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Article in *Nordic Journal of Psychiatry* · May 2019

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To cite this article: Torhild Smith Wiker, Rolf Gjestad, Liv Solrunn Mellesdal, Erik Johnsen, Ketil Joachim Oedegaard & Rune Andreas Kroken (2019): Supported accommodation for people with schizophrenia, Nordic Journal of Psychiatry, DOI: [10.1080/08039488.2019.1606938](https://doi.org/10.1080/08039488.2019.1606938)

To link to this article: <https://doi.org/10.1080/08039488.2019.1606938>



Published online: 09 May 2019.



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Supported accommodation for people with schizophrenia

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ABSTRACT

Background: As a result of deinstitutionalization of psychiatric treatment and care, many people with severe mental illness have been offered supported accommodation. However, research on this costly intervention in Norway has been scarce.

Aims: The aim of this study was to prospectively investigate the clinical and demographic factors associated with allocation to supported accommodation for people with schizophrenia.

Methods: The study was a prospective cohort study of 334 people with schizophrenia acutely admitted to Haukeland University Hospital between 2005 and 2010. Information concerning allocation to supported accommodation in their residential municipalities was collected retrospectively. Univariate and multivariate statistical methods were used to assess the association of clinical and demographical variables with allocation to supported accommodation.

Results: Supported accommodation was allocated to 29.6% of the participants during the study period. Age, gender, implementation of compulsory mental health care, substance abuse, symptom burden and suicidality were not associated with allocation to supported accommodation. Functional impairment, especially difficulties with activities of daily living, experiencing exacerbation in the course of chronic disease, being medicated and of Norwegian origin, favoured supported accommodation.

Conclusions: Our results supported the hypothesis that people with severe mental illness presenting the greatest need for supported accommodation, based on functional difficulties and exacerbation of chronic disease were allocated supported accommodation. Symptom burden was not associated with allocation.

Clinical implications: Further research is needed to examine the impact of supported accommodation on the outcomes for people with schizophrenia.

ARTICLE HISTORY

Received 7 August 2017
Revised 11 March 2019
Accepted 29 March 2019

KEYWORDS

Schizophrenia; disability; supported accommodation; allocation; compulsory mental healthcare

Background

Schizophrenia is a leading cause of long-term disability. It is typically diagnosed in adolescence and early adulthood [1–3]. A large proportion of people with schizophrenia experience functional impairment, including difficulties with independent living [4]. The last decades of the twentieth century witnessed a shift from large asylums to the community in the care of people with severe mental illness in developed countries [5]. This deinstitutionalization was triggered by new treatment optimism which surged as a result of the availability of antipsychotic medications, an emerging recognition of the lack of civil rights and the poor physical environment prevailing in the institutions [5,6]. The need to reduce treatment costs and develop alternative and more cost-effective services also spurred this shift in care [7]. In response to deinstitutionalization and to address the functional impairment experienced by many people with schizophrenia, a wide range of supported living schemes have emerged [8–11]. This process has been widespread in all

developed countries, albeit with variations in rate, funding and organization [12,13].

When the concept of supported housing emerged in the United States, it comprised several philosophical underpinnings, focusing on client choice and flexible, individualized and voluntary services. The person's right to normal, stable housing and services needed to alleviate functional impairment was also emphasized [12,14,15]. The concept of supported housing has been modified over time in response to available municipality resources and the needs of the individual person for more structural support. The link between housing and services is still under constant change according to local and national conditions. The term supported accommodation has evolved, encompassing different forms of supported living in the community.

After four decades of deinstitutionalization in Norway, there is still an ongoing reduction in the number of psychiatric hospital beds, which has more than halved since 1990 (7745 beds in 1990, compared to 3769 beds in 2014). In the Western Norway Health Region, the number of psychiatric

hospital beds has decreased by 23% over the last 10 years (2004–2014) [16,17]. Treatment, rehabilitation and care of people with severe mental illness must now, to a much larger extent, rely on service providers in, or close to, a person's residence in the community, although hospital treatment may still be necessary for shorter periods for safety or treatment reasons. A report published by the Norwegian Ministry of Social and Health Affairs in 1997 concluded that services for people with mental illness at all levels were highly inadequate, and a national 10-year plan to escalate services was launched in 1998 [18]. This National Escalation Plan led to the establishment of increased community-based care, both as ambulatory psychiatric nursing services and a range of supported accommodation schemes. In a Norwegian setting, supported accommodation for people with severe mental illness includes apartments rented from the municipality, with supporting staff employed by the municipality. The level of staff qualification and staff-to-resident ratio are tailored according to the needs of the individual person. These forms of supported accommodation are additions to 'Floating outreach and support', where people, independent of living arrangement, can receive service from community psychiatric nursing staff.

Following major developments of supported accommodation achieved by the first decade of this century, both in Norway and internationally, demands for care provision and stable housing for people with severe mental illness remain at an all-time high and municipality-supported accommodation continues to be in short supply [12,19,20].

Research on supported accommodation to evaluate outcomes and financial costs of different housing schemes has turned out to be complex [21,22]. A major difficulty has been variations in the models of supported accommodation, both across different countries and within countries, making comparisons of different housing schemes difficult [22]. Another difficulty has been to establish valid, sensitive and comparable outcome measures to determine the impact of supported accommodation, compared to other forms of follow-up in the community or to an institutional setting [12,21]. Despite the allocation of considerable resources to care for people with mental illness in Norway, Norwegian research on such costly interventions has been scarce. Guidelines for the allocation of supported accommodation as drawn in legislation are vague and not legally enforced upon municipal authorities. People with severe mental illness are entitled to necessary health care in their home, but what constitutes as 'necessary' care is to be determined locally [23]. The municipal allocation process for supported accommodation was developed during the final years of the National Escalation Plan period, which coincided with our study period, i.e. from 2005 to 2010.

The main steps in the allocation process were as follows. Each person individually applies for supported accommodation. Information on the person's medical condition and their functional evaluation is provided by the psychiatric services. People eligible for supported accommodation need to fulfil the following criteria: (1) the person should have a diagnosis of a severe, long-term mental illness (2) the person has to be

medically stable and (3) supported accommodation should be deemed essential for the person's independent living in the community. An important question is whether this allocation process effectively targets people with the greatest need for supported accommodation in terms of symptom burden and functional impairment.

The objective of this study was to prospectively investigate the clinical and demographic factors associated with allocation to supported accommodation in a cohort of people with schizophrenia in Bergen and the surrounding municipalities.

Methods

Study participants

Participants included patients ($n = 334$) with an International Statistical Classification of Diseases and Related Health Problems, tenth revision (ICD-10) diagnosis of schizophrenia (F20.0–F20.9) [24], consecutively admitted to the psychiatric emergency ward of Haukeland University Hospital from 1 May 2005 to 31 December 2010. On hospital admission, the participants were included in an open cohort study which constituted a subset of the prospective, longitudinal cohort study 'Suicidality in Psychiatric Emergency Admissions' [25]. During the study period, the psychiatric emergency ward at Haukeland University Hospital was responsible for 95% of emergency admissions within the hospital catchment area with a population of 400,000 inhabitants. People with home addresses outside the hospital catchment area and those already residing in municipality-supported accommodation at the time of index admission were excluded from the study.

Data sources and assessments

The participant's first admission with a clinical diagnosis of schizophrenia within the study period was denoted the index admission. Demographic and clinical variables were recorded by staff and resident physicians evaluating participants on hospital admission. Staff and resident physicians were trained in the specific rating scales used for the demographic and clinical variables in the study [25]. Information on allocation to supported accommodation was collected manually and retrospectively after the end of the study period from the person's respective municipality.

Variables

The sociodemographic variables comprised age, gender, ethnicity (Norwegian or other ethnic origin), education and source of income.

In Norway people referred to hospital under the Norwegian Mental Healthcare Act receive an assessment from an approved specialist in either psychiatry or clinical psychology within 24 h of their admission. There are three possible outcomes of this assessment: (1) voluntary mental healthcare; (2) compulsory observation for 10 days; or (3) compulsory mental healthcare. Only compulsory mental healthcare allows medication without consent. A person on

compulsory mental healthcare receives further assessments during the stay in hospital and on discharge, to establish the continuing presence of the legal criteria, based on the person's history and present condition. Decisions on discharge can lead to two possible outcomes: (1) discontinuation of compulsory mental healthcare, thereby voluntary follow-up and (2) compulsory outpatient care in the community (comparable to CTO-Community Treatment Order) [26]. The decisions on admission to hospital by the approved specialist were recorded for the participants of this study and used for analyses.

The Global Assessment of Functioning, Split Version (S-GAF) [27,28] was recorded on hospital admission and discharge. The S-GAF is part of the minimum data set recorded on all psychiatric hospital admissions and discharges in Norway. The S-GAF is separated into symptom score and function score to focus on both severity of symptoms and daily function. The S-GAF scores were dichotomized as follows: GAF-S and -F scores below 41 (psychosis threshold) (yes/no).

Further assessments of clinical status and function on admission were performed using the Health of the Nation Outcome Scales (HoNOS) [29,30]. HoNOS is a 12 item instrument developed in the UK to assess psychiatric symptom- and functional domains in order to measure progress towards higher degree of self-sufficiency and reducing effects of functional impairment. Individual HoNOS items are grouped into four dimensions; (A) Behaviour (item 1 Overactive, aggressive, disruptive or agitated behaviour, item 2 Non-accidental self-harm, item 3 Problem-drinking or drug-taking), (B) Impairment (item 4 Cognitive problems, item 5 Problems with physical illness or disability), (C) Symptoms (item 6 Hallucinations and delusions, item 7 Depression, item 8 Other mental or behavioural problems) and (D) Social functioning (item 9 Problems with social relationships, item 10 Problems with activities of daily living, item 11 Living conditions, item 12 Problems with occupation and activities). Assessments are made based on the last 14 days.

Problems with alcohol and drug use during the last six months before the index admission were recorded employing Alcohol (AUS) and Drug Use Scales (DUS), developed to assess substance use disorders among people with severe mental illness. Substance use is rated on five-point rating scales (1–5, with increasing severity) for alcohol and drug use, respectively, based on all available information [31–33].

In addition, specific evaluations for this cohort were carried out by the resident physician on call as answers to the following questions: (1) evaluation of suicide risk: did a suicide attempt or self-harm contribute to the hospital referral? (yes/no); (2) risk of suicide prior to hospital referral was scored as: no plans, plans for self-harm/suicide, self-harm occurred; (3) psychotropic medication and treatment adherence 14 days prior to admission were dichotomized as: medicated (yes/no), drug adherence (yes/no); and (4) the status of the current disease episode was classified as: disease onset within the last year, new episode after a period of remission, exacerbation in the course of chronic disease.

The different models of municipal supported accommodation available in the study period were: (1) separate and

scattered apartments supported by a specific team of community psychiatric nurses from a service base, serving about 20 clients per base; (2) individual apartments located in the same building with common living areas and daytime staff; (3) as (2) but with daytime, as well as night-time, staff; (4) studio apartments with common living areas, 24-hour staff presence and assistance in all necessary daily activities; and (5) psychiatric nursing homes (a few nursing homes were still in operation at the time of data collection). For our analysis, the supported accommodation models were recoded as follows: model (1) was recoded as support level 1; models (2) and (3) as support level 2; and models (4) and (5) as support level 3. Support level 2 corresponds closely with 'Supported housing' and support level 3 with 'Residential care' in international literature [22].

Municipal data on allocation to supported accommodation were dichotomized into: allocated/non-allocated.

Statistical analyses

Descriptive analyses included means, standard deviations and frequency analyses. Univariate relationships between the allocated and non-allocated groups were tested by cross-tabulation using chi-square testing (gender, ethnicity, education, source of income, dichotomized S-GAF F and S at admission and discharge, disease status, medication, compliance, suicidality, decisions under the Norwegian Mental Healthcare Act), *t*-test of group differences (age, mean S-GAF values S and mean S-GAF values F, HoNOS overall) and Mann-Whitney *U* tests (HoNOS single measures). In addition to testing overall differences, planned comparisons were used for testing relations between subcategories [34]. Multivariate logistic regression with allocation to supported accommodation as the dependent variable was performed. Since bivariate analyses may result in suppression effects, thereby losing statistically significant relations between outcome and predictors in the absence of relevant covariate variables, all predictor variables were entered. The model was then reestimated based on a backward procedure [35]. Predictor variables that showed high level of multicollinearity with other predictor variables were excluded. These predictors were S-GAF S, which overlapped with S-GAF F, and 'being compliant', overlapping with being medicated. HoNOS 8 was excluded due to its heterogeneous content ('Other mental or behavioural problems'). Source of income was not deemed eligible for multivariate regression analysis due to many categories with few observations, therefore, also excluded.

Three different models were tested, one with the HoNOS variables analyzed as separate predictors, one with the HoNOS variables grouped into the classic HoNOS dimensions; Behaviour, Impairment, Symptoms and Social functioning [29,36,37], and the last model with all HoNOS items grouped into a general dimension. The assumption of a reflective measurement model was not met [38], as confirmatory factor analyses did not give any support for these dimensions or the general factor (results not presented). Such grouping of items could, therefore, only be done under the assumption of a formative measurement model.

Table 1. Demographic and clinical variables grouped by allocation status ($n = 334$).

	Total $n = 334$	Allocated $n = 99$	Non-allocated $n = 235$	p value
Age at index adm. (years)				
mean (SD)	42 (14.253)	43 (14.393)	42 (14.196)	.339 [§]
Gender				
Male	217 (65%)	65 (66%)	152 (65%)	.865 ^{&}
Ethnicity				
Norwegian	295 (89%)	94 (95%)	201 (86%)	.021 ^{&}
Education				
Primary school (7-9 years)	157 (53%)	51 (61%)	106 (50%)	.108 ^{&}
Secondary school (12 years)	98 (33%)	20 (24%)	78 (36%)	
College, University	43 (14%)	13 (16%)	30 (14%)	
Source of income				
Employed, student	17 (5%)	0	17 (8%)	.003 ^{&}
Temporary benefits	46 (15%)	10 (11%)	36 (16%)	
Disability pension, retired	217 (69%)	79 (83%)	138 (62%)	
Social Security	24 (8%)	4 (4%)	20 (9%)	
Other	13 (4%)	2 (2%)	11 (5%)	
S-GAF at admission to hospital				
Mean S-GAF values S (SD)	31 (9.370)	32 (10.167)	31 (9.020)	.518 [§]
Mean S-GAF values F (SD)	34 (10.312)	32 (9.605)	34 (10.570)	.123 [§]
S-GAF $F < = 40$	266 (84%)	86 (90%)	180 (81%)	.060 ^{&}
S-GAF $S < = 40$	292 (92%)	85 (89%)	207 (93%)	.207 ^{&}
S-GAF at discharge from hospital				
Mean S-GAF values S (SD)	34 (9.530)	33 (9.069)	34 (9.740)	.367 [§]
Mean S-GAF values F (SD)	35 (10.075)	34 (9.144)	36 (10.431)	.089 [§]
No of patients S-GAF $F < = 40$	217 (77%)	74 (82%)	143 (74%)	.132 ^{&}
No of patients S-GAF $S < = 40$	231 (82%)	75 (83%)	156 (81%)	.612 ^{&}
Disease status				
Onset last 12 months	11 (4%)	2 (2%)	9 (5%)	.025 ^{&}
Relapse after Remission	35 (12%)	5 (5%)	30 (16%)	
Exacerbation chronic disease	239 (84%)	85 (92%)	154 (80%)	
Medication prior to adm.				
Regular medication	207 (71%)	68 (81%)	139 (68%)	.021 ^{&}
Compliant	85 (41%)	33 (49%)	52 (37%)	.135 ^{&}
Suicidality on admission				
No plans	204 (73%)	67 (74%)	137 (72%)	.582 ^{&}
Plans for self- harm/suicide	69 (25%)	22 (24%)	47 (25%)	
Self-harm Occurred	7 (3%)	1 (1%)	6 (3%)	
Suicide risk present (yes)	41 (18%)	10 (18%)	31 (18%)	.910 ^{&}
Decisions under the Norwegian Mental Healthcare Act				
Voluntary	80 (24%)	27 (28%)	53 (23%)	.149 ^{&}
Compulsory observation	95 (29%)	21 (21%)	74 (32%)	
Compulsory mental healthcare	154 (47%)	50 (51%)	104 (45%)	

Sociodemographic characteristics and clinical variables of participants recorded during Index admission, according to allocation status. Means and cross tabulations.

n : number of participants; allocated: group of participants receiving supported accommodation during the study period; non-allocated: group of participants who did not receive supported accommodation; SD: standard deviation, adm.: on index admission to Haukeland University Hospital.

Cases available for analyses: Ethnicity 332, Education 298, Source of income 317, S-GAF F admission 318, S-GAF S admission 319, S-GAF F discharge 283, S-GAF S discharge 283, Disease status on admission 285, Medication 290, Compliant 207, Suicidality 280, Suicide risk present 232, Decisions under the Norwegian Mental Healthcare Act 329.

Statistics comparing Allocated group and Non-allocated group: [§]ANOVA, [&]Chi square test.

Missing data was handled with multiple imputation when analyzing the logistic regression models in Mplus (version 8, Los Angeles, CA) [39], with $N = 40$ data sets generated. Apart from Mplus, IBM SPSS (version 23, Armonk, NY) was used for the analyses [40].

Ethics

This study was approved by the Regional Committee for Medical Research Ethics and the Norwegian Social Science Data Service. Permission was granted by the Norwegian Directorate for Health for retrieval and use of patient data.

Results

Of a total of 334 participants included in the study, 99 (29.6%) received supported accommodation over the 5-year

study period (allocated group). The allocated support levels for the 99 participants in the allocated group were as follows: 23 participants in support level 1, 49 participants in support level 2 and 27 participants in support level 3.

Descriptive analyses compared these 99 participants to the remaining 235 who did not receive supported accommodation (non-allocated group), based on demographic and clinical variables recorded on index admission, see Table 1. Results from the multivariate logistic regression model, used to find predictors of allocation to supported accommodation, are presented in Table 2.

Sociodemographic variables

Association of age and gender with allocation to supported accommodation was not found (Table 1). Analysis of the

Table 2. Predictors of allocation to supported accommodation^a.

	Full model		Re-estimated model				
	b	p	b	p	OR	CI _{Low}	CI _{High}
Age	−0.01	.654					
Gender	−0.26	.324					
Ethnicity – Norwegian	1.35	.018	1.21	.023	3.51	1.18	9.49
Education							
Primary	Ref	–					
High school	−0.29	.424					
University	−0.07	.883					
Disease chronicity							
onset last year	Ref	–					
new episode	−0.63	.491					
exacerbation chronic disease	0.59	.256	1.08	.016	2.94	1.22	7.08
Voluntary	Ref	–					
Compulsory observation	−0.73	.089					
Compulsory mental healthcare	−0.24	.546					
Suicidality	−0.01	.992					
Medicated	0.71	.074	0.73	.036	2.07	1.05	4.09
S-GAF F	−0.18	.279					
Alcohol (AUS)	−0.29	.275					
Illicit drug (DUS)	0.18	.487					
HONOS 1 ^b	−0.01	.920					
HONOS 2 ^c	−0.29	.274					
HONOS 3 ^d	−0.12	.644					
HONOS 4 ^e	−0.35	.025	−0.32	.024	0.73	0.55	0.96
HONOS 5 ^f	−0.12	.504					
HONOS 6 ^g	0.04	.817					
HONOS 7 ^h	0.05	.790					
HONOS 9 ⁱ	−0.13	.435					
HONOS 10 ^j	0.50	.008	0.52	.001	1.68	1.25	2.25
HONOS 11 ^k	0.38	.014	0.28	.035	1.33	1.02	1.73
HONOS 12 ^l	−0.34	.012	−0.36	.005	0.70	0.55	0.90
R ²	0.26		.17				

^aResults from the multivariate logistic regression analysis with allocation to supported accommodation as the dependent variable.

Explained variance was 13.3% in the restricted model.

^bOveractive, aggressive, disruptive or agitated behaviour.

^cNon-accidental behaviour.

^dProblem-drinking or drug-taking.

^eCognitive problems.

^fPhysical illness or disability problems.

^gProblems associated with hallucinations and delusions.

^hProblems with depressed mood.

ⁱProblems with relationships.

^jProblems with activities of daily living.

^kProblems with living conditions.

^lProblems with occupation and activities.

A total sum score of HONOS was constructed based on imputation of the separate items.

subcategories in the cross tabulation pointed to an association between lower education level and the allocated group. Primary education was the highest level of education attained by 72% of participants in the allocated group, compared to 58% in the non-allocated group ($\chi^2 = 4.38$, $p = .036$).

The relationship between source of income and allocation to supported accommodation showed a significant difference between allocated and non-allocated groups ($\chi^2 = 16.38$, $p = .003$), most evident with respect to disability pension (83% vs 62%, respectively) and work-related income (0% vs 8%, respectively).

Norwegian origin predicted allocation in the multivariate regression analysis with the highest odds ratio in the re-estimated model. The univariate analysis of ethnicity and allocation showed a significant difference as only 14% of non-Norwegian participants included in the study were allocated

supported accommodation, compared to 32% of ethnic Norwegian participants ($\chi^2 = 5.29$, $p = .021$).

Compulsory mental healthcare

No significant difference in the use of compulsory mental healthcare on index admission was found between the allocated and non-allocated groups in either the univariate or the multivariate analyses. Compulsory mental healthcare was settled for 51% vs 45% of participants in the allocated and non-allocated groups, respectively.

Clinical variables

Both univariate and multivariate analyses showed a relationship between being medicated and being in the allocated group. The multivariate logistic regression showed an increased probability of being in the allocated group if the patient used psychotropic medication prior to index admission. Likewise, a greater proportion of participants in the allocated group were on regular psychotropic medication, compared to the non-allocated group (81% vs 68%, respectively; $\chi^2 = 5.31$, $p = .021$), but no significant difference was found in treatment adherence between the two groups in the cross tabulation (allocated 49% vs non-allocated 37%; $\chi^2 = 2.33$, $p = .127$).

A positive association between chronicity of disease and allocation to supported accommodation was found based on disease status on index admission. Exacerbation in the course of chronic disease was found to predict allocation in the re-estimated regression model. This was also found in the univariate analysis ($\chi^2 = 7.36$, $p = .025$).

The relationship between substance abuse and allocation to supported accommodation showed mixed results. In the univariate logistic regression analysis with AUS as the predictor and allocation to supported accommodation as the dependent variable, low AUS score predicted allocation to supported accommodation ($p = .043$). In the multivariate analysis, using AUS, DUS and HoNOS item 3 (problem-drinking or drug-taking), substance abuse was not found to predict allocation to supported accommodation.

Neither suicide attempt and self-harm as a reason for hospital referral nor an elevated risk for suicide and self-harm on admission was associated with or found to predict allocation to supported accommodation, see Tables 1 and 2.

Some of the HoNOS items were associated with allocation to supported accommodation. In the nonparametric test (Mann–Whitney U test) a significant difference between the allocated and non-allocated groups was found only for HoNOS item 10 (problems with activities of daily living) (1.85 vs 1.50, respectively; $p = .012$). High score on HoNOS 10 was found to predict allocation to supported accommodation in the multivariate regression model. Other statistically significant relations were found in the multivariate analyses: High score on HoNOS item 11 (problems with living conditions), low score on HoNOS item 4 (cognitive problems) and low score on HoNOS item 12 (problems with occupation and activities) predicted allocation to supported accommodation.

Grouping items into dimensions or a total score showed no statistically significant results for the HoNOS variables.

Comparison of S-GAF scores between the allocated and non-allocated groups did not yield any significant difference, in either univariate or multivariate analysis. There was, however, a trend towards lower S-GAF F scores on admission in the allocated group vs the non-allocated group (S-GAF F \leq 40: 90% vs 81%, respectively; $\chi^2 = 3.54$, $p = .060$).

Discussion

The main finding of this study was that participants with the highest degree of functional impairment were given priority in the allocation to supported accommodation in the city of Bergen and surrounding municipalities. Several underpinnings support this conclusion. The multivariate analyses showed that allocation to supported accommodation was associated with high scores on problems with activities of daily living and living conditions. This was corroborated by results from univariate analyses of sociodemographic variables related to daily functioning: Analysis of education level indicated difficulties with completing secondary education, primary education being the highest level of education attained by participants in the allocated group. Moreover, difficulties with occupational life were indicated, as shown by our findings on source of income. No participants receiving supported accommodation had work-related income and a higher proportion received disability pension, compared to those who did not receive supported accommodation. This is comparable to the characteristics of residents of supported accommodation from other countries [13]. Low score on HoNOS item 4 (cognitive problems) predicted allocation in the regression model and could point in the opposite direction. However, this could be explained by the fact that care for people with cognitive problems is organized in other parts of the social welfare system. Low score on HoNOS item 12 (problems with occupation and activities) also predicted allocation. HoNOS item 12 is to be distinguished from HoNOS item 10 and describes whether the person has daily occupation suited to his or her functional ability. More information on the nature of these occupational activities is needed to draw any conclusions concerning the relationship to allocation to supported accommodation.

Presenting with exacerbation of chronic disease on index admission was associated with and predicted being in the allocated group, thus also implying enduring psychotic illness as an important factor in allocation to supported accommodation.

An association between non-Norwegian origin and a lower probability for allocation to supported accommodation was found in both univariate and multivariate analyses. Although the proportion of participants of non-Norwegian origin in our study population was small (11%), it is comparable to the proportion of non-Norwegian citizens in Norway recorded in 2010, which was 9.5% (available from: <https://www.ssb.no/a/publikasjoner/pdf/sa119/sa119.pdf>, accessed on 26 June 2017). A lower probability for allocation to supported accommodation for people of non-Norwegian origin

could imply the presence of cultural differences in the tradition of caring for mentally ill relatives or the influence of other factors, e.g. shorter duration of illness, which our analyses did not take into account. Language barriers between people of non-Norwegian origin and carers and decision-makers in the community could also explain the reduced possibility for allocation to supported accommodation.

Another factor associated with functional impairment and severity of illness, i.e. use of compulsory mental healthcare, did not differ significantly between the allocated and non-allocated groups nor predict allocation to supported accommodation. Compulsory mental health care was, however, the decision most frequently instituted on index hospitalization of people with schizophrenia. This is comparable to other authors' findings on people eligible for supported accommodation [9,13].

In our study substance abuse was not found to predict allocation to supported accommodation. This contrasts with the findings of Nordentoft et al. [8] who, in a Danish register-based study, found that substance abuse was the third most important predictor of supported accommodation in Denmark. However, an inverse relationship between alcohol use and allocation to supported accommodation was found in the univariate regression analysis and could suggest that the presence of alcohol problems even decreased probability of allocation to supported accommodation.

The use of regular psychotropic medication prior to the index admission predicted allocation to supported accommodation, which could indicate more severe illness among participants in the allocated group. Adherence to treatment did not influence allocation in the univariate analysis. As compliance was not possible to enter in the multivariate model as a separate variable, there was not enough information to elaborate this point.

An association between symptom burden and allocation to supported accommodation could otherwise not be identified. HoNOS scores evaluating hallucinations, delusions and depressed mood, in addition to self-harm ('non-accidental behaviour'), were not found to predict allocation to supported accommodation. Furthermore, risk of suicide as a reason for hospital referral and suicidal ideation on admission were not associated with allocation. As people with a diagnosis of schizophrenia have a higher risk for committing suicide, it can be argued that people with long-term suicidal risk should be given priority for supported accommodation. However, this was not found to be the case in our investigation.

The sociodemographic variables of age and gender did not influence allocation to supported accommodation in our study, although the majority of our study participants were male. A German study found no gender differences in supported accommodation while other studies have found that the majority of people with schizophrenia living in various forms of supported accommodation were male [8,9,13].

Supported accommodation in Norway is, to a great extent, in line with the core philosophical concepts of supported housing when it emerged in the United States. The right to a home in the community for people with severe

mental illness is widely recognized in Norway, although it is not enforced in legislation. Users of supported accommodation are considered normal tenants with all civil rights to privacy and autonomy. Empowerment is the fundamental goal of supported accommodation in Norway. The psychiatric support provided is based in the community and not in psychiatric services. However, the intended separation between housing and support provision from psychiatric services diminishes with increasing support level, thereby veering somewhat away from the concept of the original supported housing model [14].

The explained variance of this model is small (13.3%), reflecting the complicated setting in which the allocation to supported accommodation takes place. In addition to the variables available for this study, other possible variables could influence the allocation process, such as personal motivation, relationship to family and relatives, size of community, socioeconomic class and internal strategies of the individual municipality [41].

Limitations

This study aimed to identify sociodemographic and clinical factors associated with allocation to supported accommodation in and around the Norwegian city of Bergen. The municipal responsibility to provide support for people with severe mental illness in their homes was established as a result of the National Escalation Plan from 1998 to 2008, which led to the development of different supported accommodation schemes, as well as forms of ambulatory services. The criteria for, and practice of, allocation may have changed during the study period in response to demands and resource availability. This may, consequently, have affected our findings. However, we believe these changes to have been moderate, not influencing our results in a major way. Since our inclusion period corresponded to the final part of the Escalation Plan period, we think that our results are representative for a general practice in the years following.

In addition, data on the allocation process from a social policy perspective and on financial restraints in individual municipalities would have proved valuable in understanding the process of allocation to supported accommodation in Bergen and the surrounding municipalities. However, these data were not available for this study. Our study coincided with the last part of the National Escalation Plan period, which was a national endeavour and involved all Norwegian municipalities. Considerable state funding and recommendations for municipal policy making was part of the National Escalation Plan, thereby reducing differences between municipalities. For this reason, we do not think this would have affected our results. Our main objective was, therefore, to assess factors related to the allocation process from a clinical as well as a psychosocial perspective. In recognition of the importance of the social approach, we will definitely seek to include this more broadly in our future research on supported accommodation.

An important factor in the care for people with severe mental illness in the community is the degree of autonomy

and civil rights. In this context it would have been very interesting to investigate the relationship between compulsory outpatient care in the community and allocation to supported accommodation. Unfortunately, information on decisions for compulsory outpatient care was not available for this study.

Furthermore, a more comprehensive assessment of the participants needs would have been useful for understanding the allocation process. This could have been obtained for example by using the Camberwell Assessment of Needs Scale [42]. This was, however, not included in the set of variables suitable for emergency assessment.

Data on demographic and clinical variables used in this investigation were recorded in a psychiatric emergency setting with limited availability of information, which could result in missing data especially for some of the HoNOS variables. However, the use of multiple imputation, based on the relationships between intact variables, may have increased the probability of missingness to be randomly distributed and thereby improved the generalizability of the results.

It is also important to note that there was no available information on the application for supported accommodation itself for the study. The group of participants who did not receive supported accommodation during the study period did not necessarily apply for supported accommodation. Comparisons were consequently not made on the basis of actual patient applications.

Conclusions

Our study showed that allocation to supported accommodation for people with schizophrenia in Bergen and the surrounding municipalities during and immediately following the National Escalation Plan for people with psychiatric illness, was associated with functional difficulties, experiencing exacerbation of chronic disease and being of Norwegian origin. Symptom burden, substance use and being under compulsory mental health care did not influence allocation. Further research is warranted to evaluate and understand in more detail the impact of supported accommodation on patient outcomes.

Acknowledgements

The authors are especially grateful to Jill Bjarke, MSc., Marianne Langeland, R.N., Ingvild Helle, R.N., Geirr Fitje, B.B.A., and Petter Jacobsen, MSc. for valuable contributions to collecting and ensuring the high quality of the data.

Disclosure statement

The authors declare no conflict of interest. The authors alone are responsible for the content and writing of this paper.

Funding

The Division of Psychiatry Haukeland University Hospital has provided financial support for this study. The project has received additional

support in the form of a research grants from the Western Norway Regional Health Authority: Grant numbers: 911209/HV og 911671/HV.

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