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Dutch homeless people 2.5 years after shelter admission: what are predictors of housing stability and housing satisfaction?

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What is known about this topic

- Housing stability is an important focus in research on homeless people.
- Studies among homeless people with housing stability as an outcome have used different definitions of stable housing.
- None of the definitions of stable housing have included the perspective of homeless people.

What this paper adds

- Half of a cohort of homeless people who reported themselves at a central access point for social relief in four Dutch major cities were stably housed and satisfied at 2.5-year follow-up.
- We revealed a subgroup of stably housed but not satisfied initially homeless people.
- Having been arrested was the strongest negative predictor of housing stability among these initially homeless people.

Abstract

Housing stability is an important focus in research on homeless people. Although definitions of stable housing differ across studies, the perspective of homeless people themselves is generally not included. Therefore, this study explored the inclusion of satisfaction with the participant's current housing status as part of the definition of housing stability and also examined predictors of housing stability with and without the inclusion of homeless person's perspective. Of the initial cohort consisting of 513 homeless participants who were included at baseline in 2011, 324 (63.2%) were also interviewed at 2.5-year follow-up. To determine independent predictors of housing stability, we fitted multivariate logistic regression models using stepwise backward regression. At 2.5-year follow-up, 222 participants (68.5%) were stably housed and 163 participants (51.1%) were stably housed and satisfied with their housing status. Having been arrested (OR = 0.36, 95% CI: 0.20–0.63), a high level of somatisation (physical manifestations of psychological distress) (OR = 0.52, 95% CI: 0.30–0.91) and having unmet care needs (OR = 0.77, 95% CI: 0.60–0.99) were negative predictors of housing stability. Having been arrested (OR = 0.43, 95% CI: 0.25–0.75), high debts (OR = 0.45, 95% CI: 0.24–0.84) and a high level of somatisation (OR = 0.49, 95% CI: 0.28–0.84) were negative predictors of stable housing when satisfaction with the housing status was included. Because inclusion of a subjective component revealed a subgroup of stably housed but not satisfied participants and changed the significant predictors, this seems a relevant addition to the customary definition of housing stability. Participants with characteristics negatively associated with housing stability should receive more extensive and individually tailored support services to facilitate achievement of housing stability.

Keywords: cohort studies, homelessness, housing, user satisfaction, vulnerable populations

Introduction

Housing stability is an important focus in research on homeless people. Studies with stable housing as the main outcome have shown the following negative predictors of stable housing: substance abuse (Orwin *et al.* 2005, North *et al.* 2010, Palepu *et al.* 2010, Aubry *et al.* 2012), having income assistance (Palepu *et al.*

2010), belonging to an older age group (>44 years), having an arrest history (Caton *et al.* 2005), and a longer duration of homelessness (Zlotnick *et al.* 1999). Among the positive predictors of stable housing are: an intimate partner relationship (Palepu *et al.* 2010), having others who are dependent on the homeless person for food/shelter (Orwin *et al.* 2005), a better psychosocial adjustment, recent or current employment, earned income, adequate family support, no current drug treatment (Caton *et al.* 2005), entitlement benefits (Zlotnick *et al.* 1999) and being female (Pollio *et al.* 1997).

Studies among homeless people with housing stability as an outcome have used different definitions of stable housing. They also differ regarding the types of residency on which the housing stability was based (e.g. living in a place of one's own, or also including staying in a residential care facility) and regarding the time period an individual has to be housed to categorise the housing situation as being 'stable' (e.g. a duration of 90 days of being housed, or for a longer period of time). This may also explain why the percentages of stably housed formerly homeless persons at follow-up reported in these studies range from around 20% (Zlotnick *et al.* 1999, North *et al.* 2010, Palepu *et al.* 2010) to ≥60% (Orwin *et al.* 2005, Aubry *et al.* 2012). It is remarkable that none of the definitions of stable housing that we found included the perspective of homeless people.

Housing stability implies a positive situation (Srebnik *et al.* 1995); however, it seems questionable whether a housing situation can genuinely be called 'stable' when the characteristics of the housing situation are unsatisfactory or inadequate according to the individual concerned. Incorporating the perspective of homeless people will justify the positive connotation of housing stability, especially because there is a positive relation between housing satisfaction and residential stability (i.e. no change in residence) (Srebnik *et al.* 1995). Client satisfaction is also an indicator of service quality (Altena *et al.* 2014) and is associated with better treatment outcomes (Hser *et al.* 2004). In addition, taking the personal perspective of people seriously increases their sense of autonomy and competence, both of which are related to better health outcomes and general satisfaction with life in other populations (Ryan *et al.* 2008). Therefore, it seems relevant to include a measure of the perspective of homeless people. Incorporating their perspective is also in line with the tailored approach of service delivery and various strategies to end homelessness (FEANTSA 2010; Dutch Government and four major cities 2011).

The main aim of this study was to investigate predictors of housing stability among a cohort of initially homeless people. The included predictors were mainly based on previous studies and complemented with practical insights. Based on previous research, the following evidence-based predictors were included: age (Caton *et al.* 2005), gender (Pollio *et al.* 1997, Zlotnick *et al.* 1999), accompanied by children (Orwin *et al.* 2005), psychological distress (somatisation [physical manifestations of psychological distress], anxiety, depression) (Pollio *et al.* 1997, Aubry *et al.* 2012), social support (Caton *et al.* 2005), substance use (Orwin *et al.* 2005, North *et al.* 2010, Palepu *et al.* 2010, Aubry *et al.* 2012), previous arrests (Caton *et al.* 2005), work (Caton *et al.* 2005), duration of homelessness (Zlotnick *et al.* 1999) and resources for basic needs (Zlotnick *et al.* 1999, Caton *et al.* 2005). In addition, the practice-based predictors of housing stability that we explored were suggested by an expert panel (including homelessness researchers, governmental and municipal policy makers and client representatives). These predictors were: education, ethnicity, debts, physical health complaints, hostility, unmet care needs, suspected intellectual disability and experience of self-determination. We compared two definitions of stable housing on prevalence and on predictors: one definition included the subjective experience of the initially homeless participants and the other did not include their subjective experience. Using a follow-up period of 2.5 years broadly corresponds with the timeframe used in previous studies on housing stability among homeless people (Orwin *et al.* 2005, North *et al.* 2010, Aubry *et al.* 2012) and, by using this time period, we expected the number of participants who were stably housed at follow-up to be sufficient to investigate the predictors of stable housing. In addition, investigating which characteristics at baseline prove to be significant predictors of housing stability at follow-up provides information about which characteristics of homeless people might be important to screen at their intake.

The research questions were: (i) What percentage of the initially homeless participants is stably housed at follow-up (2.5 years later) and what percentage of the initially homeless participants is stably housed when including their satisfaction with the housing status at follow-up? and (ii) What are the predictors of being stably housed at follow-up, reported for housing stability with and without including the perspective of initially homeless participants?

Answers to these questions will add to the existing knowledge of the predictors of stable housing among homeless people and provide new insight into

the relevance of adding a subjective component to the definition of housing stability.

Methods

Ethics statement

This study complies with the criteria for studies which have to be reviewed by an accredited Medical Research Ethics Committee. Upon consultation, the Medical Review Ethics Committee region Arnhem-Nijmegen concluded that the study was exempt from formal review (registration number 2010/321). The study was conducted according to the principles expressed in the Code of Conduct for health research with data (http://www.federa.org/). All participants were aged ≥18 years and gave written informed consent.

Design and participants

This study is part of a larger observational longitudinal cohort study following initially homeless people for a period of 2.5 years, starting from the moment they reported to a central access point for social relief in 2011 in one of the four major cities in the Netherlands (Amsterdam, The Hague, Rotterdam and Utrecht). It is obligatory in the Netherlands for every homeless person to report to a central access point for social relief in order to gain access to social relief facilities, such as a night shelter.

At baseline, the 513 included participants satisfied all the following criteria: aged ≥18 years, having legal residence in the Netherlands, residing in the region of application for at least 2 years during the last 3 years, having abandoned the home situation and not being sufficiently competent to live independently.

The participants, consisting of homeless adults (aged ≥23 years) and young adults (aged 18–22 years), were divided over the four cities in accordance with the inflow of homeless people at the central access points for social relief.

In 2011, over 1800 adults and 1100 young adults reported themselves at a central access point for social relief and were accepted to start an individual programme plan in one of the four major cities of the Netherlands (Tuynman & Planije 2012); all these persons were potential participants for this study. No data were available on how many potential participants were approached and how many refused to participate. Therefore, in order to obtain information about the representativeness of the study participants, we compared the total population of homeless adults and young adults who reported themselves at a central access point for social relief in the four major cities in 2011 with the study participants. Comparison of the total population of homeless adults and young adults who reported themselves at a central access point for social relief in one of the four major cities in 2011 with the 513 participants at baseline revealed that adult participants (aged ≥23 years; n = 410) were representative in terms of age and gender. Young adult participants (aged 18–22 years; n = 103) were representative in terms of age but, in this subgroup, males were overrepresented (60.2% younger males in the cohort vs. 49.2% younger males in the total group).

Study procedure at first measurement

At the start of the study in 2011, potential participants were approached at a central access point for social relief or at the temporary accommodation where they stayed. When the participant agreed to participate, a trained interviewer met the participant at the participant's location of choice. All participants gave written informed consent. Participants were interviewed face-to-face using a structured questionnaire (mean duration of 1.5 hours) and received €15 (around $16) for their participation. The interviews were held in Dutch, English, Spanish or Arabic.

Study procedure at follow-up

Participants were contacted at 6, 18 and 30 months after the first measurement by telephone, e-mail, letter, their social contacts, their caregiver/institution or private messages via social media. Participants were interviewed in the same way as during the first measurement, and received €20 (around $22) for participation in the second interview, €25 (around $27) for participation in the third interview and €30 (around $32) for participation in the fourth interview.

Measurements

Demographic characteristics

Demographic characteristics including gender, age (both evidence-based predictors of stable housing), ethnicity (practice-based predictor of stable housing) and educational level (practice-based predictor of stable housing) were assessed at baseline. Ethnicity was categorised into 'native Dutch' when participants and both parents were born in the Netherlands, and as 'non-native Dutch' when participants were foreign born, or when participants were born in the Netherlands but one or both of their parents were foreign born. Education was categorised as 'lowest' when the

participant completed primary education at the most, or 'higher than lowest' when the participant completed at least pre-vocational education, lower technical education, assistant training or basic labour-oriented education.

Stable housing
Stable housing was defined as at least 90 consecutive days independently housed or living in supportive housing at the 2.5 year follow-up interview. Supportive housing is a combination of housing and support services, in which the house is owned by a care organisation. People residing in other types of accommodation (e.g. those living in shelters, pensions, etc.) are not considered stably housed in our definition.

Stable housing including homeless people's satisfaction with housing status
Stable housing including satisfaction with the current housing status of the initially homeless participants, also included their subjective experience. This was measured by a question from the Dutch version of the Lehman's Quality of Life (QoL) Interview (Wolf *et al.* 2002): 'How do you feel about the prospect of staying on where you currently live for a long period of time?'. Responses were given on a seven-point Likert scale labelled 'terrible' (1) to 'delighted' (7). Participants were categorised as stably housed and satisfied with their current housing situation when they met the criteria for stable housing and had a score of 5–7 ('mostly satisfied' to 'delighted') on this question. Of those who were stably housed, five participants failed to answer this question and were excluded from the analyses. The Lehman's QoL Interview has been successfully used in longitudinal research in homeless populations (Lehman *et al.* 1997, Sullivan *et al.* 2000, Wolf *et al.* 2002).

Duration of homelessness
Duration of homelessness (evidence-based predictor of stable housing) was measured at baseline and was defined as the total number of months of being homeless ever in life.

Company of children
At baseline, we asked participants whether they were accompanied by one or more of their children in the shelter facility (yes = 1 or no = 0) (evidence-based predictor of stable housing).

Resources for basic needs
The Dutch abbreviated version of the Lehman QoL Interview (Wolf *et al.* 2002) was used to assess the adequacy of finances to cover certain expenditures at baseline (evidence-based predictor of stable housing). Participants were asked:

> During the past month, did you generally have enough money to cover (1) food, (2) clothing, (3) housing, (4) travelling around the city for things like shopping, medical appointments, or visiting friends and relatives and (5) social activities like movies or eating in restaurants? (yes = 1 or no = 0)

The mean number of covered expenditures (ranging from 0 to 5) was calculated.

Debts
The amount of debts (practice-based predictor of stable housing) was assessed at baseline. The amount of debts reported by participants showed a very skewed distribution with various outliers (range of the continuous data: 0–500,000 Euros). Therefore, we dichotomised debts into '1000 Euros or more' (high; >first quartile) and 'less than 1000 Euros' (low; <first quartile). This cut-off between high and low debts was data-driven, as normative data for the amount of debts were not available.

Having a job/volunteer work
The Dutch abbreviated version of the Lehman QoL Interview (Wolf *et al.* 2002) was used at baseline to assess whether participants had a job (paid job or volunteer work) (yes = 1 or no = 2) (evidence-based predictor of stable housing).

Arrests
The Dutch abbreviated version of the Lehman QoL Interview (Wolf *et al.* 2002) was used at baseline to assess whether participants had been arrested in the past year (yes = 1 or no = 2) (evidence-based predictor of stable housing).

Social support
Social support (evidence-based predictor of stable housing) was assessed at baseline using five items derived from scales developed for the Medical Outcome Study (MOS) Social Support (Sherbourne & Stewart 1991). Participants were asked to indicate how often different kinds of support were available to them through family and friends or other acquaintances, on a five-point scale ranging from 'none of the time' to 'all of the time'. Two social support measures ranging from 0 to 5 were constructed by averaging across items: a family measure, and a friends and acquaintances measure. The MOS Social Support Survey has been used in studies among homeless people (O'Toole *et al.* 1999, Nyamathi *et al.* 2000) and showed high convergent and discriminant validity

and internal consistency (Sherbourne & Stewart 1991). The items selected for the present study have been successfully used in longitudinal research among homeless populations (Krabbenborg *et al.* 2013, Lako *et al.* 2013).

Physical health

To measure physical health (practice-based predictor of stable housing), the number of self-reported physical complaints over the last 30 days was assessed at baseline on 20 categories of complaints. This included 14 categories based on the International Classification of Diseases (ICD) (World Health Organization, 1994), five categories of common complaints (visual, auditory, dental problems, foot problems, fractures) (Levy & O'Connell 2004, O'Connell 2004) and a final category 'health-related complaints not previously mentioned'.

Psychological distress

The Brief Symptom Inventory 18 (BSI-18) was used to measure anxiety, depression and somatisation (Derogatis 2001) at baseline (evidence-based predictors of stable housing). We also included the BSI subscale 'hostility' as a practice-based predictor of stable housing. The BSI is a frequently used measure to evaluate psychological distress in studies among homeless populations (McCaskill *et al.* 1998, Kashner *et al.* 2002, Ball *et al.* 2005, Weinreb *et al.* 2006, Tsemberis *et al.* 2012). The Dutch translation was used with (provisional) norm scores for the Dutch population (De Beurs 2011). Participants were categorised into two groups: participants with a high level, and participants with less than a high level of anxiety, depression, somatisation and hostility. Participants were categorised as having a high level if they scored in the upper 20th percentile on a subscale compared with a Dutch community sample.

Substance use

Alcohol use (at least 5 units) and cannabis use (evidence-based predictors of stable housing) during the last month were assessed at baseline using the appropriate module from the European version of the Addiction Severity Index (Europ-ASI, version III) (Kokkevi & Hartgers 1995). The Europ-ASI is frequently used in studies among homeless people with severe psychiatric and/or substance abuse problems (Rosenheck *et al.* 2003, Min *et al.* 2004, Kasprow & Rosenheck 2007). Studies among substance-abusing populations showed satisfactory results for the reliability and validity (Kokkevi & Hartgers 1995). For each substance, the number of days used was assessed during the last 30 days. No other substances were taken into account due to the low prevalence rates (<5%) in this population (Van Straaten *et al.* 2015).

Unmet care needs

Unmet care needs (practice-based predictor of stable housing) were assessed at baseline using a questionnaire developed by Impuls – Netherlands Center for Social Care Research (Lako *et al.* 2013). The response categories were based on the format of the Short Form Quality of Life and Care questionnaire (QoLC) (Wennink & Wijngaarden 2004). Unmet care needs (no help received though wanted) were considered on four life domains: living situation, finances, daily activities and searching for work. All unmet care needs were summed up to a total unmet needs variable, ranging from 0 to 4. The questionnaire has been used in research among homeless youth (Krabbenborg *et al.* 2013).

Intellectual disability

To measure a suspected intellectual disability (practice-based predictor of stable housing), the Hayes Ability Screening Index (HASI) (Hayes 2000) was used. The HASI is a brief screening index of intellectual abilities and was assessed at 6-month follow-up. It gives an indication of whether a person has an ID (IQ <70). The HASI shows a significant correlation with other psychometric tests measuring cognitive ability (Hayes 2000). A cut-off score of 85 (Hayes 2000) was used to distinguish between the group 'suspected intellectual disability' and the group 'no suspected intellectual disability'. The Dutch version of the HASI was translated and provided by the developers of the HASI.

Experience of self-determination

Experience of self-determination (practice-based predictor of stable housing) was measured by three basic psychological needs: feelings of autonomy, competence and relatedness. These concepts were measured at baseline by the three subscales of the Basic Psychological Needs questionnaire (Ilardi *et al.* 2006). Participants were asked to indicate their agreement with 21 items on a seven-point Likert scale, ranging from not true at all (1) to definitely true (7). The scale has been used previously among homeless young adults (Krabbenborg *et al.* 2013). Adequate factor structure, internal consistency, discriminant validity and predictive validity have been demonstrated (Vlachopoulos & Michailidou 2006, Johnston & Finney 2010). Three subscale scores ranging from 1 to 7 were constructed by averaging across the items of the subscale.

Statistical analysis

Chi-squared tests for categorical variables and a *t*-test for the continuous variable were used in order to (i) obtain information about the representativeness of the study participants compared to the total population of homeless adults and young adults who reported themselves at a central access point for social relief in the four major cities in 2011, and (ii) compare respondents at follow-up with non-respondents at follow-up.

Descriptive analyses were performed to describe the demographic characteristics at baseline, and to describe the number of participants who were stably housed, and stably housed and satisfied with their housing status, at 2.5-year follow-up.

Univariate and multivariate logistic regression analyses were performed to examine predictors of both definitions of housing stability at 2.5-year follow-up. Characteristics that showed a tendency of association with housing stability ($P < 0.25$) in the univariate analysis were inserted as independent predictors into an exploratory stepwise backward logistic regression model, to prevent exclusion of potentially important variables and the minimisation of type II errors in the selection process (Mickey & Greenland 1989, Bursac *et al.* 2008). The results are reported as odds ratio (OR) with 95% confidence intervals (CI) and *P*-values. The Nagelkerke R^2 was reported as a measure of generalised variance explained by the model.

Multicollinearity among the predictors was examined by the variance inflation factor (VIF) and indicated by a VIF value >10. The model goodness of fit was tested with the Hosmer–Lemeshow test. Nagelkerke R^2 was reported.

Additionally, chi-squared tests for categorical variables and a *t*-test for the continuous variables were used in order to compare respondents at follow-up with non-respondents at follow-up on the significant variables which were derived from the stepwise backward logistic regression models.

All statistical analyses were conducted with IBM SPSS Statistics version 19.

Results

Of the initial cohort of 513 participants, 324 (63.2%) were also interviewed for the final follow-up measurement 2.5 years after shelter admission. We do not have information about the reasons for attrition of all 189 non-respondents. We compared respondents ($n = 324$) with non-respondents ($n = 189$) on demographic variables as reported at the first measurement. Compared to respondents, the non-respondents were younger (33.8 vs. 37.7 years) and more often had the lowest level of education (41.5% vs. 29.6%). There were no differences in terms of gender and ethnicity.

Characteristics of participants

Table 1a presents the baseline characteristics of the participants separately for those who were stably housed and those who were not stably housed at follow-up. Of those who were stably housed, the majority were male (71.2%) and the mean age was 38.1 years; of these latter participants, 26.0% had the lowest education level (i.e. they completed primary education at the most) and the majority were from a non-native Dutch background (65.3%). Of those who were not stably housed, the majority also were male (81.4%) and the mean age was 37.0 years. Of these participants, 37.3% had the lowest education level and the majority were from a non-native Dutch background (60.6%).

Table 1b presents the baseline characteristics of the participants separately for those who were stably housed and satisfied, and those who were not stably housed and satisfied. Of those who were stably housed and satisfied the majority were male (73.0%) and the mean age was 38.7 years. Of these latter participants, 25.5% had the lowest education level and the majority were from a non-native Dutch background (62.1%). Of those who were not stably housed and satisfied, the majority were also male (76.3%) and the mean age was 37.0 years. Of these latter participants, 33.5% had the lowest education level and the majority were from a non-native Dutch background (64.7%).

Housing stability

At baseline, none of the participants were stably housed. At 2.5-year follow-up, 222 participants (68.5%) were stably housed and 163 participants (51.1%) were stably housed and satisfied with their housing status (Figure 1). Thus, of all participants, 59 participants (17.4%) were stably housed but not satisfied with their housing situation.

The unstably housed participants ($n = 102$, 31.5%) were residing in an institution ($n = 56$, 17.3%, e.g. residential shelters), were marginally housed ($n = 22$, 6.8%; e.g. staying temporarily with friends, relatives or acquaintances), were homeless ($n = 8$, 2.5%; e.g. night shelter or transitional accommodation) or were housed for a period of <90 days ($n = 16$, 5.0%).

Table 1 (a) Baseline characteristics of the participants who were stably housed at follow-up (yes/no) and of the total group. (b) Baseline characteristics of the participants who were stably housed and satisfied with the housing status at follow-up (yes/no) and of the total group

	Yes			No			Total group		
Baseline characteristics	*N*	*n* [%]/Mean (SD)	Range	*N*	*n* [%]/Mean (SD)	Range	*N*	*n* [%]/Mean (SD)	Range
(a) Stably housed									
Age in years	222	38.1 (13.6)	18–71	102	37.0 (11.8)	18–64	324	37.7 (13.0)	18–71
Gender (% male)	222	158 [71.2]		102	83 [81.4]		324	241 [74.4]	
Ethnicity (% non-native Dutch)	219	143 [65.3]		99	60 [60.6]		318	203 [63.8]	
Education (% lowest)	219	57 [26.0]		102	38 [37.3]		321	95 [29.6]	
Suspected intellectual disability (% yes)	215	69 [32.1]		101	28 [27.7]		316	97 [30.7]	
Accompanied by children (% yes)	222	23 [10.4]		101	2 [2]		323	25 [7.7]	
Hostility (% high level)	219	51 [23.3]		102	33 [32.4]		321	84 [26.2]	
Somatisation (% high level)	220	62 [28.2]		100	48 [48]		320	110 [34.4]	
Anxiety (% high level)	220	70 [31.8]		101	43 [42.6]		321	113 [35.2]	
Depression (% high level)	218	82 [37.6]		101	46 [45.5]		319	128 [40.1]	
Physical health complaints	221	2.9 (2.4)	0–11	102	3.0 (2.5)	0–15	323	2.9 (2.4)	0–15
Cannabis use (days in the past 30 days)	221	7.4 (11.6)	0–30	101	9.3 (11.9)	0–30	322	8.0 (11.7)	0–30
Alcohol use, ≥ five glasses (days in the past 30 days)	222	2.4 (6.3)	0–30	100	5.0 (9.5)	0–30	322	3.2 (7.5)	0–30
Social support family	217	2.9 (1.3)	1–5	97	2.8 (1.4)	1–5	314	2.8 (1.3)	1–5
Social support friends	222	3.2 (1.0)	1–5	102	3.0 (1.2)	1–5	324	3.1 (1.1)	1–5
Unmet care needs	220	1.2 (1.1)	0–4	102	1.5 (1.1)	0–4	322	1.3 (1.1)	0–4
Arrested in past 12 months (% yes)	218	50 [22.9]		100	48 [48]		318	98 [30.8]	
Duration of homelessness (months)	222	25.2 (37.3)	0–252	102	40.0 (55.3)	0–324	324	29.9 (44.2)	0–324
Resources for basic needs	221	2.2 (1.8)	0–5	102	2.0 (1.8)	0–5	323	2.2 (1.8)	0–5
Debts (% 1000 Euros or more)	189	135 [71.4]		87	70 [80.5]		276	205 [74.3]	
Having a job/volunteer work (% yes)	222	137 [61.7]		102	55 [53.9]		324	192 [59.3]	
Autonomy	220	4.8 (0.96)	2.0–7.0	102	4.7 (1.0)	2.0–6.6	322	4.8 (1.0)	2.0–7.0
Competence	219	4.8 (0.95)	1.5–6.8	102	4.6 (1.0)	2.3–6.5	321	5.0 (1.0)	1.5–6.8
Relatedness	220	5.0 (0.79)	1.4–7.0	102	4.8 (0.9)	1.9–6.6	322	5.0 (0.85)	1.4–7.0
(b) Stably housed and satisfied with housing status									
Age in years	163	38.7 (13.7)	18–71	156	37.0 (12.2)	18–68	319	37.8 (13.0)	18–71
Gender (% male)	163	119 [73.0]		156	119 [76.3]		319	238 [74.6]	
Ethnicity (% non-native Dutch)	161	100 [62.1]		153	99 [64.7]		314	199 [63.4]	
Education (% lowest)	161	41 [25.5]		155	52 [33.5]		316	93 [29.4]	
Suspected intellectual disability (% yes)	157	50 [31.8]		155	45 [29.0]		312	95 [30.4]	
Accompanied by children (% yes)	163	16 [9.8]		155	9 [5.8]		318	25 [7.9]	
Hostility (% high level)	160	38 [23.8]		156	46 [29.5]		316	84 [26.6]	
Somatisation (% high level)	161	42 [26.1]		154	67 [43.5]		315	109 [34.6]	
Anxiety (% high level)	161	53 [32.9]		155	60 [38.7]		316	113 [35.8]	
Depression (% high level)	160	59 [36.9]		154	68 [44.2]		314	127 [40.4]	
Physical health complaints	162	2.8 (2.2)	0–9	156	3.1 (2.6)	0–15	318	2.9 (2.4)	0–15
Cannabis use (days in the past 30 days)	162	7.6 (11.7)	0–30	155	8.3 (11.8)	0–30	317	8.0 (11.7)	0–30
Alcohol use, ≥five glasses (days in the past 30 days)	163	2.3 (6.2)	0–30	154	4.2 (8.7)	0–30	317	3.2 (7.6)	0–30
Social support family	159	2.9 (1.3)	1–5	150	2.8 (1.3)	1–5	309	2.9 (1.3)	1–5
Social support friends	163	3.2 (1.1)	1–5	156	3.0 (1.1)	1–5	319	3.1 (1.1)	1–5
Unmet care needs	161	1.2 (1.2)	0–4	156	1.4 (1.1)	0–4	317	1.3 (1.1)	0–4
Arrested in past 12 months (% yes)	159	34 [21.4]		154	62 [40.3]		313	96 [30.7]	
Duration of homelessness (months)	163	26.6 (38.3)	0–252	156	32.9 (49.6)	0–324	319	29.7 (44.3)	0–324
Resources for basic needs	162	2.2 (1.8)	0–5	156	2.1 (1.8)	0–5	318	2.2 (1.8)	0–5
Debts (% 1000 Euros or more)	139	95 [68.3]		132	108 [81.8]		271	203 [74.9]	
Having a job/volunteer work (% yes)	163	101 [62.0]		156	87 [55.8]		319	188 [58.9]	
Autonomy	161	4.9 (0.9)	2.3–6.4	156	4.7 (1.0)	2–7	317	4.8 (1.0)	2–7
Competence	160	4.8 (0.9)	1.5–6.3	156	4.7 (1.0)	1.7–6.8	316	4.7 (1.0)	1.5–6.8
Relatedness	161	5.0 (0.7)	3.0–6.4	156	4.9 (0.9)	1.4–7	317	5.0 (0.8)	1.4–7.0

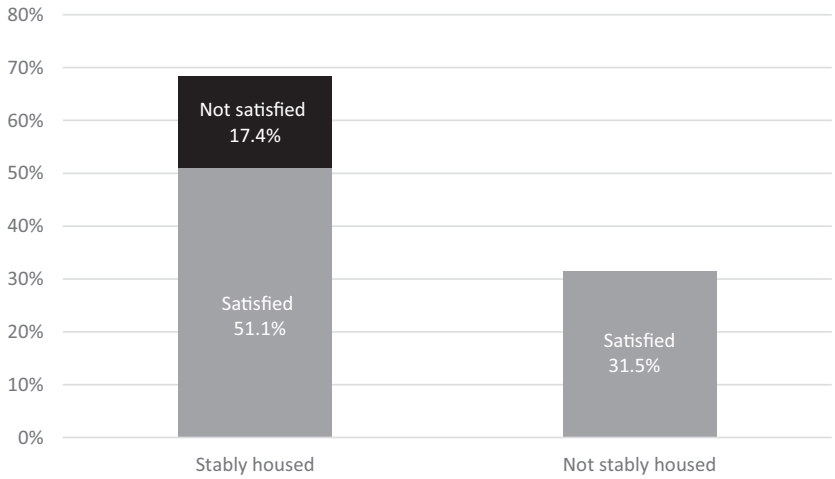

Figure 1 At 2.5-year follow-up: percentage of participants who are stably housed (n = 324); participants who are stably housed and satisfied with their housing status (n = 319); and participants who are unstably housed.

Predictors of housing stability

Univariate analyses revealed that being male, having the lowest education level, a high level of hostility, somatisation, anxiety and depression, cannabis use, alcohol use, unmet care needs, being arrested, a longer duration of homelessness and having debts of 1000 Euros or more showed a tendency of a negative association with housing stability ($P < 0.25$), whereas being accompanied by children, social support by friends, having a job or volunteer work, and feelings of autonomy, competence and relatedness showed a tendency of a positive association with housing stability (Table 2). A backward stepwise multivariate logistic regression indicated that being arrested (OR = 0.36), a high level of somatisation (OR = 0.52) and unmet care needs (OR = 0.77) were independent negative predictors of housing stability at follow-up (Table 3).

Predictors of housing stability including being satisfied with the housing status

Univariate analyses revealed that having the lowest education level, a high level of hostility, somatisation and depression, physical health complaints, alcohol use, having been arrested, a longer duration of homelessness, and having debts of 1000 Euros or more, showed a tendency of a negative association with housing stability including satisfaction with the housing status ($P < 0.25$), while age, accompanied by children, social support by friends, and feelings of autonomy, competence and relatedness, showed a tendency of a positive association with housing stability including satisfaction with the housing status (Table 2). A backward stepwise multivariate logistic regression indicated that, of the variables listed above, having been arrested (OR = 0.43), having higher debts (OR = 0.45) and a high level of somatisation (OR = 0.49) were independent negative predictors of being stably housed and satisfied with the housing status at 2.5-year follow-up (Table 3). Because 48 participants could not provide data on debts (they did not know the extent of their debts), these participants were excluded in the final models. However, additional analysis revealed that excluding these participants had no significant effect on the results.

As mentioned above, of the initial cohort of 513 participants, 324 (63.2%) were also interviewed for the final follow-up measurement 2.5 years after shelter admission. To investigate whether there was selective drop-out on the significant predictors in the two regression models (i.e. somatisation, unmet care needs, arrested in the past 12 months, and debts), we additionally compared respondents with non-respondents on these variables. This analysis revealed that there were no differences in terms of somatisation, unmet care needs, arrested in the past 12 months and debts, between respondents and non-respondents.

Discussion

This study shows that 68.5% of a cohort of Dutch homeless people who reported to a central access point for social relief in 2011 were stably housed at 2.5-year follow-up. This implies that 31.5% of the participants is still unstably housed at 2.5-year

Table 2 Univariate logistic regression analysis for 'stably housed' and 'stably housed and satisfied with housing status' at follow-up

	Stably housed			Stably housed and satisfied with housing status		
Candidate predictors	OR	95% CI	*P*	OR	95% CI	*P*
Age	1.00	0.99–1.02	0.517	1.01	0.99–1.03	0.249*
Gender (female = ref)	0.57	0.32–1.00	0.053*	0.84	0.51–1.39	0.502
Ethnicity (native Dutch = ref)	1.22	0.75–2.00	0.420	0.89	0.57–1.42	0.633
Education (higher than lowest = ref)	0.59	0.36–0.98	0.041*	0.68	0.42–1.10	0.116*
Suspected intellectual disability (no = ref)	1.23	0.73–2.08	0.433	1.14	0.71–1.85	0.589
Accompanied by children (no = ref)	5.72	1.32–24.76	0.020*	1.77	0.76–4.12	0.189*
Hostility (<high level = ref)	0.64	0.38–1.07	0.087*	0.75	0.45–1.23	0.249*
Somatisation (<high level = ref)	0.43	0.26–0.69	0.001*	0.46	0.29–0.74	0.001*
Anxiety (<high level = ref)	0.63	0.39–1.02	0.062*	0.78	0.49–1.23	0.283
Depression (<high level = ref)	0.72	0.45–1.16	0.180*	0.74	0.47–1.61	0.189*
Physical health complaints	0.98	0.89–1.07	0.610	0.94	0.86–1.03	0.189*
Cannabis use	0.99	0.97–1.00	0.196*	1.00	0.98–1.01	0.612
Alcohol use, five glasses or more	0.96	0.93–0.99	0.005*	0.97	0.94–1.00	0.030*
Social support family	1.05	0.88–1.26	0.576	1.02	0.87–1.21	0.781
Social support friends	1.20	0.97–1.49	0.096*	1.13	0.92–1.38	0.239*
Unmet care needs	0.81	0.66–1.00	0.053*	0.90	0.74–1.10	0.315
Arrested in past 12 months (no = ref)	0.32	0.20–0.53	<0.001*	0.40	0.25–0.66	<0.001*
Duration of homelessness (months)	0.99	0.99–1.00	0.008*	1.00	0.99–1.00	0.211*
Resources for basic needs	1.06	0.93–1.20	0.415	1.03	0.91–1.17	0.625
Debts (<1000 Euros = ref)	0.61	0.33–1.13	0.113*	0.48	0.27–0.85	0.011*
Having a job/volunteer work (no = ref)	1.38	0.86–2.21	0.186*	1.29	0.83–2.02	0.261
Autonomy	1.20	0.94–1.52	0.146*	1.23	0.98–1.55	0.074*
Competence	1.26	0.99–1.61	0.065*	1.20	0.95–1.51	0.121*
Relatedness	1.31	1.00–1.74	0.050*	1.24	0.95–1.61	0.114*

OR, odds ratio; CI, confidence interval; ref, reference category.
*Indicates that the predictor was selected for the multivariate logistic regression analysis ($P < 0.25$).

Table 3 Multivariate logistic regression analysis for 'stably housed' and 'stably housed and satisfied with housing status' at follow-up

	Stably housed* ($n = 261$)			Stably housed and satisfied with housing status† ($n = 256$)		
Predictor	OR	95% CI	*P*	OR	95% CI	*P*
Somatisation (<high level = ref)	0.52	0.30–0.91	0.022	0.49	0.28–0.84	0.009
Unmet care needs	0.77	0.60–0.99	0.038	–‡	–	–
Arrested in past 12 months (no = ref)	0.36	0.20–0.63	<0.001	0.43	0.25–0.75	0.003
Debts (<1000 euro's = ref)	–	–	–	0.45	0.24–0.84	0.012
	Nagelkerke $R^2 = 0.13$			Nagelkerke $R^2 = 0.12$		

OR, odds ratio; CI, confidence interval; ref, reference category.
*The Hosmer–Lemeshow test for goodness of fit was not significant ($P = 0.58$), implying good model fit. All of the VIF values for the predictors were <10, indicating that there was no multicollinearity in the model.
†The Hosmer–Lemeshow test for goodness of fit was not significant ($P = 0.75$), implying good model fit. All of the VIF values for the predictors were <10, indicating that there was no multicollinearity in the model.
‡Unmet care needs were not univariately associated with 'Stably housed and satisfied with housing status' ($P > 0.25$) and were not included in the multivariate model.

follow-up. This prevalence of housing stability among our participants is similar to that of previous studies among homeless people in Canada (Aubry *et al.* 2012) and the US (Orwin *et al.* 2005). When we included the perspective of the initially homeless people in the definition of housing stability, we found that 51.1% were stably housed and satisfied with their housing status. As 31.5% of our participants were still unstably housed 2.5 years after shelter admission and almost 50% were not stably housed

and satisfied with their housing status, prevention of chronic homelessness is essential.

Predictors of housing stability

We identified several independent predictors (as assessed at baseline) of housing stability at 2.5-year follow-up. For both definitions of housing stability, being arrested and having a high level of somatisation were negative predictors of housing stability. Regarding stable housing and being satisfied with the housing status, having higher debts was also a negative predictor, whereas for stable housing without inclusion of the homeless people's perspective, unmet care needs was also a negative predictor of stable housing. Of all significant predictors, being arrested was the strongest predictor; arrest history has previously been reported to be an important predictor of homelessness (Caton *et al.* 2005, Riley *et al.* 2007, Mizuno *et al.* 2009). In addition, the chance of reoffending is higher when suitable housing is not available upon release (Loucks 2007), which could cause a negative cycle. Screening homeless people on arrest history, gaining insight into how they became homeless after their arrest and offering them extensive support may help to improve the rate of housing stability among this subgroup. Regarding the prevention of chronic homelessness, this finding stresses the importance of comprehensive aftercare programmes for offenders.

Only one psychological factor was independently associated with housing stability, namely somatisation (physical manifestations of psychological distress). Longitudinal research on primary care patients shows that somatisation contributes substantially to disability, e.g. on the domains 'participation in society' and 'household and work activities' (van der Leeuw *et al.* 2015). This may explain the lower prevalence of housing stability among participants with a high level of somatisation in the present study. A future qualitative study would help elucidate the underlying reasons and processes with regard to the predictors of stable housing.

Predictors of housing stability including satisfaction with the housing status

Although two of the three independent predictors of stable housing were the same for the two definitions, there was also a difference. Having higher debts was a practice-based negative predictor for stable housing including satisfaction with the housing status, but not for stable housing without the perspective of homeless persons. High debts may hamper satisfaction with housing for several reasons. Fewer participants with high debts who were stably housed and satisfied with their housing status may be caused by fear of visits from debt collectors, which may have a negative impact on satisfaction with housing. Households experiencing a high level of financial stress are more likely to be dissatisfied with their housing (Bruin & Cook 1997). Debts may also negatively affect overall QoL, including housing-related QoL.

How relevant is the addition of a subjective component to the definition of housing stability?

Inclusion of a subjective component in the definition of housing stability revealed a subgroup of stably housed participants who were not satisfied with their housing status. This subgroup consisted of 17.4% of all participants who were 'objectively' stably housed but were not satisfied with their housing situation. Therefore, including the perspective of homeless people seems a relevant addition to the customary definition of housing stability. The chance of long-term housing stability is likely to be lower among this subgroup, as also found in a study reporting a positive relation between housing satisfaction and residential stability (i.e. no change in residence) (Srebnik *et al.* 1995). To improve care services, studies need to investigate why this subgroup is not satisfied with their current housing situation. After clarifying these factors, appropriate steps can be taken to promote satisfaction and thereby housing stability.

Relevance of practice-based predictors

In our study 'unmet care needs' and 'having high debts' were significant negative predictors of housing stability 2.5 years later. As these variables are generally not included in studies predicting housing stability among the homeless, this suggests that exploring characteristics based on recommendations made by professionals in the field of social care could be a relevant addition to using only evidence-based characteristics in prediction studies.

Strengths and weaknesses

Strengths of our study include the relatively large sample size of homeless people, the availability of follow-up data, and inclusion of the perspective of homeless people themselves, which is generally lacking. However, a few limitations need to be addressed. The first is related to the subgroup of the population of homeless people that was studied, i.e. only those who reported to a central access point for social relief in 2011 in one of the four major Dutch cities and

were accepted to start an individual programme plan. As stated above, it is obligatory for every homeless person to report to a central access point for social relief in order to gain access to social relief facilities. Therefore, a substantial part of the homeless population is covered by this selection criterion. Subgroups not included in this study were undocumented homeless people and homeless people who do not make use of social relief facilities. A second limitation was the selective non-response at follow-up of participants who were younger and had the lowest level of education at baseline. Especially lowest level of education was univariately negatively related to stable housing. Therefore, if selective loss to follow-up has biased our findings, it might have resulted in an overestimation of the prevalence of stably housed participants and an underestimation of the strength of the relation between the lowest level of education and stable housing because of reduced statistical power. However, there were no differences in terms of somatisation, unmet care needs, arrested in the past 12 months and debts between respondents and non-respondents at follow-up, which strengthens the findings from the regression models. Third, we dichotomised various predictors because they showed skewed distributions (debts) or because norm scores were available (psychological distress). An advantage of dichotomisation is that it allows a more meaningful interpretation of the findings and encourages a 'risk factor' approach, which helps in targeting intervention efforts (Farrington & Loeber 2000). However, there are also important drawbacks of dichotomising variables. These include loss of information, loss of power and the potential to overlook non-linear relationships (MacCallum *et al.* 2002). The results must be interpreted in the light of these issues.

We used the stepwise selection method for the selection of variables in the multivariate models. Shortcomings of this method include overfitting (Babyak 2004), bias in parameter estimation and an inappropriate reliance on a single best model (Whittingham *et al.* 2006). However, for exploratory model building (as used in this study), stepwise regression is acceptable (Field 2005). Also, by using a liberal criterion p-value in the univariate analysis (i.e. $P < 0.25$), it is more likely that truly important predictors will be retained in the model when using stepwise methods (Babyak 2004) and that type II errors will be minimised (Mickey & Greenland 1989, Bursac *et al.* 2008). In addition, with regard to standard logistic regression, it is recommended that the included predictors be based on 'good theoretical reasons for including the chosen predictors' (Field 2005). As we aimed to explore several variables which were not previously investigated, a stepwise method seemed more appropriate. Nevertheless, replication of this exploratory study is needed.

Finally, the relatively low percentage of generalised explained variance of the models predicting stable housing (12% and 13%) might follow from the result that only three variables were included in the final models, but may also indicate that other relevant factors that play a role in predicting stable housing were not included, e.g. features of the housing system and housing policies.

Conclusion

Among this cohort of Dutch homeless people, 68.5% were stably housed at follow-up and 51.1% were stably housed and satisfied with their housing status at 2.5-year follow-up.

Because inclusion of the perspective of homeless persons revealed a subgroup of stably housed participants who were not satisfied with their housing status, inclusion of housing satisfaction seems a relevant addition to the customary definition of housing stability. Incorporating the perspective of homeless individuals also fits the current focus (in both research and policy making) on the client's perspective. Participants with characteristics negatively associated with housing stability and satisfaction with their housing status (e.g. having been arrested, high debts and a high level of somatisation) should receive more extensive and individually tailored support services to facilitate achievement of housing stability.

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Conflict of interest

The authors declare that they have no conflict of interest.

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