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Clinical characteristics, attendance outcomes and deaths of homeless persons in the emergency department: implications for primary healthcare and community prevention programmes

Abstract

Objective

Persons experiencing homelessness (PEH) are known to be often excluded from primary healthcare and community prevention programmes leading to high use of hospital Emergency Departments (EDs). This study aimed to identify demographic features, clinical characteristics, and attendance outcomes of PEH presenting to ED.

Study design

Analysis of routinely collected dataset

Method

Clinical presentations and drug prescription data of PEH who presented a major ED in the West Midlands region of England from 2014-2019 were extracted and analysed using descriptive and inferential statistics.

Results

During the study period 3,271 out of 596,198 presentations were made by PEH; 74% PEH attendees were male. Drug and alcohol-related conditions, as well as pain and injury constituted the most frequent reasons for presentation, contributing to over half of all presentations. A significantly higher proportion of males (n=481, 20.3%) presented with drug and alcohol problems compared to females (n=93, 11.2%) (p=<0.001). However, pain was the primary reason for presentation for twice as many female patients (n=189, 22.8%) compared to males (n=305, 12.9%) (p<0.001). Nearly one in five left ED before being assessed and a total of 39 patients (1.2%) died in the ED and 785 (24.0%) required in-patient admissions to the same hospital.

Conclusions

Drug, alcohol and pain including the need of opioid analgesics constituted the majority of presentations made by PEH in ED. The observed rate of death of PEH in ED is 12 times higher than the general population. A very high proportion of PEH also leave ED before being treated. Future research should focus on strengthening community interventions, particularly to improve access to those at risk of dual diagnoses of substance misuse and mental health problems. Interventions involving multi-sector

collaborations are needed to improve seamless discharge from ED and minimise repeat attendance. Gender differences in the nature of presentations and ED outcomes needs to be investigated further.

Keywords: Drug abuse, emergency department, emergency department utilisation, mental health, homelessness

Clinical characteristics, attendance outcomes and deaths of homeless persons in the emergency department: implications for primary healthcare and community prevention programmes

Background

Homelessness can be defined as a situation where an individual does not have a secure or safe place of residence. This may include residents of homeless shelters, temporary accommodations such as bed and breakfasts, hostels, squats; rough sleepers or those sofa surfing between family and friends' houses.[1] It also includes a persons who are in accommodation but not able to 'reasonably occupy' it such as due to the threat of violence.[2] Homelessness is a widespread issue in the United Kingdom (UK).[3] In recent years, there has been a sharp rise in the number of people sleeping rough.[3,4] Persons experiencing homelessness (PEH) face severe and multiple disadvantages. They are 12 times more likely to die prematurely than the general population[5] with cardiovascular health conditions, drug overdose and accidents contributing to their higher mortality. Health status worsens with the length of time spent as homeless.[6] The negative health consequences of social exclusion are noted to be greater in female than male PEH with average age of death of PEH in England reported to be 43.4 (female) and 45.9 (male) years.[7]

Engaging PEH in research and identifying healthcare needs including the need for emergency healthcare is often challenging. Surveys provide limited information due to missing data from the non-respondents, small sample size of the survey population and lack of reliability of the self-reported data. In addition, homeless populations are also known to have very limited coverage in routine health surveys. Healthcare utilisation data can hence be a useful source of information to explore healthcare needs of this population .

Homelessness is independently associated with high emergency care utilisation; higher rates of presentations to the emergency department (ED) are often linked to their multiple complex needs and the barriers in accessing primary healthcare and substance misuse services.[8,9] Findings from recent studies[10,11] show that PEH face system-related 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 such as lack of knowledge and awareness of primary healthcare services, inadequate skills and health literacy. They are also known to face negative experiences when accessing primary healthcare services such as perceived stigma, thereby preferring to use ED. Many patients are often denied

access to primary care due to their no-fixed abode status, contrary to existing guidelines.[10]

There is a lack of research, particularly in the UK that investigate clinical reasons for which PEH present to ED. Available literature have focused on risk factors that lead to higher ED utilisation amongst ED.[8,9] One previous study conducted within the UK sought to determine how seasonal weather variations affect the rate of attendance of homeless persons in the ED.[12] International literature often shows wide variations in relation to the reasons why PEH present to ED. Such variations may be attributable to diverse study aims. Published studies often tend to focus on presentations in specific clinical areas such as substance and alcohol misuse, mental health,[13,14] and injuries.[15]

Investigating clinical reasons for ED presentations is important to inform appropriate preventive and public health services in the community and primary care, thereby enabling health services providers and commissioners to minimise ED presentations in PEH. This study aimed to identify demographic features, clinical characteristics, and outcomes in relation to ED attendance made by PEH.

Methods

The study was conducted at a Type 1 ED, i.e. a consultant-led 24 hour service with full resuscitation facilities and designated accommodation for the reception of ED in the West Midlands region of England. The study setting is also a designated trauma centre. The ED is located in an urban area and receives approximately 120,000 attendances per year. Data from all patients who presented to the ED between 01/05/2014 and 30/04/2019, and who were assigned a specific demographic code for 'no-fixed-abode', i.e. homelessness were included. In addition to those presenting with no fixed abode, the codes can also be assigned by ED staff when patients refer their domicile as temporary homeless shelters, homelessness health service, sofa surfing or any other forms of homelessness. Data on demographic characteristics, presenting conditions, attendance outcomes and medicines administered during ED stay and to-take-out (TTO) were extracted and anonymised by clinical staff with routine access to clinical records before handing over to the research team. Attendance outcomes enables the identification of how an ED attendance concluded such as further admission to a hospital bed, discharge from ED to patient home or death.

Presenting conditions were clinically re-coded into a smaller number of categories (electronic supplemental material 1). For example, all pain-related conditions were

coded into a single 'pain' category. Ethnicity data were similarly re-coded. All prescription items including ED administered and to-take-out medicines (TTOs) were coded as per British National Formulary (BNF)[16] chapters. BNF is a joint publication of the British Medical Association and the Royal Pharmaceutical Society and is intended to be a rapid reference source of drugs used in the NHS for all healthcare professionals.[16] Drugs are listed as per body systems such as the respiratory and central nervous systems. Data were independently checked for accuracy by two researchers (AG and TS). Both descriptive and inferential statistics were calculated using Microsoft Excel and SPSS v21. Comparison of data across arrival mode, referral source and presenting conditions across gender categories were conducted using Chi-square statistics.. P values ≤0.05 were considered significant.

A national multi-disciplinary stakeholder event was conducted in West Midlands, UK in 2018 by the study researchers prior to undertaking this study.[17] Determining unmet healthcare needs amongst PEH using routinely collected data such as those in the ED was identified as one of the priority research areas by the stakeholders who participated in the workshop.

This study was reviewed and approved by the Ethics Review Panel, University of XXX (2019-35). XXX NHS Foundations Trust classified and approved this study as an audit (CARMS-15434) and further NHS Ethical approval was not required.

Results

Total attendance

A total of 596,198 ED presentations were recorded at the study site during the five year study period. Of these, 3271 (0.55%) were identified to have been made by PEH. Anonymised data relating to PEH attendances were then extracted and subjected to further analyses.

Demography characteristics

The majority of PEH were male, representing 74% (n=2372) of all PEH attendances. The mean age of patients was 39 (standard deviation: 13.5) years (table 1). Ethnicity was not recorded in a third of the cases (32.9%). Excluding the cases with no records of ethnicity, 79.5% (1685 out of 2119) of attendances were made by patients of 'White' ethnicity. Median time spent within the ED was 184 minutes (interquartile range 121-236 minutes). A total of 2,647 (80.9%) attendees were seen within four hours (240 minutes) or less.

Referral sources and arrival modes

Approximately four in five attendees (n=2557, 79.9%) referred themselves to the ED. Referral through primary care/ general practitioner (GP) was low (n=28, 0.008%) (figure 1).

The majority of the patients (n=2109, 65.9%) arrived at the ED via emergency services, e.g. ambulance. Significantly more male patients (n=1672, 70.5%) used emergency services compared to females (n=437 52.7%), ($p<0.001$) (table 2). Significantly more males were brought in by law enforcement agencies, i.e. police officers, compared to females (4.1% vs 1.9%, $p<0.001$).

Clinical reasons for presentation

The most common presenting conditions were related to drug, alcohol or overdose (18.3%, n= 598), followed by pain (n=497, 15.2%), injury (n=431, n=13.2%) and trauma (n= 362, 11.1%). These presentations constituted over half (57.7%, n=1526) of all attendances (table 3).

The presenting conditions differed significantly across the gender categories. For example, a significantly higher proportion of males (n=481, 20.3%) attended with drug and alcohol-related problems compared to females (n=93, 11.2%) ($p=<0.001$). However, pain was the primary reason for presentation for twice as many female attendances (n=189, 22.8%) compared to male (n=305, 12.9%) ($p<0.001$). Presentations such as injury and trauma were more prevalent in male patients compared to the females (table 3). Presentation for psychiatric and behavioural problems as well as for infection, wound/abscesses and respiratory problems each constituted less than 3% of all attendances (table 3).

Drugs prescribed

A total of 636 (19.4%) attendances required drugs to be administered during their stay in the ED (2239 items) and 356 (10.8%) consultations resulted in TTO prescriptions (1866 items). In total, 172 patients required administration of five or more items in the ED. Similarly, 167 patients were discharged with five or more different TTO prescriptions.

Commonly prescribed drugs for both ED administration and TTO included analgesics such as paracetamol and opioids such as codeine, morphine and methadone (table 4). The BNF chapter ‘central nervous system’ (CNS) constituted the highest number of

drugs administered in ED and TTOs (figure 2). These included analgesics, anti-emetics and drugs to treat epilepsy and anxiety. This was followed by BNF chapters 'blood and nutrition' and 'infection' respectively. For prescription drugs administered during ED stay, a total of 5 items out of the top 15 (33.0%) related to analgesia. For the TTO prescriptions, 3 out of the 15 items (20%) related to analgesia.

Outcomes of ED attendance

A total of 18.4% patients left the ED before being assessed (figure 3).The majority of the patients (n=1791, 54.8%) were discharged to healthcare beyond ED such as through inpatient admissions and transfer to another hospital. A total of 39 patients (1.2%) died in the ED including 26 males and 9 females. The majority of patients who died in the ED primarily presented with trauma (n=21, 53.8%) followed by other conditions noted as 'medical alert' (n=15, n=38.5%), cardiovascular disorders (n=2, 5.1%) and pain (n=1, 2.6%). All were brought by emergency services to the ED.

Discussion

This study aimed to identify the demographic characteristics and clinical reasons for all visits made by PEH over a 5-year period at a major ED in the West Midlands. This study shows that drug and alcohol-related conditions, as well as pain including the need for opioid analgesics and injury constituted the most frequent reasons for presentation of PEH to the ED. Triangulation of prescription data for both ED administered and TTO prescriptions also confirmed these findings. Our findings are in line with the systematic reviews of international literature[5] and the data from the Office of National Statistics[7] which show that drug and alcohol-related deaths most commonly contribute to the mortality in PEH.

There is substantial literature on the linkage between homelessness and substance and/or alcohol dependence; these issues are cited as both cause and consequences of homelessness. [5,7,31] This study demonstrates that these problems contribute to homeless persons' most frequent reasons for utilisation of emergency healthcare. Although the presentations due to other health conditions, such as respiratory and cardiovascular health conditions, were lower compared to substance/alcohol dependence, it is important to note that the homeless and socioeconomically disadvantaged populations experience higher mortality rates attributed to respiratory and cardiovascular health conditions, compared to the general population.[18]

The proportion of PEH who died in the ED was approximately 12 times higher than in the general population (1.2% vs 0.1%[19] respectively). A recent systematic review has

suggested that homeless persons have 12 times higher early mortality rate compared to the general population.[5] Our study demonstrates similar extent of inequality in the mortality data in healthcare setting. Comparison of the study dataset with the national datasets of general populations ED attendance in England also suggests that were more likely to be admitted to the same hospital provider following presentation in the ED (24.0% vs 19.1%[19] respectively).

Strengths and limitations

A large sample size was used enhancing the transferability of the findings to other settings. The proportion of people who were identified and coded as 'homeless' accounted for 0.55% of all ED attendances during the study period. This is in line with the best available estimate of the number of homeless persons in England relative to the population size as per 2019 estimates (280,000 homeless persons in 55.98 million (0.5%).[20] However, it is important to note that homeless persons who reside in temporary shelters such as emergency accommodation, hostels or charity services may use corresponding addresses and postcodes when presenting to the ED. Therefore practices to record homelessness in EDs may vary across hospitals. It is likely that rough sleepers are more commonly identified as PEH in the medical records compared to patients experiencing other forms of homelessness. Many patients may also be using the postcode of their last permanent domicile when presenting to health services. It is therefore highly likely that the numbers presented here are an underestimation of the actual number of attendances made by homeless persons. Previous literature suggests that refusal of GP/dentist registration is often associated with repeat ED attendance.[21] We were not able to investigate repeat attendance by PEH given the anonymization of the data and hence the dataset may represent repeat attendance by same PEH. The study setting was a specialist trauma centre. Therefore the observed adverse outcomes, especially the higher incidence of deaths amongst PEH is likely to have been influenced by the nature of the study setting.

Implications for practice

This study has emphasised the continued need to diversify the provision of mental health and substance misuse related support in the community. Prevention measures needs to be further strengthened to address the health inequalities faced by this population. In particular, under-treatment of substance misuse in the community, unsuitable opening hours for PEH, fragmentation of service are key issues that PEH experience when presenting to the services.[10] Previous research demonstrates effectiveness of integrated models of care around reduction in substance misuse, quality of life and mental health improvement, greater motivation to uptake treatment

in relation to integrated models of management.[22-24] In addition, clinical guidelines for substance misuse and mental health need to be further inclusive to dual diagnosis as well as social and community cause and consequences such as homelessness.[25]

Homeless people are known to be less likely to be registered with a mainstream general practice compared to the general population.[26] Documented cases of access being denied in primary care, contravening NHS England guidance, have come to light.[10,27] In an attempt to address such disparities, specialist primary healthcare centres for homeless persons have been established. Whilst such services are often highly regarded by patients,[11] mainstream services need to be adapted to be inclusive of homeless patients. Training and education of frontline staff at mainstream general practices can help to reinforce the registration guidelines. Additionally, distribution of 'My right to access healthcare' cards[28] would provide guidance to homeless individuals about registering at mainstream providers and facilitate self-advocacy.

Further research is required to understand the entry criteria to primary care, mental health and substance misuse services for homeless persons in order to increase accessibility. Our previous study showed that homeless persons will benefit from a lower entry threshold for the criteria to access mental health services.[10] Providers of alcohol and drug, mental health and other services need to have an open door policy for individuals with co-occurring conditions, and to make every contact count[29] and promote self-care.[30,31] Treatment for any of the co-occurring conditions should be available through every contact point. Prevention focused services such as needle exchange, naloxone, opioid optimisation and substitution services needs to be readily available in the community, including through community pharmacies.[32,33] Implementation barriers such as adequate remuneration, privacy, confidentiality, interdisciplinary working and adequate training of staff needs to be addressed to facilitate service provision through pharmacy.[34-37] Pharmacist-led outreach based model have the potential to address many of the barriers to access of healthcare by PEH. A recent evaluation in Glasgow, Scotland showed that intervention involving pharmacist independent prescriber working alongside a social worker conducting outreach engagement at low threshold venues such as streets, city day centres and soup kitchens showed signals of improvement in patient engagement with the healthcare team and minimise repeat ED visits.[38]

There is also a need for compliance with the Homelessness Reduction Act 2017[39] to ensure healthcare settings proactively identify vulnerable people and work collaboratively with social services to offer support. This will aid in the continuity of

care of patients in primary care when being discharged from the ED. There is a duty on these services to refer service users they believe are homeless or threatened with homelessness to a local public housing authority.[39] The duty to refer came into force from October, 2018.

Future studies should consider accessing individual medical notes and health related data from multiple sources to triangulate the findings. There is a need for research investigating repeat attendance and associated reasons. 'Homelessness' appears as one of the disease diagnostic criteria as per the International Classification of Diseases (ICD).[40] However such codes are not often available for ED personnel and where available such coding often seems to be under-utilised, such as in the hospital in-patient setting.

Conclusions

The study shows that drug and alcohol-related conditions, pain and injury constitute the most frequent reasons for utilisation of emergency healthcare by homeless persons. There appears to be significant gender differences in the nature of presentations. PEH mortality rate in the ED is 12 times higher compared to general population. There is a continued need for prevention measures, enhanced service provision at the community level, and multi sector collaborations to maximise opportunities for early interventions and minimise the need for ED utilisation by PEH.

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Conflict of interests

There are no conflicts of interests to declare.

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Table 1: Demographic characteristics of persons experiencing homelessness who presented to the Emergency Department

		Male	Female	Total
Age (valid n*=2606)	Mean age** (± SD)	39 (±13.3)	39 (±14.0)	39 (±13.5)
	Age Range	18-84	18-85	18-85
	18-25	324 (17.1)	143 (20.1)	467 (17.9)
	26-35	494 (26.1)	177 (24.9)	671 (25.7)
	36-45	509 (26.9)	131 (18.4)	640 (24.6)
	46-55	351 (18.5)	191 (26.8)	542 (20.8)
	56-65	138 (7.3)	34 (4.8)	172 (6.6)
	66-75	55 (2.9)	27 (3.8)	82 (3.1)
	76-85	23 (1.2)	9 (1.3)	32 (1.2)
Ethnicity (valid n*=3157)	Asian/Asian British	136 (5.8)	42 (5.2)	178 (5.6)
	Black/African/Caribbean/ Black British	81 (3.5)	12 (1.5)	93 (2.9)
	Mixed/multiple ethnic groups	40 (1.7)	12 (1.5)	52 (1.6)
	White	1181 (50.4)	504 (62.0)	1685 (53.4)
	Other ethnic group	90 (3.8)	21 (2.6)	111 (3.5)
	Ethnicity not coded	816 (34.8)	222 (27.3)	1038 (32.9)

SD: standard deviation; valid n excludes unknown or erroneous entries

Table 2: Arrival mode of persons experiencing homelessness who presented to the Emergency Department from 01/05/2014 to 30/04/2019

Arrival mode	Male (n=2372)	Female (n=830)	Total (n=3271)
Emergency services (e.g. 999, police, helicopter)	1672 (70.5)	437 (52.7)	2109 (65.9)
Ambulance (Transfer)	13 (0.5)	2 (0.2)	15 (0.5)
Foot	214 (9.0)	136 (16.4)	350 (10.9)
Private transport	298 (12.6)	178 (21.4)	476 (14.9)
Public transport	102 (4.3)	46 (5.5)	148 (4.6)
Other	73 (3.1)	31 (3.7)	104 (3.2)

Table 3: Clinical reasons for presentation to the Emergency Department

Presenting conditions	Male n (%)*	Female n(%)*	Total male and female n(%)	Total including gender unknown cases
Drug/Alcohol-related/Overdose	481 (20.3)	93 (11.2)	574 (17.9)	598
Pain	305 (12.9)	189 (22.8)	494 (15.4)	497
Injury	347 (14.6)	80 (9.6)	427 (13.3)	431
Trauma	269 (11.3)	67 (8.1)	336 (10.5)	362
Unwell/Weakness	167 (7.0)	74 (8.9)	241 (7.5)	243
Strange in Manner (SIM)	158 (6.7)	55 (6.6)	213 (6.7)	213
Consciousness impairment	95 (4.0)	27 (3.3)	122 (3.8)	124
Seizure	68 (2.9)	11 (1.3)	79 (2.5)	80
Infection	47 (2.0)	29 (3.5)	76 (2.4)	76
Abscess/Swelling	56 (2.4)	19(2.3)	75(2.3)	75
Wound/Cut/Burn	55 (2.3)	16 (1.9)	71 (2.2)	71
Any psychiatric complaint/disorder	35 (1.5)	18 (2.2)	53 (1.7)	53
Behavioural problems	35 (1.5)	17 (2.0)	52 (1.6)	53
Respiratory complaint	28 (1.2)	17 (2.0)	45 (1.4)	45
Endocrine disorders	27 (1.1)	8 (1.0)	35 (1.1)	36
Bleeding	11 (0.5)	22 (2.7)	33 (1.0)	35
Gastro-intestinal issues	16 (0.7)	10 (1.2)	26 (0.8)	26
Cardiovascular disorders	10 (0.4)	3 (0.4)	13 (0.4)	13
Genito-urinary disorders	3 (0.1)	8 (1.0)	11 (0.3)	11
Other	159 (6.7)	67 (8.1)	226 (7.1)	229
Total	**2372 (100.0)**	**830 (100.0)**	**3202 (100.0)**	**3271**

* % represent proportion within gender categories

Table 4: Top 15 items prescribed during Emergency Department stay and for patients 'to-take-out'

Medicines administered at the ED	n	Medicines prescribed for patients to take out	n
Sodium chloride (saline) flush	199	Paracetamol	181
Paracetamol	183	Codeine Phosphate	99
Sodium chloride	178	Thiamine Hydrochloride	63
Codeine phosphate	77	Vitamin B Compound Strong	57
Morphine sulphate solution 10mg/5ml	77	Co-amoxiclav	54
Hartmann's solution	75	Senna	47
Vitamins B & C	65	Docusate Sodium	44
Co-amoxiclav	64	Lansoprazole	42
Morphine sulphate injection	62	Ferrous Sulfate	37
Ondansetron	60	Flucloxacillin	34
Adsorbed Diphtheria vaccine	58	Pregabalin	31
Tetanus Inactivated Poliomyelitis vaccine	58	Ibuprofen	28
Co-codamol	56	Methadone	25
Flucloxacillin	46	Salbutamol	24
Chlordiazepoxide	37	Quetiapine	23

ED: Emergency department