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Research Article

Predictors of Discharge from Hospital to Supported Accommodation and Support Needs Once in Supported Accommodation for People with Serious Mental Illness in Scotland: A Linked National Dataset Study

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Background. Many individuals with serious mental illness live in supported accommodation. Decisions regarding type of supported accommodation required and level of support to meet individual's needs are crucial for continuing rehabilitation and recovery following admission to hospital. This study aimed to identify personal and contextual predictive factors for (1) discharge from hospital to different levels of supported accommodation and (2) self-directed support needs of individuals with serious mental illness once they are in supported accommodation in Scotland. *Method*. Linked data from the Scottish Morbidity Record-Scottish Mental Health and Inpatient Day Case Section and the Scottish Government Social Care Survey were analysed using multinomial regression and multivariable logistic regression to identify personal and contextual factors associated with accommodation destination at the time of discharge and four self-directed support needs: personal care; domestic care; healthcare; and social, educational, and recreational. *Results*. Personal factors (age and having a diagnosis of schizophrenia, schizotypal, or delusional disorder) were associated with individuals moving to supported accommodation with higher levels of support. One contextual factor, compulsory detention when admitted to hospital, decreased the likelihood of moving to any type of supported accommodation. The personal and contextual factors associated with identified self-directed support needs varied by need. Support provided by the local authority was associated with all self-directed support needs, with having a diagnosis of schizophrenia, schizotypal, or delusional disorder associated with identifying domestic care, healthcare, and social, educational, and recreational needs, while living in the most deprived areas was associated with identifying healthcare needs. Advancing age and being compulsorily detained decreased the likelihood of identifying social, educational, and recreational needs. *Conclusion*. The study highlights that older men with a diagnosis of schizophrenia, schizotypal, or delusional disorder require higher levels of support upon discharge from hospital. When living in supported accommodation, having this diagnosis increases the likelihood of identifying support with looking after the home, looking after their health, and social and recreational activities; however, being older decreases the likelihood of identifying support with social and recreational activities.

1. Introduction

A significant number of people with serious mental illness, that is, people who have had a diagnosis of psychosis for over 2 years and experience significant disabilities which affect self-care, social, recreational, and occupational functioning [1, 2], live in supported accommodation. Supported accommodation provides opportunities for individuals with serious mental illness to maintain a tenancy with varying levels of staff support to manage risk, develop and maintain living skills, and engage in social, educational, and work activities [3]. The type of support and accommodation

provided varies based on living arrangement (group or individual), level of staffing provided, type of support needs identified, and intervention focus [3–5].

People with serious mental illness living in supported accommodation identify support needs related to basic living (personal/self-care and domestic activities), daytime activities, and social, educational, and recreational activities, for example, social and leisure activities, attending college, volunteering, or getting a job [6–8]. However, there is evidence that there can be a discrepancy between what the individuals' identified support needs are and the funding available to support these needs, meaning that people can continue to have unmet support needs while living in supported accommodation, impacting on their quality of life and recovery [9–13].

The process of identifying supported accommodation and support needs is complex and is informed by both personal and contextual factors. These decisions can be influenced by the individual's relationship with their living environment including the people supporting them, their social connections with the wider community, and how services are organised, delivered, and prioritised [14].

1.1. Personal Factors. There are reported differences in the likelihood of males and females developing serious mental illness following an initial psychosis diagnosis, with males 1.5 times more likely than females to develop SMI, with the subsequent high impact on functioning and physical health comorbidities [1]. As the average age of onset of psychotic disorders in men is between 15 and 25 [15], they are also less likely to have established daily living skills and social networks in comparison to women [16]. In addition, the impact of living with symptoms for several years such as lack of motivation, depression, and anxiety can also cause significant disruption to self-care, social, occupational, and cognitive functioning [17], meaning that men frequently require accommodation that provides a higher level of support [18, 19]. Ethnic minority groups are more likely to be diagnosed as having a psychosis and serious mental illness vs. the ethnic majority groups in the United Kingdom. They also experience higher rates of compulsory detention, delays in accessing services, and discrimination within services resulting in poor engagement and outcomes [20–22]. Compulsory admission to hospital can have a continued impact on social outcomes for people with serious mental illness when they move into supported accommodation, due to reduced choice and autonomy [23], with the biggest impact on individuals meeting their social and leisure needs [24–26].

1.2. Contextual Factors. System and policy factors can influence the availability of appropriate supported accommodation, resources to fund support packages, and capacity of support providers to meet an individual's identified needs [27–29]. In the United Kingdom, funding support to meet the needs of adults is provided by local authorities and is means tested, meaning that the individual may have to contribute to paying for support identified, and this may be privately funded or funded via welfare benefits. Previously, identifying if people require support was based on an assessment of the individual's ability to look after themselves, their home, and any dependents, including how people manage personal care tasks (washing and dressing, toileting, and getting in and out of bed), how they manage their home (housework, laundry, and shopping), their ability to prepare and cook food, the things they do (work, education, employment, and social activities), and staying safe and managing risks at home. The introduction of personalised support through self-directed support legislation in the United Kingdom [30–32] has aimed to provide an individualised approach to identifying support needs. This is a coproduced process, building on a relationship between the social worker and the individual to agree on the type and level of support they require to enable them to live their life [33]. Following this, a support budget is agreed and the individual makes a decision about how they want to manage their support budget. In Scotland, there are four options available to the individual: option 1—direct payment where the individual takes full responsibility for their budget and arranges their support with support providers (local authority, third sector organisations, and private providers); option 2—an individual chooses the provider and then the local authority pays the provider; the local authority holds the budget, and the person is in charge of how it is spent; option 3—an individual chooses to allow the local authority to arrange and determine their service; and option 4—an individual chooses a mix of options for different types of support [34]. For people with serious mental illness, this has enabled them to meet needs beyond personal and daily living needs, supporting access to education and employment [35].

Provision of supported accommodation in Scotland is the responsibility of integration authorities, established as a result of the legislative framework set out in the Public Bodies (Joint Working) (Scotland) Act 2014 [36] which integrated NHS Health Boards, the statutory organisations responsible for the delivery of frontline healthcare services in Scotland and local authorities, and the statutory organisations responsible for delivering services related to housing, education, and social care. These integration authorities have joint responsibility for planning, resourcing, and coordinating community-based health and social care services [37]. This includes delivery of mental health strategy which places a duty on them to provide services for those who have or have had a mental health problem, to promote their wellbeing and social development, minimise the effect of mental disorder, and give people the opportunity to lead lives as normal as possible [38]. Supported accommodation can be provided for people with serious mental illness via local authority providers, or they can commission third sector organisations, "not for profit" organisations which are not government controlled, to provide these services. In Scotland, third sector organisations include community groups, voluntary organisations, charities, social enterprises, and cooperatives. Housing and social services account for over half of third sector organisation income in Scotland, a total of £3.2 billion, with social care and health organisations employing over half of all paid staff in the third sector [39].

Two types of supported accommodation are more commonly provided in Scotland: supported housing, which is provided as tenancies in shared living with staff based on site up to 24 hours a day, and floating outreach, where support is provided to people with serious mental illness living in their own self-contained tenancy who are visited several times a week by support workers [5].

Both formal (paid) support and informal support (family and friends) is provided to people with serious mental illness within both types of supported accommodation. The type of support provided differs, with higher levels of informal support received from family and friends focused on daily living activities and relationships when people are receiving less paid support in floating outreach [40]. The relationships people with serious mental illness have with staff paid to support them can influence how their needs are met. This can positively impact on the individual having their needs met, with higher levels of participation in daily living activities and community-based activities reported in supported accommodation with higher levels of support [41]. However, staff attitudes about individual's abilities can contribute to delayed discharge to supported accommodation [42, 43], and staff having lower expectations of individual's capabilities can impact on their access to education and employment [44].

Being able to access the local community to meet social and healthcare needs can be restricted for people with serious mental illness due to the geographical location of their supported accommodation, which can effectively segregate them from the wider community due to socioeconomic issues and neighbourhood design [45–47]. Subsequently, people with serious mental illness can feel less confident to access community resources due to not feeling safe or encountering stigmatising attitudes when they access local facilities [48, 49].

As services and clinicians continue to focus on supporting recovery for people with serious mental illness [50, 51], it is important to understand what personal and contextual factors are associated with discharge to supported accommodation and identification of support needs to enhance decision making and intervention in practice. This study, therefore, aimed to address two questions: (1) What personal and contextual factors predict moving from hospital to supported accommodation for people with serious mental illness in Scotland; (2) What personal and contextual factors predict the identification of self-directed support needs (personal care, domestic care, healthcare, and social, educational, and recreational) of people with serious mental illness when living in supported accommodation in Scotland.

2. Methods

2.1. Data. To address the research questions, two datasets were identified that included data representative of the personal and contextual factors identified for people with serious mental illness moving to, and living in, supported accommodation in Scotland, which were the Scottish Morbidity Record-Scottish Mental Health and Inpatient Day Case Section (SMR04) and the Scottish Government Social Care Survey. The Scottish Morbidity Record-Scottish Mental Health and Inpatient Day Case Section (SMR04) is a national Scottish dataset collected by the Information Services Division of NHS National Services Scotland. It contains episode level data on individuals receiving care in psychiatric hospitals in Scotland at the point of both admission and discharge. The Scottish Government Social Care Survey dataset is a census of care and support services provided or purchased by Scottish local authorities. Information is collected on an individual basis for each person identified as having Self-Directed Support needs as well as people receiving home help, meals, and community alarm/telecare services.

A single anonymised data extract was generated from the two datasets by the National Records of Scotland indexing team, using identified linkage variables (Community Health Index number and postcodes (see Supplementary Material: Figure S1)). Data were linked for the years 2013/14, 2014/15, and 2015/16 to ensure that the Scottish Government Social Care Survey dataset included data on people with serious mental illness receiving Self-Direct Support which was recorded in the Scottish Government Social Care Survey from 2013. In the Scottish Government Social Care Survey dataset for the included years, only option 1: direct payment where the individual takes full responsibility for their budget and arranges their support with support providers (local authority, third sector organisations, and private providers), was recorded.

Linking was carried out using a calibrated optimal method [52], which generated 5016 linked cases. The accuracy of the linkage was 99%. All linking information was removed from the dataset and unique identifiers were generated to enable anonymisation for analysis purposes, prior to it being moved into the National Safe Haven. This meant that each individual identified across both datasets had a unique identifier allocated to their information in each dataset.

2.2. Variables. Variable selection was informed by previous research and preliminary statistical analysis [53]. Predictor and outcome variables are detailed in full in Supplementary Material: Table S1.

2.3. Outcome Variables

2.3.1. Supported Accommodation. Three supported accommodation variables were generated from the SMRO4 dataset by combining codes from the Discharge_transfer_to datapoint to match identified definitions of hospital, supported housing, and floating outreach [3, 4].

2.3.2. Needs within Supported Accommodation. Four self-directed support needs out of a total of ten recorded in the Scottish Government Social Care Survey dataset were included: (1) personal care; (2) healthcare; (3) domestic care; and (4) social, educational, and recreational, based on the support needs most frequently reported as identified by people with serious mental illness [25]. The excluded needs

were Housing support, Equipment and Temporary Adaptations, Respite, Meals, Other, and Not known.

2.4. Predictor Variables

2.4.1. Personal. Personal variables were all generated from the Scottish Morbidity Record-Scottish Mental Health and Inpatient Day Case Section (SMR04) dataset. The age range within the dataset was 18–65, and individual age was generated by the NHS National Services of Scotland indexing team prior to data being released. The diagnosis variable was created from the International Statistical Classification of Diseases and Related Health Problems Revision 10 (ICD-10) [54], with diagnostic classifications recorded in the "diagnosis at discharge" data point and grouped together into ICD-10 categories to increase accuracy in the diagnosis variable [55] resulting in ten categories (F00–F09: Organic mental disorders; F10–19: Mental and behavioural problems due to psychoactive substance use; F20–F29: Schizophrenia and other psychotic disorders; F30–F39: Mood (affective) disorders; F40–48: Neurotic and stress-related disorders; F50–59: Behavioural syndromes associated with physiological disturbances; F60–69: Disorders of adult personality and behaviour; F70–79: Intellectual disability; F80–89: Disorders of psychological development; and F90–99: Behavioural and emotional disorders with onset in childhood); the ethnicity variable was generated from the "ethnic group" data point (White British/other); the sex variable was generated from the "sex" data point (male/female), and the legal status at admission variable was generated from the "status on admission" data point (formal/informal).

2.4.2. Contextual. Length of stay was calculated from two data points in the Scottish Morbidity Record-Scottish Mental Health and Inpatient Day Case Section (SMR04) dataset: the admission date and the discharge date; range is not reported as this would reveal identifiable information [56]. Previous psychiatric care was generated from the "previous psychiatric inpatient care" data point (yes/no). All other contextual variables were generated from the Scottish Government Social Care Survey dataset. Carer was generated form the carer data point (known to have carer/known to not have carer/not known if has carer); financial contributor was generated from the financial contributor data point which details who is funding the support package (contribution from social worker/contribution from multiple sources/contribution from other); the support mechanism variable was generated from the support mechanism data point which records who is providing formal (paid) support as part of the self-directed support care package (support provided by local authority/support provided by private provider/support provided by combined providers); level of deprivation was generated from the Scottish Index of Multiple Deprivation deciles assigned by the NHS National Services of Scotland indexing team from postcode data prior to data being released and combined into three categories (living in least deprived areas/living in moderately deprived areas/living in most deprived areas).

2.4.3. Inclusion Criteria. Data were selected for adults aged 18–65 who had been discharged from psychiatric hospital in Scotland to either supported housing or floating outreach supported accommodation. Individuals with a diagnosis in one of the following ICD-10 categories were selected as being indicative of serious mental illness [57]: F20–F29 (Schizophrenia and other psychotic disorders); F30–F39 (Mood (affective) disorders); and F60–69 (Disorders of adult personality and behaviour).

2.4.4. Exclusion Criteria. Individuals with a diagnosis in the following ICD-10 diagnostic categories: F00–F09: Organic mental disorders; F10–19: Mental and behavioural problems due to psychoactive substance use; F40–48: Neurotic and stress-related disorders; F50–59: Behavioural syndromes associated with physiological disturbances; F70–79: Intellectual disability; F80–89: Disorders of psychological development; and F90–99: Behavioural and emotional disorders with onset in childhood, were excluded. Any individual discharged or transferred to an institution or temporary accommodation was excluded from the data.

2.5. Study Sample. Following application of the inclusion and exclusion criteria to the SMR04 dataset, a cross-sectional sample was identified which consisted of individuals with serious mental illness discharged from psychiatric hospital in Scotland between 2013 and 2016 ($n = 3432$) and used to address research question one.

To address the second research question, a self-directed support needs subsample was created. Firstly, a cross-sectional sample was generated from the Scottish Government Social Care Survey data for 2015/16 as this was the first year that self-directed support needs were recorded, with only data for individuals receiving direct payment and taking full responsibility for their budget (option 1) reported that year. A subset from the Scottish Morbidity Record-Scottish Mental Health and Inpatient Day Case Section (SMR04) dataset was identified using discharge date, diagnosis, and accommodation type for 2015/16. This subset was then linked to the Scottish Government Social Care Survey sample using unique identifiers to create the self-directed support needs subsample ($n = 289$; see Supplementary Material: Figure S1). The reduction in the self-directed support subsample size is comparable to the reported number of people identified as having mental illness in the summary report for the Scottish Government Social Care Survey data in 2015/16, which was reported as 4% [58].

2.6. Ethics. Governance and access to these datasets were managed by the Electronic Data Research and Innovation Service (eDRIS), including managing the appropriate ethical approvals and access to data in a secure environment through the NHS Scotland Public Benefit and Privacy Panel for Health and Social Care (Application No: 1617-0318). Data were accessed by MH via secure remote access to the National Safe Haven to ensure confidentiality of the data. All data analysis generated to report study outcomes was

reviewed and approved by the Electronic Data Research and Innovation Service Research Coordinator to ensure that original dataset or identifiable material was not removed from the National Safe Haven.

2.7. Data Analyses. All analysis was performed in R version 3.5 [59]. Based on the nature of the variables in the datasets (continuous and categorical variables), multinomial regression modelling and multivariable logistic regression modelling were used to address the research questions. The goodness of fit of models was tested using the chi-square distributed residual deviance and pseudo-R^2. The deviance statistic along with its degrees of freedom and associated p value and three versions of R^2 as recommended [60] are reported: the Hosmer and Lemeshow R^2, based on the chi-square score; Cox and Snell R^2, based on the deviance of the model; and finally as Cox and Snell's statistic never reaches a theoretical maximum of 1, Nagelkerke's R^2 provides a correction.

2.8. Factors Predicting the Move from Hospital to Supported Housing and Floating Outreach Accommodation. Multinomial regression was used to determine which factors predict moving to supported accommodation for people with serious mental illness, using the mlogit package. Outcome variables were hospital, supported housing, and floating outreach. Hospital was set as the baseline category as the regression was identifying the personal and contextual factors that predicted people with serious mental illness moving to supported housing or floating outreach. Univariable analysis was conducted to select significant predictor variables to include in the final model.

2.9. Factors Predicting the Identification of Self-Directed Support Needs. Multivariable logistic regression was used to determine which factors predict the identification of Self-Directed Support needs of people with serious mental illness when living in supported accommodation, with the outcome variable set as Yes/No. Multivariable logistic regression was run using the glm function. Models were fitted for each self-directed support need separately. To reduce selection bias and ensure overfitting did not occur, predictor variables were selected using two methods. The relationship between categorical predictor variables and the outcome for each self-directed support need was analysed using the chi-square test. The CrossTable function was used to generate contingency tables to establish frequency of observations for each predictor variable to the outcome for each self-directed support need. Any variable with a p value less than 0.05 was retained as this shows there is a significant relationship between the two variables. Frequency of observations in the tables was reviewed, and any variables with frequencies ≤5 were excluded as the assumption for chi-square had not been met [60]. Univariable regression was then carried out on both categorical and continuous variables, with variables fitted in the multivariable logistic regression if they had a p value ≤ 0.25 [61]. Consequently, the number of variables fitted into regression models for each self-directed support need differed. For each model, key assumptions of logistic regression were tested: independence of errors, linearity of relationship between continuous predictor variables and log-transformed outcome, and absence of multicollinearity between predictor variables [60].

3. Results

3.1. Factors Associated with Moving from Hospital to Supported Accommodation. Six variables were fitted in the final model: age, sex, diagnosis, length of stay, previous psychiatric care, and legal status at admission, which were all significant following univariable analysis. Ethnicity was excluded due to the small proportion of black and minority ethnic groups recorded in the total sample, which risked revealing personally identifiable information [56]. A forced entry method was used to fit the predictor variables in the multinomial regression in one block. Age and length of stay were entered as a continuous variable. Sex (male/female), diagnosis (schizophrenia, mood disorders, and personality disorders), previous psychiatric care (yes/no), and legal status at admission (compulsory/voluntary) were entered as categorical variables.

Descriptive statistics for the sample are presented in Table 1. The mean age of the total sample was 44.3 years (SD 12.5). Compared to those discharged to floating outreach support, people discharged to supported housing were more likely to be male ($p < 0.001$), to have a diagnosis of a psychotic disorder ($p < 0.001$), to have had previous admission/s ($p < 0.01$), and to have a longer index (most recent) admission ($p < 0.001$) that was more likely to have been involuntary ($p < 0.001$).

The results of the multinomial regression modelling are detailed in Table 2. Three variables were significant. Advancing age ($p < 0.001$) and having a diagnosis of schizophrenia or other psychotic disorder ($p < 0.001$) increased the likelihood of moving to supported housing compared to other diagnoses. Being compulsorily detained in hospital ($p < 0.001$) reduced a person's likelihood of moving to supported housing compared to being in hospital. Being compulsorily detained in hospital significantly reduced the likelihood of someone moving to floating outreach ($p < 0.001$) compared to being in hospital. While longer stays in hospital were significant ($p < 0.001$), they did not have an effect on whether people were discharged to supported accommodation.

3.2. Factors Associated with the Identification of Needs in Supported Accommodation. In the self-directed support subsample, the mean age was 47.4 years, with 57% of the sample being male, 67% of the sample having a diagnosis of schizophrenia or psychotic disorder, and 71.5% having an informal admission to hospital. 90% of the sample were living in floating outreach accommodation with 71% of the sample living in the most deprived areas. Descriptive statistics for the samples for each self-directed support need are presented in Table 3.

Table 1: Demographic and variable information: moving from hospital to supported accommodation.

	Hospital (reference category) $N = 274$	Supported housing $N = 301$	Floating outreach $N = 2857$	p value
Age (range 18–65)	Mean: 43.57 Median: 44	Mean: 45.21 Median: 47	Mean: 44.24 Median: 45	$p = 0.27$
Sex	n (%)	n (%)	n (%)	
Male	159/58%	184/61%	1431/50.1%	$p < 0.001$
Female	115/42%	117/39%	1426/49.9%	
Diagnosis				
Mood disorders	69/25%	45/15%	1029/36%	$p < 0.001$
Schizophrenia	178/65%	232/77%	1400/49%	
Personality disorders	27/10%	24/8%	428/15%	
Length of stay in hospital	Mean: 232.3 days Median: 48 days	Mean: 482.7 days Median: 178 days	Mean: 72.9 days Median: 26 days	$p < 0.001$
Legal status at admission	n (%)	n (%)	n (%)	
Compulsory admission	134/49%	172/57%	77/27%	$p < 0.001$
Informal admission	140/51%	129/43%	2086/73%	
Previous psychiatric admission				
Yes	241/88%	274/91%	2400/84%	$p < 0.01$
No	33/12%	27/9%	457/16%	

Results of the regression analyses of the self-directed support subsample are presented in Table 4.

3.2.1. Personal Care. Three variables were fitted in the personal care model: sex, diagnosis, and support mechanism.

Carer and financial contributor were excluded following chi-square tests as they included frequencies of <5, and age, supported accommodation type, level of deprivation, length of stay in hospital, and legal status at admission were excluded following univariable analysis. Support provided by the local authority was the only significant variable in the model ($p < 0.001$).

3.2.2. Domestic Care. Four variables were fitted in the domestic care model: age, diagnosis, supported accommodation type, and support mechanism. Carer and financial contributor were excluded following chi-square tests as they included frequencies of <5, and level of deprivation, length of stay in hospital, and legal status at admission were excluded following univariable analysis. Support provided by the local authority ($p < 0.001$) and a diagnosis of schizophrenia, schizotypal, and delusional disorders ($p < 0.01$) were the significant variables in the model, both increasing the likelihood of a domestic care need being identified.

3.2.3. Healthcare. Seven variables were fitted in the healthcare model: age, sex, diagnosis, length of stay, level of deprivation, supported accommodation type, and support mechanism. Carer and financial contributor were excluded following chi-square tests as they included frequencies of <5, and status at admission was excluded following univariable analysis. Support provided by the local authority ($p < 0.001$), a diagnosis of schizophrenia, schizotypal, and delusional disorders ($p < 0.05$), and living in the most deprived area ($p < 0.05$) were the significant variables in the model, all increasing the likelihood of a healthcare need being identified.

3.2.4. Social, Recreational, and Educational. Five variables were fitted in the healthcare model: age, diagnosis, legal status at admission, supported accommodation type, and support mechanism. Carer and financial contributor were excluded following chi-square tests as they included frequencies of <5, and level of deprivation and length of stay in hospital were excluded following univariable analysis. Support provided by the local authority ($p < 0.001$), a diagnosis of schizophrenia, schizotypal, and delusional disorders ($p < 0.05$), compulsory detention at admission ($p < 0.05$), and age ($p < 0.05$) were significant variables in the model. Support provided by the local authority and a diagnosis of schizophrenia, schizotypal, and delusional disorders increased the likelihood of a social, recreational, and educational need being identified, while being older and compulsory detention at admission decreased the likelihood of a social, recreational, and educational need being identified.

Testing of key assumptions in all models confirmed that all models were a good fit with no collinearity and no influential cases identified.

4. Discussion

This study presents the first analysis, as far as we are aware, of the characteristics of people with serious mental illness in Scotland that are associated with the type of supported accommodation they are discharged to from hospital, and their identified self-directed support needs once there.

4.1. Factors Which Predict Moving from Hospital to Supported Accommodation for People with Serious Mental Illness. The study identified that people discharged to supported housing were more likely to be males with a diagnosis of schizophrenia or other psychotic disorder and a history of previous admission/s than those discharged to floating support. In addition, their most recent admission was longer and more likely to have been involuntary. The group of

Table 2: Results from multinomial analysis: moving from hospital to supported accommodation.

	Hospital vs. supported housing				Hospital vs. floating outreach			
	B (SE)	95% CI for odds ratio			B(SE)	95% CI for odds ratio		
		Lower	Odds ratio	Upper		Lower	Odds ratio	Upper
Constant	−2.28*** (0.67)	0.03	0.10	0.38	2.47*** (0.45)	4.84	11.82	28.84
Age	0.04*** (0.01)	1.02	1.04	1.06	0.01 (0.01)	0.99	1.01	1.02
Sex								
Female[1]	−0.13 (0.27)	0.51	0.87	1.49	0.27 (0.21)	0.88	1.31	1.97
Diagnosis								
Schizophrenia, schizotypal, and delusional disorders[2]	1.06** (0.34)	1.48	2.88	5.61	−0.05 (0.24)	0.60	0.95	1.51
Disorders of adult personality and behaviour[2]	0.43 (0.52)	0.56	1.54	4.24	−0.10 (0.35)	0.46	0.90	1.78
Length of stay	0.001** (0.0003)	1.00	1.00	1.00	−0.002*** (−0.0003)	1.00	1.00	1.00
Legal status at admission								
Compulsory detention[3]	−1.15*** (0.27)	0.19	0.32	0.53	−1.03*** (0.20)	0.24	0.36	0.53
Previous psychiatric admission								
Yes[4]	0.36 (0.38)	0.68	1.44	3.04	0.33 (0.26)	0.83	1.39	2.31

[1]Sex compared to male. [2]Diagnosis compared to mood (affective) disorders. [3]Compared to informal legal status at admission. [4]Compared to previous psychiatric care: No. *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$. Log-likelihood: −828.03; McFadden R^2: 0.13226; likelihood ratio test: chi-sq = 252.41 (p value ≤0.00).

Table 3: Demographic and variable information for self-directed support needs identified by people with serious mental illness living in supported accommodation.

	Self-directed support needs			
	Personal care $n = 262$	Domestic care $n = 210$	Healthcare $n = 233$	Social, educational, and recreational $n = 211$
Personal factors				
Age	(Range 19–65 years) Mean: 47.2 Median: 48	(Range 19–65 years) Mean: 47.7 Median: 49	(Range 18–65 years) Mean: 46.9 Median: 48	(Range 19–65 years) Mean: 47.6 Median: 49
Sex	n/%	n/%	n/%	n/%
Male	152/58%	122/58%**	128/55%	122/58%**
Female	110/42%	88/42%**	105/45%	89/42%**
Diagnosis				
Mood (affective) disorders	89/34%	65/31%	65/28%	65/31%
Schizophrenia, schizotypal, and delusional disorders	173/66%	145/69%	147/63%	146/69%
Disorders of adult personality and behaviour	*	*	21/9%	*
Contextual factors				
Supported accommodation type				
Floating outreach	233/89%**	189/90%	210/90%	190/90%
Supported housing	29/11%**	21/10%	23/10%	21/10%
Level of deprivation				
Living in most deprived area (deciles 1–3)	183/70%**	151/72%**	165/71%	152/72%**
Living in moderately deprived areas (deciles 4–6)	79/30%**	59/28%**	68/29%	59/28%**
Living in least deprived areas (deciles (7–9)	*	*	*	*
Carer				
Known to have carer	34/13%*	21/10%*	23/10%*	21/10%
Known to not have carer	105/40%*	97/46%*	105/45%*	97/46%
Not known if have carer	123/47%*	92/44%*	105/45%*	93/44%
Support mechanism				
Support provided by local authority	87/33%	92/44%	103/44%	93/44%
Support provided by private provider	115/44%	118/56%	130/56%	118/56%
Support provided by combined providers	60/23%	*	*	*
Financial contributor				
Contribution from social worker	191/73%*	132/63%*	154/66%*	133/63%*
Contribution from multiple sources	71/27%*	69/33%*	79/34%*	78/37%*
Contribution from client/other	—	9/4%*	—	—
Length of stay in hospital	Mean: 100.2 days[1]** Median: 35 days**	Mean: 92.1 days[1]** Median: 32 days**	Mean: 85.2 days[1] Median: 29 days	Mean: 92.5 days[1]** Median: 32 days**
Legal status at admission				
Compulsory detention	28%**	61/29%**	65/28%**	61/29%
Informal	72%**	149/71%**	168/72%**	150/71%
Self-directed support need identified				
Yes	68/26%	65/31%	77/33%	57/27%
No	194/74%	145/69%	156/67%	154/73%

*Variable removed as frequency <5 for having need identified. **Variable removed following univariable analysis. [1]Range not reported as it would reveal identifiable information.

Table 4: Results of multivariable logistic regression analysis: predictors of self-directed support needs identified by people with serious mental illness living in supported accommodation.

	B (SE)	95% CI for odds ratio		
		Lower	OR	Upper
Personal care				
Constant	−1.73*** (0.45)	0.07	0.18	0.42
Sex[1]				
Female	−0.11 (0.33)	0.47	0.90	1.67
Diagnosis[2]				
F20–29: schizophrenia, schizotypal, and delusional disorders	0.45 (0.34)	0.81	1.56	3.10
Support mechanism[3]				
Local authority	1.57*** (0.40)	2.25	4.82	11.04
Private	−0.72 (0.46)	0.20	0.49	1.20
Model $X^2(4) = 49.1$, $p < 0.001$, Hosmer and Lemeshow R^2 0.16; Cox and Snell R^2 0.17; Nagelkerke's R^2 0.25				
Domestic care				
Constant	−2.27* (0.89)	0.02	0.10	0.57
Age	−0.02 (0.02)	0.96	0.98	1.02
Diagnosis[2]				
F20–29: schizophrenia, schizotypal, and delusional disorders	1.08** (0.42)	1.34	2.94	6.91
Supported accommodation type[4]				
Supported	0.24 (0.54)	0.43	1.27	3.67
Support mechanism[5]				
Local authority	2.07*** (0.39)	3.82	7.93	17.43
Model $X^2(4) = 43.98$, $p < 0.001$, Hosmer and Lemeshow R^2 0.18; Cox and Snell R^2 0.19; Nagelkerke's R^2 0.27				
Healthcare				
Constant	−2.19* (0.91)	0.02	0.11	0.64
Age	−0.03 (0.02)	0.94	0.97	1.02
Length of stay	0.00 (0.00)	0.99	1.00	1.02
Sex[1]				
Female	0.03 (0.36)	0.51	1.03	2.10
Diagnosis[2]				
F20–29: schizophrenia, schizotypal, and delusional disorders	1.04* (0.42)	1.27	2.84	6.62
F60–69: disorders of adult personality and behaviour	0.62 (0.66)	0.50	1.87	6.84
Level of deprivation[6]				
Most deprived	0.84* (0.39)	1.10	2.32	5.07
Supported accommodation type[4]				
Supported	−0.09 (0.52)	0.33	0.91	2.54
Support mechanism[5]				
Local authority	2.51*** (0.38)	6.05	12.30	26.54
Model $X^2(8) = 71.49$, $p < 0.001$, Hosmer and Lemeshow R^2 0.24; Cox and Snell R^2 0.26; Nagelkerke's R^2 0.37				
Social, educational, recreational				
Constant	−1.18 (0.91)	0.05	0.31	1.79
Age	−0.03* (0.02)	0.94	0.97	0.99
Diagnosis[2]				
F20–29: schizophrenia, schizotypal, and delusional disorders	0.92* (0.43)	1.12	2.50	5.89
Legal status at admission[7]				
Compulsory	−1.04* (0.42)	0.15	0.35	0.78
Supported accommodation type[4]				
Supported	0.083 (0.55)	0.37	1.09	3.20
Support mechanism[5]				
Local authority	2.41*** (0.41)	5.13	11.15	26.12
Model $X^2(5) = 56.02$, $p < 0.001$, Hosmer and Lemeshow R^2 0.23; Cox and Snell R^2 0.23; Nagelkerke's R^2 0.34				

[1]Sex compared to male. [2]Diagnosis compared to F30–39: mood (affective) disorders. [3]Support mechanism compared to combined providers. [4]Supported accommodation type compared to floating outreach. [5]Support mechanism compared to private providers. [6]SIMD category compared to moderately deprived. [7]Compared to informal legal status at admission. *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$.

people requiring supported housing in this study have comparable characteristics to service users identified in a national study in England [19].

The results also show that people who were compulsorily detained are less likely to move to supported accommodation than stay in hospital. Additionally, participants in supported housing had a length of stay in hospital which was more than twice the average length of stay in hospital of the whole sample in this study. While this could be due to lack of availability of supported housing or financial resources to provide required levels of support [27, 28], it is concerning because a gradual increase in the use of compulsory

treatment in the United Kingdom is reported [62–64]. The impact of a longer stay in hospital combined with being compulsorily detained is disruptive for people with serious mental illness in participating in daily living and social activities, affecting relationships with family, friends, and wider social networks with a continued detrimental effect when people are discharged [23, 25, 26, 65, 66]. Evidence shows that moving to supported accommodation can provide a higher quality of life for people with serious mental illness [67], bringing about initial gains in functioning which are maintained at two-year follow-up [68, 69]. To increase opportunities for earlier discharge from hospital for the group of people identified in this study, consideration needs to be given to provision of enhanced supported accommodation options which enable reduced lengths of stay in hospital, facilitating positive living conditions, and enable improved functional and social outcomes [70, 71]. This kind of provision can be achieved by an intersectoral partnership which brings together statutory services (health and social care), housing, and third sector organisations to provide responsive and flexible multiagency support [72].

4.2. Factors Which Predict the Identification of Self-Directed Support Needs for People with Serious Mental Illness Living in Supported Accommodation. Predictors of identification of needs varied across the self-directed support needs models, with purchasing support from the local authority being a significant predictor variable in all four models. Having a schizophrenia, schizotypal, and delusional disorder was a significant predictor variable in three of the self-directed support needs models (domestic care, healthcare, and social, educational, and recreational), increasing the likelihood of these self-directed support needs being identified. The healthcare model also had an additional significant predictor which increased the likelihood of this need being identified (living in the most deprived area), while the social, educational, and recreational model had an additional two significant predictor variables (age and compulsory detention), which decreased the likelihood of this need being identified. The results suggest that when living in supported accommodation, having a schizophrenia, schizotypal, or delusional diagnosis increases the likelihood of identifying support with looking after the home, looking after health, and social and recreational activities; however, being older and previously compulsorily detained decreases the likelihood of identifying support with social and recreational activities.

The purpose of self-directed support is to enable people to have increased choice and control over how their support needs are met, with personalisation being a mechanism for recovery if negotiated well [73]. The dataset consisted of people with serious mental illness who were receiving direct payments, meaning the person has full control over their support budget, how this is spent, and which provider they purchase support from. As self-directed support is a process to enact personalised care and support, the systems and processes in place to support individuals have the potential to impact on choices about who they purchase support from. Guidance around the self-directed support process recommends that support needs are coproduced between the individual and their social worker to ensure the process is personalised, enabling a shared understanding of an individual's priorities [33]. It has been suggested that for people with serious mental illness, there have been additional challenges in implementing self-directed support. This has been linked to the focus of mental health services being on the management of risk and a need for flexibility in how self-directed support is negotiated to ensure that people's fluctuating mental health needs are accommodated. Receiving direct payments, while creating opportunities for greater freedom for individuals, also brings responsibilities with regard to financial management, e.g., making payments to providers, meeting needs within the identified budget. Information provision and support for people who are managing their budget for the first time is not always consistently provided which can create difficulties or necessitate some reliance on the local authority [74, 75]. This could be influential in how individuals choose to purchase support [76].

Support provision may also be influenced by local delivery and availability, limiting the options available to the individual. It has been reported that there is variation in availability of support providers in different local authority areas in Scotland due to the mix of rural and urban geography, with higher uptake of direct payments (self-directed support (option 1)) reported in rural areas [77]. There is also evidence that health and social care workforce shortages can reduce choice of support providers for people purchasing support in Scotland [78–80] and in some cases necessitate them taking up direct payments (self-directed support (option 1)) [81]. Support may also be automatically provided linked to the type of supported accommodation the person is living in. For example, if a person identifies they require supported housing, a shared setting with moderate or high level support is provided for core hours daily, and these types of provision usually have a sole provider delivering support to everyone living there. By default, they have to accept their support needs will be met by the sole provider linked to the accommodation, which could be the local authority.

Having a diagnosis of schizophrenia or other psychotic disorder predicted having a healthcare, domestic care, and social, educational, and recreational need identified, compared to a mood disorder. The identification of domestic care and social, educational, and recreational needs is in keeping with other studies that have identified that illness experience will impact on people's level of functioning, ability to complete daily living activities, and engagement in social activities [18, 19, 82, 83]. Other research has shown that people with serious mental illness living in supported accommodation recognise the importance of community networks in supporting their recovery and that they require support to enhance opportunities for participation in the community [84, 85].

While it is not known what healthcare needs people were purchasing support for as this detail is not recorded in the Scottish Government Social Care Survey dataset, it is positive to see that this need is being identified. It is well documented that people with a diagnosis of schizophrenia

and other psychotic disorders have higher reported prevalence of serious health conditions, including type 2 diabetes, heart disease, and cancer [86]. These results mirror previous research with people with schizophrenia in Scotland who expressed concern about the impact of their mental illness on their physical health [87]. Living in the most deprived area also predicted identification of a healthcare need and aligns with previous research regarding location of supported accommodation and ability to access the local community to meet healthcare needs [46–48].

The model with the greatest number of significant predictor variables was the social, education, and recreational model, reflecting the complexity in how this need is met for people with serious mental illness [88]. It is positive to note that support was identified and purchased to meet this need, and that having a diagnosis of schizophrenia, schizotypal, or delusional disorder was also associated with identifying this need, supporting previous findings about how self-directed support has enabled people with serious mental illness to access education and employment [35]. However, the other significant variables, being compulsorily detained or being older, reduced the likelihood of identifying this need. Previous research has shown that people with serious mental illness who are older reported feeling there were a lack of opportunities for education and employment for them when living in supported accommodation as they felt that services were targeted at younger people [85]. It has also been reported that being compulsorily detained can reduce individuals' choice and autonomy with regard to how they meet their needs, impacting on their engagement in social activities [23]. Section 26 of The Mental Health Act (Care and Treatment) (Scotland) Act 2003 [89] places a duty on local authorities to provide care and support services to people with mental health issues which include services to promote social, cultural, and recreational activities, training, and assistance with employment [90]. The finding suggests that there may be some inconsistency in how this is applied for people who have been previously compulsorily detained. It is important to note that employment needs are not a data field gathered in either of the datasets used in this study. This is interesting as research has found that only 12.9% of working age adults with serious mental illness in the United Kingdom are in employment [91]. This is in contrast to a significant amount of international research that indicates that Individualised Placement and Support (IPS) can support 55% of people with serious mental illness back to paid employment/education [92] and a Scottish Enhanced Individualised Placement Support programme which successfully supported 63% of people with serious mental illness into paid employment/education [93].

5. Limitations

It is recognised that there are some limitations when using secondary data. The Scottish Government Social Care Survey has only included self-directed support needs since 2014. The data extract used incorporated the first two years of these data being collected and there are reported issues in the completeness and quality of the dataset [94]. The self-directed support needs subsample predominantly consisted of people who were receiving floating outreach, meaning that the sample could be considered as underpowered in identifying predictors of support needs for the supported housing group. The data available also lacked comparable information on the 90% of the sample who were included in the discharge destination modelling who do not have needs identified in the Scottish Government Social Care Survey data extract used. This could be due to the Scottish Government Social Care Survey data only recording people who were receiving direct payments (self-directed support (option 1)) for the years available for this study. Future research to identify if predictors of need differ between people with serious mental illness choosing to manage their own budget through direct payments and the other three self-directed support options would create a more complete understanding of self-directed support needs for all people with serious mental illness living in supported accommodation in Scotland. In addition, the current study is cross-sectional and therefore associations reported cannot be considered causal.

6. Conclusion

For people with serious mental illness, personal and contextual factors predict moving from hospital to supported accommodation and identification of needs within supported accommodation. The results showed that men in their 40s required higher levels of support when discharged from hospital. The results also provide an initial understanding of what factors are significant for people with serious mental illness living in supported accommodation and managing their own self-directed support budget, in identifying and choosing how to support their needs within the context of support service provision in Scotland.

Data Availability

The linked data (1617-0318) used to support the findings of this study may be released upon application to the Electronic Data Research and Innovation Service, who can be contacted at phs.edris@phs.scot.

Ethical Approval

Approval was received from the NHS Scotland Public Benefit and Privacy Panel for Health and Social Care (Application No: 1617-0318) in November 2017.

Disclosure

The content in this work is derived from a doctoral thesis: "People with serious mental illness living in supported accommodation: a meta-analytic and secondary data analysis study" (Prof Doc Thesis, Queen Margaret University, 2019; [95]). The funding body had no role in the design of the study, identification, analysis, and interpretation of data, and writing the manuscript.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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Supplementary Materials

Figure S1: data linking process. Table S1: variables used in modelling. (*Supplementary Materials*)

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