RETRACTED - Epidemiological features of depression and anxiety among homeless adults with healthcare access problems in London, UK: descriptive cross-sectional analysis

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Background

In England in 2021, an estimated 274 000 people were homeless on a given night. It has long been recognised that physical and mental health of people who are homeless is poorer than for people who are housed. There are few peer-reviewed studies to inform health and social care for depression or anxiety among homeless adults in this setting.

Aims

To measure the symptoms of depression and anxiety among adults who are homeless and who have difficulty accessing healthcare, and to describe distribution of symptoms across sociodemographic, social vulnerability and health-related characteristics.

Method

We completed structured questionnaires with 311 adults who were homeless and who had difficulty accessing healthcare in London, UK, between August and December 2021. We measured anxiety and depression symptoms using the 4-item Patient Health Questionnaire (PHQ-4) score. We compared median PHQ-4 scores across strata of the sociodemographic, social vulnerability and health-related characteristics, and tested for associations using the Kruskal–Wallis test.

Results

The median PHQ-4 score was 8 out of 12, and 40.2% had scores suggesting high clinical need. Although PHQ-4 scores were consistently high across a range of socioeconomic, social vulnerability and health-related characteristics, they were positively associated with: young age; food insecurity; recent and historic abuse; joint, bone or muscle problems; and frequency of marijuana use. The most common (60%) barrier to accessing healthcare related to transportation.

Conclusions

Adults who are homeless and have difficulty accessing healthcare have high levels of depression and anxiety symptoms. Our findings support consideration of population-level, multisectoral intervention.

Keywords

Depressive disorders; anxiety or fear-related disorders; epidemiology; social deprivation; polypharmacy.

An estimated 274 000 people were homeless on a given night in England in 2021, including 250 000 people in temporary accommodation and 2700 sleeping rough.[1] The number of people who are homeless is increasing owing to growing challenges in housing systems in the context of existing overcrowding and widening economic insecurity.[2] It has been recognised that the physical and mental health of people who are homeless is poorer than that of people who are housed.[3] A global review of homeless people[4] estimated that 47% report symptoms of depression, and between 11 and 26% have major depression (major depressive disorder). Other reviews in high-income settings[5,6] estimated a prevalence of 11 and 12% for major depression. The only national psychiatric survey of homeless people[7,8] in Great Britain was conducted in 1994 and this estimated that 36% of homeless people had depression or general anxiety disorder. This figure contrasts with an estimated 14% with symptoms in the Psychiatric Morbidity Survey of England in 1993, and more recently 17% in 2014.[9] As a survey of adults living in private households, the Psychiatric Morbidity Survey did not include people who sleep rough or live in hostels.

Medical and social implications of depression and anxiety among homeless people

Depression or anxiety can lead to disabling symptoms such as lack of motivation, energy and concentration, and chronic and excessive worry, which impair access to healthcare.[10] Limited access to services is exacerbated by high need, as people affected by depression or anxiety are more likely to experience the occurrence, persistence and recurrence of other physical, mental and substance use conditions[11,12] and to attempt suicide.[13–15] For homeless persons, access to health and social services for such conditions is already hindered by stigma, discrimination and other intersecting domains of social exclusion (e.g. insecure migration status or past experience of prison, sex work and substance use).[16] The combination of social exclusion and medical vulnerability results in inequitable health outcomes, culminating in premature mortality[16–18] and standardised mortality ratios 2–5 times higher than in the general population.[3] In England and Wales in 2013–2017, the median age at death was 44 years for homeless men and 42 years for homeless women, compared with 76 and 81 years for men and women in the general population.[19]

Epidemiological evidence

From systematic reviews of studies about mental health among adults who are homeless[4–6] it is clear that the majority of data were generated in the USA, where the homeless population has distinct challenges, including high cost and poor availability of health and social care. There are limited peer-reviewed data to inform

health and social care for depression or anxiety for homeless adults in the UK, where psychological care for depression and anxiety is available and free at the point of use but is not necessarily accessible (e.g. owing to barriers of registration, opening hours and appointment booking systems). For depression among homeless adults in the UK, there is some evidence of an association between dental problems and depression, found among 853 homeless adults in Scotland,[7] and 62% of a small sample of homeless adults in England had probable depression.[20] Evidence on anxiety among homeless adults in the UK is more limited: in one study of young people (16–24 years) in temporary supported accommodation,[21] 19% had generalised anxiety disorder, which was associated with a 2.8-fold increase in emergency department use.[22] And a cluster analysis of 452 homeless adults[23] found those who had experience of being 'very depressed or anxious' were clustered with those who had more complex and severe experiences of social exclusion and, further, that the former tended to precede the latter.

With the population of homeless adults in England projected to increase,[1] and access to healthcare – and more specifically to mental healthcare – remaining constrained,[24,25] it is essential to more fully characterise the epidemiological features of depression and anxiety, so that policy and programmes can be tailored and targeted appropriately.

Method

Setting/context

In England everyone is entitled to free primary and emergency healthcare through the National Health Service, regardless of residency status.[26] For those with symptoms of depression or anxiety, self-referral to self-guided therapy is available, and general practitioners (GPs) can refer patients to talking therapy, opt for watchful waiting, prescribe medication or refer to mental health specialists. In addition to these services, people who are homeless can choose to register at a GP surgery that specialises in homeless healthcare, where available, and those staying in hostels may be able to access talking therapy through hostel-based counsellors. GPs and key workers can refer people with drug or alcohol dependency, or psychosis, directly to specialist mental healthcare, where comorbid depression or anxiety can be treated. Although such entitlements are legally mandated, there are frequently a range of barriers to the availability and uptake of mental healthcare.[27] These barriers include long waiting lists, logistical and administrative challenges, language barriers, past experiences or fears of discrimination, as well as low prioritisation of personal healthcare amid competing priorities of survival.

Study procedures

This secondary analysis draws on data from an evaluation of a peer advocacy programme delivered by a non-governmental organisation to improve access to healthcare, the methods for which have been described in detail elsewhere.[28] Briefly, for the evaluation we recruited two cohorts from the same source population: adults experiencing homelessness in London, England (UK), who had difficulty accessing healthcare. We recruited these cohorts concurrently between August and December 2021 and followed up for 12 months. The first cohort ('clients') were adults (≥25 years), homeless (e.g. sleeping rough, living in a hostel or shelter, in supported housing, or with insecure private housing) in London, had difficulty managing their healthcare and were receiving support – whether new or ongoing – from the peer advocacy programme to surmount these difficulties. Peer advocates – all of whom had lived experience of homelessness – recruited their clients into the

cohort as part of their usual client engagement activities, with understanding that consent or refusal to participate in the research would not affect the clients' access to the intervention or to healthcare. The second cohort ('non-clients') were homeless adults who were living in hostels or using day centres in London where the peer advocacy programme was not commissioned to work, and either they or their keyworkers reported their having difficulty managing healthcare. A team of co-researchers – several of whom had lived experience of homelessness – approached people from these sites, explained the aims of the study and assessed them for eligibility. Given the lack of a sampling frame, with this recruitment strategy, we sought to recruit non-clients who would be similar to the clients. For both client and non-client cohorts, given limitations regarding translation of the questionnaire, recruits had to be fluent in English or Polish to be eligible. All recruits who gave consent completed a 30 min structured questionnaire that could either be self- or interviewer-administered on a tablet device. The questionnaire contained sections in three domains: (a) sociodemographic (including age, gender identity, ethnicity, citizenship, sexual orientation); (b) social vulnerability (including multiple exclusion homelessness,[29] food insecurity, history of incarceration and trauma) and (c) health (including current conditions, barriers to care, drug and alcohol use, and depression and anxiety symptoms).

Study measures

To maintain participant confidentiality, we combined strata with <10 observations with other strata if appropriate or did not tabulate their findings. We measured age in years and grouped in 10-year intervals from 25. Participants could select one or more ethnic backgrounds (i.e. White, Asian, Black, Arab, Hispanic, Other); we classified those who identified as White only, Black only or Asian only into their own categories, and the remainder (multiple ethnicity, other, refused) into a category. We asked participants the age at which they first became homeless, took the difference from their current age and created a category of <2 years to classify those who had recently become homeless; we then divided the remaining participants into approximately equal-sized groups for 2–9 years, 10–24 years and ≥25 years since first becoming homeless. For drinking frequency in the past 12 months we re-categorised nine frequency categories into four: never, infrequent (up to a few times a year), frequent (a few times a month) and daily (5 or more days/week). For English literacy, we classified those who reported having below average ability in either reading or writing as having lower literacy. We included an 11-item tool to measure social vulnerability and exclusion characteristics for homeless persons.[29] Participants who affirmed going hungry because they could not afford food in the past 12 months were classified as food insecure. We asked questions about violence using items drawn from the World Health Organization (WHO) multi-country study on domestic violence[30] with recall periods of <6 and ≥6 months ago; participants who reported ever having been pushed, shoved or slapped were classified as having experienced physical abuse; those who reported ever having been belittled or humiliated or called racist names as having experienced verbal abuse; and those who reported ever having been touched, grabbed or forced sexually as having experienced sexual abuse. We asked participants about their non-prescription drug use in the past 12 months and whether they used each of the drugs daily or less frequently. Those who had a PHQ-4 score ≥9 and who used a substance (i.e. alcohol, cocaine, crack cocaine, heroin, marijuana or 'spice') daily were classified as having probable dual diagnosis.

Outcome measure

To measure depression and anxiety symptoms, we used the 4-item Patient Health Questionnaire (PHQ-4),[31] which combines the 2-item Patient Health Questionnaire-2 (PHQ-2) and the 2-item Generalized Anxiety Disorder-2 (GAD-2); each item uses a 4-point Likert scale to rate symptoms from 0 'never' to 3 'nearly every day'). As depression and anxiety are frequently comorbid and are increasingly considered to be a single psychological construct,[32,33] and recognising the dimensional nature of mental illness,[32] most of our analyses used the sum of the four PHQ-4 items, a continuous measure (range 0–12) that in this sample had a Cronbach's alpha of 0.83. We also created categories of 0–5, 6–8 ('yellow flag') and 9–12 ('red flag'), using cut-off scores suggested by Löwe et al to inform clinical practice,[34] with higher categories indicating greater clinical need. The full questionnaire, which details the source of items, can be found in the Supplementary material available at https://doi.org/10.1136/bmjopen-2021-050717.

Ethics

The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008. All procedures involving human subjects/patients were approved by the Dulwich Research Ethics Committee (IRAS 271312) and the London School of Hygiene and Tropical Medicine (ref. 18021), both in the UK. All participants provided written informed consent and were reimbursed £10 (cash or grocery voucher) for their time and offered a copy of *The Pavement* magazine, which contains a listing of services for homeless people in London.

Statistical analysis

First, we describe measures within the domains of the sociodemographic, social vulnerability and health-related characteristics of the two cohorts separately using proportions for categorical variables. For large 'choose all that apply' question sets (e.g. ongoing health problems), we present the 3 or 4 most affirmed responses only. Second, we describe the distribution of the four PHQ-4 items using proportions. We described the distribution of the PHQ-4 sum using medians and interquartile ranges (IQR). We report proportions with 'yellow flag' and 'red flag' scores. Third, we report the median PHQ-4 score and IQR within each stratum of study variables, organised by the domains of socioeconomic, social vulnerability and health-related variables. Fourth, we consider evidence of association with PHQ-4 scores using the Kruskal–Wallis test, which is a non-parametric test to compare the distribution of a non-normal continuous variable across two or more categories. We used Stata/SE 17.0 for Windows (StataCorp, College Station, USA) for this analysis (the Stata code is available in the Supplementary material). Finally, we repeated steps 3 and 4 and used the PHQ-2 (depression symptom score) and the GAD-2 (anxiety symptoms score) as separate scores.

Results

Among the 434 peer advocacy clients who had engagements scheduled during the recruitment period, 153 consented and completed the questionnaire. We recruited another 158 people into the non-client cohort, which excludes 9 people who were approached and declined consent and 1 person who withdrew consent a day after completing the questionnaire. The characteristics of the participating clients and non-clients are shown in Table 1.

Among all participants, 78.5% were male, which was similar for both peer advocacy clients (77.1%) and non-clients (79.7%), and 21.5% were female. Three participants (1.0%) identified as transgender and their data were not tabulated. The median age for all participants was 48 years (IQR = 40–57), with clients being slightly older (50 years, IQR = 43–58) than non-clients (45 years, IQR = 39–55). Clients had first become homeless a median of 20 years previously (IQR = 7–33), compared with 9 years[3–17] for non-clients. Clients were less likely to have slept rough the previous night (1.3%) compared with non-clients (13.9%) and were more likely to have ever injected drugs (40.5%) than non-clients (17.7%). Although 81.1% of clients had help to attend a medical appointment in the past 12 months, only 43.0% of non-clients reported such help. Among clients 10.5% used heroin daily, compared with 1.9% of non-clients. Over 70% of both clients and non-clients affirmed ongoing problems with depression or anxiety. For the full sample the median PHQ-4 score was 8 (IQR = 4–10) out of 12 and did not vary appreciably by cohort. Using suggested cut-off scores to guide clinical practice,[34] 40.2% had 'red flag' scores of 9–12 and another 23.8% had 'yellow flag' scores of 6–8, which was also similar across cohorts. Some 16.6% of participants had probable dual diagnosis.

The median PHQ-4 scores and IQRs for strata of sociodemographic, social vulnerability and health-related characteristics, and Kruskal–Wallis tests for association, are presented in Table 2. We did not analyse the transgender variable owing to the small stratum size. Male participants had a median PHQ-4 score of 8 (IQR = 4–11) out of 12, and female participants had a median PHQ-4 score of 7 (IQR = 4–10), and there was no evidence of a difference in these distributions (Kruskal–Wallis $P = 0.57$). There was evidence of association of PHQ-4 score with age, in that scores were highest among younger participants (median 8.5) and lower among older participants (median 2). PHQ-4 scores varied in a non-linear fashion for the categories of time since the person first became homeless. People who reported food insecurity had higher scores (median 8, IQR = 5–12) than those who were food secure (median 6, IQR = 2–9). Recent or historic experience of physical, verbal and sexual abuse were all associated with higher PHQ-4 scores (all $P < 0.10$). Those who had joint, bone or muscle problems had higher scores (median 8, IQR = 5–11) than those who did not (median 7, IQR = 3–10). The three most common barriers to healthcare were all associated with higher scores; for example, participants who identified transportation as a barrier had a median score of 8 (IQR = 5–11), compared with a median of 5 (IQR = 2–9) for those who did not. Those who used marijuana daily had higher scores (median 10, IQR = 6–12) than those who did not use (median 7, IQR = 3–10). There was no evidence of difference in PHQ-4 scores across cocaine/crack cocaine, heroin or alcohol consumption categories (all $P > 0.36$). The results for analyses of the PHQ-2 and the GAD-2 are presented in Supplementary Tables 3 and 4.

Discussion

Key findings

Among homeless adults who reported difficulties accessing healthcare, depression and anxiety symptoms were high, with a median PHQ-4 score of 8 out of 12, and 40.2% having 'red flag' scores warranting clinical attention. Awareness of these conditions by name was also high: over 75% of participants affirmed having ongoing problems with depression or anxiety. PHQ-4 scores were consistently high across most strata and particularly elevated among younger people, those using marijuana daily, or who were experiencing joint, bone or muscle problems. Almost two-thirds of participants had experienced hunger in the previous 12 months,

Stratum	Clients, n/153 (%), or median (IQR)	Non-clients, n/158 (%), or median (IQR)	Total n/311 (%), or median (IQR)
Table 1 Sociodemographic, social exclusion and health-related characteristics of peer advocacy clients and non-clients, London, UK, 2020–2021			
Sociodemographic characteristics			
Gender			
Male	118 (77.1)	126 (79.7)	244 (78.5)
Female	35 (22.8)	32 (20.2)	67 (21.5)
Age category, years			
25–34	11 (7.2)	29 (18.3)	40 (12.9)
35–44	32 (20.9)	46 (29.1)	78 (25.1)
45–54	55 (36.0)	43 (27.2)	98 (31.5)
55–64	42 (27.5)	36 (22.8)	78 (25.1)
≥65	13 (8.5)	4 (2.5)	17 (5.4)
Age, years	50 (43–58)	45 (39–55)	48 (40–57)
Sexual orientation			
Heterosexual	138 (90.2)	132 (83.5)	270 (88.8)
Gay, lesbian	4 (2.6)	7 (4.4)	11 (3.6)
Bisexual	6 (3.9)	5 (3.2)	11 (3.6)
Other, don't know, refuse	5 (3.3)	14 (8.9)	19 (6.1)
Ethnicity			
White only	106 (69.3)	97 (61.4)	203 (65.3)
Asian/British Asian only	12 (7.8)	15 (9.5)	27 (8.7)
Black/Black British only	14 (9.1)	27 (17.1)	41 (13.2)
Other, multiple, refuse	21 (13.7)	19 (12.0)	40 (12.9)
Citizenship			
Other	26 (17.0)	42 (26.5)	68 (21.9)
British	127 (83.0)	116 (73.4)	243 (78.1)
Education completed			
Less than secondary	18 (11.8)	22 (14.2)	40 (13.0)
Secondary	88 (57.9)	73 (47.1)	161 (52.4)
More than secondary	46 (30.3)	60 (38.7)	106 (34.5)
English reading and writing skill			
Better than average	111 (72.5)	113 (71.5)	224 (72.0)
Below average	42 (27.5)	45 (28.5)	87 (28.0)
Social vulnerability characteristics			
Years since first became homeless	20 (7–33)	9 (3–17)	11 (5–28)
Years since first became homeless category			
0–1	8 (5.2)	21 (13.3)	29 (9.3)
2–9	37 (24.2)	65 (41.4)	102 (32.8)
10–24	43 (28.1)	49 (31.0)	92 (29.6)
≥25	65 (42.4)	23 (14.5)	88 (28.3)
Sleeping location, last night			
Slept rough/public location	2 (1.3)	22 (13.9)	24 (7.7)
Hostel	104 (68.0)	114 (72.1)	218 (70.1)
Own tenancy	27 (17.6)	5 (3.2)	32 (10.3)
Other	20 (13.1)	17 (10.8)	37 (11.9)
Sleeping location, ever[a]			
Sofa surfed	117 (76.5)	121 (76.6)	238 (76.5)
Hostel or refuge	141 (92.2)	134 (84.8)	275 (88.4)
Slept rough/public location	123 (80.4)	141 (89.2)	264 (84.9)
Multiple exclusion homelessness characteristics, ever[a]			
Applied to council as homeless	113 (73.9)	106 (67.1)	219 (70.4)
Local authority care as a child	45 (29.4)	30 (19.0)	75 (24.1)
Begged	78 (51.0)	50 (31.6)	128 (41.2)
Shoplifted	80 (52.3)	59 (37.3)	139 (44.7)
Daily binge drinking	89 (58.2)	101 (63.9)	190 (61.1)
Street drinking	77 (50.3)	86 (54.4)	163 (52.4)
Sold sex	15 (9.8)	15 (9.5)	30 (9.6)
Incarcerated	90 (58.8)	65 (41.1)	155 (49.8)
Injected drugs	62 (40.5)	28 (17.7)	90 (47.4)
Police contact, past 6 months[a]			
Arrested, detained or charged	21 (13.7)	28 (17.7)	49 (15.8)
Imprisoned	12 (7.8)	3 (1.9)	15 (4.8)
Told to move from public space	44 (28.8)	42 (26.6)	86 (27.6)
Food insecure, past 12 months[b]			
No	55 (36.0)	66 (41.8)	121 (38.9)
Yes	97 (63.4)	90 (57.0)	187 (60.1)
Verbal abuse			
Never	43 (28.2)	34 (22.1)	77 (25.2)
Over 6 months ago	34 (22.5)	42 (27.2)	76 (24.9)
Within past 6 months	74 (49.0)	78 (50.6)	152 (49.8)
Physical abuse			
Never	57 (38.0)	50 (32.3)	107 (35.1)

(Continued)

Table 1 (*Continued*)

Stratum	Clients, *n*/153 (%), or median (IQR)	Non-clients, *n*/158 (%), or median (IQR)	Total *n*/311 (%), or median (IQR)
Over 6 months ago	59 (39.3)	51 (32.9)	110 (36.1)
Within past 6 months	34 (22.7)	54 (34.8)	88 (28.8)
Sexual abuse, ever			
No	113 (73.9)	113 (71.5)	226 (72.7)
Yes	40 (26.1)	45 (28.5)	85 (27.3)
Health-related characteristics			
Health problems, current[a]			
Depression or anxiety	118 (77.2)	116 (73.4)	234 (75.2)
Dental	87 (56.9)	92 (58.2)	179 (57.6)
Joint, bone or muscle	73 (47.7)	70 (44.3)	143 (46.0)
Addiction	72 (47.1)	63 (39.9)	135 (43.4)
Respiratory problems (e.g. obstructive airway disease, bronchitis, emphysema, asthma)	84 (54.9)	46 (29.1)	130 (41.8)
Healthcare barriers, current[a]			
Problems with transportation	105 (68.6)	83 (52.5)	188 (60.5)
Uncertainty about place and provider	96 (62.7)	89 (56.3)	185 (59.5)
Could not get appointment	87 (56.9)	74 (46.8)	161 (51.8)
Had help to attend medical appointment, past 12 months[c]			
No	28 (18.3)	88 (55.7)	116 (37.3)
Yes	124 (81.1)	68 (43.0)	192 (61.7)
Crack cocaine/cocaine used, past 12 months			
No	80 (52.3)	106 (67.1)	186 (59.8)
Yes, less than daily	53 (34.6)	44 (27.8)	97 (31.2)
Yes, daily	20 (13.1)	8 (5.1)	28 (9.0)
Heroin used, past 12 months			
No	92 (60.1)	128 (81.0)	220 (70.7)
Yes, less than daily	45 (29.4)	27 (17.1)	72 (23.1)
Yes, daily	16 (10.5)	3 (1.9)	19 (6.1)
Marijuana used, past 12 months			
No	91 (59.5)	99 (62.6)	190 (61.1)
Yes, less than daily	47 (30.7)	34 (21.5)	81 (26.0)
Yes, daily	15 (9.8)	25 (15.8)	40 (12.9)
Daily substance use (i.e. crack cocaine, cocaine, heroin, marijuana or spice)			
No	117 (76.5)	128 (81.0)	245 (78.8)
Yes	36 (23.5)	30 (19.0)	66 (21.2)
Alcohol consumption, past 12 months			
Never	41 (27.9)	32 (20.4)	73 (24.0)
Up to a few days a year	34 (23.1)	41 (26.1)	75 (24.7)
Up to a few days a month	32 (21.8)	43 (27.4)	75 (24.7)
Daily	40 (27.2)	41 (26.1)	81 (26.6)
Depression or anxiety symptoms daily (PHQ-4), previous 2 weeks			
Little interest in doing things	52 (34.4)	51 (32.5)	103 (33.4)
Feeling down or depressed	57 (37.8)	62 (39.5)	119 (38.6)
Feeling anxious	58 (38.4)	54 (34.4)	112 (36.4)
Can't stop worrying	66 (43.7)	69 (43.9)	135 (43.8)
PHQ-4 score	8 (4–11)	7.5 (4–10)	8 (4–10)
PHQ-4 score category			
0–5	58 (37.9)	54 (34.2)	112 (36.0)
6–8 ('Yellow flag')	35 (22.9)	39 (24.7)	74 (23.8)
9–12 ('Red flag')	60 (39.2)	65 (41.1)	125 (40.2)
Probable dual diagnosis ('red flag' and daily substance use)			
No	123 (82.0)	133 (84.7)	256 (83.4)
Yes	27 (18.0)	24 (15.3)	51 (16.6)

[a] Participants could select more than one option for each of these measures. Only the stratum with the affirmative response is presented here. [b] Excluding three participants who refused to answer or did not know. [c] Excluding three participants who did not know. PHQ-4, 4-item Patient Health Questionnaire; IQR, interquartile range.

1 in 2 experienced verbal abuse in the previous 6 months and 1 in 3 experienced physical abuse or sexual abuse in their lifetime.

Burden of symptoms and coverage of care

In our sample, three in four study participants affirmed problems with depression or anxiety, which is evidence of some combination of high incidence and long duration. These figures are far higher than found in meta-analyses and surveys of the general population and homeless populations,[4–9] and are likely attributable to our inclusion criterion being of people who had difficulty accessing healthcare. As insecure housing is already a known risk factor for a range of social and medical conditions,[35] action to increase the supply of affordable housing is a priority. To reduce duration of illness among those already affected, we need to develop more accessible forms of psychological support, such as peer-delivered counselling and *ad hoc* therapeutic services available in hostels, day centres or over the phone. Models of peer- and lay-support psychological interventions have been developed and demonstrated to be effective in low-resource settings,[36,37] and one model is being evaluated in the UK now.[38] Further, the consistently high PHQ-4 scores across strata should motivate consideration of population-level mental health interventions for people served across the homeless service sector.

Table 2 Sociodemographic, social exclusion and health-related characteristics, and association with PHQ-4 score among peer advocacy clients and non-clients, London, UK, 2020–2021

Measure and stratum	PHQ-4 median score (IQR)	P
Total sample	8 (4–10)	
Sociodemographic characteristics		
Gender		0.65
Male	8 (4–11)	
Female	7 (4–10)	
Age category, years		0.01
25–34	8.5 (4.5–11.5)	
35–44	8 (5–11)	
45–54	7.5 (4–11)	
55–64	6 (3–10)	
≥65	2 (0–8)	
Sexual orientation		0.91
Heterosexual	7.5 (4–11)	
Gay, lesbian	8 (3–9)	
Bisexual	4 (3–12)	
Other, don't know	8 (5–10)	
Ethnicity		0.98
White only	7 (4–11)	
Asian/British Asian only	8 (6–10)	
Black/Black British only	8 (4–12)	
Other, multiple, refuse	7.5 (4–10)	
Citizenship		0.42
Other	6 (4–10)	
British	8 (4–11)	
Education completed		0.97
Less than secondary	8 (4–10)	
Secondary	8 (3–11)	
More than secondary	7 (4–10)	
English literacy		0.40
Better than average reading and writing	8 (4–10)	
Below average reading or writing	6 (3–11)	
Social vulnerability characteristics		
Years since first became homeless category		0.02
0–1	8 (5–10)	
2–9	7 (3–10)	
10–24	9 (6–12)	
≥25	6 (3–10.5)	
Sleeping location, last night		0.32
Slept rough/public location	8.5 (5–12)	
Hostel	7 (4–10)	
Own tenancy	8 (3.5–10)	
Other	8 (4–11)	
Sofa surfed, ever		0.80
Yes	7.5 (4–10)	
No	8 (4–10)	
Lived in hostel or refuge, ever		0.16
Yes	8 (4–11)	
No	6 (3–9.5)	
Slept rough or in public location, ever		0.74
Yes	8 (4–10.5)	
No	8 (4–10)	
Applied to council as homeless, ever		0.37
Yes	8 (4–11)	
No	6.5 (4–10)	
Local authority care as a child, ever		0.16
Yes	6 (3–10)	
No	8 (4–10.5)	
Begged, ever		0.53
Yes	8 (4–11)	
No	8 (4–10)	
Shoplifted		0.54
Yes	8 (4–11)	
No	8 (4–10)	
Daily binge drinking, ever		0.81
Yes	7 (4–11)	
No	8 (3–10)	
Street drinking, ever		0.64
Yes	7 (4–10)	

(Continued)

Table 2 (Continued)

Measure and stratum	PHQ-4 median score (IQR)	P
No	8 (4–11)	
Sold sex, ever		0.67
Yes	7 (3–10)	
No	8 (4–11)	
Incarcerated, ever		0.84
Yes	7 (4–10)	
No	8 (3.5–10.5)	
Injected drugs, ever		0.40
Yes	8 (4–11)	
No	8 (4–10)	
Arrested, detained or charged by police, past 6 months		0.82
Yes	6 (4–10)	
No	8 (4–10)	
Told to move from public space by police, past 6 months		0.39
Yes	8 (5–11)	
No	8 (4–10)	
Food insecure, past 12 months		0.01
No	6 (2–9)	
Yes	8 (5–12)	
Verbal abuse		0.01
Never	5 (2–9)	
Over 6 months ago	7 (4–10)	
Within past 6 months	9 (5–12)	
Physical abuse		0.01
Never	6 (2–10)	
Over 6 months ago	8 (4–11)	
Within past 6 months	8 (5–12)	
Sexual abuse, ever		0.07
No	7 (4–10)	
Yes	8 (5–12)	
Health characteristics		
Dental problems, current		0.23
Yes	8 (4–11)	
No	7 (4–10)	
Joint, bone or muscle problems, current		0.02
Yes	8 (5–11)	
No	7 (3–10)	
Addiction problems, current		0.15
Yes	8 (4–11)	
No	7 (3.5–10)	
Respiratory problems (e.g. obstructive airway disease, bronchitis, emphysema, asthma), current		0.12
Yes	8 (5–11)	
No	7 (3–10)	
Depression or anxiety problems, current		0.01
Yes	8 (5–11)	
No	3 (1–7)	
Has problems with transport to get healthcare		0.01
Yes	8 (5–11)	
No	5 (2–9)	
Has uncertainty about healthcare place or provider		0.01
Yes	8 (5–11)	
No	6 (2–9)	
Has difficulty getting healthcare appointment		0.01
Yes	8 (5–12)	
No	6 (3–10)	
Had help to attend medical appointment, past 12 months		0.51
No	7 (3–10)	
Yes	8 (4–11)	
Crack or cocaine used, past 12 months		0.36
No	7.5 (3–10)	
Yes, less than daily	8 (5–10)	
Yes, daily	8 (3.5–12)	
Heroin used, past 12 months		0.41

(Continued)

Table 2 (Continued)		
Measure and stratum	PHQ-4 median score (IQR)	P
No	7.5 (4–10)	
Yes, less than daily	7.5 (4.5–11)	
Yes, daily	9 (4–12)	
Marijuana used, past 12 months		0.01
No	7 (3–10)	
Yes, less than daily	8 (4–10)	
Yes, daily	10 (6–12)	
Daily substance use (i.e. crack cocaine, cocaine, heroin, marijuana, spice), past 12 months		0.01
No	7 (4–10)	
Yes	8.5 (5–12)	
Alcohol consumption, past 12 months		0.98
Never	8 (4–10)	
Infrequent (up to a few days a year)	8 (4–10)	
Frequent (up to a few days a month)	7 (4–11)	
Daily	6 (4–10)	

IQR, interquartile range; PHQ-4, 4-item Patient Health Questionnaire.

Sociodemographic, social vulnerability and health-related characteristics, and associations with depression and anxiety symptoms

We observed higher PHQ-4 scores among younger age groups. This trend is consistent with one study[39] from Taiwan and the opposite of another[40] from the USA. Younger age could be a proxy for recent loss of housing, which itself is often the outcome of other socio-economic traumas. Two studies,[41,42] both from San Francisco, found that recent homelessness was associated with depression and anxiety. Further research should consider how the mental health needs of younger and older homeless persons differ, and whether age is a proxy for other risk factors.

The lack of association between sexual orientation and depression and anxiety here is contrary to findings from the general population in the UK[43] and among homeless people in the USA.[41,44,45] Overall, 11% of our sample identified as gay, lesbian, bisexual or other – substantially higher than the 3% estimated from national population surveys in the UK[43] but the same as reported in the 2022 Homeless Health Needs Audit in England.[46] The disproportionate representation of sexual minorities in the homeless population is well characterised,[47] and given the lack of mental health research among sexual minorities within the homeless population, we recommend further qualitative research and larger quantitative studies to consider whether there are protective factors for sexual minorities that are present in the UK or absent in other settings.

Around six in ten of our participants had experienced hunger due to lack of funds in the previous 12 months, which reinforces the 2022 Homeless Health Needs Audit in England,[46] which found that only 18% of respondents had an average of three meals a day. Our participants who had recently experienced hunger had higher PHQ-4 scores than those who had not experienced hunger. Similar findings have been reported from Canada and the USA,[42,48,49] with the cohort study from Palar et al[49] finding that severe food insecurity precedes an increase in depression symptom severity. These findings further support the need for a strengthening of social care services, so that social work teams can devote adequate time to helping their clients navigate disparate services (i.e. for housing, physical health, mental health and nutrition) and can sensitise the relevant service providers to the intersecting vulnerabilities their clients face.

The use of drugs and alcohol to self-medicate against symptoms of mental distress has been well characterised in the general population, and has been reported from studies of homeless persons in the USA and France.[50,51] In this study, we did not detect associations between cocaine/crack cocaine, heroin or alcohol use and PHQ-4 scores, although we did for marijuana. It is possible that, relative to other drugs, marijuana use is more useful as an indicator of depression and anxiety, and vice versa. We did observe that one in five participants was using a substance daily, demonstrating a confluence of homelessness, substance use and mental distress, which should motivate consideration of a coordinated, concurrent response across social and medical sectors.

The high prevalence of verbal, physical and sexual abuse is consistent with review evidence[3] that estimates between 27 and 52% of homeless persons had experienced physical or sexual assault in the previous year. As evidenced in the UK and internationally[23,50,52–54] abuse is associated with depression and anxiety, and with other domains of social exclusion. Homeless service providers need to ensure that health and social services are informed by an understanding of and sensitivity to experience of violence and the role that this trauma might play in the lives and behaviours of service users.[55,56] This understanding might include the development of organisational cultures that foster an understanding of how experiences of adversity may shape behaviour, and improving staff training in how to recognise and respond to the signs of trauma. Improving access to specialist trauma services for people experiencing homelessness is also key. Inclusion of people with lived experience of homelessness services as staff and volunteers can also facilitate systemic change, to better recognise and meet the needs of clients who face historic and ongoing abuse. Further, these findings reinforce the need for integration of housing and mental health support for survivors of abuse.

Consistent with a study of people who are homeless in Los Angeles,[57] we found high levels of physical joint, bone or muscle problems associated with higher PHQ-4 scores. Although somatic symptoms are common features of depression, these physical problems can sometimes be independent comorbidities. This finding highlights the need for integrated approaches to care, such that presentation with these common physical complaints is routinely accompanied by investigation into depression and anxiety and vice versa, and that clinical providers coordinate their care. We also note the high concordance of PHQ-4 scores with self-reported problems with depression and anxiety. That participants with symptoms recognised their underlying conditions by name evidences the relative absence of a key individual-level barrier to care – internalised stigma – and should motivate focus on the structural-level barriers.

All participants in this analysis had difficulty managing their healthcare, per the eligibility criteria of the study. The most common barriers to accessing healthcare were problems with transportation, uncertainty about location and inability to get an appointment. These barriers were associated with higher PHQ-4 scores. We recommend that policymakers consider removal of structural barriers to services, including access to public transport and referrals within and between medical and social care sectors.

Strengths and limitations

This is the first analysis of the distribution of depression and anxiety symptoms among any homeless population in the UK. Given emerging findings about peer support for homeless health[58] we believe our engagement with peers and co-researchers with lived experience of homelessness meant that many of our participants were people who would otherwise be hesitant to participate in a research study and were more likely to provide complete and accurate responses. We believe that this engagement resulted in less selection bias and less response bias. The high levels of affirmation of question items

that are considered stigmatising (e.g. on abuse, substance use and mental health) evidences a level of trust to disclose. Our measure of depression and anxiety symptoms was the PHQ-4, a subset of items drawn from the PHQ-9 and GAD-7,[31] both of which are well characterised and widely used to screen for depression and anxiety respectively. For analysis, we used the PHQ-4 as a continuous measure, which is consistent with the dimensional approach to mental illness[32,33] and avoids the clinical and measurement issues inherent with using a cut-off score to diagnose a mental health condition.[59]

There are several limitations of this analysis that must be noted. First, it is not possible to make causal interpretations from the associations detected here, because each association in question requires adjustment for relevant confounding factors and also because our data are cross-sectional and temporality is not always clear. Second, no sampling frame exists of homeless people in London, nor could we recruit from all hostels and day centres in London as we relied on cooperation from site managers. Further, given the focus of the primary study from which this secondary analysis was drawn – people who have difficulty accessing healthcare – we cannot necessarily generalise findings from this study to all adults who are homeless in London or in the UK. Our sample may be systematically different from the broader population of people who are homeless. Among participating clients we cannot necessarily generalise to all clients, given their low response rate, nor to all clients historically because of our recruitment period coinciding with the period after the final COVID-19 lockdown, which dramatically affected the composition of the homeless population and the services that could reach them. And third, some strata in this analysis were relatively small, so our statistical power to detect modest variations in PHQ-4 scores was limited.

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Supplementary material

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Data availability

The data that support the findings of this study are available from the corresponding author, S.D.R., on reasonable request.

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Author contributions

S.D.R. designed and conducted this analysis, collected data and wrote the article. P.J.A. contributed to interpretation and drafting the article. P.H. carried out data collection and contributed to drafting the article. A.G. designed the broader study within which this analysis was conducted, contributed to interpretation of this analysis and drafting the article. L.P. contributed to the broader study within which this analysis was conducted, collected data, contributed to interpretation of this analysis and drafting the article. All authors approved the version to be published and agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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Declaration of interest

None.

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