion about the app in order to ensure some data was collected about it. I tried to keep my questions worded in

a way that was asking about the participants' experience of clinical and how they felt instead of implying there was a right or wrong answer. However, I can also see how my own agreement with what they were saying could led to participants thinking that they had answered the question correctly and then wanted to stay on the same topic.

2) *Social desirability bias-* this bias involves respondents answering questions in a way that they think will lead to being accepted and liked (Sarniak 2015). This type of bias may result in some reporting inaccurately on sensitive or personal topics to present themselves in the best possible light (Sarniak 2015). I did aim to make it known to students prior to the interview that there was no right or wrong way to answer the questions and to impress that the information would be confidential. However, it is still possible that students wanted to give answers that would give a positive response from the researcher. This is most likely to have occurred during discussion about the app, when students hadn't used the C-SMARTT App they might have felt like they had to give a positive response about either using it in future or their ideas to what they would like to see in an app in order to please the researcher.

The process of conducting this study was challenging and rewarding. It provided opportunities for me to learn and expand on how I design and conduct research and I have also gained confidence as a researcher. There were several specific challenges during this process, particularly with issues with participant recruitment, which led to disappointment in how I was able to use that data during the QN data analysis. Reflecting on my own assumptions and biases has been an important part of the learning from this research that I will be able to apply to any future projects.

Chapter 8: Conclusion

8.0 Preamble

Although stress and resilience in student nurses has been widely studied in the past, investigating the correlation between these phenomena in the context of first year nursing students during their first clinical placement has been relatively unexplored. In this work, first year nursing student's experience of stress and resilience in the context of their first clinical placement and their experience of using a stress management and resilience support tool have been presented and discussed in detail to answer the following research questions:

1) **What are nursing students' perceptions of stress and levels of resilience before and during their first clinical placement?**

2) **What are nursing students' experience of stress and resilience during their first clinical placement**

3) **What are nursing students' experiences of using a stress management app delivered by smartphone**

8.1 Background

This study presented a large literature review covering stress and resilience in nursing students, and interventions aimed to reduce stress and develop resilience in this population. From this review, several gaps in the knowledge became apparent, such as: the lack of mixed methods approaches used, limited focus on the initial clinical experience and no studies were found that investigated the correlation of stress and resilience during the first clinical placement. Furthermore, the literature highlighted the need for further development of interventions aimed at stress reduction and resilience development. The literature supported that these interventions would benefit from using mobile technology as a method of delivery, as this could address some of the limitations of workshop/classroom methods. This resulted in the design

and development of a stress management and resilience building mobile app for this study, called the C-SMARTT App (Clinical Stress Management and Resilience Tips and Techniques).

The use of Lazarus & Folkman Transactional Model of Stress and Coping (1984), the initial guidance of the Medical Research Council guidelines for developing and evaluating complex interventions (Craig et al. 2008) and Sharples Theory of Mobile Learning (Sharples 2007; 2015) allowed for a strong theoretical background for the development the C-SMARTT App. Connection with these frameworks continued throughout this study to provide a consistent approach to data collection, analysis and interpretation of the findings. In the discussion chapter, these frameworks were used alongside Bowen's et al. (2009) work on feasibility study design to present a model for future app development, one of the key interpretations of the findings in this study (Chapter 7, section 7.1)

8.2 Instruments and Participants

A convergent parallel mixed methods approach was used in this study. QN data were collected using the Resilience Scale (RS) (Wagnild & Young 1990) and the Stress in Nursing Students Scale (SINS) (Deary et al. 2003) at two intervals, prior to and 2 months into the first clinical placement. QL data was collected through interviews, towards the end of the first clinical placement, and analyzed using thematic analysis. The data integration process followed Fetter's et al. (2012) recommendations, and this allowed for a structured approach that resulted in several clear displays of how the QN and QL data were integrated for final interpretation of the mixed methods results.

There was a final sample size of 52 participants, for the QN data analysis and 7 participants took part in the QL interviews. Although 17 students accessed the mobile app, only 3 of these students took part in QL element of this study. Both app users and non-users provided valuable insight into what type of additions and changes they would like to see in future versions of the C-SMARTT App. Interestingly, all non-users showed interest in the idea of an app for use on clinical placement, even though they

had not used the C-SMARTT app. This perhaps points to the challenges faced with student engagement and promotion of the app to the students in this study.

8.3 Summary and Recommendations

The findings in regards to nursing student's experience of stress while on clinical placement are consistent with the current literature, with an increase in perceived stress found during the first clinical placement. The impact of social support was found to be essential in helping students manage stress. Students who perceived their interaction with their mentors to be positive, interpreted their overall clinical experience as positive, regardless of whether their perceived level of stress increased during their first clinical placement experience.

However, the findings in relation to the role of resilience and the benefits of a stress management and resilience-building app require further investigation. There was no significant difference found in levels of resilience prior to and during the initial clinical placement and although there was a moderate negative correlation found between levels of resilience and stress prior to the initial clinical placement, this was not found during the initial clinical placement. Participants in the QL element of this study provided some insights and suggestions for improvements to the C-SMARTT App, however the lack of engagement in the app signifies the need for improvements to be made in student engagement from start to finish in the project and for focus on app promotion in future app development and research attempts.

On reflection, a mixed methods approach was a good choice for the current study and the data integration process provided valuable findings and insights. However a sequential approach might have allowed for the results of the QN strand to guide the QL interview questions, which could have resulted in a more straightforward and complimentary data integration process.

Future attempts to investigate nursing student's experiences of using a mobile app should allow for more focus on participant recruitment and engagement and one

recommendation from this study would be to conduct a feasibility study to support the development of future versions or variations of the C-SMARTT App.

There are several important implications for practice and future research resulting from the findings of this study, and these are discussed in detail in Chapter 7, section 7.4.

8.4 Conclusion

Nursing students are going to experience stress during their education and clinical placements, and this is unlikely to be completely eliminated from the clinical placement experience. In fact it can be argued that due to issues such as staff nursing shortages and organizational changes to health and social care integration, and the impact this has on student nurses (Clements et al. 2015), stress in this population may actually increase. However, the initial clinical placement is an area when stress is heightened due to several factors, such as: inexperience, performing clinical skills for the first time, caring for patients and challenging relationships with mentors and staff (McKenna & Plummer 2013; Shaban et al. 2012; Sheu et al. 2002). Importantly, some of these stressors can be addressed by having increased support from educators, mentors and nursing staff to develop resilience through reflective practices, as well as having stress management and resilience development tools available. The findings from this study suggest that there is an increase in perceived levels of stress during clinical placement, which is supported by both QN and QL data. Social support was found to be an essential factor in regards to coping with stress and mentors in clinical placement were found to have a significant impact on student's overall clinical experience. There were no significant changes in resilience found prior to and during clinical placement, although a moderate negative correlation was found between levels of resilience and perceived levels of stress prior to the initial clinical placement. There is undoubtedly value in increasing awareness in student nurses regarding building of personal resilience and developing coping skills to help manage stressful situations. The limited success of the C-SMARTT app in this study limits future research recommendations in this area. Qualitative data gathered in regard to the use of technology to support

resilience and stress management emphasizes the need for optimal student

engagement in the design process to enhance usage and accessibility.

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Appendix

Appendix A: Reflective Account of C-SMARTT App Development and pilot

There are a number of models of reflection that are used by health care professionals and this allows for individuals to challenge and develop their existing knowledge, maximize learning opportunities and avoid mistakes that they have made in the past (Royal College of Nursing, 2012).

The Gibbs Model (1988) has been chosen as a model for reflection throughout this study as it acknowledges the role of emotion in the reflection process (Royal College of Nursing, 2012), which is suited to both the nursing profession and the researcher.

The Gibbs Model (1988) of reflection is systematic and can be broken down into six key steps:

1. *Description:* this step explores the context of the event and covers fine details such as who was present at the event, where it happened and what happened
2. *Feelings*: this step encourages the reflector to explore their thoughts and feelings at the time of the event.
3. *Evaluation*: this step encourages the nurse to make their own judgement about the event and to consider what went well and what went less well about the event.
4. *Analysis*: this step delves even deeper into reflection on the event and encourages the nurse to break the event down into smaller episodes in order to facilitate analysis.
5. *Conclusions*: this step explores the potential alternatives that may be used to deal with the situation that is being reflected upon.
6. *Action Plan*: this is the final step in the reflection process. The action plan is put into place in order to deal more effectively with the situation if or when it may arise again.

The reflective cycle (Gibbs 1988)

1) Description: The development of the C-SMARTT App began in the autumn of 2015, once the majority of the literature review for this study had been completed and the decision was made to pursue this type of technology. I was introduced to working with the GearedApp team by one of my supervisors who had knowledge of their newly developed company.

The content for the app was based on the commonly found stressors found in clinical placement and then several meetings with the GearedApp team were held to iron out details of formatting and functioning of the app. It was decided that it would be best if a group of students could pilot the app prior to the study in order to determine the usability and any major issues could be identified

The attempt at a pilot of the app was unsuccessful, and the initial attempt at data collection in Jan 2015 proved very challenging due to the organization of when and how I was going to present the study. It was arranged that I would speak to a large lecture hall of all first year students at the end of their classroom session; however, this class ended 45 min early. So

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although the instructor came to get me from my office, more than half the students (understandably) had already left.

2) **Feelings***:* The design of the C-SMARTT app was very time consuming and stressful, due to the time pressures to have it completed in time for a both a pilot and the winter semester (2015). Also, due to cost, only the very basic design was used in the end, which resulted in some missed opportunities for data collection. Also, student recruitment for a pilot of the app was completely unsuccessful. This could have been due to several factors, for instance, the pilot needed to be conducted right before the Christmas break, when students are overwhelmed with exams and other school commitments. In addition to the pilot failing, the first attempt at data collection in January 2015 was rushed due to the class ending early, which I'm sure didn't add to student's interest in the project

3) **Evaluation:** Overall, I think with the challenges I faced to design the content of the C-SMARTT app, I am happy with the result. However, there were frustrations over missing out on unique data collection opportunities (such as measurement of level of stress when the student's open the app and cause of stress), which would have added a unique element to this study's data collection processes. Although the initial attempt to present the project and collect data was unsuccessful, there were many learning opportunities that allowed the next data collection attempt (January 2016) to be much more successful. For example, I was able to introduce myself to the students before their class began and let them know I would be staying after class to present the project. Also, I stayed in the room for the entire class in case it ended early. However, there is still more work to be done in order to improve participant retention and interest in using the app.

4) **Analysis:** I have found that there were several elements of the C-SMARTT App that I could have improved, however, I really felt that at the time, I needed to have it finished in order to allow time for the GearedApp team to finish the software and have it done in time for the winter semester. I would hope that in

the future, without the time and budget constraints of a PhD project, I could have some time to run a proper pilot study and then design the app to be more suited to the needs of the students. However, there was so much that I learnt from the design process and failed attempts at piloting and data collection that even though at the time it was incredibly frustrating, I do think it has allowed me to develop some valuable research skills and realize the reality of conducing data collection.

5) **Conclusion:** On reflection, there are several changes I would have made to the design process and implementation of the C-SMARTT app. The main thing would be to invest more time on recruitment strategies because even once the app was finished, it doesn't help the project if students aren't aware of it or know how to use it. I feel very strongly that this app has great potential to help students in clinical placement and although there have been several issues in the initial design and development, I have learned many valuable lessons in regards to how to engage students and I look forward to having another opportunity to do this in the future.

6) **Action Plan:** In future, if I have the chance to develop the C-SMARTT app further, I would put more effort into participant recruitment and participant engagement. I think one of the difficulties I faced was that in the winter semester, first year students are infrequently on campus, which really limited my ability to access students more than a few times. In future, I might begin to engage students in the project in the autumn semester, in smaller class sizes, to help promote the purpose of the app and familiarize students with the project. I would also be interested in applying for funding for the app development, as having a minimal budget really did impact how much of the interesting and useful technology I was able to access.

Appendix B: C-SMARTT App Content

Napier C- SMARTT APP (Clinical Stress management and resilience tips & techniques)

- Please note: All contact persons have been removed from this appendix to protect privacy

Open App:

    -Register using student number and must read terms & conditions, which will be finalized by GearedApp designers (only required during registration)

When the App is Opened Students will be asked to:
- Rate you stress from 1 --- 2--- 3---4----5
  - Not at all stressful -------Extremely Stressful
- Is your current stress caused by one of the following?
  - Clinical Skill Development
  - The Theory-Practice Gap
  - Time management & work overload
  - Relationships with Mentors & Co-workers
  - Caring for suffering and/or dying patients
  - Other: please specify

This will then direct students to the home page of the app, which will have the Intro, Purpose, How to Use, Causes of Stress (which will open to a list of categories), Tips and Techniques (which will open to a list of categories) and Definitions.
The bottoms bar of the app will have a <mark>Community, Contacts and MyNapier</mark> icons.
If any student rates himself or herself a 5/5- they will receive a pop-up suggesting they contact someone from the support network.

HOME PAGE

Introduction:
    Clinical placements have been proven to cause stress and anxiety in nursing students due to multiple factors such as; developing clinical skills, difficulty with time management, relationships with mentors and co-workers, the theory-practice gap and caring for patients who are suffering/dying (Gibbons et al. 2009, Gibbons et al. 2010, Galbraith & Brown 2011, Chernomas & Shapiro 2013). It is important that as you head into your first clinical experiences, you are aware of potential causes of stress, have easy access to the support network within Edinburgh Napier as well as some simple tips and techniques to help manage stress and build resilience while on placement

What this app is for:
    The purpose of this app is to provide you, a 1st year nursing student beginning your clinical placement with on the spot information, support and simple techniques to manage stressors that arise during clinical placements. This app will collect data regarding your current level and cause of stress that will not only help you become self-aware of your own stress but to provide information on how and why this app is used. This will help inform the experience of stress in clinical placement for 1st year Edinburgh Napier nursing students specifically. Furthermore, this app aims to connect you with other students on placement through an online community to share thoughts, feelings and experiences throughout your clinical placement
    By helping you identify some common causes of stress that occur in clinical placement and increase your self-awareness of these issues, it is hoped that this app will help you through your first

clinical journey and assist you in contacting the appropriate support person or network at Edinburgh Napier University.
*See the contact list below

How to use the app:
  The app is design to increase self-awareness of several common causes of stress in clinical placement. You can select a cause of stress and this will give you information and the appropriate person to contact within the Edinburgh Napier support network.
You can also select from the tips & techniques which provide information and brief practical tools which have been proven to manage and reduce stress levels and help build personal resiliency (Galbraith & Brown 2011, Jackson et al. 2007)
  Being alone on placement can be tough! You can use the community page to discuss your clinical experiences with other 1st year students

<u>**Causes of Stress:**</u>

This section will provide information and tips about some of the most common sources of stress for student nursing during clinical practice. You can use this information to help acknowledge your own causes of stress in clinical practice and take reassurance that you are not alone!

  Clinical Skill Development

  The development of competency in clinical skills is often a cause of stress for students throughout their clinical practice and includes common issues such as fear of inadequate knowledge, insecurity about competence, taking intimate care of patients and evaluations of clinical practice (Gibbons 2009, Thomas et al. 2012, Chernomas & Shapiro 2013, Consolo 2008)
  At this point you may have little if any direct interaction with patients and providing care, but this will change dramatically throughout your clinical experiences. Being able to completely use clinical skills is one important aspects of providing care for your patients, and you have just begun that journey!
  You have begun to learn the theory behind some clinical skills and using this knowledge during your clinical practice can help cement the reasoning for why and how clinical skills are done (for example, using aseptic technique) (Morrell & Ridgway 2014)
  One way to help reduce stress around developing clinical skills is by building your confidence, and this can be achieved through practice (Morrell & Ridgway 2014). Take some time to have a detailed look through the expected competencies you are to achieve throughout your placement(s). Are there any skills that cause you stress or anxiety? By recognizing these, you can utilize your mentor for support to practice theses skills or ask a friend or co-worker if you can practice with them, for example, taking a manual blood pressure.
  It is beneficial to acknowledge and communicate and concerns you have regarding clinical skills with your practice mentor (Effective Mentoring 2011). They are in a position to answer questions and demonstrate skills prior to you practicing them yourself. Remember, you mentor and PDT are there for you to ask questions- don't be shy!

Have a look at Benner's (1994) Stages of Clinical Competence- it may help you see the differences in levels of clinical competency and where you are as first year student in stage 1.
http://www.health.nsw.gov.au/nursing/projects/Documents/novice-expert-benner.pdf

Utilize available resources: Do you know that you can request permission to access the Edinburgh Napier Skills lab? Contact your <u>link lecturer</u> for further information.

<u>NEED HELP?</u> *Would you like help developing your clinical skills or have a particular question or concern regarding a particular skill? Take the time to <u>contac</u>t your Edinburgh Napier support network.*

The Theory-Practice Gap

There is widespread agreement in the literature to the distancing of theoretical knowledge from what is actually practiced in nursing (Gallagher 2004, Corlett 2000). This is defined as a discrepancy between what you are taught in a classroom setting (theoretical) and what you experience when on placement (the practice of nursing)(Corlett 2000). Research suggests that without exception, students have found that not only does the theory-practice gap exist, but that it is "huge" (Corlett 2000). These differences can be frustrating for students and many students place more value on what is seen and learned in placement or "the real world" compared to what they learn in the classroom as this if often viewed as unrealistic (Corlett 2000)

Some research suggests that nurse teachers focus on performing in an ideal way, while clinical mentors and staff are more concerned with getting work achieved realistically (Pepper 1977 cited from Corlett 2000) and educators are even accused of creating the theory-practice gap by teaching ideals of nursing that are impossible to implement in the clinical area (Corlett 2000) In their defence, nursing instructors may feel they need to teach the ideals of nursing, so that students understand the principles involved so as they naturally shift from theses ideals, they will continue to practice safely (Corlett 2000)

Mentors play a big role in helping students relate theory to practice, but with short placement times and heavy workloads, patient care has to be the first priority which at times can lead for little explanation or teaching in regards to clinical skills (Allan et al. 2011)

So what can you do? The theory-practice gap is not going to disappear overnight but one way you can help manage stress and frustration in relation to discrepancies between theory and practice is to actively connect relevant theory to your own personal experiences in clinical, for example when measuring a patients vital signs, take time to think about what you have learned about cardiac output, anatomy and signs of sepsis.

One of the most distressing issues for students navigating differences between theory and practice is witnessing "poor" practice by other nurses or mentors during clinical placement (Duffy et al. 2012). It can place you in a difficult situation and many students don't feel confident enough to report concerns or worry they will be labelled as a trouble maker and report fear of bullying and impact on clinical assessment (Duffy et al. 2012) Although it is important to note that there is a difference between "bad habits" and unethical practice you may find that speaking to your PDT may help you clarify differences in a specific issue you are concerned about as it is your ethical duty to speak out against practices that concern you (NMC 2012). Furthermore, ask your mentor or other members of staff why they practice skills in a particular way, you may find that the same principles are in place or that new guidelines have been put into place.

NEED HELP? *Are you concerned about clinical practice you have witnessed? Do you feel unsure about how you should practice based on conflicts between theory you have learned and what you have experienced in clinical? Take time to* <u>*contact*</u> *your Edinburgh Napier Support Network.*

Time Management & Work Overload

After a few weeks of preparation classes and orientation to patient care, you may be feeling overwhelmed with information and anticipation to start your clinical experience! When you arrive at your placement, it is common to feel overwhelmed by the amount of patient care, paperwork and disruptions that occur and many students struggle with prioritizing and time management at this stage (Nelson 2010). Be assured that as you become familiar with your new practice setting and the daily routines this will improve!

You may notice the time pressures that nurses and other health care workers are under to keep up an acceptable speed of work (Nelson 2010). However, although fast skill performance may reduce time pressures, this can have a negative effect on decision-making, impacting on its quality, because reflection and consideration of alternatives can be perceived as time wasting processes (Waterworth 2003). As a first year student, it is important that you're leaning and patient safety come first, which may sometimes means emphasizing safety over speed (Nelson 2010)!

Two time management techniques that are useful are using routines and learning to prioritize (Waterworth 2003)). By learning the routine of your placement facility, you will be able to understand the expectations of certain task completion, for example when drug rounds should be started and

completed. But it is also important to think about how your individual routine will fit with that of your patient and of other nurses and health care team members (Waterworth 2003) For example, you may find that physiotherapy starts at 09:30 and patients are expected to be showered and out of bed ready for physio each day. This is an example of how synchronizing routines with others helps the overall provision of care become more efficient (Waterworth 2003)

The ability to prioritize is a learning process, but an important strategy to learn so that decisions can be made as to what is most important and this can be followed by appropriate action (Waterworth 2003). You may find it difficult at first, as nurses are often faced with conflicting priorities from various sources, such as the patient, doctors, and other health care workers and from the organization to name a few (Waterworth 2003, Nelson 2010)! This is often a source of stress for student nurses and registered nurses alike, but take this opportunity to learn from your mentor or other co-workers. Does your mentor or another nurse appear to be particularly efficient at managing her/his time? Ask them if they have any tips that can help you manage your time and workload and utilize the experience of nurses on your team, as they are a valuable resource of information!

Below are some practical tips to help you organize you days in clinical practice, as adapted from NursingTimes.net (Woogra 2012).

1) **Get into the habit of arriving early**
   As if the clinical day wasn't long enough! But seriously, giving yourself a few minutes extra time to review the handover, ease your mind and organize yourself before the busy day begins can help you start the day on a calm and collected note.

2) **Make a note**
   Many students find it helpful to take notes for personal use, whether on your handover sheet or in a separate notebook. By writing down which activities you need to accomplish for the day, you can clearly see what tasks you are expected to accomplish. It can also be useful to write down questions you think of to ask your mentor later!

3) **Estimate how long it will take**
   Once you have a good idea of how your clinical placement is organized, it can be helpful to have a guideline estimate of how long you want to spend on a task. This can help prevent you from spending too much time on one task and overlooking another.

4) **Prioritize**
   As discussed above, it takes time to learn to prioritize tasks. If you have made a list of tasks for the day, practice prioritizing tasks. What needs to be done first? Which tasks are urgent? What would happen if a task wasn't carried out immediately? Take time to discuss the days' organization with your mentor.

5) **Learn to say "no"**
   As a student this can be difficult, you may feel that you need to say yes when your mentor or other nurses ask for your help. However, you can't be everywhere at once, so some things will have to wait. Communicate your plan with your mentor or co-workers by saying something like. "I'm sorry I have to deal with X right now, but I will be back to help in a few minutes."

6) **Listen to your patient**
   Your priorities and those of your patient may be different, so try not to assume- ask! For example, it may be the ward routine to help patients wash first thing, but your patient might have had a poor sleep and would prefer to wash later in the morning or afternoon.

7) **Take a Breather**
   Take a minute to collect your thoughts and even use one of the tools in the techniques section to help you calm your mind and feel more in control. Although the business of the ward may make it feel like you can't take a break, taking a few minutes out will help you refocus and clear your head and allow you to be more efficient.

8) **Be Flexible**
   a. As mentioned, priorities on placement can change quickly and can be unpredictable even for the most prepared, so it is important to learn to be flexible and respond to the

changes around you. Having an organized to-do list is still useful but make sure that you reassess and update this list as the day progresses.

9) Don't be too hard on yourself

a. Developing prioritizing and time management skills takes time. It isn't helpful to criticize yourself for not finding enough time to complete a task, but use it as a learning opportunity- over time you will find that your time management skills will improve!

NEED HELP? *Do you need help with time management or are feeling overwhelmed with workload organization? Speak with your mentor or take some time to* contact *your Edinburgh Napier support network.*

Relationships with Mentors & Co-workers

Linking theory to the realities of nursing practice is an important part of your learning and building a positive relationship with your mentors can help provide this work-based teaching and learning environment (Foster et al. 2014). Furthermore, there is agreement in the literature that mentoring is crucial to student's success and that all good practice requires the basis of theoretical knowledge that should be integrated into practice (Foster et al. 2014). There are many more reasons why having a mentor is important for student nurses; such as, the need to ensure safe practices by the student, enable students to achieve the course practice competencies and to be there for support to listen to worries and fears that the student may have regarding caring for patients (Effective Mentoring, 2011)

When you are in placement, you will be paired up with one or a few nurse mentors who you will work with for each shift. It is hoped that a positive and learning based relationship will develop between you and your mentor, unfortunately this is sometimes not the case and relationships with mentors has been shown to be a significant source of stress for student nurses (Gibbons et al 2009, Emanuel & Pryce-Miller 2013, Chernomas & Shapiro 2013)

Research has shown problems with the level of support student nurses receive from clinical staff that are acting as their mentors and student experiences can vary considerably. Mentors may find it difficult to take responsibility for a student without a reduction in their own workload and other duties and this lack of time can make students feel unsupported in their learning (Huybrecht et al. 2011). Mentors in the clinical area should have received additional training for this role and should be aware of role expectations, however, as a student, one way to help facilitate a positive relationship between you and your mentor and co-workers is to use communication and your clinical competencies as a guide to achieve your learning goals (Foster et al. 2014).

The relationship between you and your mentor is one of the most important contributing factors to your clinical learning. Yet, for two individuals who are initially unknown to each other, developing a meaningful professional relationship requires good communication from both sides (Effective Mentoring 2011)). For an effective working relationship to exist, the mentor and mentee must have an element of trust and be willing to spend time together to maintain the relationship and to work together towards achieving the clinical practice objectives (Effective Mentoring 2011)

So how can you help improve communication with your mentor?

- Be clear about your role in placement as a first year student, this includes what skills you want to learn and practice and which skills/tasks are not appropriate for you to do.
- Be clear about your learning objectives. By using your competencies as a guide for your mentor can get an understanding of what is required for your learning and look for opportunities to help you achieve these.
- Also, be clear about your schedule, how many hours you are required to work and find out when your mentor is going to be on shift. It is helpful to mentors to know when you are expected to be on shift so that they can help organize another mentor if they are not in that day.

It is important to remember, that being mindful of effective working relationships, clear communication and competency based learning strategies may not always mean that your relationship with your mentor is completely smooth and it is helpful to manage conflicts as soon as possible.

Caring for suffering and/or dying patients

The complexity of clinical care environments is increasing and research suggests that as a first year student, you may be involved in end of life car or patient death during their first clinical placement (Poultney et al. 2013). However, nursing students are often unprepared for the impact a patient's death may cause even though it is the duty of nurse educators and mentors to support you through this aspect of care (Jenkins 2011, Cooper & Barnett 2005 from Poultney et al. 2013)

End of life care can be defined as care that "helps all those with advanced, progressive, incurable illnesses to live as well as possible until they die. It enables the supportive and palliative care needs of both patient and family to be identified and met throughout the last phase of life and into bereavement. It includes management of pain and other symptoms and provision of psychological, social, spiritual and practical support (pg.47, Department of Health 2008)." It is no wonder that many students report providing end of life care is a daunting task!

Spouse (2003) reports that student nurses harbour fears and anxieties of caring before the dying before their first placement and it is identified that preparation for coping with death and dying early in a student's career as negative experience may impact their ability to cope and affect their practice further (Terry & Carroll 2008). It is important that you take time to reflect on your own attitudes towards death and dying in order to help you confront your own feelings and develop insights to help you effectively nurse dying and suffering patients (Becker 2009).

It is suggested that taking time to recognize your individual concerns and coping strategies while participating in end of life care is crucial, but it is also important to explore procedures and practicalities of caring for these patients (for example after death care) that you may not have previously thought about but are part of the nursing role (Becker 2009). Furthermore, Becker (2009) suggests that caring for a dying patient can shape professional attitudes, beliefs and values and further encourages nurses to be aware of their own vulnerability, to allow reflection time and address potential issues. It is important to remember, that support from mentors in practice, peer support, as well as academic staff support are recommended to help you cope with the difficulties that may arise when caring for dying or suffering patients (Becker 2009).

Debriefing and sharing your personal feelings with other nurses or students is a great way to legitimize your concerns and will allow you to explore your own feelings, express anxieties and reflect on your experiences (Cooper & Barnett 2005)

Caring for suffering and /or dying patients can be difficult emotionally, psychologically and physically. If you are involved with caring for these types of patients, it is important to utilize your mentor and other staff to discuss concerns and debrief about clinical experiences.

Tips & Techniques:

This section of the app aims to provide you with some simple tools that have been proven to help manage and reduce stress as well as some practical tips to help you build resilience which has be proven to be a key element in stress management (Galbraith & Brown 2011)

Imagery

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Imagery is defined as an ancient healing technique whereby purposeful or therapeutic use of mental images is used to achieve a specific, desired goal (Stephens 1992 & Achterberg 1985). It is a gentle but powerful technique that invokes the uses of vision, audition, smell, taste, movement, position and touch and not only engages the mid but involves the whole body, both emotions and senses. Stephens (1992) work highlights several studies that used imagery to lower anxiety, and as this technique is completely portable and can be done at any time/place for any length or time as privately or openly as you like, it is a great method to use during clinical if you feel your stress levels beginning to rise, or if you want to prepare for an upcoming skill or evaluation.

Although there are many different types of imagery (Health Journeys 2014), for the purpose of managing clinical placement related stressors, process, feeling state and end-result imagery are suggested for you to try.

Process imagery has you picture and actual or fantasized mechanism by which the desired goal is achieved (Stephens 1992). You might find this more useful for physical effect of stress, for example, picturing hands massaging your tense shoulders or picturing your blood vessels dilating and your heart rate slowing and blood pressure dropping, helping you feel more relaxed.

End result imagery, on the other hand, has you picture a concrete image of the desired result of the imagery process already accomplished and the emotional response of the success (Stephens 1992). For example, seeing yourself complete a task, such as a head to toe patient assessment, successfully, with confidence and focus.

Feel State Imagery: This is simple imagery that changes mood, such as seeing yourself in your favourite place, or recalling a happy, peaceful time (Health Journeys 2014). Any imagery that can genuinely elicit feelings of love, care, safety and gratitude, will crowd out feelings of stress, fear or anxiety.

Using imagery can help you feel a sense of control, which can improve optimism, self-esteem and stress (Health Journeys 2014). Because imagery is an entirely internally driven activity, the user can decide when, where, how and if it is applied.

How to practice imagery:

Using imagery during clinical placement is useful as it is quick, portable and can be done by anyone at just about any time. Although it is best to find somewhere relatively quiet to help you focus, even spending a minute or two sitting on your own is enough to use imagery to help you feel prepared for a task or calm your nerves. There is no correct way to use imagery or specific imagery to use, but instead it is an entirely individual experience. You may find that using end-state imagery helps you with completion of tasks while feeling state imagery may help you calm your feelings of stress and anxiety by conjuring images of a loved one or favourite vacation place. The best way to find out is to practice!
Images

Mindfulness

Mindfulness is a stress management technique that has gained increasing attention recently and is rooted in Buddhism (Sharma & Rush 2014). The practice of mindfulness-based stress reduction (MBSR) was developed by Kabat-Zinn (1990) and has been used successfully to decrease a wide range of physical and psychological symptoms and increase well-being (Beddoe et al. 2004, Sharma & Rush 2014). Mindfulness is described by Kabat-Zinn (1990) as "paying attention in a particular way: one purpose, in the present moment and non-judgmentally" and "the intentional cultivation of non-judgmental moment-to-moment awareness (van der Riet et al. 2014 pg. 2)

For the purposes of this app, not all areas of MBSR are appropriate, such as yoga and walking meditation. However, using a technique call the body scan may be a useful tool you can use during clinical practice.

The body scan is a progressive relaxation in which participants' direct attention and observe sensations to each part of the body in turn and experience how that area feels at that particular moment in time (Sharma & Rush 2014, Beddoe et al. 2004, van der Riet et al. 2014). This could be done at break during clinical or even at home to help you de stress after a tough day or prepare before the start of a new one.

For the purposes of this app, a short 3 minute body scan video is provided, as this can be done relatively quickly and you may find after several usages, you are able to use the script on your own throughout the day. It should be noted that there are many different types of body scan videos and scripts available online and it is encouraged that you explore these options if the body scan is a tool that works for you.

VIDEO
http://elishagoldstein.com/video/3-minute-body-scan/

Diaphragmatic Breathing

Perhaps the simplest technique to deep or diaphragmatic breathing is simple, quick and effective and often not given the credit it deserves (Consolo et al. 2008)! When your stress levels rise, your breathing becomes shallow and rapid while deep breathing involves expanding the diaphragm with the abdomen rising with each inhalation, which provides an immediate response to stress reduction (Consolo et al. 2008))

How to practice Diaphragmatic Breathing (as adapted from Essence of Stress Relief 2014):

You may find it easiest to practice laying down with your knees bent and feet on the floor at first, but once you get the technique you will be able to do this sitting down or standing up!

1) Keep your spine straight.

2) Lightly place one hand over the stomach area just below the rib cage and the other hand over the upper chest, this will help you feel any movement.

3) Relax and focus on the rhythm of your breath.

4) Count with an equal number of beats to inhale and exhale if it helps, as some find this extended exhale relaxing.

5) Proper deep breathing doesn't ever force air into the lungs or strain going out. Never try to breathe beyond your capacity. Just breathe easy and rhythmically using the ever-slightest pressure to move the diaphragm downward and expand the abdomen.

INHALE through the nostrils. The abdominal area rises and the lower rib cage expands as the lungs fill with air—the upper chest should remain basically motionless.

EXHALE through the nose slowly and evenly, allowing your lungs to completely empty. Finish the breath by gently contracting the abdomen and expel the last bit of stale air… pause… and wait for the spontaneous draw of air that follows.

Although it may seem self-explanatory, take a minute to watch the quick video below and take a few minutes to practice this type of breathing. You may find that this can help you refocus and calm your racing mind!

VIDEO: https://www.youtube.com/watch?v=kgTL5G1ibIo

Exercise

Although exercise isn't a tool you can use during your days at clinical, it has been included in this app because of the remarkable effect that participating in regular activity can have on reducing stress, improving mood, energy and quality of sleep (NHS Choices 2013). Not to mention the variety of other health benefits such as reducing risk of heart disease, stroke and diabetes (NHS Choices 2013)!

Many nursing students will know the benefits of exercise but may feel they are too busy and stressed to even fit it in to their routine. However, any form of exercise, whether yoga, swimming, walking or running can go a long way towards stress management. This is because exercise increases your overall health and your sense of well-being and it has some direct stress reduction benefits; such as, it can increase your endorphins and improve your mood (NHS Choices 2013).

A successful exercise programme begins with a few simple steps:

Build your fitness up gradually, find a form of exercise you truly enjoy to help you stick with it and make sure you schedule time in to keep exercise a priority. Another way to help you incorporate exercise into your busy week is to enlist a friend to come with you to keep you motivated and accountable (NHS Choices 2013).

While you are going through your clinical placements, it might seem overwhelming to add exercise to the ever-growing to-do list, but even brief bouts of activity offer benefits and can help you unwind and become an important part of your approach to easing stress!

Build up your Resilience

You may have heard people speaking about the concept of resilience in health care or already have a good idea of what it means, in the context of this app, resilience can be defined as "the ability of individuals to bounce back or to cope successfully despite adverse circumstances (Rutter 2008) and when a person recovers easily and quickly from setbacks that occur (Zautra et al. 2010)" (Hart et al. 2014 pg. 720).

The high degree of stress that nurses face along with occupational challenges such as poor support, high acuity, long hours, violence from patients and families and bullying and horizontal violence from within organizations, along with feelings of psychological emptiness and frustrations with a poor work life balance are only some of the reported contributing factors that affect resilience (Jackson et al. 2007)

There is evidence that developing and strengthening personal resilience is a key factor in coping with a stressful nursing environment (Jackson et al. 2007 & Hart et al. 2014) as well as traits that will enrich life outside of the work environment.

"Highly resilient people are flexible, adapt to new circumstances quickly and thrive in constant change. Most importantly, they expect to bounce back and feel confident that they will and are considered adept at seeing things from another person's perspective (Siebert 2005)"

So why do some people bounce back from adversity and others fall apart?

Researchers suggest that personal resilience plays a part in how an individual copes with adversity. Although it is thought that some people are born with more resilience than others *it is possible to build more,* and one key is adjusting how we think about adversity (McGee 2006, Tugade & Fredrickson 2004)

Below are 5 practical steps you can take to build up your own resilience (as adapted from Experience Life, Sholl 2014)

1) **Positive Thinking (Jackson et al. 2007)**

Resilience people are characterized by an ability to experience both positive and negative emotions even in difficult situations and tend to maintain a positive outlook (Fredrickson 2009). It is important to note that this doesn't mean resilient people ignore negative emotions, but instead they allow them to sit side by side with other feelings (Fredrickson 2009). You may think that this doesn't come naturally to you but you can help encourage this by developing your positive thinking skills (Tugade & Fredrickson 2004, Bright 1997, Bonanno 2004, 2005 and Steinhardt & Dolbier 2008).

Researchers suggest that our brains are wired to pay more attention to negative events than positive events even though in reality we experience positive events much more frequently (Fredrickson 2009). By noticing and appreciating positive experiences when they occur, you may need to challenge your thought patterns and self-talk. This is because thinking patterns trigger emotional patterns, and in order to change emotional patterns it is key to increase positive thinking and curtail negative thinking (Fredrickson 2009).

For example, if you find yourself focusing on negative thoughts, such as "I will never be confident in a code blue situation" ask yourself, "what is the evidence that I'll never succeed?' you might say, "well, there's this history of success and this history of failure", how does this add up to never? It's a matter getting really literal about the kinds of blanket statements we have in our self-talk (Fredrickson 2009)

Experts also suggest that in order to build resilience it is important to improve your positivity ratio (Fredrickson 2009, Tugade & Fredrickson 2004). This is based on how you characterize the balance of positive and negative experiences in your daily life, and it is suggested that a 3-1 ratio of positive to negative experiences is needed! So take some time to reflect on your reactions to daily occurrences in your life, could you change your thinking and perspective to up your positivity ratio?

2) **Learning from adversity**

When you are able to use challenges in your life as opportunities to grow and learn, you are more likely to be resilient. (Giordano 1997, Steinhardt & Dolbier 2008) This is done by looking at difficult situations as an opportunity to problem solve, build confidence and a habit of moving toward pain instead of away from it (Sholl 2014) One strategy to learn from adversity is to use 'question thinking' which encourages you to approach challenges with learning, neutral questions such as "what is useful here" or "what are my available choices?" instead of judgmental questions like "what's wrong" or "who's to blame" (Adams 2009)

It is suggested that learner questions promote thinking, empowerment and acceptance as well as improve how you relate to others, which is an important aspect of resilience (Adams 2009). So next time you are faced with a difficult situation in clinical practice or in your day to day life, take time to reflect on how you approach adversity and if some learner questioning could help!

3) **Acts of Kindness**

Being of service to others is a great way to building resilience. Acts of kindness, and the serotonin boosts that accompany them, have a cumulative effect and it is suggested that the benefits become exponential, so that you have a reserve to draw from in times of difficulty (Sholl 2014). Act of kindness can be organized such as volunteering for charity or simple and informal (Brannan et al. 2011, Sholl 2014) such as being encouraging to a colleague or helping another nurse or student so that the can get their lunch break.

Gratitude is an important part of building resilience as it can help you put difficult times into perspective when adversity strikes, so it is important to receive and appreciate acts of kindness as well (Sholl 2014). One way to achieve this is to take time to be conscious of things going right in your life, such as starting a gratitude journal or thinking of 3 things in your life you are grateful for before you fall asleep. Another suggestion by (Fredrickson 2009), is to deliberately draw attention to the positive, stable aspects of your life which you may have started to take for granted; Such as, a roof over your head, food on the table, your health and the choice to go to university. This can again help with perspective, gratitude and positive thinking, all of which help build resiliency.

4) Self-Care

Nurses and nursing students have been found to put the care of others before themselves (Jackson et al. 2007) but self-care is a key element to both mental and emotional resilience (McDonald et al. 2013 and Bright 1997). A regular routine of healthy habits are key, when you are eating and sleeping well and keeping stress levels low you will be less fragile and less likely to respond to a setback by falling into unhealthy patterns. Of course, physical resilience is connected to both your mental and emotional well-being, which can be nurtured by taking a mental break and using one of the techniques such as imagery or mindfulness to decrease stress, and reduce feeling overwhelmed (Sholl 2014)

Two other key self-care factors that help nurture resilience: Spending time outdoors and surrounding yourself with people you enjoy. So take some time to grab a friend for a walk outside, where you will get some stress reducing exercise and a social connection, which has also been shown to increase resilience (McDonald et al. 2014, Jackson et al. 2007, Sholl 2014). Furthermore, research shows that spending time outdoors fights depression and anxiety as well as improves immunity and reduces levels of inflammatory chemicals in the body (Sholl 2014)!

5) Humour

Laughing in the face of adversity can be profoundly pain relieving, for both the body and mind. Laughing reduces tensions to more moderate levels and psychologically, choosing cheerfulness can be incredibly empowering (Jackson et al. 2007). Making light of situations can be more empowering that sheer determination to overcome a difficult or stressful situation (Sholl 2014)

Nurses have been known to harbour a dark sense of humour, and for good reason considering the hardships, stress and complexity of their daily work. Have a look at #whatshouldwecallnuring for some nursing related laughs http://whatshouldwecallnursing.tumblr.com/

<mark>Contacts:</mark> not included in this copy

Personal Development Tutor:

Shortened Pathway:

Programme Leader:

Link Lecturer:

Pastoral Services:

Financial Services: How to contact the Student Funding Team

The Student Funding Team is based at Student Hub, Merchiston Campus.
Student Funding Drop-in Sessions: held twice a week during term time. For current details visit Money pages on myNapier.
Phone: 0131 455 2929
Email: studentfunding@napier.ac.uk

Counselling Services: Edinburgh Napier Counselling team offer a wide range of

services to support you while at University. The Counselling team are there to help if you are distressed and in need of help or something in your personal life is affecting your confidence or ability to do your work. You can contact the counselling team by emailing counselling@napier.ac.uk

Prep-for-Practice Module Leaders:
(not included in this copy)

Researcher:
If you have questions about this research project or about this app, please do not hesitate to contact Shannon at ██████████████████

<mark>Terms & Conditions: *</mark>

By agreeing to the terms and conditions of this app, the user agrees to the following:
1) This app has been designed as part of an exploratory PhD project. It is designed to promote awareness of causes of stress and provide basic stress management, reduction and resilience building techniques. This app is not a diagnostic tool. This app is not a substitute for seeking professional help for stress disorders or any mental health issues.
2) This app has been designed to help assist users in contacting appropriate support; it is the responsibility of the user to make contact with available support if they wish to do so.
3) Data will be collected from this app to measure frequency of use, and level and cause of stress at each use. All data collected from this app will be kept confidential.
4) If the user has been found to use the app with self-assessed high stress levels of 5/5, they will receive a pop-up alert to suggest they contact their PDT or pastoral services at Edinburgh Napier. Users will not receive any other pop-up alerts.
5) It is expected that the use of the community board will be done so with respect for other users and professionalism. There is a zero tolerance policy for any reported inappropriate language, rude behaviour, bullying and disrespectful comments. If a person is found to have done so, they will be banned from using the community board.
6) Users of the community board will be expected to maintain patient and co-worker confidentiality. If a person is found to have breached confidentiality, their post will be removed and they may be reported.

Note from the researcher:

I would like to take a minute to thank you for using the C-SMARTT App. I hope that you have found it helpful it raising your awareness to common causes of stress and that you have tried some of the suggested techniques and tips. If you would like more information on the project or would like to be involved in the interview or focus group portion, please feel free to email me, Shannon at ██████████████████ Many thanks and best wishes during your clinical placements!

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Community board guidance:

- This board is to be used as a professional outlet for you to discuss your experiences during your clinical placement. Please be considerate and respect the confidentiality of your patient and colleagues.
- If you have been found to breach confidentiality your post will be removed and you may be reported to the programme leader.

- Please see the <u>terms & conditions</u> for more information.

Potential Starter Topics:

- **My favourite things about this clinical placement**
- **Difficulties during clinical**
- **Experiences with mentors? Good or bad?**
- **Has your clinical experience been what you expected**

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Appendix C: Ethical Approval Letter

Edinburgh Napier University
School of Health and Social Care
Research Integrity Committee
9 Sighthill Court
Edinburgh
EH11 4BN

Dear Shannon

Project Title: First year nursing students' perceptions of stress and resilience during their initial clinical placement and experience of using a stress management app: a mixed methods approach."

Project reference: FHLSS 2511

Please note you received ethical approval to undertake a research study at Edinburgh Napier University on the 19/12/14.

The data from your study should be held securely for a period agreed by the University's data management policy or longer if specified by the funder:
http://staff.napier.ac.uk/services/research-innovation-office/Documents/Research%20Data%20Management%20Policy.pdf

All documents related to the research should be maintained throughout the life of the project, and kept up to date at all times. Please bear in mind that your study could be audited for adherence to research governance and research ethics.

Yours sincerely,

Dr. Anne Rowat
Chair

4clean ethical approval letter

This informed Consent is for Edinburgh Napier 1st year Nursing Students beginning clinical placement January 2016 who are invited to participate in a PhD research project, titled:

First year nursing student's perceptions of stress and resilience during their initial clinical placement and experience of using a stress management app: a mixed methods approach.

Name of researcher: Shannon Porter
Name of organization: Edinburgh Napier University
Director of studies: Dr. Stephen Smith

This informed consent for has two parts:
- Information sheet (to share information about the study with you
- Certificate of Consent (for signatures if you choose to participate)

Part I: Information Sheet

Introduction

My name is Shannon Porter, PhD student at Edinburgh Napier University in the Faculty of Health, Life and Social Sciences, School of Nursing and Midwifery. I am doing research on the effectiveness of a stress management and reduction intervention, which will be delivered by smartphone. This will be designed for first year nursing students beginning and during their first clinical placement. In the pages that follow, I will provide you with information and invite you to be part of this research as well as allow you to ask me any questions you may have about this project.

Purpose of research

Nursing students have been identified as having higher levels of stress than other types of university students, with experiences in clinical placement being a large contributor to stress. This study aims to implement and evaluate the use of an app to help first year nursing students manage and reduce stress throughout the first clinical experience.

Type of research:

This research may involve your participation in 2-3 separate phases of the study over a three-month period, this includes completing questionnaires in the 1st and 2nd phase and your choice to participate in focus group or individual interview as part of the 3rd phase. If you choose to take part in the questionnaires it is not mandatory that you participate in the focus group or interviews even if you are deemed an appropriate candidate and invited to participate.

Part of this project involves the evaluation of a stress management and resilience-building app. If you are interested, you can download the app and then over the period of your first clinical placement the frequency of usage of the app and your stress level when using it will be recorded. You may then be invited to take part in your choice of a focus group or individual interview.

The first phase will be answering two questionnaires that will be provided to you after a regularly scheduled class during the AHA module in January 2016. This should take no longer than 15 min.

The second phase will take place March 15th, 2016 during the AHA module. This will involve answering the same questionnaires as phase 1, which should take no longer than 15 min.

If you are deemed to be an appropriate participant, you may be asked to take part in a focus group with 6-8 people to discuss your experience of stress during your clinical placement and how the intervention has/has not been effective in helping you manage and/or reduce stress. Discussions during the focus group will be recorded. This may take up to 1 hour.

If you have requested an individual interview, you will be asked to meet the interviewer to discuss the same topics as in the focus group or this discussion can take place over the phone. This may take up to 1 hour.

You will be contacted by your Edinburgh Napier student email address to be invited to take part in your choice of a focus group or interview if you are an appropriate candidate.

Participant selection

You have been chosen for participation in this study because first year students may face high levels of stress during their first clinical placement. Therefore, I feel that your experiences can contribute greatly to the understanding of the student experience and the development of tools to help students through this time.

Voluntary participation

Your participation in this research is entirely voluntary. The choice that you make will have no bearing on any school related evaluations or reports. You may change your mind latter and stop participating at any time even if you agreed earlier.

Risks

Experiencing stressful situations can be emotional and personal. I may ask you to share some personal information and you may feel uncomfortable talking about some of the topics. You do not have to answer any questions or take part in the questionnaires or focus groups if you don't wish to do so. You do not have to give any reason for not responding to any question or for refusing to take part in the focus group or interview. You will be given information on appropriate support personal if you require contacting them.

Benefits

The benefits of this project may be that the intervention is successful in helping you manage and reduce stress related to your first clinical placement. Further benefits will be the information you provide on what made the app successful or not, as this information will allow for an opportunity to make improvements to help other student nurses in the future.

Confidentiality

You will be asked to provide your student email address for contact regarding the focus group or interview, this is not mandatory. You will not be emailed at any other time. You may be asked about your experiences with your tutor(s), nursing staff and levels of stress. I will not share information about you to anyone outside the research team. The information I collect from this project will be kept private and you will not be asked to use your name at any time. The data will be stored electronically; by a password protected PC and a paper copy will be kept in a locked cabinet on the Sighthill campus. All data will be destroyed following the project examination.

If you decided to use the app, you will be asked to register using your student number. Your name will not be accessed using your student number at any time. You will be asked to self-assess your level of stress and cause of stress when you use the app and this data will be collected. The frequency in which you use the app will also be collected. Contact details for support will be provided throughout the app if you should wish to address further concerns or questions.

The results of this study will be used for the basis of my PhD thesis and the aim to finish this will be July 2017. The results may also be submitted to an academic journal for publication.

A copy of transcripts and knowledge gained from this research will also be made available to you at your request.

Right to Refuse or withdraw

Your participation in this research is voluntary. You do not have to take part if you do not wish to do so, and choosing to participate or not will not affect your university evaluations in any way. You may stop participating in the questionnaires or focus group at any time. If you wish to have a transcript of the focus group or interview discussion I will be able to provide that for you.

Who to contact

If you have any further questions or would like more information, please contact Shannon by email at ███████████████████ or the projects' FHLSS independent advisor Norrie Brown at ███████████████.

This proposal has been reviewed and approved by the Edinburgh Napier University Research Ethics and Governance Committee, whose task it is to make sure research participants are protected from harm.

Appendix E: Consent Form

Part II: Certificate of Consent

I have been invited to participate in research about a stress management and stress reduction intervention during my first clinical placement of the adult nursing programme at Edinburgh Napier University.

My participation in this study is voluntary and I may withdraw from the study at any time should I feel the need to do so without giving any explanation.

I understand that information from this study will be used in a PhD thesis and potentially be published in an academic journal, however all personal details will remain confidential.

I understand that I may be contacted by email using my Napier University address in order to be contacted about attending a focus group or individual interview and will not receive any other emails regarding this project.

I have read the information sheet provided. I have had the opportunity to ask questions about it and any questions I have asked have been answered to my satisfaction. I consent voluntarily to be a participant in this study.

Print name of participant: _____

Signature of participant: _____

Email of participant (Napier University address):_____

Date: _____

Appendix F: Interview Schedule

Begin with an introduction and explanation of the research project and the expectations on the researcher and participant for the interviews. Check that consent form has been signed.

Key Questions:

1) Can you describe you experience in clinical placement so far?
2) Are there any particular aspects you have found stressful? And can you tell me more about these?
   a. Can lead with suggestions such as, learning new skills, mentors, time management
3) How do you cope with these stressors or stress in general? Can you tell me more about this?
   a. Can lead with suggestions such as hobbies, recreation, family, friends
4) Would you describe yourself as resilient?
5) Do you feel you have a good support network (from university, family, friends). How do they help you cope with stress?
6) Have you used the C-SMARTT App?
   a. Why or why not?
   b. What about it was helpful?
   c. What would you like to see added?
   d. What information would be most useful to you to have on an app?
   e. Do you currently use techniques such as deep breathing or meditation to help you cope with stress
7) Re-cap and clarify and answers with participants

Appendix G: Phases of Thematic Analysis (Braun & Clarke 2006)

Phase	Description of the process
1. Familiarizing yourself with your data	Transcribing data (if necessary), reading ad re-reading data, noting down initial ideas
2. Generating initial codes	Coding interesting features of the data in a systematic fashion across the entire data set, collating data relevant to each code
3. Searching for themes	Collating codes into potential themes, gathering all data relevant to each potential theme.
4. Reviewing themes	Checking in the themes work in relation to the coded extracts (Level 1) and the entire data set (Level 2), generating a thematic 'map' of the analysis.
5. Defining and naming themes	Ongoing analysis to refine the specifics of each theme, and the overall story the analysis tells; generating clear definition and names for each theme.
6. Producing the report	The final opportunity for analysis. Selection of vivid, compelling extract examples, final analysis of selected extracts, relating back of the analysis to the research questions and literature producing a scholarly report of the analysis.

Appendix H Resilience Scale

The Resilience Scale (Wagnild & Young 1990)

Please read the following statements. To the right of each you will find seven numbers ranging from "1" (Strongly Disagree) on the left to "7" (Strongly Agree) on the right. Please circle the number which best indicates your feelings about that statement.

1	When I make plans, I follow through with them	1	2	3	4	5	6	7
2	I usually manage one way or another	1	2	3	4	5	6	7
3	I am able to depend on myself more than anyone else	1	2	3	4	5	6	7
4	Keeping interested in things is important to me	1	2	3	4	5	6	7
5	I can be on my own if I have to	1	2	3	4	5	6	7
6	I feel proud that I have accomplished things in life	1	2	3	4	5	6	7
7	I usually take things in my stride	1	2	3	4	5	6	7
8	I am friends with myself	1	2	3	4	5	6	7
9	I feel that I can handle many things at a time	1	2	3	4	5	6	7
10	I am determined	1	2	3	4	5	6	7
11	I seldom wonder what the point of it all is	1	2	3	4	5	6	7
12	I take things one day at a time	1	2	3	4	5	6	7
13	I can get through difficult times because I've experienced difficulty before	1	2	3	4	5	6	7
14	I have self-discipline	1	2	3	4	5	6	7
15	I keep interested in things	1	2	3	4	5	6	7
16	I can usually find something to laugh about	1	2	3	4	5	6	7
17	My belief in myself gets me through hard times	1	2	3	4	5	6	7
18	In an emergency, I'm someone people can generally rely on.	1	2	3	4	5	6	7
19	I can usually look at a situation in a number of ways.	1	2	3	4	5	6	7
20	Sometimes I make myself do things whether I want to or not.	1	2	3	4	5	6	7
21	My life has meaning	1	2	3	4	5	6	7
22	I do not dwell on things that I can't do anything about.	1	2	3	4	5	6	7
23	When I'm in a difficult situation, I can usually find my way out	1	2	3	4	5	6	7
24	I have enough energy to do what I have to do	1	2	3	4	5	6	7
25	It's okay if there are people who don't like me.	1	2	3	4	5	6	7

Appendix I Shapiro-Wilk Test of Normality

Tests of Normality

Tests of normality were conducted to confirm that the use of parametric tests were appropriate for the Likert scale data collected. The literature suggest that several approaches are used to confirm normality of data and these are Histograms, a Normal Q-Q plot and use of the Shapiro Wilk Test.

Shapiro Wilk Test

In addition to graphical methods, the literature recommends that further statistical tests be conducted to support these results. There are several ways to test for normality in data, however in this study the Shapiro-Wilk test was used, as it is more appropriate for a smaller sample size (n <50). When the sig. value of the Shapiro-Wilk test is greater that 0.05, the data is classified as normal.

The results of the Shapiro-Wilk test for RSpre, RSd, SINSpre and SINSd show that the sig. value is great than 0.05 in all of the data sets and this is illustrated below

Test of Normality for RSpre data

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	df	Sig.
RSPre	.091	52	.200*	.977	52	.423

Tests for Normality for RSd

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
RSd	.077	52	.200*	.989	52	.906

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Tests of Normality for SINSpre

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
SINSpre	.073	47	.200*	.981	47	.647

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Tests of Normality for SINSd

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
SINSd	.091	48	.200*	.984	48	.731

*. This is a lower bound of the true significance.

a.   Lilliefors Significance Correction

Appendix J Q-Q plot Test of Normality

Tests of Normality

Tests of normality were conducted to confirm that the use of parametric tests were appropriate for the Likert scale data collected. The literature suggest that several approaches are used to confirm normality of data and these are Histograms, a Normal Q-Q plot and use of the Shapiro Wilk Test.

Normal Q-Q Plot

Another graphical method used to determine normality of data was the use of a normal Q-Q plot. If the data are normally distributed, the data points will be close to the diagonal line. If data points obviously stray from the line in a non-linear manner, the data are normally distributed.

The Normal Q-Q Plots for RSpre, RSd, SINSpre and SINSd show that the data points follow the diagonal line closer and are included below:

Normal Q–Q Plot of SINSpre

Normal Q–Q Plot of SINSd
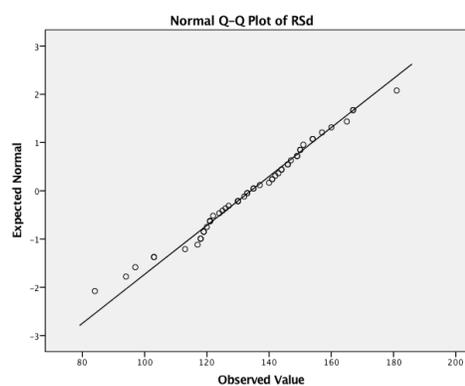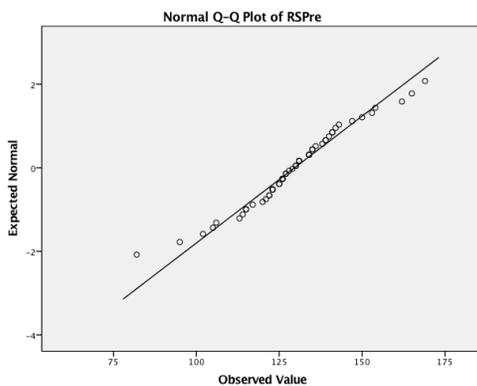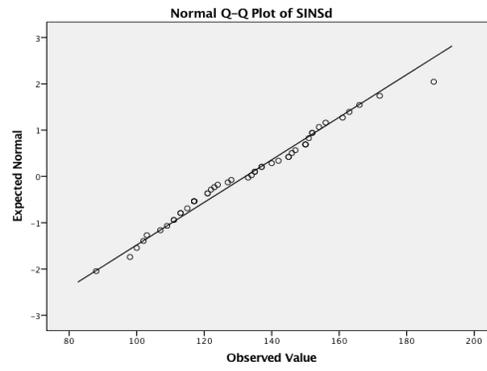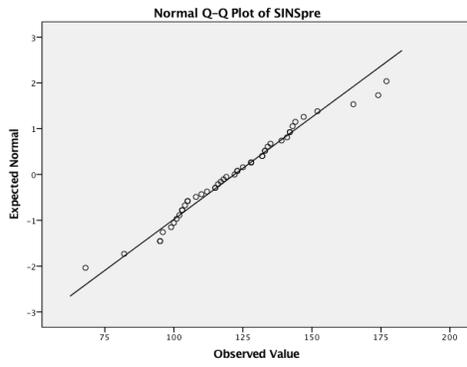
**Appendix K: Histograms test of normality**

Tests of Normality

Tests of normality were conducted to confirm that the use of parametric tests were appropriate for the Likert scale data collected. The literature suggest that several approaches are used to confirm normality of data and these are Histograms, a Normal Q-Q plot and use of the Shapiro Wilk Test.

Histograms

Histograms were plotted to give an indication of the shape of the distribution of the data. A normal approximation curve was added to help determine distribution. Although it is unlikely that a histogram will produce a perfectly normal curve, as long as the data is approximately normally distributed, with a peak in the middle and fairly symmetrical, data can be assumed to have a normal distribution and this supports the use of parametric tests.

The histograms for RSpre, RSd, SINSpre and SINSd are included below and show that the data is approximately normally distributed:
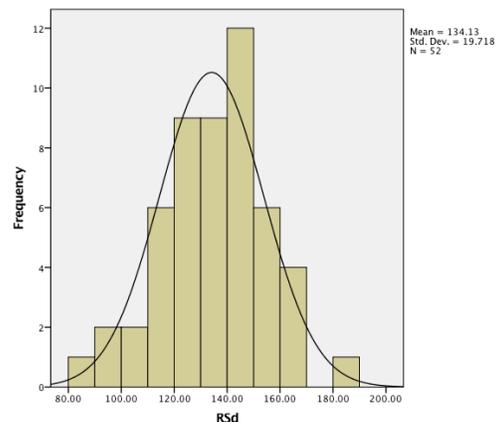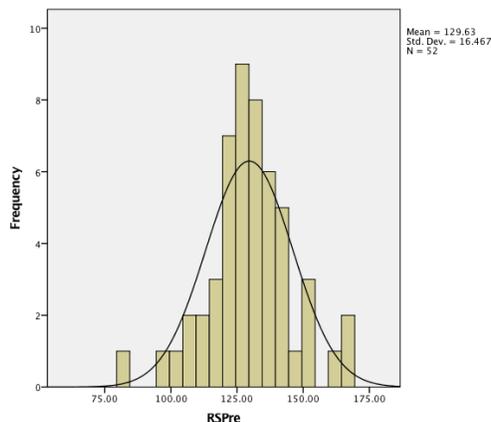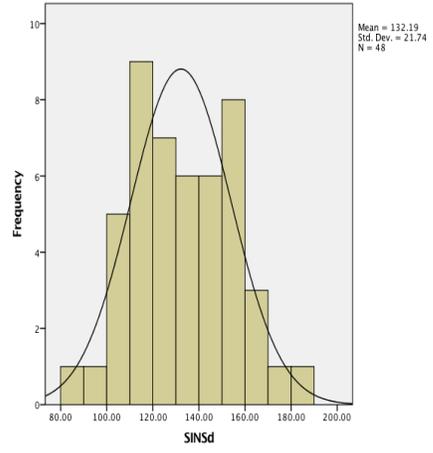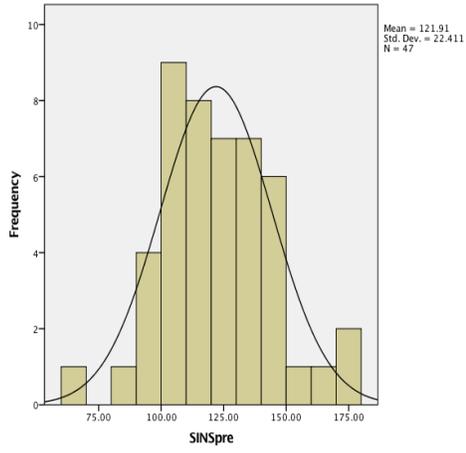
Appendix L: SINS scale

Stressors in Nursing Students (SINS) Scale (Watson et al. 2013)

Below is a list of items that might or might not be a source of stress for student nurses. To the right of each you will find numbers ranging from "1" (not at all stressful) to "5" (extremely stressful). For each item circle the rating that best applies to <u>you</u>.

1	The amount of classwork material to be learned	1	2	3	4	5
2	Relationships with family members	1	2	3	4	5
3	Having too much clinical responsibility	1	2	3	4	5
4	The difficulty of the classwork material to be learned	1	2	3	4	5
5	Personal problems other than health	1	2	3	4	5
6	Not getting enough feedback about performance	1	2	3	4	5
7	Examinations and placement gradings	1	2	3	4	5
8	Patients' attitudes towards me	1	2	3	4	5
9	Fear of making a mistake in clinical placements	1	2	3	4	5
10	Competition from fellow students	1	2	3	4	5
11	Relations with staff in the clinical area	1	2	3	4	5
12	Caring for the emotional needs of patients	1	2	3	4	5
13	The attitudes and expectations of other professionals (doctors, administrators, social workers, etc.) towards nursing	1	2	3	4	5
14	Being interrupted in clinical duties	1	2	3	4	5
15	Not having enough staff or equipment to meet patients' needs	1	2	3	4	5
16	Fear of poor job prospects	1	2	3	4	5
17	Conflicts with peers	1	2	3	4	5
18	Having too much to learn	1	2	3	4	5
19	The atmosphere created by teaching staff	1	2	3	4	5
20	Dealing with un-cooperative, anxious, abusive or otherwise difficult patients or relatives	1	2	3	4	5
21	Conflicts with staff in placements	1	2	3	4	5
22	The lack of free time	1	2	3	4	5
23	Not being sure what is expected in the course	1	2	3	4	5
24	Criticism from peers or senior staff	1	2	3	4	5
25	Not having enough time for friends and family	1	2	3	4	5
26	The college response to student needs	1	2	3	4	5
27	Conflicts with administrators or managers	1	2	3	4	5
28	Not having enough money for entertainments	1	2	3	4	5
29	Meeting deadlines for coursework	1	2	3	4	5
30	Relations with other professionals	1	2	3	4	5
31	Not having anyone to talk to about course problems	1	2	3	4	5
32	Patients' attitudes toward nursing	1	2	3	4	5
33	Fear of failing in the course	1	2	3	4	5
34	Not being sure what is expected on placements	1	2	3	4	5

35	Having no time for entertainment	1	2	3	4	5
36	Conflicts with college staff	1	2	3	4	5
37	Surviving on a low income	1	2	3	4	5
38	Personal health problems	1	2	3	4	5
39	Feeling responsible for what happens to patients	1	2	3	4	5
40	Speaking to patients' relatives	1	2	3	4	5
41	Making less money than friends who are not nurses	1	2	3	4	5
42	Physical health of family members	1	2	3	4	5
43	Coping with suffering or death of patients	1	2	3	4	5

Appendix M: SINS sub dimensions

Clinical

8	Patient's attitudes towards me
9	Fear of making a mistake in clinical placements
10	Competition from fellow students
11	Relations with staff in the clinical area
12	Caring for the emotional needs of patients
13	The attitudes and expectations of other professionals (doctors, administrators, social workers, etc.) towards nursing
14	Being interrupted in clinical duties
15	Not having enough staff or equipment to meet patient's needs
20	Dealing with un-cooperative, anxious, abusive or otherwise difficult patients or relatives
32	Patient's attitudes towards nursing
39	Feeling responsible for what happens to patients
40	Speaking to patient's relatives
43	Coping with suffering or death of patients

Education

1	The amount of classwork material to be learned
2	Relationships with family members
3	Having too much clinical responsibility
4	The difficulty of the classwork material to be learned
5	Personal problems other than health
7	Examinations and placement gradings
18	Having too much to learn
23	Not being sure what is expected in the course
29	Meeting deadlines for coursework
33	Fear of failing the course

Confidence

17	Conflicts with peers
19	The atmosphere created by teaching staff
21	Conflicts with staff in placement
25	Not having enough time for friends and family
26	The college response to student needs
27	Conflicts with administrators or managers
30	Relations with other professionals
31	Not having anyone to talk to about course problems
34	Not being sure what is expected on placements
36	Conflicts with college staff
38	Personal health problems

Finance

22	The lack of free time
25	Not having enough time for friends and family
28	Not having enough money for entertainment
35	Having no time for entertainment
37	Surviving on low income
41	Making less money than friends who are not nurses

Appendix N: Description of Statistical tests

Description of Statistical Test Used

There were several approaches to statistical data analysis used to interpret the quantitative data. First of all, test of normality were conducted on all data to determine appropriateness of parametric measures being used (Laerd Statistics 2013). This was followed by using a paired sample t-test to determine differences in the pre-clinical and during- clinical groups for the RS and SINS. A paired sample t-test was then used to determine difference in the pre-clinical and during clinical groups for each of the SINS subscales. Lastly, Pearson's correlation coefficient test was conducted to determine if there were correlations between levels of resilience pre and during clinical, levels of stress pre and during clinical and between levels of resilience and stress , pre and during clinical (Frost 2016)

Paired Samples T-test

The paired sample t-test is used to determine whether the mean difference between two sets of observations is zero. In a paired sample t-test, each subject is measured twice, resulting in pairs of observation and is commonly used when measuring results in a before and after scenario (Laerd Statistics 2013).

The paired sample t-test is a parametric test and the observations are defined as the differences between two sets of values, and there are four main assumptions which refer to these differences as follows; the dependent variable must be continuous, the observations are independent of each other, the dependent variable should be approximately normally distributed and the dependent variable should not contain any outliers (Laerd Statistics 2014)

Interpreting the results of a paired sample t-test looks at statistical significance and practical significance. Statistical significance is determined by looking at the p-value. A low p-value, of 0.05 or less, corresponds to a statistically significant result, or

to a 5% (or less) chance of obtaining a similar result if the null hypothesis was true. Interpreting for practical significance (Laerd Statistics 2013)

Pearson's Correlation Coefficient

Pearson's Correlation coefficient, r, is a measure of the strength of a linear association between two variables that can be used for dependent and independent variables (Frost 2016). This is done by attempting to draw a line of best fit through the data of two variables and the Pearson correlation coefficient indicates how far away all these data points are to this line of best fit (Frost 2016).

The Pearson correlation coefficient can take a range of values from +1 to -1. A value of 0 indicates no association; a value greater than 0 indicates a positive association (as value of one variable increase, so does the value of the other one) a value of less than 0 indicates a negative association (the value of one variable increases, the value of the other decreases) (Frost 2016).

It is recommended that the variables are on either an interval or ratio scale (they do not have to be on the same scale) and that ordinal data should us Spearman's rank-order correlation. However, as it has been proven that the data in this sample are normally distributed, than a parametric test is acceptable for use (Frost 2016)

The stronger the association of the two variables, the closer the Pearson correlation coefficient will be to either +1 or -1, depending on whether the relationship is positive or negative (Frost 2016)

Strength of association based on r-value

Strength of association	Coefficient, r	
	Positive	Negative
Weak	0.1-0.3	-0.1- -0.3
Moderate	0.3-0.5	-0.3 - -0.5
Strong	0.5-1.0	-0.5- -1.0

Cohen's *d* and Effect Size

Cohen's *d* can be used when comparing two means and is the difference in two groups' means divided by the average of their standard deviations (Durlak 2009). Cohen suggested that *d*=0.2 be considered a 'small' effect size, 0.5 represents a 'medium' effect size and 0.8 a 'large' effect size. This means that if two groups' means don't differ by 0.2 standard deviations or more, the difference is trivial, even if it is statistically significant (Durlak 2009).

Appendix O: 15-Point Checklist for Criteria for Good Thematic Analysis (Braun & Clarke 2006)

Process	No.	Criteria
Transcription	1	The data has been transcribed to an appropriate level of detail, and the transcripts have been checked against the tapes for 'accuracy'
Coding	2	Each data item has been given equal attention in the coding process
	3	Themes have not been generated from a few vivid examples (an anecdotal approach) but instead the coding process has been thorough, inclusive and comprehensive
	4	All relevant extracts for each theme have been collated
	5	Themes have been checked against each other and back to the original data set
	6	Themes are internally coherent, consistent, and distinctive.
Analysis	7	Data have been analysed-interpreted, made sense of-rather than just paraphrased of described
	8	Analysis and data match each other- the extracts illustrate the analytic claims
	9	Analysis tells a convincing and well-organized story about the data and topic
	10	A good balance between analysis narrative and illustrative extracts is provided
Overall	11	Enough time has been allocated to complete all phases of the analysis adequately, with rushing a phase or giving it a once-over-lightly
Written Report	12	The assumptions about, and specific approach to, thematic analysis are clearly explicated

	13	There is a good fit between what you claim you do, and what you show you have done, ie. described method and reported analysis are consistent
	14	The language and concepts used in the report are consistent with the epistemological position of the analysis
	15	The researcher is positioned as *active* in the research process; themes do not just 'emerge.'

Appendix P: Reflective Account of Thematic Analysis Process

There are a number of models of reflection that are used by health care professionals and this allows for individuals to challenge and develop their existing knowledge, maximize learning opportunities and avoid mistakes that they have made in the past (Royal College of Nursing, 2012).

The Gibbs (1988) has been chosen as a model for reflection throughout this study as it acknowledges the role of emotion in the reflection process (Royal College of Nursing, 2012), which is suited to both the nursing profession and the researcher.

The Gibbs (1988) model of reflection is systematic and can be broken down into six key steps:

1) *Description:* this step explores the context of the event and covers fine details such as who was present at the event, where it happened and what happened
2) *Feelings*: this step encourages the reflector to explore their thoughts and feelings at the time of the event.
3) *Evaluation*: this step encourages the nurse to make their own judgement about the event and to consider what went well and what went less well about the event.
4) *Analysis*: this step delves even deeper into reflection on the event and encourages the nurse to break the event down into smaller episodes in order to facilitate analysis.
5) *Conclusions*: this step explores the potential alternatives that may be used to deal with the situation that is being reflected upon.
6) *Action Plan*: this is the final step in the reflection process. The action plan is put into place in order to deal more effectively with the situation if or when it may arise again.

The reflective cycle (Gibbs 1988)

1) **Description:** Thematic analysis (TA) was used to analyse the interview data from this study. Interview took place in the spring of 2016 and once all interviews had been completed, they were transcribed and read several times each before TA was conducted. Several large mind maps were made during the process to help visualize and untangle the different concepts that were appearing and these progressed into 2 mind maps (chapter 5) and the final themes and sub-themes.

2) **Feelings:** I found the process of TA reasonably straightforward, as I would say I am naturally more comfortable with QL data analysis than I am with QN. However, the process of transcribing the interview was tedious and time consuming, I did try my best to view it as the first opportunity to engage with the data. The biggest challenged I faced was not place my own assumptions and experiences as a student nurse onto the participants. This was more difficult than I thought it would be and the use of mind maps did help me to visualize the participant's experiences separately from my own.

3) **Evaluation:** Due the design of this study, the interview schedule was designed to touch on certain areas in order to answer the research questions (stress, resilience and the C-SMARTT App), which resulted in these topics coming out from the interview data. I don't think there was any way around this, as in order to answer my research questions these areas had to be addressed. However, it did make the TA challenging in the sense that I didn't want to assume that these would be the final themes, so I worked hard to break down all the data and reconstruct it in order to feel confident that I hadn't simply followed structure of the interviews.

4) *Analysis:* I think initially, I thought that TA would be an easy process, because I am more comfortable with this type of data, however there were other challenges that hadn't occurred to me. For instance, the volume of data was overwhelming to start with. The first few mind maps that I created had so much information on them that it was difficult to see how I was going to make sense of it. Also, my own bias had to be dealt with in regards to how I organized and interpreted the data- it was tempting to try and make themes happen because it would suit the outcome that I wanted from the data. Also, it would have maybe been useful to use a software programme to organize and code data, which is something I would be interested to try in the future.

5) **Conclusions:** Overall, I feel happy with how I was able to conduct the thematic analysis of my QL data. Although the transcription process was time consuming it provided a useful learning experience. It was important for me to use my expertise as a nurse (and former student nurse) to guide how I interpreted the results; however, I had to be mindful not to assume that the participants held the same views/beliefs as I do in regards to this topic.

6) *Action Plan:* The process of thematic analysis was successful, and there are many aspects that I would repeat in future. The use of mind maps was extremely helpful, as well as following the guidelines from Braun & Clarke (2006).

Appendix Q: A Reflective Account of the data integration process

There are a number of models of reflection that are used by health care professionals and this allows for individuals to challenge and develop their existing knowledge, maximize learning opportunities and avoid mistakes that they have made in the past (Royal College of Nursing, 2012).

The Gibbs (1988) has been chosen as a model for reflection throughout this study as it acknowledges the role of emotion in the reflection process (Royal College of Nursing, 2012), which is suited to both the nursing profession and the researcher.

The Gibbs (1988) model of reflection is systematic and can be broken down into six key steps:

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2) *Feelings*: this step encourages the reflector to explore their thoughts and feelings at the time of the event.

3) *Evaluation*: this step encourages the nurse to make their own judgement about the event and to consider what went well and what went less well about the event.

4) *Analysis*: this step delves even deeper into reflection on the event and encourages the nurse to break the event down into smaller episodes in order to facilitate analysis.

5) *Conclusions*: this step explores the potential alternatives that may be used to deal with the situation that is being reflected upon.

6) *Action Plan*: this is the final step in the reflection process. The action plan is put into place in order to deal more effectively with the situation if or when it may arise again.

The reflective cycle (Gibbs 1988)

1) **Description**: The process of data integration took place after the QN and QL data had been analysed separately. Types of data integration were researched and then the most appropriate methods of integration were chosen. The QN data results guided how the QL results were included in the integration. This took place in my office with print outs of the results of the QN and QL analysis and summary of key findings for reference.

2) **Feelings:** The integration process was particularly challenging. I felt that the success of the study was reliant on my ability to draw meaningful conclusions from the data integration. I often felt frustrated as I felt I would be close to making a connection between data sets only to realize that it didn't quite make sense. Also, the amount of data I had from the questionnaires, interviews and C-SMARTT app was overwhelming at times and I felt that some data was 'lost' due to it not fitting in with both QN and QL results. I was extremely lucky to have the support of statistician Nadine Dougall, and she was able to provide clear guidance on how to navigate some of the issues I came across in analysis my QN

data. Once I had decided on how I was going to approach integration, I did feel that I was able to follow a more thoughtful and organized process.

3) **Evaluation:** The data integration of my QN and QL results was successful and did allow me to confirm and expand on the individual QN and QL results, which was satisfying. The outlining of the integration process went well and was straightforward, however, actually conducting the integration of my own data took a lot of time and I think this could have been prevented if I had been more insightful to plan earlier parts of the study around the final step of integration.

4) **Analysis:** In order to get the most out of the data integration, the results of the QN data analysis (top 10 common stressors and stressors with statistically significant changes) were used to guide the areas of the QL interviews, which were investigated for congruencies and discordances. This worked fine, however was very time consuming. Interview excerpts often confirmed QN findings, however it was important to ensure that quotes were not taken out of context to simply confirm a QN finding and this required time and continued reflection on the interview data.

5) **Conclusion:** overall, the data integration was successful, however I think that there are several areas for improvement that would make data integration more successful and easier to manage in the future. First of all, better preparation for data integration from earlier on in the study. For this project, I always knew that I would be combining the QN and QL data at some point, however it was always a plan for the future and could have been built into the study design much better. For instance, making sure that the interview questions were more related to the questionnaires in order to make the connections/incongruences more obvious and easier to pull from all the data. I also think in future, I would try a different type of mixed methods design, where one strand was more clearly guided by the other in order to make the connections between the two data sets easier to achieve.

6) **Action Plan**: the data integration of the QN and QL strands of this study was challenging. My action plan for future data integration attempts would be to have a more clearly defined concept of what areas of the study are going to be

integrated, and this might lend itself better to a different type of mixed methods design where one strand is guided by the results of the first. This would allow for clear links between data sets to be part of the research design.

Interview/Participant 2: C.B.

Alright. So today is May 19th. We're going to get started, so what I will just generally ask you is how has your experience in clinical been so far? If you just give me an outline of what you've been doing and how you've been finding it.

My first placement was community, and I absolutely loved every aspect of it. I was, I loved everything that I did. I spent the day with the district nurses, which was great, because it got me to help with [inaudible] and everything. I loved it every single day. And I went into care home and they, it was like a baptism of fire. It was hellish. The first patient I got, went in on my first shift and they said right, you're going to do a bed bath on this patient. Okay. And the patient was end of life care and died while I was doing the bed bath. And then they're like oh, just move on and do this patient instead. I'm like hang on, I've never actually had, I told them I'd never done hands on patient care before and they said never mind, move on to the next one. It's quite a shock. [Cell phone beeping]. When you, because a patient dies like that.

Dies, and even just having that experience, anybody having that experience is quite, lots of people need to debrief after that. Especially, anybody, let alone the first time.

Yeah, my mentor was quite, there was quite a large personality clash as well. She was not particularly positive about me. At my interim assessment I spoke my PDT and had my mentor changed because of the way that she'd actually spoken to me. I was just like I don't know how I'm meant to work towards the goals that she's telling me to set. I don't know how to improve it. It was just a, you're doing this wrong. Not how to fix it. It was all neg, she couldn't say anything positive about me and it was quite difficult.

That's quite hard, yeah. Did you find that changing the mentor process, how did that go for you? Was it relatively smooth, or was it a bit...

It was quite smooth. My new mentor was actually really good and appreciated my first mentor had been quite sort of that you don't know what you're doing, go away, and had actually, when my, not my first shift there, it was my first shift with her. She was on annual leave my first week. My first shift with her, she told me to sit down in the corner and shut up and that can be quite...

Yeah, that's really...

That's not particularly how you teach someone.

No, it's not really particularly helpful, is it, to you?

So it became, it went from a how much can I learn out of this to a how can I get this placement pass so I don't have to do it again? It isn't a positive experience when you're in that setting.

No, and it makes every day that you have to go on to a shift, that's quite hard to show up to that. You know what I mean? Did you find yourself feeling sort of that you didn't want to go, or was it…

Yeah, it was a case of every morning I'd be like oh god, do I actually have to get up this morning and leave the house? I don't want to do that. I didn't like the way the patients were treated. There was one patient who had HIV and I've worked with people with HIV before. I've got no issues at all. So I was sitting having a conversation with her in her room, and the nurses and the nursing assistance waved me out and said you know she's got HIV? And I was like, and? It was like aren't you worried you'll catch it? It's like no, and I went back in and talked to her again because I was having a conversation, and I just felt that that was quite, she's going to hear, she could hear that, and that's not a nice thing to hear.

So did you find that the first mentor that you had sounds like, unfortunately, quite a negative experience. Did you find that the staff were generally of that attitude at that placement, or were there, a mix or was there…

It was much the same…

…sort of a culture there of being that way.

Yeah, it was quite a difficult placement to have. I've got, I've not done my [inaudible] placement yet. I don't start until the end of the month, but those are what I've had so far.

So far, so it sounds like quite, quite different experiences. One that seemed like you had a really positive experience and one really, really negative one. So I guess if I ask you what aspects of that have you found the most stressful, it obviously sounds like the mentor for one, and maybe other relationships with other staff?

Yeah. Yeah, the nursing assistants, there's some that would, there's some who are very much we've been doing this for 13 years; we know what we're doing, we're not listening to you. And I questioned, I probably shouldn't have done it, but I questioned their manual handling because I felt that what they were doing was at risk of injuring both the patient and the person helping the patient. And they said well, we've been doing it this way for so long. This wasn't the way we've been taught to do it.

Yeah, and that can put you in quite a difficult position then because you are just coming from your training, and maybe it's been updated a wee bit of what is expected now and you're trying to…

[Over speaking]. Well actually this is not how we've been taught.

[Over speaking]. That sort of dynamic that happens when you're a student and when you're with experienced staff can sometimes be quite tricky to navigate. So yeah. And how about, sit here anything else in terms of clinical skills you've had to do or managing time or anything else you found that's been difficult, or is it mainly focused on these relationships?

It's more the interpersonal relationships I struggle with personally. I find I enjoy clinical skills. I've got, I practice blood pressure and the trickier ones at home quite a lot because I've splashed out on my own [inaudible] thing.

Oh right, okay.

But I do feel that it's the interpersonal relationships personally that I struggled with because they were so set in their ways.

Have you known anyone else that's worked in that same area as a placement?

One of my friends whose daughter happens to be that the same school as my children, she was on the placement with me there, and she found it quite difficult as well.

Same reasons?

She struggled with her mentor as well. Obviously had a different mentor and she struggled with her mentor as well.

And did you find having her there with you quite a good support?

Yeah, it was nice to have another student to talk to and have that, well, it's nice to not be the only one there.

Yes, and if they're going through a similar thing…

Yeah. She's got a lot more experience because she works on the staff bank, so she has a lot more experience with actual personal care than I had, but it was quite a…

And would you say that you have, quite, or like a group of friends or colleagues in your nursing class that you feel you can speak to about nursing related problems?

Definitely, yeah. Definitely. My friend just [inaudible]. I work, well, she's just quit, but I was working with her until a couple, until [just over two weeks. And there's another friend of, colleague of ours, and there's others that just sort of, you find friends.

You do, and I think it's really, it's really I think a nice support network to have because sometimes it's difficult to explain to your husband or partner what is going on. Sometimes nursing is quite, you need to be there almost to…

I think my husband, it's not the same. He used to be a chef. He's not anymore, but it's very much a similar industry as, it's very fast-paced. It's very long hours, very anti-social hours, very high-stress.

Yeah, and dealing with people.

A lot of chefs don't deal with people, they deal with food, but it's, you deal with other chefs and I think it was stressful as anything else. He's thankful he left the cheffing industry to go and work in the labs in the Royal. So he's still doing a 24-hour a day job, but he's working a lot less, and he still understands there's the stress there.

And would you talk to him about the types of stress that you have on placements?

I do, yeah. He's genuinely interested. The only reason he wouldn't train to be a nurse is that he doesn't like people.

Yeah, which is…

Which is a big problem…

Probably not the career to go into.

Yeah, it's not, not his best. He wouldn't make a good nurse, but he does, he's always been inquisitive, he's always been interested in that sort of thing.

Yeah, yeah. Excuse me. And what would you say, do you have any ways that you naturally cope with stress, whether it be talking to friends or whether it's going for a walk or doing something else? Is there anything that you would naturally gravitate to?

I craft quite a lot. I like doing cross-stitch or sewing.

Yeah, which is almost like kind of a meditation.

Yeah it is, because certainly with the cross-stitch, repetitive moment and you just have to think and all you have to do is count, and it's quite calm. I do have friends that I talk to, and it's good to vent to your friends.

Yeah, so do you feel in general that you got quite, would you describe yourself as resilient? A resilient person?

I like to think I'm resilient. I like to think I'm resilient. Sometimes if someone catches you on a bad day, it can still affect you, but it tends to be more the personal things that affect me, like things with the kids will affect me. I missed a couple of shifts on, at the care home, because my daughter got a vomiting bug and she was vomiting everywhere.

What can you do?

What can I do? I can't leave her. She can't go to school. She can't go to childminders. I've got to just stay home with the child who is puking everywhere. And that affected me because it's difficult to see a wee one that ill.

Absolutely. I completely understand. So switching gears a little bit, you have, you used the c-smart app, or you've looked at it anyway. I'd like to get your thoughts on whether you thought it was useful or not, if there's something else you'd rather see if you were going to have something on your phone that would, what would help you, I guess?

I like the coping mechanisms it had there. I had a look at them. And the way you could go for help if you needed to. Because a lot of the time there's a Facebook group that's got a lot of students in it, and a lot of time people are going there to say what to do for this, and I don't personally find that very helpful. I find what the app was suggesting more helpful. I think turning to a Facebook group is perhaps bordering on, sort of blurring the lines of being professional and having, let's say well, why didn't you come and talk confidentially? I spoke to Kev Head* and seeing, having that, well, this is who you can speak to in confidence at the university who is there to be spoken to in confidence, and that was beneficial.

Good, and that's great to hear. I think as well, depending on the person, some people just like to have a bit more privacy than having it out.

Yeah.

Depends on you, of course, and what the topic is, but I completely understand. So coping mechanisms, would I be correct in saying that was the most useful part?

Yeah, definitely for me. I find, I know there are people who struggle with clinical skills. I personally don't, and I watch the videos, like handwashing is not something I struggled with; blood pressure I've not struggled with. I feel more confident in clinical skills than I do in the interpersonal bits. I feel perhaps that's just me, that's my personality and I know that. I'm aware of that and I know how I can lead on from that, but it's just the, leading up.

I know, I know. It's tricky. Is there anything that, if we were going to develop the app more with Napier, is there anything you'd want to see or anything that you think when I'm out on placement, it would really be good if I had blank, I don't know. Is there anything that you can...

I like the, I like the….

[Over speaking]. Yeah, that's great. Yeah.

When you're finishing an 8:00 shift, 8:30 in the evening, your feet are tired and you're thinking well, I had a really rubbish day. I just want to sit down, but I'm feeling too wound up. Having that, here's something you can do to calm down, sitting and cross-stitching I did kind of, but not everyone does that. It's not always something that you can do because you're just too wound up. Sitting down and trying to actually take a deep breath before you pick up [0:13:01] is not always easy.

Yes, it's hard sometimes when you're so exhausted, but you just can't...

Yeah, you can't turn your brain off.

Yeah, you can't get home and sleep within 30 seconds; you need that time.

Yeah. Sometimes it doesn't occur to you to do something really simple, and having even, it's common sense. You think I should know to do that, to try and calm down or try and unwind or whatever, but seeing it ion the screen, it's prompting you to think a bit, which is quite good.

Yeah, no, I think, yeah, I would agree. I think sometimes it's just, you just need a reminder that it only would take a few minutes to do that. So that's really good. I'm trying to think. We've sort of covered quite a bit, really. Is there anything else that you want to mention in terms of the support that you've got from staff here or in terms of helping? It sounds like it's been pretty good in terms of switching your mentor, and then that was reasonably positive experience and that you were able to contact people.

I sat down, I came and speak to Kev Head quite a bit. I spoke to the care home education facilitator as well, and she was really good. She was actually quite surprised by the comments that my mentor had made, the first mentor had made, in my book because she said it sounds like all you do is sit in the corner and do nothing. She said well, what do you do? So I talked her through what you do in the day and she's like well, you don't sit and do nothing.

Yeah. It's not much of a learning experience for you, is it?

No, I sat in my, I tried to do as much as I could. I did argue because they said that they were going to sign my timesheets from 7:30 in the morning, but you tell me I've got to be in by handover at 7:00. So surely my shift starts at 7:00. I said no, no, it's 7:00 a.m. to 8:00 p.m. I've got to take the handover at the end as well. So you start, you've got to start and be there for handover at 7:00, and you can't leave until handover's finished at 7:00, at 8:30 in the evening. That's not the same as what they were wanting me to write

in the book. So I had a slight disagreement with that because I felt that that was asking me to be in longer.

Yeah, and that's a bit...

And it's a long day as it is.

Yeah.

It was also very confusing as to the breaks that we were allowed to take. It's not clear, the university didn't give us, the students, very much guidelines...

Yeah, you just do what...

What we're told, we were told that students only get half an hour for lunch, but the staff get an hour. And you're like well hang on...

That doesn't sound right, does it?

So at the end of our half hour we were told to go back, but the staff would be there for another half hour. Hang on, but this is my lunch break too.

And it is hard when you are there for such a long day. Those breaks are really important to keep you going, because you just need some time to...

Sit down and relax and have something to eat.

Enjoy, enjoy your lunch, yeah.

It felt like break was very much rushed, but they weren't clear as to why we only got half an hour. They said oh, the university says you only get this long. Well, but, then where's the guidance we get for that? Having said what breaks we're entitled to; they don't, I looked at the table to see, on the app, it might be good to be able to say I started at this time and I finished at this time...

Yeah, almost have a login or, and then I wonder as well, would it be helpful to on there have a general university guideline, quick this is what's expected of you in terms of when, hours and breaks and whatever, just so almost that you could say, well this is actually from the university.

Yeah, this is what we're entitled to.

This is what we're meant to do. Yeah.

Yeah, this was a lot of miscommunication.

Yeah. And then I also wonder, what do you think about, do you feel that going into each placement you knew what you were going into? Did you say oh right, I've read a bit about community, I know what to expect. I've read a bit about care of the elderly, I know what to expect. Or would it be helpful to have a quick glance, this is what this placement's going to be? Or do you have that already?

We've got the practice information sheets that they give us, but I don't, I feel that sometimes they're lacking quite a bit of information. So my next placement's in day surgery at St John's, and it's not got a lot of information. I'm pretty sure I've got an idea of what goes on there, but I'm not 100% sure, and you think well hang on, the only reason I've got an idea is because I've spoken to second year and third year students. I'd maybe like to have a bit more information elsewhere.

Yeah. Would it be, would you want to have what to expect on a shift? That type of detail?

Yeah, so maybe what time you might get your breaks. It might seem silly, but not, my first three or four shifts at the care home, I wasn't told what time my breaks were and it was often, because I wasn't told, because I wasn't told when to go for breaks, I didn't end up getting the morning coffee break or the evening coffee break. I did feel like there were a lot of coffee breaks, and you weren't sure which ones were yours. The first breaks or second breaks, and what time that meant.

Yeah, so a bit more clarity, maybe?

I think that might be something placements have to, the practice areas have to give to the university, but it would be really useful to have.

But you know if we, because there's only a limited amount of placements, I'm sure there'd be a way to get some type of layout of if you're going to this place, this is a general day. So I think that could be good. What have we got for time here? We're racing through this. How have you found the balance, I guess, between, it sounds like you've obviously got kids and husband and a whole other life outside nursing. Do you find that balancing the amount of work you've got with clinical placements and family, how are you finding that?

I enjoy the study. I like sitting down and reading. I find myself on my last placement at the care home, I found myself reading up a lot about conditions that I'd not heard of before outside of my placement time, purely because I was curious and wanted to figure out what the progression of the disease or the condition was, and what stage each patient was at and what might be expected to happen for them. Because I enjoy doing that, I don't find it difficult. I don't find it difficult to the essays. I quite enjoy writing the essays, but I think that my background, because my dad works as a lecturer in [inaudible] in Surrey, and my brother works as a lecturer in ecology in Norfolk, all my life it's you read what you're interested in; you sit and you read. And I'd sit and read academic journals for the fun of it. And that's just who I am.

So that, those assignments and things, you're probably in a position where it's almost quite natural for you to know the format and how you would…

Yeah, my dad proofreads a lot of my essays for me. So, proofread this for me and he'll find silly mistakes. It's quite nice to have that. But I know there are people who do struggle with it because everyone works a bit differently. Everyone studies differently.

And it sounds like you've got quite a lot of family support then, in that way, in terms of giving you that option to ask for help from your family, which is really nice.

It is, and my husband is incredibly supportive as well. When we had the case study due, he took the kids out and spent the whole day out with the kids so that I can get a break.

That's great.

The kids know that mummy's studying; mummy's studying. They're at the age where they know that mummy has homework as well, and mummy's homework takes longer.

Yeah, and quite nice age for them to be if they're able to realise that they need to leave you a bit.

Yeah, I think it's also good for them to see the studying as well, because it encourages learning in them. And the girls are only in primary one, but they'll sit and ask for extra homework, because they see mummy's homework takes a long time. That's quite nice, so they end up colouring in pictures of brains and things.

Oh, very good.

If you're happy.

If you're happy, everyone's happy. So it sounds like you're pretty, do you come across well-balanced in terms of how you're managing being back at school with the family, because it sounds like you enjoy the school a lot, which is great.

I love, to be honest, I wish I'd started studying this ten years ago. I wish I was ten years further down the line because I'm enjoying it so much, and I'm kind of kicking myself for putting it off for so long. But it's…

But you have started, so that's great.

I have started, and that's the main thing…

That's the main thing, absolutely. I think we're done unless you've got anything that you really wanted to add. I think that's it. I've got a lot of really great stuff from you, thank you so much. I'll just turn this off because…

Appendix S: MRC Framework for Developing and Evaluating Complex Interventions

3.1.2 MRC Framework for Developing and Evaluating Complex Interventions

  The Medical Research Council (MRC) document on Developing and Evaluating Complex Interventions (Craig et al. 2008) was used as a framework for developing the mobile stress management tool, called the C-SMARTT App (Clinical Stress Management and Resilience Tips and Techniques). Using these stages of intervention development is well supported in the development of other nursing interventions, with several of these reporting detailed accounts of their approach to intervention development. (Blackwood 2006, Byrne et al. 2006, Faes et al. 2010, Hardeman et al. 2005, Lovell et al. 2008, Murchie et al. 2007, Redfern et al. 2008, Robinson et al 2005)

  Corry et al. (2013) review of developing complex interventions for nursing found that the MRC Framework (Craig et al. 2008) appeared to be the most widely used guideline for the development of complex interventions in nursing research. This review found that out of 14 papers identified reporting on the development of interventions, 9 of these referred to the MRC framework for complex interventions. The key steps identified by this review (Corry et al. 2013) in intervention development can be categorized as follows: integrating theory and research, building and modelling (representing) the intervention, determining acceptability and planning, and intervention delivery.

  For purposes of clarification, the C-SMARTT App is a mobile tool and is not described as an *intervention* for use in this study. Due to the research design, which will be discussed later in this chapter, this study encouraged all students to access the tool and did not have a control vs. intervention type design in which to evaluate the impact of the tool. However, it was important that a reputable framework supported the development of the C-SMARTT App in order to provide reliability and quality for the current C-SMARTT App as well as any future versions (Craig et al. 2008).

  Corry et al. (2013) emphasizes the importance of utilizing literature to inform the early phases of intervention design in order to define the nature of the intervention and the problem(s) that the intervention aims to address. The literature review in the previous chapter clearly uncovers a gap in the knowledge in respect to the lack of

mixed methods research design and to the development and implementation of an accessible mobile stress management tool.

Furthermore, Corry et al. (2013) review of developing complex interventions suggests that any intervention be grounded in a well-tested theoretical framework to create the foundation on which further development of the intervention hinges. This is to increase the likelihood of having a measurable impact on key outcomes and it is important that the conceptual/theoretical framework has empirical support and gives guidance to operational procedures (Corry et al. 2013). For instance, the MRC framework provides the support for identifying the need for an intervention based on the literature, and for identifying an appropriate underlying theory; as well as give guidance for piloting, evaluation and implementation of an intervention.

It is therefore important that nurses develop interventions based on theories relevant to and within the scope of nursing practice and therefore amenable to nursing intervention (Corry et al. 2013) and the current study attempts to use relevant framework and theories in the development of the stress management app.

3.3.2 Application of the MRC framework in the development of the C-SMARTT App

The Medical Research Council (MRC) document on Developing and Evaluating Complex Interventions (Craig et al. 2008) was used as a framework for developing the C-SMARTT App. They suggest that the process includes five steps; developing, piloting, evaluating, reporting and implementation.

In table 3.1, it can be seen that although several areas of implementation of the MRC guidelines are missing, attempts were made to follow the development process. The MRC advises three elements to consider in the development phase; (1) identifying the evidence base (2) identifying/developing appropriate theory and (3) modelling process and outcomes. The first two elements were addressed by completing a literature review and identifying the Transactional Model of Stress and Coping (Lazarus and Folkman 1984) as an appropriate theoretical approach. Unfortunately, modelling the C-SMARTT tool prior to implementation was not achievable due to time constraints of the current PhD study and pragmatic considerations of the BN programme under

investigation, although an unsuccessful attempt at piloting the app was attempted and will be discussed in detail later in this chapter.

Table 3.1 Application of the MRC Developing and Evaluating Complex interventions framework in the development of the C-SMARTT App. This table illustrates how this framework was applied to the design of the C-SMARTT App

Stage of Development	Recommendations	Application
Developing an intervention	-Identifying the evidence base -Identifying/ developing theory -Modelling process and outcomes	The literature review supports development of app Transactional model of stress and coping
Piloting and feasibility	-Testing procedures -Estimating recruitment/retention -Determining sample size	-Attempt to pilot study which led to changes in recruitment procedures
Evaluating the intervention	-Assessing effectiveness -Understanding change process -Assessing cost-effectiveness	- Evaluation of the app was not done during the design stage, however this is one of the study's aims
Reporting	-Use an established guidelines for reporting when possible -Use graphical methods	-Figures and images used to clarify steps in app development
Implementation	-Dissemination -Surveillance and monitoring -Long term follow up	-App usage was monitored online