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Structured Abstract:

Purpose: To gain insight into nurses' understandings of what constitutes suitable footwear for older people in care homes.

Design/Methodology/Approach: An exploratory descriptive qualitative survey of twenty registered nurses employed in six Scottish care homes for older people. Data were collected using a semi-structured questionnaire that included five open-ended questions. Content analysis was used to theme footwear perceptions.

Findings: Participants' had several views about what encompasses safe footwear; some were erroneous. The link between inappropriate footwear and falls was recognised by 80% of respondents, but some were unclear about the features that effect or inhibit safety. No UK or international standardised guidelines were identified that advise nurses about appropriate footwear for older people.

Practical implications: It is unknown whether survey respondents represent the nurse population because findings are restricted by a small sample size. Nonetheless, the group showed variable understanding of what constitutes safe footwear for older people and links with fall prevention. Improved nurse-education about what comprises safe footwear and the links with falls prevention in older people is required. Structured guidelines to direct nurse educators about what to teach student nurses about appropriate footwear for older people may work towards reducing falls.

Originality/value: No guidelines to direct nurses about appropriate footwear for older people in care homes have been written. Key points have been developed.

Key words: Falls; Footwear; Guidelines; Nursing homes; Older people; Shoes

Article classification: Research

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Running Heads:

Introduction

One person 65 years or older dies every five hours owing to falls (Help the Aged Policy Statement, 2007). Non-fatal falls impair functioning, increase dependency on nursing services, reduce patient autonomy and increase fear of further falls (Kallin *et al.*, 2004). Falls in older people are caused by many factors, including: age-related muscle weakness; balance and mobility impediments; cognitive impairment; medication side-effects and reduced visual and hearing acuity (Hosseini and Hosseini, 2008). To complicate the picture, an estimated 64% of nursing home residents have dementia (Alzheimer's Society, 2009), which progressively reduces intellect, sensory ability, memory and consequently ability to negotiate the environment (Varcolis, 2000). Alzheimer's disease inhibits a person's capacity to judge depth and distance between objects (Parsons and Cantley, 2001). Relationships between biomechanical properties of shoes worn in healthy older adults (>65 years) and fall risks are addressed in the literature (Barton *et al.*, 2009; Jessup, 2007; Koepsell *et al.*, 2004; Menant *et al.*, 2008; Sherrington and Menz, 2003).

Selecting appropriate footwear for older people in care homes is a relatively autonomous component of the nurses' role, which may lead to inappropriate or even hazardous decisions that may increase falls. Falls prevention in older people is relevant nationally and internationally, having engaged wide-ranging attention (e.g., BGS, 2001; Iowa Geriatric Education Center, 2010; NICE, 2004; PSTF(US), 1996).

What constitutes suitable footwear for older people in care homes?

Several research reports describe what constitutes suitable footwear for older people. For example, high heels optimise fall risks (Tencer *et al.*, 2004; Menant *et al.* 2008) but few older people elect to wear them (Koepsell *et al.*, 2004; Sherrington and Menz 2003). Koepsell *et al.*, (2004) compared biomechanical measurements of shoes worn by older people who had experienced a fall (n=327) and a matched control group who had not (n=327). Lateral stability, foot position and shoe/surface interface were measured. Findings showed that greater heel height is associated with increased falls risk (p=0.03), as is reduced the sole's contact area (p=0.005). Koepsell *et al.*, (2004) recommends that shoes with low heels and large contact area are worn by older people to reduce falls; e.g., Oxford type shoe, trainers/sneakers, boots and high-collar shoes.

Link between footwear and fall risk

Fall risk sharply increases whilst walking barefoot or in stockings (Kelsey *et al.*, 2010; Koepsell *et al.*, 2004; Larsen *et al.*, 2004; Menant *et al.*, 2008; Menz *et al.*, 2006; Sherrington and Menz, 2003). Menant *et al.*, (2008a) surveyed 606 nursing home residents and found that 37% wore slippers indoors because they were flexible and soft. Comfort and financial aspects were shown to outweigh safety issues when purchasing footwear. Dunne *et al.*, (1993) telephone surveyed retired people in Seattle and found that 20% were barefoot or in socks at that time. Munro and Steele (1999) found that 32% women and 28% men (aged 65+) do not wear shoes around the home; slippers were by far the most common footwear.

Sherrington and Menz (2003) studied older peoples' footwear after fall-related hip fractures occurred (mean age, 78.3 years). From 95 participants, 22% were wearing slippers, 17% walking shoes, 8% sandals and 2% high heels when they fell.

Most (75%) were wearing shoes that had at least one sub-optimal feature: absent fixation; excessively flexible heel counters and flexible soles (Sherrington and Menz, 2003). Jessup (2007) assessed patients' foot pathology and footwear associated with increased falls risk. Among 44 participants, 98% bore foot pathologies and 41% required podiatric management. At assessment, 86% were wearing footwear that increased falls risk.

Fortinsky *et al.* (2004) showed that if health workers are exposed to an educational program then most implement fall-prevention strategies. For example, carers were more likely to refer older people refer older people with gait and transfer impairments (85%) and balance disturbances (82%) for assessment by podiatrists. Lowest intervention rates occurred when there were footwear problems (58%), sensory or perception deficits (61%).

Relationship to nurse's role

The literature associates footwear characteristics and falls risk in older people (Barton *et al.*, 2009; Jessup, 2007; Koepsell *et al.*, 2004; Menant *et al.*, 2008a; Sherrington and Menz, 2003). Currently within UK care homes for older people, it is the nurse's responsibility to evaluate resident's function level and ability, and select appropriate clothing and footwear. Our search disclosed no guidelines designed to direct nurses towards appropriate footwear and foot care for older people. Producing and implementing guidelines could potentially reduce falls in nursing home residents. Moreover, it is salient that nurses actually understand shoe qualities and related features that magnify falls risk in older people.

Research question and method

No national or international survey to date has assessed nurses' knowledge in this arena. Consequently, it seemed reasonable to explore registered nurses' understandings of what constitutes suitable footwear for older people and the links with fall prevention (our main research question) with a view to developing guidelines, so we carried out an exploratory descriptive qualitative survey.

Sample/participants

The study assessed a representative, convenience sample of 20 first- and second-level nurses. Twenty were selected since Kuzel (1992) suggests that 12 to 20 informants are needed to achieve maximum variation of opinions within a population so that different experiences are provided by the sample. The inclusion criteria were that: participants were currently on the Nursing and Midwifery Council (NMC, 2009) register and that they were practising and employed in an Ayrshire and Renfrewshire (Scotland) nursing home. The recruitment process entailed sending letters inviting six nursing home managers to host the study. The researchers provided information, invited questions and issued the questionnaires to interested parties.

Data collection

Data were collected using a semi-structured questionnaire incorporating five open-ended questions:

1. What do guidelines and assessment tools in your home state resident's shoe-style?
2. What characterises safe shoes?
3. How do residents in your home obtain new footwear?
4. What aspects of resident's footwear may contribute to falls?

5. To what extent do you think footwear and falls are related?

Data were collected between January 10th and April 30th 2011. Twenty questionnaires were distributed with a 100% return rate.

Ethics

No ethical issues were attached to this research. However, informed consent was obtained from all participants. Approval was granted from the appropriate university ethics committees.

Data analysis

The completed questionnaires were read in their entirety. Data were copied and inserted into a word program before identifying preliminary codes. Individual comments were coded and short descriptive labels allocated to the text. Labels expressing similar concepts were grouped to form themes. Labels and themes were compared across scripts. The allocated codes enabled the researcher to summarise, synthesise and quantify themes. The selected themes represent registered nurses' perceptions about what they perceived constituted suitable footwear for older people and the links with fall prevention. To facilitate assimilation and dissemination in relation to our five questions, themes and participants' agreement are summarised in Tables I to V.

Validity

To establish the study's trustworthiness, three issues are considered important: credibility, transferability and dependability (Koch, 1994). Trustworthiness was confirmed by only two researchers analysing data to reduce potential bias during theme development. The final category system was agreed by both researchers and accepted as representing the data. All data collected remained confidential and anonymity was imposed at transcription. Researcher impartiality was clarified from outset, with biases or assumptions affecting the inquiry established (Creswell, 2007).

Findings - Guidelines knowledge and appropriate footwear assessment tools

Table I shows that nurses have no structured national or local guidelines to direct them about appropriate footwear for elderly care-home residents. Some nursing home managers have developed individual approaches to footwear selection and maintenance, which may or may not consider factors that increase fall. Since evidence links unsuitable footwear with falls (Barton *et al.*, 2009; Jessup, 2007; Koepsell *et al.*, 2004; Menant *et al.*, 2008b; Sherrington and Menz, 2003), it is salient that nurses understand safe-footwear principles.

Table I here

Characteristic of safe shoes - registered nurses' knowledge

Table II show nurses' understandings of what constitutes safe footwear for care home residents. Only some safety features ascribed are accurate. One participant said that information about appropriate footwear should come from physiotherapists, when the appropriate professional is a podiatrist who is qualified to diagnose and treat conditions affecting the foot, ankle and legs. Part of the podiatrists' role is to prescribe and fit suitable shoes for patients with balance and gait problems, and foot pathologies (APMA, 2010). In some cases orthotics are required - shoe inserts intended to correct

abnormal irregular walking patterns (Lower-Limb Orthotics Society, 2010). Podiatrists make standing and walking more comfortable and efficient for patients by altering angles at which their foot strikes a surface whilst walking or running. If residents have neurological, bone or limb pathologies, are frail or cognitively impaired then nurses should ensure that a podiatrist prescribes individualised footwear for that person. Key points for appropriate shoes include fit and comfort, which could mean a soft, flexible and unsupportive shoe. Although resident's shoe choice is important, safety features are premier (Menant *et al.*, 2008a).

Table II here

Obtaining new footwear for residents in nursing homes

Table III indicates that around 85% of residents' footwear is purchased by family members. To ensure good fitting, nursing home managers should contact local shoe fitting providers or have staff trained for this role. A qualified shoe fitter will determine a resident's foot size and width using a Brannock Device®, which measures heel to toe and arch length and width, and ensures individualised fit. They will also test shoes for comfort and slippage.

Table III here

How residents' footwear contributes to falls – nurses' understanding

Table IV explore nurses' understandings of footwear characteristics that contribute to falls. Data show that most nurses recognise that poorly fitting shoes are a key instigator (Barton *et al.*, 2009; Jessup, 2007; Koepsell *et al.*, 2004; Menant *et al.*, 2008; Sherrington and Menz, 2003). Other reasons: include worn and smooth soles; high heels; heavy footwear; backless/mules; loose fastenings and wearing other peoples' shoes. Salient factors omitted by participants include: insecure fittings/fastenings; walking barefoot; and wearing socks without shoes or slippers (Sherrington and Menz, 2003; Koepsell *et al.*, 2004., Larsen *et al.*, 2004., Menz *et al.*, 2006, Menant *et al.*, 2008b).

Table IV here

Link between footwear and falls – nurses' understanding

Table V shows that the link between inappropriate footwear and falls was recognised by 80%, with nurses unclear about what exactly effects or inhibits falls. Since 20% were unaware that inappropriate footwear increases falls (Barton *et al.*, 2009), an education program may help (Hosseini and Hosseini, 2008).

Table V here

Discussion

Our study has limitations; e.g., it is unknown whether respondents represent all nurses, so our findings are restricted by the small sample. Nonetheless, respondents showed variable understandings of what constitutes safe footwear for older people in care homes and the links with fall prevention. The most salient finding was missing guidelines to advise nurses about footwear and foot care. This implies a dependence on nurses' knowledge, which in our study proved to be sketchy. Evidence supports that the most effective falls-prevention strategies are multi-factorial interventions that

target identified risk factors (Iowa Geriatric Education Center, 2010). The US Preventive Services Task Force recommends that all 75 years and older are counselled about specific measures to prevent falls (PSTF, 1996). The American Geriatrics Society, the British Geriatrics Society and the American Academy of Orthopaedic Surgeons released joint evidence-based guidelines for this purpose (BGS, 2001).

Assessment tools have been developed to evaluate residents' function levels and cognition relative to safety (Iowa Geriatric Education Center, 2010). In the UK, regulations apply to care homes that assert minimum expected standards. A registered professional is required to perform needs assessment on every older person entering residential care (DoH, 2000). This procedure includes foot care, mobility and dexterity. There are several falls assessment tools that can be used to assess elderly residents' falls risk. It is as important to implement falls-prevention strategies in conjunction with appropriate footwear policies (Gross, 2010).

Falls and footwear assessment tools

Gray-Miceli et al. (2005) and Gray-Miceli (2007) recommend the Hendrich II Fall Risk Model, which is quick to administer and determines fall risk based on gender, mental and emotional status, dizziness symptoms and medications known to increase risk (Hendrich *et al.*, 2003). The Model was validated in a large case-controlled study conducted in an acute care tertiary facility employing skilled nursing and rehabilitation staff. Risk factors in the Model had a statistically significant relationship with patient falls ($p < 0.0001$). Content validity was established through an exhaustive literature review, accepted nursing nomenclature and the principal investigators' extensive experience (Hendrich *et al.*, 2003). The instrument is sensitive (74.9%) and specific (73.9%) with 100% inter-rater reliability agreement. The Model's major strengths are its brevity; it includes risky medications and it focuses on interventions for specific risk-areas rather than on a single, summed general risk score. Medication side-effects that increase falls risk are built into the instrument. Crucially, the Model can be inserted into existing documentation and electronic health records with targeted interventions that prompt and alert caregiver to modify and/or reduce risk factors (Hendrich *et al.*, 1995). Through its stepwise format, fall aetiologies can be identified and appropriate interventions initiated.

Barton *et al.*, (2009) developed a comprehensive footwear assessment tool to assist future research and clinical footwear assessment. Generally, good reliability indicates that the tool can be used with confidence (Barton, 2009). The tool was developed to cover fit, general features, general structure, motion control properties, cushioning and shoe wear patterns.

Menz and Sherrington (2000) developed a simple clinical Footwear Assessment Form to assess examiner assessments reliability across time. Two examiners assessed seven footwear variables (shoe type, heel height, heel counter stiffness, longitudinal sole rigidity, sole flexion point, tread pattern and sole hardness) in 12 different shoe-types, and repeated the measures three weeks later. Kappa and percentage agreement statistics revealed that the examiners' assessments were generally highly reliable. The main conclusion was that the Footwear Assessment Form can be used with confidence to determine relationships between footwear characteristics, instability and falls in older people (Menz and Sherrington, 2000).

National and professional recommendations for falls assessment is available, including the clinical practice guideline for assessing risk and preventing falls in older people (NICE, 2004). Alternatively, nursing home staff may consider using the Home

Falls and Accidents Screening Tool (HOME FAST), (Mackenzie *et al.*, 2000) to assess residents' global fall risk.

Butler *et al.*, (1998) researched existing falls-prevention activities in care homes for older people. A self-administered questionnaire was sent to care home managers (n=175) to ascertain what falls prevention practices were instituted in their establishments. Staff perceived falls to be a problem in over 75% of participating institutions. Footwear assessment, medication and environmental audits were the most common falls-prevention strategies employed by over 80%. Butler *et al.*, (1998) recommends that vitamin D and calcium supplements, hip protectors and lower extremity strength training are included in fall prevention programs.

Conclusion and recommendations

Our study substantiates that some registered nurses have erratic understandings of what constitutes safe footwear for older people in their care and that nurses have sketchy knowledge of footwear and falls prevention relationships. To reduce falls, educators and managers must ensure that nurses working with older people are well informed about features that constitute safe footwear and their links with falls prevention. Even though biomechanical properties have been clearly linked with falls risk, guidelines to advise nurse educators specifically about what to teach student nurses in relation to shoe features haven't been developed. Providing a guideline to direct educators about appropriate foot care/wear for older people may work towards reducing future falls statistics. To effect reduction, we formulated 11 key points to guide nurse educators about appropriate foot care/wear (Table VI).

Table VI here

Improved basic and continuing nurse education about what comprises safe footwear and the links with falls prevention in older people are required. Nurses should be taught the relationships between older person's shoe biomechanical properties and falls risk. Structured guidelines to direct nurse educators about what to teach student nurses about appropriate footwear selection for older people in care homes may reduce falls incidence. Protocols to direct nurses about appropriate footwear for older people in care homes need to be written. We recommended that falls are monitored in nursing homes after education programmes and falls protocols are implemented. The key points for nurse educators in Table VI highlight checking an older person's feet monthly for pathologies and if necessary referring the resident to a podiatrist. What constitutes 'a safe shoe' is summarised; and residents encouraged to wear suitable shoes indoors and to avoid wearing slippers or walking barefoot. Guidance advises that managers provide a shoe-fitting service and coherent explanations about shoe purchase to family members.

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Table I: Nurses’ knowledge of guidelines and assessment tools that advise on appropriate footwear for older people in care homes

Question 1	Themes	%	Sub-themes
Guidelines knowledge and assessment tools that advise appropriate footwear	(1a) No guidelines available	45% (n=9)	(1bi) In fall risk assessment 1bii) In other areas of care plan (1ci) Advice from physiotherapist (1cii) From other knowledgeable staff (1di) Personal preference, the only consideration (1dii) Comfort and safety encouraged
	1b) Unaware of specific guidelines	20% (n=4)	
	(1c) Shoes that fit and are comfortable	20% (n=4)	
	(1d) Residents preference	10% (n=2)	
	(1e) Deformities referred	5%	

	to surgical appliances	(n=1)	
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Table II: Characteristics of safe shoes – nurses’ knowledge

<i>Question 2</i>	<i>Themes</i>	<i>%</i>	<i>Sub-themes</i>
Knowledge - safe footwear	(2a) Correct size	85% (n=17)	(2ai) Width (2aii) Room at toe box
	(2b) Overall condition	45% (n=9)	(2bi) Sole to have grip
	(2c) Comfort	50% (n=10)	(2ci) Soft insole (2cii) No sharp edges (2ciii) Light
	(2d) Style	50% (n=10)	(2di) Low heel height (2dii) Full shoe
	(2e) Retaining medium to prevent sliding	20% (n=4)	

Table III: Obtaining new footwear for nursing home residents

<i>Question 3</i>	<i>Themes</i>	<i>%</i>	<i>Sub-themes</i>
How do residents obtain footwear?	(3a) Bought by family members	85% (n=17)	(3ai) From local shop (3aii) From specialist catalogues
	(3b) multidisciplinary team advice	55% (n=11)	(3bi) Podiatrist (3bii) Physiotherapist (3biii) Occupational Therapy (3biv) Surgical appliances (3bv) Nurses
	(3c) Residents going out for shoes	10% (n=2)	

Table IV: Footwear characteristics falls – nurses’ understanding

<i>Question 4</i>	<i>Themes</i>	<i>%</i>	<i>Sub-themes</i>
Footwear issues linked to falling	(4a) Poorly fitting	85% (n=17)	
	(4b) Worn parts	55% (n=11)	(4bi) Insecure fittings/fastenings (4bii) Worn soles
	(4c) Style	50% (n=10)	(4ci) High heels (4cii) Heavy (4ciii) Backless/mules (4civ) Smooth soles
	(4d) Not being worn properly	30% (n=6)	(4di) Loose fastenings (4dii) Wearing others due to confusion

Table V: Link between footwear type and falls – nurses’ understanding

<i>Question 5</i>	<i>Theme</i>	<i>%</i>	<i>Sub-themes</i>
Link between footwear and falling	(5a) Close link	35% (n=7)	
	(5b) Link	45% (n=9)	

	(5c) Unsure (5d) No link	10% (n=2) 10% (n=2)	5di) Falls more dependent on mobility level 5dii) Few fall due to footwear 5diii) No clear evidence to link footwear and falls
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Table VI: Guiding nurses about appropriate footwear for older people in care homes -

Implications for practice

1. Check residents' feet monthly for pathologies. Deformities such as bunions, hammer toes or pathologies should be referred to a podiatrist. Patients with diabetes require specialist attention (APMA, 2010; Scheffler, 2004).
2. When purchasing residents shoes, consider the following points:
 - (a) Have residents feet been measured before purchasing shoes? Do not select shoes by size marked inside. The best time to fit shoes is at the end of the day when feet are at their largest (Scheffler, 2004).
 - (b) Ensure sizing is correct for both feet. During fitting process make sure there is enough space (three-eighths to half-an-inch) for longest toe at end of each shoe when wearer is standing up (Medicine Net, 2010; Scheffler, 2004).
 - (c) Try on shoes with socks intended for wear with them. Note that bulky socks take up room (Scheffler, 2004).
 - (d) Make sure ball of foot fits comfortably into widest part of shoe, which should coincide with the foot's widest part (Medicine Net, 2010; Scheffler, 2004).
 - (e) Avoid shoes that feel tight and don't expect them to stretch (Medicine Net, 2010).
 - (f) Heels should fit comfortably in shoes with minimal slippage. Shoes should not ride up and down on heel when resident walks (Medicine Net, 2010).
 - (g) Ask resident to walk in shoes before purchase. Wearer must confirm that shoes fit and feel comfortable when walking. Do not buy mail-order shoes Scheffler, 2004).
 - (h) Upper part of shoe should be soft and flexible. Select boots and high-collar shoes as they reduce standing body sway and produce better dynamic balance (Lord *et al.*, 1999).
 - (i) Make sure toe box is deep enough. There should be enough room to wiggle toes (Scheffler, 2004).
 - (j) Avoid hard sole material as slippage is more likely on a slidey floor surface than softer sole material (Chaffin *et al.*, 1992; Tsai and Powers, 2008). At the other extreme, avoid excessively soft sole material and rocker-bottom sole designs. Assess sole's relative hardness by pushing vigorously with a ballpoint pen. Slip-resistant sole; e.g., Oxford-type shoe with textured sole is most slip-resistant on wet surfaces (Menz *et al.*, 2001). Sole material with wider and deeper tread provides greater coefficients of friction (Gross, 2010). Stiff, thick soles cushion feet when walking on hard surfaces (Menant, *et al.*, 2008; Robbins *et al.*, 1992, 1998).
 - (k) Sole shape should match patients' foot, so select shoes with wider soles (Gross, 2010; Menant *et al.*, 2009).
 - (l) Avoid shoes with elevated heels (Gross, 2010; Koepsell *et al.*, 2004; Lord and Bashford, 1996).
 - (m) Shoes with laces are preferable to slip-ons because they are made narrow so that feet will not slip out (Scheffler, 2004).
 - (n) Weight gain or loss affects shoe size, so re-measure each time shoes are bought (Scheffler, 2004).
 - (o) If the podiatrist has fitted orthotics then ensure resident uses them (Scheffler, 2004).
3. It is advisable for residents to wear shoes indoors whenever possible to minimize falls risk (Kelsey *et al.*, 2010). Wear shoes not slippers as trips risk is greater because slippers provide no support and have no fixation (Munro and Steele, 1999; Sherrington and Menz, 2003).
4. Avoid patients walking barefoot or in nylon socks as falls risk is greater risk (Horgan *et al.*, 2009; Koepsell *et al.*, 2005; Scheffler, 2004).
5. Consider providing an in-house shoe fitting service. An experienced shoe fitter will ensure shoes are the right ones (Scheffler, 2004). Ask the podiatrist what local stores provide this service. Consider having two nurses, trained for shoe fitting and falls risk assessment, responsible for purchasing and maintaining residents' shoes.
6. Ensure resident and family members understand why particular shoes are advised.
7. At four-weekly intervals, check residents' shoe condition and replace if necessary. Check inside shoe for seams or rough spots that can rub (Scheffler, 2004).
8. Ensure laces are well tied and appropriate socks/tights are worn (Scheffler, 2004).
9. Ensure toe nails are cut to shape, not down at sides as they may become ingrown. This requires the podiatrist's skills (Scheffler, 2004).
10. Keep feet clean, have fresh, correctly fitted hosiery daily, protect feet from debris, dirt and the elements (Scheffler, 2004).
11. Ensure that nurses are educated about appropriate footwear for older people and that they understand the link with falls prevention (Fortinsky *et al.*, 2004).