

The Homeless Supplement to the Diagnostic Interview Schedule: test-retest analyses

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Abstract

This study sought to extend previous work on reliability of self-reported residential history in a homeless population with high rates of drug abuse. The latest version of the Homeless Supplement to the Diagnostic Interview Schedule (DIS/HS) was used to achieve reliability on homelessness experience, use of shelters, transience, and recent residential patterns.

Homeless study volunteers were recruited for a test-retest study from a drop-in day centre for mentally ill homeless people (N = 25) and a substance abuse day programme (N = 30). They were administered the instrument approximately one to two days apart. Kappa and intraclass correlation analyses were performed to assess reliability.

Overall, the reliabilities of most variables were acceptable, ranging from fair to excellent. Six items were reconstructed to achieve reliability and two were dropped. Substance dependence and adult antisocial behaviour patterns did not affect reliability on most items.

This study has developed a reliable self report instrument for measuring residential history that can be used with homeless and drug abusing populations. Replication is needed in larger, more representative samples and comparison of reliability with other psychiatric and cognitive characteristics.

Introduction

Reliability of reporting is pivotal to the results of research relying on self-report information. It is established that drug abusers can reliably report psychiatric symptoms, antisocial behaviour, and alcohol and other drug-use histories (Hser, Anglin and Chou 1992; Calsyn, Morse, Klinkenberg et al., 1997; Cottler, Compton, Ridenour et al., 1998; Conrad, Yagelka, Matters et al., 2001; Sacks, Drake, Williams et al 2003). Reliability of reporting residential history is critical for examining the course of homelessness, in which drug abuse is also prevalent.

Attempts to document reliability and validity of self-report data in homeless populations encounter special challenges inherent in characteristics of the population. Although the transience of homelessness (short stays in many places) might be expected to yield a wealth of residential data, how well this population can efficiently store and retrieve such information is

unknown. Homeless life can be chaotic and it lacks the structure of rituals, routines, and calendars that normally anchor life's memories. Severe mental illness and active substance abuse that are over-represented in the homeless population may produce cognitive problems and further impair reporting consistency. Drake's group (Drake, McHugo and Biesanz, 1995) and Calsyn's group (Calsyn, Allen, Morse et al., 1993) have previously presented some encouraging data demonstrating good to excellent self-report reliability on a limited set of homeless history variables.

This report extends the previous work on reliability of self-reported residential history in a homeless population with high rates of drug abuse. The instrument used to achieve reliability was the latest version of the Homeless Supplement to the Diagnostic Interview Schedule (DIS/HS) a revision of an instrument with extensive prior use by the authors (Smith, North and Spitznagel, 1992). The DIS/HS elicits data on

respondents' personal experience and of homelessness, use of shelters, transience, and recent residential patterns. Establishing reliability on more comprehensive residential history variables will be essential for understanding residential patterns of homeless populations.

Methods

Sample

A test-retest study was conducted at two St Louis, Missouri, agencies (a drop-in day centre for mentally ill homeless people and a substance-abuse day programme) serving homeless persons. Study volunteers were recruited from the populations served by these agencies in April and May of 2000 via sign-up sheets posted at the day centre for mental illness ($N = 25$) and the substance-abuse day programme ($N = 30$). Of these 55 subjects, 51 (93%) completed both the test and retest. For this study, respondents were considered to be experiencing an episode of homelessness if they had no stable residence and were living in a public shelter or in an unsheltered location without a personal mailing address such as on the streets or in a car, an abandoned building, or a bus station for the past 14 consecutive nights. Persons living in marginal housing, such as those doubled up with friends or relatives or living in single room occupancy facilities, were not included in the sample.

Procedure

Prior to the inception of this study, approval was obtained from the Washington University Institutional Review Board. All participants provided written informed consent before participating. During the informed consent procedure, respondents were told that the purpose of this study was to assess the quality of questions in the interview and that they would be interviewed with the same questions twice. Participants were interviewed at the agency at which they were recruited in either a private office or public space away from other programme participants, and they were given a \$20 gift certificate or the equivalent in cash in recognition of their time and effort. All four interviewers were college graduates with bachelors' or masters' degrees in the social sciences and had experience with homeless populations; they were fully trained on the DIS/HS prior to administering it for the test-retest study.

Instruments

The DIS/HS was administered along with the antisocial personality disorder section of the Diagnostic Interview Schedule (DIS for DSM-IV) and the Composite International Diagnostic Interview Short Form (CIDI-SF) for DSM-III-R substance use disorders. Demographic data were collected using the World Health Organization's Disability Assessment Scale (WHO-DAS) and ethnicity data with the DIS. The Homeless Supplement was administered a second time by a different interviewer aiming for a 24 to 48-hour interval between administration, resulting in a mean of 1.7 ($SD = 1.3$; median = 1.0; range = 1–7) days after the initial interview.

The residential section of the Homeless Supplement obtains information on the longitudinal course of homelessness, precipitants of homelessness, shelter use, transience, and recent residential history. The longitudinal course of homelessness section includes four items about homelessness onset, eight items about intervening periods housed (such as securing housing, doubling up in housing, and number of homeless episodes), and one item pertaining to chronicity. The precipitants of homelessness section includes seven items each for current and first homeless episode (such as finances, family, health, substance use, and intimate relationships). The shelter history section includes six items pertaining to onset, recency, and extent of shelter use. The transience section contains 13 items covering location stability and migration. The residential history section details the lengths of stay at and characteristics of places the individual lived during in the last 24-hour (two items), 30-day (21 items), and 12-month time periods (13 items), items about other inhabitants of these locations (four items), and items about the individual's last own residence (five items).

Data analysis

To assess reliability of categorical data, kappa tests were performed. Level of agreement is considered poor with kappa values below 0.40, fair to good between 0.40 and 0.75, and above 0.75 excellent (Fleiss, 1981). Because kappa estimates of agreement are inadequate for items with especially low or high prevalences, items with prevalence less than 20% or greater than 80% were omitted from analysis. For continuous data, intraclass correlation coefficients (ICCs) were calculated. Chi-square tests were used to compare kappa scores,

and z-tests were used to compare ICCs between groups of subjects with and without substance dependence. Continuous variables with low correlation values (<0.4) were refined by collapsing them into discrete categorical variables and retaining the lowest number of categories yielding acceptable reliability (>0.4). A Bonferroni correction for multiple comparisons was made to compensate statistically for the large number of analyses.

Results

Sample characteristics

The sample was predominantly male (84%), non-white (85% African-American and 2% Asian-American), and never married (55%). Their mean age was 40.4 years ($SD = 10.3$; range, 21–77), and they had 12.1 mean years ($SD = 3.0$; range, 3–18) of education. Fewer than half (41%) were gainfully employed. Approximately one-half (49%) of the sample was diagnosed with substance dependence: 24% with alcohol dependence, 43% with drug dependence, and 20% with both. Few participants (4%) had alcohol dependence without drug dependence, but conversely 24% had drug dependence without alcohol dependence. Among the drug dependent, cocaine (95%) and cannabis (59%) were the substances of choice. Full antisocial personality disorder criteria (adult criteria plus conduct disorder) were met by 14% of the sample, and another 65% met the adult criteria only. These demographic and diagnostic characteristics are similar to those reported in an epidemiological sample of homeless people for the larger study by this research team (North, Eyrich, Pollio et al., 2004), for which the reliability substudy examined the reliability of the interview to be used.

Reliability of the entire sample

Table 1 provides the specific interview questions used to obtain data on variables to follow in Tables 2 and 3, and 4. Table 2 provides data on numerical variables with means and ICC values. Table 3 presents data on categorical variables with cell numbers/percentages and kappa values. Table 4 presents data on rationales given for homelessness, all categorical variables with cell numbers/percentages and kappa values.

For variables providing reliability of duration and episodicity (or course) of homelessness (Tables 2 and 3), items pertaining to onset of homelessness had the

best reliabilities, ranging to excellent. An item about number of intervening occurrences of being housed for a month or more with family or friends had a poor ICC of 0.13. Instead of this continuous variable, the grouped variable with a kappa value of 0.52, representing fair reliability, was used (Table 3). The continuous variables representing chronicity of homelessness (Table 2) provide only ICCs for estimation of reliability for which no formal guidelines exist for interpretation. However, the means of the number of years since first homeless and the number of years since last housed were quite similar for the first and second interviews and the ICC values were similar to the ICC values of other variable topics in this table, suggesting reasonably good reliability.

Number of years since first shelter use had a high ICC, and nights of shelter use in the past year had fair reliability (Table 3). A continuous variable describing number of shelters used in the past year had a low ICC of 0.06 and was redefined as a grouped variable with kappas in the fair to good range for one to three or more shelters respectively.

With regard to data concerning reliability of reporting transience, a continuous variable pertaining to number of moves in the past year had a low ICC of 0.24 and was redefined as a dichotomous variable (moved/did not move in the past year) (Table 3) with a fair kappa value. Another continuous variable, number of other cities in which the respondent resided in the past five years, with a low ICC of 0.23, was redefined as a grouped variable (Table 3) with fair kappa values. Variables representing length of continuous residence in St Louis and prior residence in another state had kappas in the excellent range (Table 3). All other kappa values in Table 3 were in the fair to good range.

For reliability data on residential history, two variables, any residence in the home of a friend and residence in home of romantic partner in the last year, were dropped due to poor kappa values of 0.32 and 0.34 respectively. The other responses pertaining to place of residence in the last year had kappa values in the fair to good range (Table 3). Responses regarding main place of residence in the last year were largely in the fair range. Reports of current residence with individuals with alcohol or drug problems had fair reliability, with more acknowledgment of these items on the second interview.

Table 4 presents reliability of rationales provided by

Table 1. Variables tested and interview questions providing the data

NUMERICAL VARIABLES (data in Table 2)

First onset of homelessness

Years since first homeless:

Question: When was the first time you were without a place to stay? How old were you then?

Intervening periods of housing

Episodes housed >1 month since first homeless:

Question: Since the first time you (were homeless/had no place to stay), how many times have you lived in your own room, apartment, or house for a month or more?

Years since last housed:

Question: When was the last time you lived in your own room, apartment, or house for a month or more? (<2 weeks, 1–6 months, 6–12 months, >1 year) How old were you then?

Homelessness chronicity

Lifetime years homeless:

Question: Adding up all the months or years in your life that you spent without a regular place to stay, how long was this altogether?

Reliability of shelter use

Years since first shelter use:

Question: How old were you the first time you stayed in a shelter or other temporary facility?

Nights shelter use in past year:

Question: How many nights in the past 12 months did you stay in a shelter or other temporary facility?

CATEGORICAL VARIABLES (data in Table 3)

Reliability of homelessness history

Resided in St Louis when first homeless (yes/no):

Question: Were you in St. Louis then (the first time you were without a place to stay)?

Housed ≥ 1 month since first homeless (yes/no):

Question: Since the first time you (were homeless/had no place to stay), have you ever lived in your own room, apartment, or house for a month or more? Don't include times you stayed with friends or family or rooms paid for with vouchers.

Housed ≥ 1 month with family/friends since first homeless (yes/no):

Question: Since the first time you (were homeless/had no place to stay), have you ever lived with family or friends for a month or more?

Shelters used in past year (0,1,2,3+):

Question: In how many different shelters have you stayed overnight during the past year? (0,1,2,3+)

Reliability of transience

Moved in past year (yes/no):

Question: How many times have you had to move to a different location in the last year? (0,1+)

Duration of continuous residence in St Louis (>1 year, lifelong):

Question: How long have you lived continuously in St Louis? (<1 week, 1–4 weeks, 1–6 months, >1 year, lifelong)

Prior residence in another state (yes/no):

Question: Did you live in another state before coming to St Louis?

Reason moved to St Louis (family in St Louis, to find work, no particular reason):

Question: What was the main reason you came to St Louis? (CODES: to live with relatives or friends, to look for job, lived here before, just passing through, weather, other, don't know)

Other cities of residence in past 5 years (0, 1-2, 3+):

Question: In how many other cities outside the St Louis area have you lived during the last 5 years?

Reliability of residential history

During past year, stayed in (own apartment or home, family's home, a motel/hotel, on the streets, a hospital, jail):

Questions: Where did you stay last night?

Where else have you stayed overnight in the past month?

Where else have you stayed overnight in the past year?

...in your own apartment or home?, in your family's home?, in your girlfriend's or boyfriend's home?, in another friend's home?, in a cheap motel or hotel?, in a shelter?, on the streets with no stable residence? - that might be in a car, in an abandoned building or tunnel, in a bus station, in a park, or something like that., in a hospital?, in jail?, anywhere else? (SPECIFY).

Main place stayed in past year (own apartment or home, family's home, in a shelter, on streets):

Questions: In the past year, which one of these places was your usual sleeping place?

...your own apartment or home?, your family's home?, your girlfriend's or boyfriend's home?, another friend's home?, a cheap motel or hotel?, a shelter?, on the streets with no stable residence? - that might be in a car, in an abandoned building or tunnel, in a bus station, in a park, or something like that; in a hospital?, in jail?, anywhere else? (SPECIFY).

Currently living with problem drinker (yes/no):

Question: Do you live with anyone who has a current alcohol problem?

Currently living with drug user (yes/no):

Question: Do you live with anyone who currently uses non-prescribed drugs?

RATIONALES FOR HOMELESSNESS (data in Table 4)

Reasons: Employment/financial problems; family/housing problems; government benefits, health, or mental illness problems; imprisonment, alcohol, or other drug problems

First episode

Questions: People don't have a regular place to stay for many different reasons. I'd like you to think back to the very first time you ever found yourself without a regular place to stay.

Were unemployment, loss of job, problems paying the rent or mortgage or having no money reasons?

Were family conflict, eviction or loss of a home or other family breakup reasons?

Were lost government benefits, a health problem, a hospital discharge or nerves, emotional problem, or mental illness reasons?

Were imprisonment, alcohol, or drugs reasons?

Were divorce or separation or breaking up with a boyfriend or girlfriend reasons?

For what other reasons did you not have a regular place to stay? (CODES: personal reasons/choice, job concerns, death of loved one, running from police/fight with others, relocation, house was robbed, foster care placement domestic violence)

Main reason:

Question: What was the main reason? (PROBE: If you had to choose one reason, which one would you choose?) (USE ABOVE CODES.)

Current episode

Reasons:

Questions: I'd like for you to think about your present situation. What are the main reasons you don't have a regular place of your own to live right now? (Repeats same questions for first episode, above.)

Main reason:

Question: What was the main reason? (PROBE: If you had to choose one reason, which one would you choose?) (USE ABOVE CODES.)

Table 2. Reliability of homelessness: numerical variables

Item	N	Test mean (standard deviation)	Retest mean (standard deviation)	Intra-class correlation coefficient (standard deviation)
First onset of homelessness				
# Years since first homeless	49	6.5 (7.0)	6.9 (7.6)	0.86 (0.03)
Intervening periods of housing				
# Episodes housed ≥ 1 month since first homeless	48	2.2 (4.4)	2.6 (5.0)	0.68 (0.06)
# Years since last housed	25	2.2 (4.0)	2.1 (2.8)	0.78 (0.06)
Homelessness chronicity				
# Lifetime years homeless	46	3.7 (4.9)	3.8 (4.4)	0.66 (0.07)
Reliability of shelter use				
# Years since first shelter use	45	6.4 (6.9)	7.4 (7.2)	0.90 (0.02)
# Nights shelter use in past year	49	110.8 (120.7)	83.5 (110.2)	0.52 (0.09)

Table 3. Reliability of homelessness: categorical variables

Item	N	Both	1st only	2nd only	Neither	% Positive in either interview	Kappa (standard error)
Reliability of homelessness history							
Resided in St Louis when first homeless	50	35	2	1	12	76	0.85 (0.09)
Intervening periods of housing:							
Housed ≥ 1 month since first homeless	49	25	2	8	14	71	0.58 (0.12)
Housed ≥ 1 month with family/friends since first homeless	50	20	7	5	18	64	0.52 (0.12)
# Shelters used in past year:							
0	47	0	0	7	40	15	0.00 (0.00)
1	47	17	11	1	18	62	0.51 (0.11)
2	47	11	2	4	30	36	0.70 (0.12)
3+	47	4	2	3	38	19	0.55 (0.18)
Reliability of transience							
Moved in past year	51	26	11	3	11	78	0.42 (0.12)
Duration of continuous residence in St. Louis:							
>1 year	49	23	8	1	17	65	0.64 (0.11)
Lifelong	49	15	0	5	29	41	0.78 (0.09)
Prior residence in another state	51	27	5	1	18	65	0.76 (0.09)
Reason moved to St. Louis:							
Family in St. Louis	31	9	3	3	16	48	0.59 (0.15)
To find work	31	2	1	1	27	13	0.63 (0.24)
No particular reason	31	2	0	3	26	16	0.53 (0.23)
# Other cities of residence in past 5 years:							
0	49	23	6	5	15	69	0.54 (0.12)
1-2	49	9	2	6	32	35	0.59 (0.13)
3+	49	4	5	2	38	22	0.45 (0.17)
Reliability of residential history							
During past year, stayed in:							
Own apartment or home	50	13	7	2	28	44	0.61 (0.12)
Family's home	50	14	6	7	23	54	0.46 (0.13)
A motel/hotel	50	15	8	3	24	52	0.55 (0.12)
On the streets	50	19	6	2	23	54	0.68 (0.10)
A hospital	50	8	7	1	34	32	0.57 (0.13)
Jail	50	7	3	1	39	22	0.73 (0.13)
Main place of stay in past year:							
Own apartment or home	49	6	0	7	36	27	0.56 (0.14)
Family's home	49	3	0	4	42	14	0.56 (0.19)
In a shelter	49	10	11	3	25	49	0.39 (0.13)
On the streets	49	4	1	3	41	16	0.62 (0.17)
Currently living with problem drinker	51	14	4	9	24	53	0.48 (0.12)
Currently living with drug user	49	13	5	7	24	51	0.49 (0.13)

Table 4. Reliability of rationales for first and current homeless episodes

Item	N	Both	1st only	2nd only	Neither	% Positive in either interview	Kappa (standard error)
First episode							
Reasons:							
Employment/financial problems	51	19	5	5	22	57	0.61 (0.11)
Family/housing problems	51	23	6	4	18	65	0.61 (0.11)
Government benefits, health, or mental illness problems	51	9	4	5	33	35	0.55 (0.13)
Imprisonment, alcohol, or other drug problems	51	15	5	3	28	45	0.67 (0.11)
Main reasons:							
Employment/financial problems	44	6	1	5	32	27	0.59 (0.15)
Family/housing problems	43	15	3	0	25	42	0.85 (0.08)
Government benefits, health, or mental illness problems	44	2	2	1	39	11	0.54 (0.24)
Imprisonment, alcohol, or other drug problems	44	13	1	2	28	36	0.85 (0.09)
Current episode							
Reasons:							
Employment/financial problems	51	28	3	7	13	75	0.57 (0.12)
Family/housing problems	51	18	4	6	23	16	0.61 (0.11)
Government benefits, health, or mental illness problems	51	14	4	5	28	45	0.62 (0.12)
Imprisonment, alcohol, or other drug problems	51	16	5	5	25	51	0.60 (0.11)
Main reason:							
Employment/financial problems	45	11	6	5	23	49	0.47 (0.14)
Family/housing problems	43	4	2	4	33	23	0.49 (0.18)
Government benefits, health, or mental illness problems	45	3	4	1	37	18	0.49 (0.19)
Imprisonment, alcohol, or other drug problems	45	11	3	5	26	42	0.60 (0.13)

participants for their first and current episodes of homelessness. Kappa values, for the various reasons given for the first and the current episode, were all approximately 0.6, which is considered the lower limit of good reliability. The main reasons given for the first episode had reliabilities ranging from the mid 0.50s to mid 0.80s, well into the excellent range. The main reasons given for the current episode of homelessness had lower reliabilities, varying from upper 0.40s to 0.60, covering the fair range.

For current episode of homelessness, the variable pertaining to break-up of a relationship with significant other had a very low kappa of 0.29. Therefore, it was combined with the family/break-up/housing problems variable (which had a 0.60 kappa) to yield a new variable with a higher kappa of 0.61. A similar combination was provided for the main reason for the current episode of homelessness. Redefinition of these variables in the first episode section also improved the kappa values of the two variables respectively from 0.59 and 0.61 to 0.61 on the combined variable, and redefinition on the main reasons in the first and current episode sections similarly yielded very little

change in values on these variables. Examination of cell sizes revealed that movement of subjects from one response to another from test to retest showed very little directionality.

Effects of substance dependence on reliability

Substance dependence was associated with reliability only on one continuous variable. Those with substance dependence were less reliable on report of number of nights of shelter use in the past year (ICC 0.17 versus 0.79; $z = 2.97$, $p < 0.01$).

Effects of adult antisocial pattern on reliability

Participants who met DSM-IV criteria for adult antisocial pattern (meeting adult antisocial criteria, not considering the presence or absence of conduct disorder), compared to those without adult antisocial patterns, showed significant differences in reliability on four items. Their reliability was less on lifetime numbers of years homeless (ICC 0.45 versus 0.96, $z = 4.19$, d.f. = 1, $p < 0.001$), number of nights of shelter use during the past year (ICC 0.38 versus 0.97, $z = 4.53$, d.f. = 1, $p < 0.001$), and number of years since

last housed (ICC 0.63 versus 0.92, $z = 2.48$, $p < 0.05$), but greater on imprisonment or substance abuse as the precipitating reason for their first homeless episode (κ 0.74 versus -0.15 , $\chi^2 = 32.73$, $d.f. = 1$, $p < 0.001$).

Discussion

This study has developed a reliable instrument for gathering residential history data in homeless populations, especially those most difficult to assess, with substance dependence. This exercise created an instrument measuring both lifetime and recent experiences of homeless residential history across multiple domains that can be folded almost seamlessly into a family of diagnostic assessments. While reliability was in the acceptable to excellent range for many items, several others with poor reliability were revised to construct acceptably reliable categories.

Given the relatively brief window of time between the two interviews and knowledge by participants that they would receive the interview again, however, the reliability is not as robust as might be anticipated. Only on few interview items was reliability affected by diagnoses of drug dependence or adult sociopathy. It is possible that other psychiatric illness such as mood and psychotic disorders, which are over-represented in this population (North et al., 2004), and which may present with symptoms such as concentration difficulties or thought disorder, may have affected the study participants' ability to provide consistent responses.

A few noteworthy limitations of this study might have implications for some of the findings. The sampling for this study from programmes for mentally ill and substance abusing homeless people probably over-represented mental illness and substance abuse in the study sample. An advantage emerging from this methodological limitation was an opportunity to test the instrument on a sample with problems considered linked to poorer reliability. However, the volunteer nature of the sample may have excluded from this study the proportion of the population least able to provide reliable data. The retest interval of 1.7 mean days was short, possibly further inflating reliabilities obtained relative to studies with longer retest intervals.

Power to detect differences in reliabilities between the two groups compared (substance dependent versus not substance dependent) may have been limited by the relatively small sample. A number of items that

could not be assessed in the sample tested await further study because proportions with given responses were too low. Future studies of reliability of obtaining data from this population will benefit from obtaining larger and more representative samples, using longer retest intervals, and assessment of effects of other psychiatric disorders such as schizophrenia and other personality disorders besides antisocial personality disorder.

Reliable and valid information about this population's residential patterns is vital to making sound practice, community planning, and policy decisions. Rather than focusing solely on current housing status, the homeless supplement allows researchers to understand both the lifetime history and roots of the current episode, increasing ability to treat not just the current episode but also lifetime patterns. Further, additional information on issues such as transience and stability can aid urban planners in anticipating population needs and creating better informed systems of care.

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