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## Multimorbidity and emergency department visits by a homeless population:

a database study in specialist general practice

### Abstract

#### Background

Estimating healthcare needs of the homeless is associated with challenges in identifying the eligible population.

#### Aim

To explore the demographic characteristics, disease prevalence, multimorbidity, and emergency department visits of the homeless population.

#### Design and setting

EMIS electronic database of patient medical records and Quality and Outcomes Framework (QOF) data of all 928 patients registered with a major specialist homeless primary healthcare centre based in the West Midlands in England, from the period of October 2016 to 11 October 2017.

#### Method

Prevalence data on 21 health conditions, multimorbidity, and visits to emergency departments were explored and compared with the general population datasets.

#### Results

Most homeless people identified were male (89.5%), with a mean age of 38.3 (SD = 11.5) years, and of white British origin (22.1%). Prevalence of substance (13.5%) and alcohol dependence (21.3%), hepatitis C (6.3%), and multimorbidity (21.3%) were markedly higher than in the general population. A third (32.5%) had visited the emergency department in the preceding 12 months. Emergency department visits were associated with a patient history of substance (odds ratio [OR] = 2.69) and alcohol dependence (OR = 3.14).

#### Conclusion

A high prevalence of substance and alcohol dependence, and hepatitis C, exists among the homeless population. Their emergency department visit rate is 60 times that of the general population and the extent of multimorbidity, despite their lower mean age, is comparable with that of 60–69-year-olds in the general population. Because of multimorbidity, homeless people are at risk of fragmentation of care. Diversification of services under one roof, preventive services, and multidisciplinary care are imperative.

#### Keywords

epidemiology; general practice; healthcare utilisation; homeless persons.

### INTRODUCTION

Homelessness is a widespread issue in the UK,<sup>1</sup> with an estimated 250 000 people known to be homeless in England alone.<sup>2</sup> More than 4000 people sleep rough on any given night in England, with numbers of rough sleepers rising, particularly in urban areas; in London, for example, the number of rough sleepers has doubled in the last 6 years (up to and including 2017).<sup>3</sup>

There is a dearth of literature investigating healthcare issues among homeless people in the UK. Findings from international literature suggest that those experiencing homelessness are significantly disadvantaged in achieving and maintaining a healthy lifestyle.<sup>4</sup> They face up to 12 times higher mortality rates than the general population, mostly due to opioid overdose, accidents, heart failure, and infectious diseases.<sup>4</sup> The negative health consequences of social exclusion are noted to be greater in females than males.<sup>4</sup> A UK study in 2012 identified that rough sleepers and those occupying homeless shelters die at an average age of 47 years.<sup>5</sup> Health status worsens with increasing length of time as homeless.<sup>6</sup> Historical estimates have suggested that homelessness is independently linked with high emergency department use.<sup>7</sup> However, there is limited literature exploring the rate of emergency

department visits and the characteristics within homeless populations associated with this increased use of emergency care.

#### Primary healthcare service provision for homeless people

There has been an emergence of some specialist primary care support for homeless people across the UK. There is at least one such practice in most major cities in the UK that offers primary healthcare centres for homeless people and some general practices have particular expertise in homelessness.<sup>8</sup>

The lack of studies in the UK that have investigated the prevalence of key health conditions necessitates the strengthening of the evidence around the primary healthcare needs of homeless populations. Identifying the burden of disease is often challenging in socially excluded populations as social disadvantage is often not recorded in medical records and the UK general register of births and deaths. Homeless populations also have very limited coverage in routine health surveys due to their often secluded and unstable locations. There is also a need to address the current gap in the range of methodology that has been used to explore the healthcare issues of homeless people. Gathering and analysing healthcare utilisation datasets from a large specialist

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## How this fits in

Homeless people face extreme social exclusion. There is a dearth of literature in the UK about the healthcare needs of homeless people, and most of the literature around healthcare issues and homelessness are of international origin. This research sought to identify the demographic characteristics, disease prevalence, multimorbidity, and emergency department visits of the registrants of a specialist primary healthcare centre for the homeless, using a large sample size. The findings of this study show that homeless populations are at risk of facing fragmentation of care as a result of high levels of multimorbidity. It demonstrates the need for the provision of preventive health care and multi-sector approaches in addressing homeless people's complex healthcare needs and minimising their use of emergency care.

primary healthcare centre for the homeless can provide useful data for use by primary healthcare service providers, researchers, and decision makers to identify unmet need. It can also aid in the redesigning of services and widening preventive measures for public sector action.

The aim of this study was to explore the demographic characteristics, disease prevalence, multimorbidity, and visits to emergency departments of homeless people.

## METHOD

This study was conducted in a specialist primary healthcare centre for the homeless in the West Midlands in England. The healthcare centre provides general practice services to the homeless population. Registrants have access to a GP, nurse practitioners, psychotherapy counsellor, podiatrist, alcohol dependence intervention nurse, and street outreach services. The centre does not provide treatment for substance dependence so patients are referred to a dedicated service based in the city.

The Quality and Outcomes Framework (QOF) and EMIS electronic data of patient medical records were used. QOF is an annual reward programme for general practice achievements, an aspect of which involves the building of disease registers.<sup>9,10</sup> EMIS is an online database, which is used by most general practices across the UK to store patients' clinical data (<https://www.emishealth.com/products/emis-web/>).

A search function allows the prevalence of

health conditions to be gathered among the practice registrants. For disease prevalence data, all patient records were searched with relevant Read codes.

The data search was undertaken in November 2017 by staff at the general practice with routine access to the datasets using queries specific for a health condition. All data were cleaned and anonymised before being passed to the research team. The prevalence of 21 key health conditions was explored. These conditions included cardiovascular disease, mental health, infection, respiratory, neurological disorders, cancer, and endocrine disorders. For emergency department attendance, a search was run to identify patients' EMIS datasets for the previous 12 months (October 2016 to 11 October 2017). Demographic data including age, sex, ethnicity, and smoking status were extracted. The World Health Organization definition of multimorbidity, 'the coexistence of two or more chronic conditions in the same individual', was used.<sup>11</sup>

All data were stored on secure password-protected computers. Data were analysed using descriptive and inferential statistics. The comparison of prevalence data across age and sex was undertaken based on the evidence from international literature that health inequality is found to affect socially excluded females and older populations more than the male population.<sup>4</sup> Comparative data relating to the English or UK general population were taken from a variety of sources including the QOF, national statistics, and published literature. In addition, comparison was made to prevalence data as available in the international literature that related to homeless populations. Binary logistic regression analysis was conducted to identify factors that were associated with patient emergency department attendance. Emergency department attendance in the previous 12 months was used as an outcome variable. Explanatory variables related to disease areas and any demographic characteristics that showed an association ( $P \leq 0.25$ )<sup>12</sup> with the outcome 'A&E attendance in the last 12 months' in the univariate analysis.

## RESULTS

Datasets for all 928 registrants were available.

### Demography characteristics

Most registrants were male ( $n = 831$ ; 89.5%), with 97 (10.5%) female registrants. The mean age of registrants was 38.3 (SD = 11.5)

**Table 1. Demographics of homeless registrants (N= 928)**

Demographic characteristics		Female (n= 97), n (%) <sup>a</sup>	Male (n= 831), n (%) <sup>a</sup>	All registrants (n= 928), n (%)
Age	Mean age (SD), years	34.0 (10.1)	38.8 (11.6)	38.3 (11.5)
	Range	17–81	19–68	17–81
	10–19	5 (5.2)	7 (0.8)	12 (1.3)
	20–29	32 (33.0)	199 (23.9)	231 (24.9)
	30–39 <sup>b</sup>	37 (38.1) <sup>b</sup>	247 (29.7) <sup>b</sup>	284 (30.6) <sup>b</sup>
	40–49	13 (13.4)	224 (27.0)	237 (25.5)
	50–59	8 (8.2)	117 (14.1)	125 (13.5)
	60–69	2 (2.1)	32 (3.9)	34 (3.7)
	70–79	0 (0)	3 (0.4)	3 (0.3)
	80–89	0 (0)	2 (0.2)	2 (0.2)
	<b>Total</b>	<b>97 (100%)</b>	<b>831 (100%)</b>	<b>928 (100%)</b>
Ethnicity	<b>Asian/Asian British</b>	3 (3.1)	44 (5.3)	47 (5.1)
	Bangladeshi	0 (0)	4 (0.5)	4 (0.4)
	Chinese	0 (0)	1 (0.1)	1 (0.1)
	Indian	0 (0)	6 (0.7)	6 (0.6)
	Other Asian	3 (3.1)	21 (2.5)	24 (2.6)
	Pakistani	0 (0)	12 (1.4)	12 (1.3)
	<b>Black/African/Caribbean/black British</b>	8 (8.2)	56 (6.7)	64 (6.9)
	African	4 (4.1)	31 (3.7)	35 (3.8)
	Caribbean	0 (0)	13 (1.6)	13 (1.4)
	Other black	4 (4.1)	12 (1.4)	16 (1.7)
	<b>Mixed/multiple ethnic groups</b>	8 (8.2)	44 (5.3)	52 (5.6)
	Other mixed	4 (4.1)	30 (3.6)	34 (3.7)
	White and Asian	1 (1.0)	3 (0.4)	4 (0.4)
	White and black African	1 (1.0)	1 (0.1)	2 (0.2)
	White and black Caribbean	2 (2.1)	10 (1.2)	12 (1.3)
	<b>White</b>	23 (23.7)	221 (26.6)	244 (26.3)
	White British	18 (18.6) <sup>b</sup>	187 (22.5) <sup>b</sup>	205 (22.1) <sup>b</sup>
	White Irish	1 (1.0)	9 (1.1)	10 (1.1)
	Other white	4 (4.1)	25 (3.0)	29 (3.1)
	<b>Other ethnic group</b>	0 (0)	11 (1.3)	11 (1.2)
Arab	0 (0)	2 (0.2)	2 (0.2)	
'Any other'	0 (0)	9 (1.1)	9 (1.0)	
Unknown ethnicity or not recorded	55 (56.7)	455 (54.8)	510 (55.0)	
	<b>Total</b>	<b>97 (100)<sup>c</sup></b>	<b>831 (100)<sup>c</sup></b>	<b>928 (100)<sup>c</sup></b>
Smoking prevalence (proportion of registrants that smoke, per age category)	10–19	3 (6.0)	1 (14.3)	4 (33.3)
	20–29	15 (46.9)	78 (39.0)	93 (40.1)
	30–39	22 (59.5)	134 <sup>c</sup> (54.3)	156 (54.9)
	40–49	5 (38.5)	134 <sup>c</sup> (59.8)	139 (58.6)
	50–59 <sup>b</sup>	5 (62.5) <sup>b</sup>	71 (59.2) <sup>b</sup>	76 (59.4) <sup>b</sup>
	60–69	0 (0)	19 (59)	19 (55.9)
	70–79	0 (0)	0 (0)	0 (0)
		<b>Total</b>	<b>50 (51.5)</b>	<b>437 (52.6)</b>

<sup>a</sup>% reflects proportion in sex category. <sup>b</sup>Modal categories. <sup>c</sup>The totals are higher than expected as both categories and sub-categories are included here. For example, the number of individuals of a 'white' ethnicity is the total number of 'white British', 'white Irish', and other 'white individuals' added together. SD = standard deviation.

years, with a range of 17–81 years. White British constituted the largest ethnic category (Table 1). The ethnicity data of 510 (55%) registrants were not recorded.

A total of 487 (52.5%) were current smokers, which is more than three times the adult smoking rate of 15.5% in the English general population.<sup>13</sup> There were no significant differences between the proportion of male ( $n=437$ ; 52.6%) and female ( $n=50$ ; 51.5%) registrants who smoked ( $P=0.931$ ). The highest proportions (percentage within age groups) of male and female patients who smoked were in the age brackets 40–49 years and 50–59 years, respectively (although the number of smokers is greater in other groups, these are the groups with the highest proportion of smokers, Table 1).

### Prevalence of health conditions

**Mental health conditions.** Prevalence data were available for depression (as a diagnosis), patients on the mental health register (which includes those diagnosed with schizophrenia, bipolar affective disorder, and other psychoses, and other patients on lithium therapy), alcohol dependence, and substance dependence (Table 2). The highest prevalence was observed with alcohol dependence ( $n=198$ ; 21.3%), followed by substance dependence ( $n=125$ ; 13.5%). Prevalence rates were not associated with sex. Those with alcohol dependence were significantly older than those without the diagnosis.

**Cardiovascular health conditions.** Prevalence data for a total of four cardiovascular health conditions were available: coronary heart disease, stroke/transient ischaemic attack, hypertension, and atrial fibrillation. Those with a diagnosis of any of the four cardiovascular conditions were significantly older and predominantly male (Table 2).

**Infectious diseases.** Of the observed prevalence rates among three infectious diseases, hepatitis C had the highest prevalence rate of 6.3% ( $n=58$ ) (Table 2). A total of six patients (0.6%) were diagnosed with HIV infection, and 87 (9.4%) with a sexually transmitted infection. No statistically significant differences in the prevalence rates were identified across sex groups.

**Respiratory health conditions.** Data were available for chronic obstructive pulmonary disease (COPD) and asthma (Table 2). Prevalence rates of 1.5% and 4.2%,

respectively, were observed. In both disease areas, those with confirmed diagnosis were significantly older than those without a diagnosis. Female registrants had significantly higher prevalence rates for asthma than males. Even though the number of patients with asthma is greater in males than females, the proportion of females with asthma is significantly higher than the proportion of males because there are considerably more males than females in this population.

**Neurological disorders.** Prevalence rates of 1.4% and 1.1% were observed for epilepsy and migraine, respectively (Table 2).

**Other chronic health conditions.** Data were available for six other health conditions: diabetes, cancer, learning disabilities, rheumatoid arthritis, leg ulcers, and gastrointestinal ulcers or bleed. Low prevalence rates were observed for diabetes (2.8%) and cancer (0.4%) (Table 2).

**Multimorbidity.** A total of 452 (48.7%) patients had at least one chronic medical condition, with 198 (21.3%) patients having at least two chronic medical conditions. There was no difference in the mean (SD) of the number of chronic medical conditions across the sex groups.

**Visits to emergency departments.** A total of 302 (32.5%) registrants had visited an emergency department in the previous 12 months (Table 3).

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Emergency department attendance data were linked to diagnoses of individual health conditions. In univariate analysis, (unadjusted odds ratios [OR]) alcohol dependence (OR 3.951,  $P<0.001$ ), substance dependence (OR 2.688,  $P<0.001$ ), epilepsy (OR 4.776,  $P=0.013$ ), hepatitis C (OR 2.735,  $P<0.001$ ), leg ulcers (OR 2.191,  $P=0.004$ ), and sexually transmitted infections (OR 2.196,  $P<0.001$ ) were significantly associated with emergency department visits (further data available from the authors on request). Patients who had these health conditions were significantly more likely to have visited the emergency department in the last 12 months. There were no significant differences in the mean ages of those attending and not attending the emergency department in the last 12 months. Emergency department attendance was not associated with sex (Table 3).

**Table 2. Prevalence of health conditions among homeless registrants and comparison data with available literature (N = 928)**

Health conditions	Mean age (SD) with the condition, years	Mean age (SD) with no condition, years	Prevalence n (%)			P-value	All registrants n	Prevalence in English or UK general population	Prevalence in homeless population (UK or international literature)
			Male n (%)	Female n (%)	P-value				
<b>Mental health conditions</b>									
Mental health register	40.0 (9.6)	38.2 (11.7)	54 (6.5)	6 (6.2)	1.000	60 (6.5)	0.9% <sup>14</sup>	Not available	
Depression	39.6 (10.4)	38.2 (11.7)	95 (11.4)	13 (13.4)	0.567	108 (11.6)	9.1% <sup>14</sup>	42.1% Glasgow <sup>15</sup> 36% England <sup>16</sup> 29.7% Leicester <sup>17</sup> 50% Dublin <sup>18</sup>	
Alcohol dependence	43.3 (10.2)	37.0 (11.5)	176 (21.2)	22 (22.7)	<0.001	198 (21.3)	1.4% <sup>19</sup>	29% Leicester <sup>17</sup> 56.4% Glasgow <sup>15</sup> 53% Dublin <sup>18</sup> 37.9% Western countries <sup>20</sup>	
Substance dependence	39.5 (7.9)	38.1 (12.0)	109 (13.1)	16 (16.5)	0.102	125 (13.5)	4.3% male, <sup>21</sup> 1.9% female <sup>21</sup>	66% Leicester <sup>17</sup> 62.4% Glasgow <sup>15</sup> 33% Dublin <sup>18</sup> 24.4% Western countries <sup>20</sup>	
<b>Cardiovascular health conditions</b>									
Coronary heart disease register	53.0 (12.0) <sup>a</sup>	38.1 (11.4)	14 (1.7)	0 (0.0)	N/A	14 (1.5)	3.2% <sup>14</sup>	Not available	
Stroke/TIA register	62.0 (34.0) <sup>b</sup>	38.3 (11.5)	3 (0.4)	0 (0.0)	N/A	3 (0.3)	1.7% <sup>14</sup>	20% US <sup>22</sup> 2% Dublin <sup>17</sup>	
Hypertension register	55.0 (13.0)	37.7 (11.2)	37 (4.5)	2 (2.1)	0.420	39 (4.2)	13.8% <sup>14</sup>	27% US <sup>23</sup> 22% Dublin <sup>17</sup>	
Atrial fibrillation register	69.5 (23.0) <sup>a</sup>	38.3 (11.5)	2 (0.2)	0 (0.0)	N/A	2 (0.2)	1.8% <sup>14</sup>	Not available	
<b>Infectious diseases</b>									
Hepatitis C	42.0 (8.6)	38.1 (11.7)	50 (6.0)	8 (8.2)	0.390	58 (6.3)	0.67% <sup>24</sup>	24.8% Glasgow <sup>15</sup> 11.3% Leicester <sup>17</sup> 23% Dublin <sup>18</sup>	
HIV	38.0 (17.0) <sup>b</sup>	38.3 (11.6)	4 (0.5)	2 (2.1)	0.123	6 (0.6)	0.16% <sup>25</sup>	0.5% Leicester <sup>17</sup> 6% Dublin <sup>18</sup>	
Sexually transmitted infections	40.0 (9.4)	38.2 (11.7)	73 (8.8)	14 (14.4)	0.071	87 (9.4)	—	0.9–52.5% US <sup>26</sup> 8% Dublin <sup>17</sup>	

... continued

**Table 2 continued. Prevalence of health conditions among homeless registrants and comparison data with available literature (N = 928)**

Health conditions	Mean age (SD)		Prevalence n (%)		P-value	All registrants n	Prevalence in English or UK general population	Prevalence in homeless population (UK or international literature)
	with the condition, years	with no condition, years	Male n(%)	Female n(%)				
<b>Respiratory illnesses</b>								
COPD register	54.5 (13.0) <sup>a</sup>	38.1 (11.4)	13 (1.6)	1 (1.0)	<0.001	14 (1.5)	1.9% <sup>14</sup>	1.7% Leicester <sup>17</sup> 3% Dublin <sup>18</sup>
Asthma register	42.0 (8.8)	38.2 (11.6)	30 (3.6)	9 (9.3)	0.011	39 (4.2)	5.9% <sup>14</sup>	4–5% UK, Europe, and US <sup>27–29</sup> 1.6% Leicester <sup>17</sup> 21% Dublin <sup>18</sup>
<b>Neurological disorders</b>								
Epilepsy	38.0 (15.0)	38.3 (11.6)	11 (1.3)	2 (2.1)	0.279	13 (1.4)	0.8% <sup>14</sup>	8.1% Paris <sup>30</sup>
Migraine	40.5 (24.0)	38.3 (11.5)	7 (0.8)	3 (3.1)	0.897	10 (1.1)	15% <sup>33</sup>	4% UK <sup>31</sup> 6% Canada <sup>32</sup> 8% Dublin <sup>18</sup> 25–36% Canada <sup>34,35</sup>
Diabetes	54.0 (14.0) <sup>a</sup>	37.9 (11.3)	25 (3.0)	1 (1.0)	<0.001	26 (2.8)	6.7% <sup>14</sup>	8.0% Ireland <sup>36</sup> 6.1% Paris <sup>37</sup> 8.0–12.0% US <sup>23,38</sup> 4% Canada <sup>38</sup> 8% Dublin <sup>18</sup> 3% Dublin <sup>18</sup> 12% England <sup>39</sup> 36% Canada <sup>40</sup> 29.5% Netherlands <sup>41</sup> 39% Japan <sup>42</sup> 6% Dublin <sup>18</sup>
<b>Other chronic health conditions</b>								
Cancer	52.0 (10.0) <sup>a</sup>	38.3 (11.5)	3 (0.4)	1 (1.0)	0.043	4 (0.4)	2.6% <sup>14</sup>	Not available
Learning disabilities	40.0 (29.0) <sup>a</sup>	38.3 (11.5)	3 (0.4)	0 (0.0)	0.763	3 (0.3)	0.5% <sup>14</sup>	10% lifetime prevalence <sup>44</sup> 0.12–15% yearly <sup>45</sup>
Rheumatoid arthritis	40.0 (NA) <sup>a</sup>	38.3 (11.6)	1 (0.1)	0 (0.0)	0.885	1 (0.1)	0.7 <sup>14</sup>	
Leg ulcers	44.1 (10.6)	37.9 (11.5)	51 (6.1)	9 (9.3)	<0.001	60 (6.5)	1% <sup>43</sup>	
GI ulcers or bleed	43.0 (20.0) <sup>a</sup>	38.3 (11.6)	6 (0.7)	0 (0.0)	0.619	6 (0.6)	1.000	

<sup>a</sup>Median (interquartile range). <sup>b</sup>The US has a much larger proportion of African Caribbean population with much higher rates of hypertension; a study from England has found the prevalence of hypertension in those aged <40 years to be just 3.3%<sup>47</sup> and 40.9% in the current study of this (the current study's) participants are <40 years. COPD = chronic obstructive pulmonary disease. GI = gastrointestinal. TIA = transient ischaemic attack.

**Table 3. Emergency department attendance by homeless registrants in past 12 months (N = 928)**

Mean age (SD) of those attending ED, years	Mean age (SD) of those not attending ED, years	Prevalence n (%)			Prevalence data in English or UK general population	Data in homeless population (from other studies in the UK and Ireland, systematic reviews of international literature) <sup>15</sup>
		Male n (%)	Female n (%)	All registrants n (%)		
38.8 (10.3)	38.1 (12.1)	264 (31.8)	38 (39.2)	302 (32.5)	200.2–552.7 per 1000 population (includes repeat attendances) <sup>16</sup>	48.1% Glasgow <sup>15</sup>
		P-value		P-value		
		0.352		0.174		

ED = emergency department.

**Table 4. Key variables associated with attendance at the emergency department by registrants (N = 928)**

Variable	ED attendance, n (%)		P-value	Unadjusted		Adjusted	
	Yes	No		OR	95% CI	OR	95% CI
Alcohol dependence	Yes	106 (46.5)	<0.001	3.14	2.27 to 4.34	<b>2.85</b>	1.96 to 4.15
	No	534 (73.2)					
Substance dependence	Yes	66 (52.8)	<0.001	2.69	1.83 to 3.94	<b>2.31</b>	1.41 to 3.78
	No	236 (29.4)					

ED = emergency department. OR = odds ratio.

In the binary regression analysis, alcohol dependence and substance dependence were associated with emergency department attendance, with adjusted OR 2.85 [95% confidence intervals (CI) = 2.27 to 4.34;  $P < 0.001$ ] and 2.31 [95% CI = 1.83 to 3.94;  $P = 0.001$ ], respectively (Table 4).

## DISCUSSION

### Summary

This study aimed to explore the demographic characteristics, disease prevalence, multimorbidity, and visits to the emergency department by the registrants of a specialist primary healthcare centre for the homeless in the West Midlands. Datasets of all registered 928 patients were retrieved and analysed. Demographic characteristics, a range of health conditions, including alcohol and substance dependence, and emergency department attendance data were explored. This study adds to the limited evidence that exists around the prevalence of health conditions and multimorbidity in homeless people by using a large sample size. This study has demonstrated a high prevalence of multimorbidity, mental health conditions, particularly substance and drug misuse, and infectious diseases, notably hepatitis C, among the homeless population in the area studied compared with the general population.

A high rate of emergency department attendance was observed among the study population. Considering all emergency department visitors among study participants made a minimum of one visit to the emergency department, this translates to approximately 60 times the rate of emergency department attendance made by the general population (as measured in 2011).<sup>48</sup>

### Strengths and limitations

The datasets presented here represents a large sample size of a homeless population and hence adds to the literature. Rigorous methods of analyses were used to explore the link between demography, diagnosed health conditions, and emergency visits among the homeless population and provides extensive comparison with existing datasets from international literature.

Similar to other studies using routinely collected datasets in investigating disease prevalence and multimorbidity, this study relied on the diagnosis of the health conditions being accurately recorded in patient medical records. Therefore, the prevalence of the health conditions and multimorbidity, as identified in this

study, are likely to be an underestimation. Particularly, it was noted that health conditions such as coronary heart disease, stroke, diabetes, cancer, asthma, learning disabilities, and rheumatoid arthritis were found to be under-prevalent in the study participants compared with the findings in the literature.<sup>13</sup>

This study analysed datasets of those who presented at the specialist homeless healthcare centre. This study did not explore how much patients engaged with the practice, therefore, the actual prevalence of the included health conditions may have been under-estimated as patients may be missing scheduled appointments, which makes it likely for key health conditions to go undiagnosed and because of the inclusion of information of those who regularly attend the practice.

#### **Comparison with existing literature**

Substance and/or alcohol dependence have been cited as a cause and consequence of homelessness.<sup>49</sup> Previous studies have looked at the extent of self-harm,<sup>50</sup> and mortality linked to mental health conditions, including suicide, among homeless people.<sup>51</sup> This study demonstrates that substance and alcohol dependence are important risk factors that make homeless populations seek emergency care.

This study has also demonstrated a high rate of multimorbidity among the homeless registrants. Given that the mean age of the registrants of the homeless healthcare centre was 38.3 (SD = 11.5) years, the proportion of patients with at least two long-term health conditions compares with those aged 60–69 years in the general population.<sup>52</sup> The proportion of patients with multimorbidity was identified to be less than that reported in a Scottish study.<sup>53</sup> The reasons for these differences should be explored; however, it is likely that, despite a small sample size in the Scottish study,<sup>53</sup> researchers had access to individual patient medical notes. Similarly, in the current study, the prevalence of mental health conditions, particularly depression and alcohol and substance dependence, despite being higher than in the general population, was lower compared with other studies on the homeless population in the UK.<sup>16,18,20,21</sup>

The prevalence of some cardiovascular health conditions such as hypertension, as well as respiratory health conditions, diabetes, and cancer, was also noted to be lower than other studies on the homeless population in the UK. However, the literature suggests that homeless and socioeconomically disadvantaged people

have higher mortality rates contributed by these health conditions than the general population and those with less deprived backgrounds.<sup>54,55</sup> It is highly likely that some of these conditions were not appropriately coded in patient medical records or potentially underdiagnosed. Health conditions such as hypertension are asymptomatic and it may not be routine practice to record blood pressure in every consultation given the constrained resources that are available in these settings. Information on the length of time the registrants were registered at the practice was not available for this study. Registrants of similar services in other studies have demonstrated that participants also reported using mainstream general practices.<sup>18</sup>

The number of health conditions investigated for the multimorbidity analysis in this study compares favourably with other studies. There are no international standards on how many long-term conditions should feature in the measurement of multimorbidity; however, an average of 18.5 chronic health conditions was featured in a systematic review of the international literature that included 39 studies.<sup>56</sup> The prevalence of all cardiovascular health conditions, COPD, hepatitis C, diabetes, cancer, and leg ulcers was linked to older age, and this supports the epidemiological trend in the general population.<sup>23,57–65</sup> Repeat emergency department attendance by the study population was not investigated. A previous study has identified that homeless people, including rough sleepers, constitute approximately 8% of all repeat users of the service.<sup>7</sup> There is a lack of research investigating in depth the reasons for such repeat attendance. Repeat attendance could be linked to poor general health and lifestyle, as well as non-access to or non-use of available primary healthcare services.<sup>66</sup> Greater use of the emergency department may impact on patient care, as patients seeing a known and trusted clinician in primary care is imperative for ensuring the continuity of care.<sup>67</sup>

#### **Implications for research and practice**

This study provides compelling evidence that there exists a high prevalence of key chronic health conditions and multimorbidity among the homeless population. Although data of only those registered with the specialist general practice were analysed, the data can be carefully extrapolated to those not registered with such services or hidden homeless who often do not declare their



fixed-abode status to their health services providers. Healthcare professionals seeing patients who are homeless are more likely to encounter multimorbidity than in mainstream healthcare centres. The extent of multimorbidity seen in this population is often only encountered in the older population and hence specialist clinical knowledge, alongside multidisciplinary management, is required for many of these patients. Diverse skill sets are imperative at these specialist healthcare centres. Patients with multimorbidity are often disadvantaged because of the fragmentation of care.<sup>53</sup>

The high level of multimorbidity in this population could be linked to socioeconomic deprivation as well as to the uptake of behaviours such as smoking, alcohol, and substance dependence, or both.<sup>53</sup> Public health, NHS, and local government interventions, particularly preventive services in the community and primary care, can help prevent multimorbidity where such outcomes are linked to the implications of the uptake of risky behaviours. The groundwork for further collaboration between such public bodies is already being laid down in the UK, for example, through the Homelessness Reduction Act 2017.<sup>68</sup> The act places emphasis on multi-agency approaches to preventing homelessness and provides an opportunity for public bodies to work more closely with partners and co-produce an approach to homelessness prevention through collaboration and cooperation.

Future longitudinal studies are needed to identify the contribution of key factors linked to multimorbidity. There is a continued need to improve access to mental health including for those with substance and alcohol dependence.

Community screening of bloodborne viruses, particularly opportunistic screening when presenting for other services, as has been piloted in some areas of England,<sup>69</sup> is recommended.

The barriers associated with access and positive experiences around homeless people's use of primary care and wider community services also needs to be addressed, given the health inequalities as demonstrated by this study. Findings of the authors' recent study<sup>66</sup> shows that there are organisational barriers (such as difficulty in registering with a general practice, lack of

integration of services including suboptimal communications and transition of care across services) and patient-related barriers (including lack of knowledge and awareness of primary healthcare services, inadequate skills and capacity to navigate services, and level of health literacy) to access and encounter positive experiences of primary healthcare services among the homeless population. There appears to be confusion around eligibility of people who are homeless registering with a general practice, and patients have often been denied access, contrary to the guidelines that are available, which state that people do not need a fixed address or identification to register or access treatment at GP practices.<sup>70</sup> Awareness of such policy among frontline staff, homeless people, and any partner agencies should be strengthened. Patients are often less aware of specialist services for the homeless people existing in their areas. Provision of such specialist services are often temporary solutions and are mostly located in areas with high homelessness. Long-term planning could incorporate improving capacity in mainstream general practices. Such improvement will require skills in managing multimorbidity and the communication skills required to develop rapport with homeless people, along with minimising perceived stigma and discrimination for this group in the society and healthcare settings.

Emergency department attendance data as reported in this study should be treated with caution because of the possibility of unknown confounders and the chance that visits were not linked to the conditions. It is recommended that data should be supplemented from emergency departments to identify key reasons for repeat attendance.

Future studies should consider using multiple data sources in estimating disease burden. These include consideration of aggregated datasets as used in this study, access to individual medical notes, health-related data available from other partners including housing and the voluntary sector, datasets from outreach services, surveys of homeless populations to gather self-reported data, prescribing and medicines dispensing data, and inclusion of datasets from homeless populations using mainstream services.

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### Provenance

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### Competing interests

The authors have declared no competing interests.

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