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BRIEF ORIGINAL RESEARCH

Health service utilization by people experiencing homelessness and engaging with community paramedics: a pre–post study

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Abstract

Objectives To compare health service utilization of patients interacting with a mobile integrated health care program consisting of advanced care paramedics delivering community paramedic care to people experiencing homelessness before and after their initial visit.

Methods ED visits, physician claims, and pharmaceutical dispensations were compared in the year prior to and in the year following the initial community paramedic visit. Administrative databases were linked and utilization rates were calculated and analyzed between periods in this pre–post cohort study.

Results The 1360 community paramedic patients included in this study had no significant change in ED visits (IRR: 1.02) following their initial visit. There were 17,699 ED visits in the pre-period and 18,398 visits in the post-period. There was an observed increase in rates of primary care physician claims (IRR 1.22) and pharmaceutical dispensations from community pharmacies (IRR 1.04). Patients who did not have pharmaceutical dispensations and those without physician claims in the pre-period were significantly less likely to not access these services in the post-period.

Conclusions In the year following the initial community paramedic visit there were small but significant increases in community-based care utilization of people experiencing homelessness. These data suggest that the continued development and implementation of paramedics as part of an interdisciplinary care team can increase access to care for a traditionally underserved population with complex health needs. Patients would likely benefit from the integration of community paramedics in community-based management that aim to improve access to care following ED visits.

Keywords Emergency department visits · Paramedic · Community paramedic · Mobile integrated health care · Homelessness

Résumé

Objectifs Comparer l'utilisation des services de santé des patients interagissant avec un programme de soins de santé mobile intégrés composé d'ambulanciers paramédicaux de soins avancés fournissant des soins paramédicaux communautaires aux personnes sans domicile fixe avant et après leur visite initiale.

Méthodes Les visites aux urgences, les demandes de remboursement des médecins et les prescriptions pharmaceutiques ont été comparées dans l'année précédant et dans l'année suivant la visite initiale du personnel paramédical communautaire.

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Les bases de données administratives ont été reliées, et les taux d'utilisation ont été calculés et analysés entre les périodes dans cette étude de cohorte avant et après.

Résultats Les 1 360 patients paramédicaux communautaires inclus dans cette étude n'ont pas connu de changement significatif dans les visites aux urgences (IRR : 1,02) après leur visite initiale. Il y a eu 17 699 visites aux urgences dans la pré-période et 18 398 visites dans la post-période. On a observé une augmentation des taux de demandes de remboursement des médecins de soins primaires (IRR : 1,22) et des dispensations de produits pharmaceutiques par les pharmacies communautaires (IRR : 1,04). Les patients qui n'ont pas bénéficié d'une dispensation de produits pharmaceutiques et ceux qui n'ont pas fait l'objet d'une demande de remboursement par un médecin au cours de la période précédente étaient significativement moins susceptibles de ne pas avoir accès à ces services au cours de la période suivante.

Conclusions Au cours de l'année qui a suivi la première visite du personnel paramédical communautaire, on a constaté une augmentation faible mais significative de l'utilisation des soins communautaires par les personnes sans domicile. Ces données suggèrent que le développement et la mise en œuvre continus des ambulanciers paramédicaux au sein d'une équipe de soins interdisciplinaire peuvent accroître l'accès aux soins pour une population traditionnellement mal desservie et présentant des besoins de santé complexes. Les patients bénéficieraient probablement de l'intégration des ambulanciers communautaires dans la gestion communautaire qui vise à améliorer l'accès aux soins après une visite aux urgences.

Mots-clés Visites aux urgences · Ambulanciers paramédicaux · Ambulanciers paramédicaux communautaires · Soins de santé mobiles intégrés · Sans-abrisme

Clinician's capsule

What is known about the topic?
People experiencing homelessness have higher rates of ED visits and decreased utilization of community-based care when compared to the general population.

What did the study ask?
What was the impact of a mobile integrated health care program with community paramedics delivering care to people experiencing homelessness on health service utilization before and after the initial visit?

What did the study find?
Emergency department visits were unchanged following the initial visit, while there were significant increases in community-based care.

Why does this study matter to clinicians?
Integrating paramedic care into health systems could reduce barriers to care and improve access for underserved populations.

Introduction

Mobile integrated health care programs involve community paramedics providing episodic care with an intent to reduce barriers that patients encounter when accessing health services [1]. Mobile integrated health care programs are heterogeneous, but in general they aim to improve access to care for patients with complex health needs by leveraging existing paramedic resources and skills [2, 3].

People experiencing homelessness have complex health needs and a disproportionate incidence of addictions and mental health issues that are not appropriately addressed by the health system [4]. In Canada people experiencing homelessness have higher rates of ED visits when compared to the general population and lower rates of primary care utilization [5, 6]. Chen et al. suggested that connecting high-system users of EDs to existing resources that increase primary care access may improve both ED utilization and patient outcomes [7]. Likewise, ED-initiated interventions for people experiencing homelessness are found to be effective at improving their social determinants of health and access to primary care [8].

Studies describing mobile integrated health care programs have focused predominantly on paramedic service utilization, including ambulance events and ED transports [9, 10]. As such, the study of these programs has not focused on the utilization of primary care as a measure of effectiveness.

In studying access to other health services, such as primary care visits and community pharmacy drug dispensations, we improve the understanding of how patients experiencing adverse social conditions access care outside of acute settings. The objective of this study was to compare the ED visit rates as well as community pharmacy drug dispensations and primary care physician claims for those interacting with a community paramedic health care team before and after their initial visit.

Methods

Study design

This pre–post cohort study compared the utilization of ED and community-based care of patients in the 12-months prior to their initial community paramedic visit (the pre-period) and in the 12-months after the initial visit (the post-period) (Supplementary Information, Fig. 1). This study received ethical approval from the University of Calgary Conjoint Health Research Ethics Board with a waiver of informed consent (REB19-1335).

Study setting

A community paramedic team was implemented in Calgary in April 2016 to address the unmet health care needs of people experiencing homelessness and patients with substance use and mental health disorders. This specialized team consists of two community paramedics operating outside of the emergency response system that respond to diverse community settings for referrals from partner agencies and health care providers, including emergency department and urgent care center physicians. The advanced care paramedics of the community paramedic team provide care for chronic and acute health conditions in individuals suffering from adverse socio-economic circumstances and who have had negative experiences accessing facility-based care. The community paramedic team works with a cross-disciplinary approach that includes partnerships with consulting physicians as well as social services that aim to address the social determinants of health of people experiencing homelessness.

Study cohort

This study cohort includes individuals receiving treatment from the community paramedic team from its implementation to December 31, 2018 (Supplementary Information, Fig. 2). Patients that were over 18 years of age throughout the study period and were enrolled in the provincial public health insurance plan were included in the study. The study cohort was identified using patient data from a community paramedic scheduling database.

Data sources

Data from each community paramedic visit were used to determine patient characteristics and identify the study cohort. Each ED visit was recorded in the National Ambulatory Care Reporting System (NACRS), which contains data from all ED and outpatient care encounters in the province. Pharmaceutical dispensation data were obtained from the provincial Pharmaceutical Information Network that contains data on prescription drugs dispensed through community pharmacies. Physician claims data were available through the provincial physician claims database. Databases were linked deterministically using the unique provincial health number that is assigned to each provincial resident eligible for public health coverage, an exact deterministic linkage strategy was used that incorporated the patient date of birth.

Analysis and outcomes

Zero-inflated Poisson regression models were used to compare the pre- and post-period ED visits, physician claims, and pharmaceutical dispensation estimates. Zero counts were observed in patients who received no services in the year preceding the initial community paramedic visit. Data were censored for those that died in the post-period.

Results

Study cohort characteristics

The study cohort consisted of 1360 unique patients with a total of 4760 community paramedic visits in the year following their initial visit (Supplementary Information, Table 1).

Emergency department visits

The rate of ED visits did not significantly change between periods (Table 1) with an incidence rate ratio of 1.02 (95% CI 0.996–1.04). There was a total of 17,699 ED visits in the pre-period and 18,639 in the post-period. Patients without an ED visit in the pre-period saw no difference in their odds of having visits following their initial community paramedic visit.

Community-based care

Primary care physician claims increased by 14.9 per person between periods (Table 1). The rate of prescription dispensations increased following the initial community paramedic visit from 81.0 to 102.9 dispensations (Table 1). The high rate of prescription drug dispensations corresponds with opioid agonist therapy where patients present to community pharmacies frequently for dispensations, in many instances daily.

Table 1 Health service utilization of community paramedic patients by period

	Number of patients with zero counts (%)	Rate per person 12-months (SD)
Emergency department		
Pre-period ($n=17,669$)	154 (11.3)	13.0 (20.5)
Post-period ($n=18,398$)	94 (6.9)	14.9 (28.8)
Incidence rate ratio (95% CI)	–	1.02 (0.996–1.04)
Primary care physician claims		
Pre-period ($n=32,272$)	77 (5.7)	23.7 (26.5)
Post-period ($n=40,561$)	34 (2.5)	38.6 (79.4)
Incidence rate ratio (95% CI)	–	1.22* (1.20–1.24)
Pharmaceutical dispensations		
Pre-period ($n=110,190$)	166 (12.2)	81.0 (229.4)
Post-period ($n=133,706$)	121 (8.9)	102.9 (241.9)
Incidence rate ratio (95% CI)	–	1.04* (1.03–1.05)

CI confidence interval, *SD* standard deviation

*$p<0.001$

Patients without pharmaceutical drug claims in the pre-period were significantly less likely to have no claims in the post-period (IRR 0.19, 95% CI 0.15–0.26). The shift from receiving no claims in the pre-period to receiving care in the post-period was a similar finding in patients who did not have primary physician claims in the year prior to their initial community paramedic visit (IRR 0.43, 95% CI 0.28–0.64).

Discussion

Interpretation of findings

Our study found that following the initial community paramedic visit patients had increased utilization of community-based services, including primary care physician visits and community pharmacy dispensations, although there was no decrease in ED use. Patients that had no pharmaceutical dispensations from a community pharmacy or physician claims in the year prior to the initial community paramedic visit had a significantly higher likelihood of accessing these services in the post-period. This higher likelihood of accessing care suggests that following the initial community paramedic visit patients experienced improved access to health services resulting in increased utilization.

Comparison to previous studies

The rate of ED visits being comparable between period is an important finding and differs from previous studies that identified that mobile integrated health care programs reduced ED visits. This finding suggests that there are multiple confounding factors to ED utilization including risks associated with substance use, disease progression, and willingness to access facility-based care.

Strengths and limitations

Our study describes the ED utilization of a large sample of people experiencing homelessness in a major Canadian center who are typically difficult to define using administrative data. The linkage of multiple health databases provides insight into health service utilization between multiple health disciplines and provides a better understanding of how people experiencing homelessness access health services.

There were limitations to this study. Data on patient diversity, including gender and race, were not available and prevented stratified analyses. Diversity-based analyses could provide knowledge on the impacts of community paramedic care on population groups who experience health service inequities. These analyses could inform equity-oriented approaches to care that aim to improve health service access and utilization in underserved populations. The one-year post-period may be insufficient to demonstrate a reduction in ED utilization, a longer study period would be more informative on the impact of community paramedic care on ED utilization.

As with other cohort studies, our study used health administrative data that were not collected primarily for research purposes and are dependent on the quality of clinician documentation. The potential that these data were incorrectly documented would lead to the possibility of an underestimate of health service utilization. An underestimate of health service utilization would not invalidate the findings of this study.

Clinical implications

As an outreach service and having established pathways to care, community paramedics are well-positioned to increase access to community-based health services for patients experiencing homelessness and those with addictions and mental health disorders by providing treatment and connecting patients to primary care. To address their unmet health needs and improve access to care, it would likely benefit patients experiencing homelessness for ED providers to partner with community-based health services, such as community

paramedic programs, that are designed for these specific populations.

Conclusion

In a cohort of patients with complex social and health needs there was no significant change to the utilization of EDs following community paramedic care. However, higher rates of community-based health services were observed; this finding is important given that people experiencing homelessness face barriers to primary care. Acute care, including ED and paramedic services, would benefit from continuing to integrate and measure performance within the broader health system to study program success.

Supplementary Information The online version contains supplementary material available at https://doi.org/10.1007/s43678-022-00387-w.

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Declarations

Conflict of interest The authors report no conflicts of interest.

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