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Review Article

Addressing healthcare disparities in homeless neurosurgical patients: A comprehensive literature review on strategies for equitable care and improved outcomes

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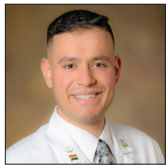
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ABSTRACT

Background: Homelessness is a growing concern in the US, with 3.5 million people experiencing it annually and 600,000 on any given night. Homeless individuals face increased vulnerability to 30-day hospital readmissions and higher mortality rates, straining the healthcare system and exacerbating existing disparities. This study aims to inform neurosurgeons on evidence-based strategies to reduce readmission and mortality rates among homeless patients by reviewing the literature on the impact of medical respite on 30-day readmission rates. The study aims to gauge the efficacy of medical respite in reducing hospital readmissions and improving health outcomes for homeless individuals.

Methods: A comprehensive literature search was conducted across PubMed, Embase/Medline, and Cochrane databases, as well as consulting the National Institute for Medical Respite Care and the Department of Health Care Access and Information. Ten articles were chosen from an initial 296 to investigate the impact of respite programs on readmission rates among homeless patients.

Results: Homeless patients experience high readmission rates due to various factors. Interventions such as respite programs and a comprehensive approach to healthcare can lower these rates. Collaboration between hospitals and medical respites has proven particularly effective.

Conclusion: Inadequate healthcare for homeless individuals leads to increased readmissions, longer hospital stays, and higher costs. Medical respites are a viable solution, but limited resources hamper their effectiveness. Therefore, it is crucial to facilitate cooperation between hospitals, respites, and other entities. Future research should focus on disparity in neurosurgical procedures and explore alternative services. An interdisciplinary approach is key to addressing healthcare inequalities.

Keywords: Healthcare disparities, Homelessness, Interdisciplinary collaboration, Medical respite, Neurosurgery

INTRODUCTION

The persistent challenge of unequal healthcare delivery affects numerous populations, with the homeless population being particularly susceptible to elevated rates of 30-day hospital readmissions and increased mortality.[8] The pressing nature of this issue is further amplified by the growing prevalence of homelessness in the United States, with an estimated 3.5 million people experiencing homelessness annually and 600,000 individuals facing homelessness on

any given night.[8,9] Unplanned hospital readmissions for homeless patients have become a significant concern in the healthcare industry as they can result in increased healthcare costs and strain the healthcare system while negatively affecting patients' health outcomes.[9,10] These readmissions are often seen as potential markers of incomplete treatment, insufficient coordination of health services after discharge, or as a reflection of healthcare disparities.[8,10] Despite numerous studies exploring the disparity between homelessness and equitable care, as well as readmission and mortality rates, there has yet to be any research conducted specifically concerning equitable neurosurgical care for homeless patients. Given the scarcity of data, this academic work will draw on strategies demonstrated to enhance equitable patient care. The aim is to assist practicing neurosurgeons in incorporating these strategies into their clinical practice for the betterment of neurosurgical patients.

The higher risk of hospital readmission among homeless individuals across various treatment categories, including chronic respiratory disease and acute myocardial infarction (AMI), underscores the existence of healthcare disparities in this population.[1] The increased readmission rates among homeless patients treated for AMI may be attributed to higher rates of psychiatric comorbidities and their impact on their health and the 30-day readmission rate.[1] This highlights the need for addressing the social determinants of health and promoting equitable care to reduce hospital readmission rates among the homeless population. Research has shown that patients who are placed into medical respite have a 50% reduction in the odds of readmission 90 days post-discharge compared to those who were back on the street or at other shelters.[6] This is due to its customizable nature, which includes 24-hour nursing care, on-site physicians, and nurse practitioners.[6] Ensuring equitable care is critical for optimal medical care, regardless of socioeconomic status, and has the potential to decrease readmission rates.[6]

The present study draws on a comprehensive literature review examining the 30-day readmission rates of homeless patients to elucidate the existing disparities for neurosurgeons. Our findings reveal that homeless individuals experience higher 30-day readmission and mortality rates compared to their non-homeless counterparts. This study was motivated by the scarcity of extant literature addressing the provision of equitable care for homeless patients within the realm of neurosurgery. To the best of our knowledge, no prior research has specifically tackled this pressing issue. A thorough exploration of available sources highlights the prevailing inequities in healthcare for homeless individuals. Consequently, the primary objective of this study is to utilize the existing literature to inform neurosurgeons on the implementation of evidence-based strategies that ultimately aim to reduce readmission and mortality rates among the homeless patient population.

MATERIALS AND METHODS

We conducted a comprehensive and rigorous literature search encompassing PubMed, Embase/Medline, and Cochrane databases, to investigate the influence of medical respite on readmission rates among homeless patients. This search spanned from the inception of each database up to March 2023.

Our initial search strategy incorporated the following terms: "Homeless" "readmission" "rate," "homelessness" "readmission" "rate," and "homeless" or "homelessness" "readmission" "rate." To expand the scope of our inquiry, we performed a secondary search using the terms "medical respite" and "readmission." Finally, we conducted a tertiary search employing the terms "homeless patients" and "neurosurgery." Articles were deemed relevant if they examined the impact of medical respite on homeless readmission rates.

To supplement our findings with the most recent data on medical respite and homeless hospitalization in California, we consulted both the National Institute for Medical Respite Care and the Department of Health Care Access and Information website. We also cited an article from outside the search criteria. Furthermore, we enriched our analysis by referencing an article that, while falling outside our initial search parameters, provided valuable insight.

Our systematic search strategy, aligned with the PRISMA 2020 guidelines, is illustrated in Figure 1. The preliminary database search yielded a total of 296 articles, of which 147 were excluded due to duplication, leaving 149 articles for initial screening. After reviewing the titles and abstracts, we excluded 96 articles as they were determined to be outside the scope of our research question. Consequently, 53 articles were subjected to full-text retrieval, though 11 were unattainable, leaving 42 articles for eligibility assessment.

On meticulous evaluation of the remaining articles, 32 were deemed not relevant to the objectives of our systematic review and were subsequently excluded. Thus, our final analysis included ten articles, which constituted the foundation of our comprehensive review, with eight of these articles directly cited in Table 1.

Overview of the articles

Of the eight distinct articles that are incorporated, four of these studies employed secondary data analysis, utilizing existing national or state databases such as the state inpatient database, the state emergency department (ED) database, the American Hospital Association Annual Survey, the American College of Surgeons National Surgical Quality Improvement Program database, and the National Readmission Database.

Three of the studies under examination were single-center investigations, focusing on data collected from individual hospitals. One of these investigations was particularly unique,
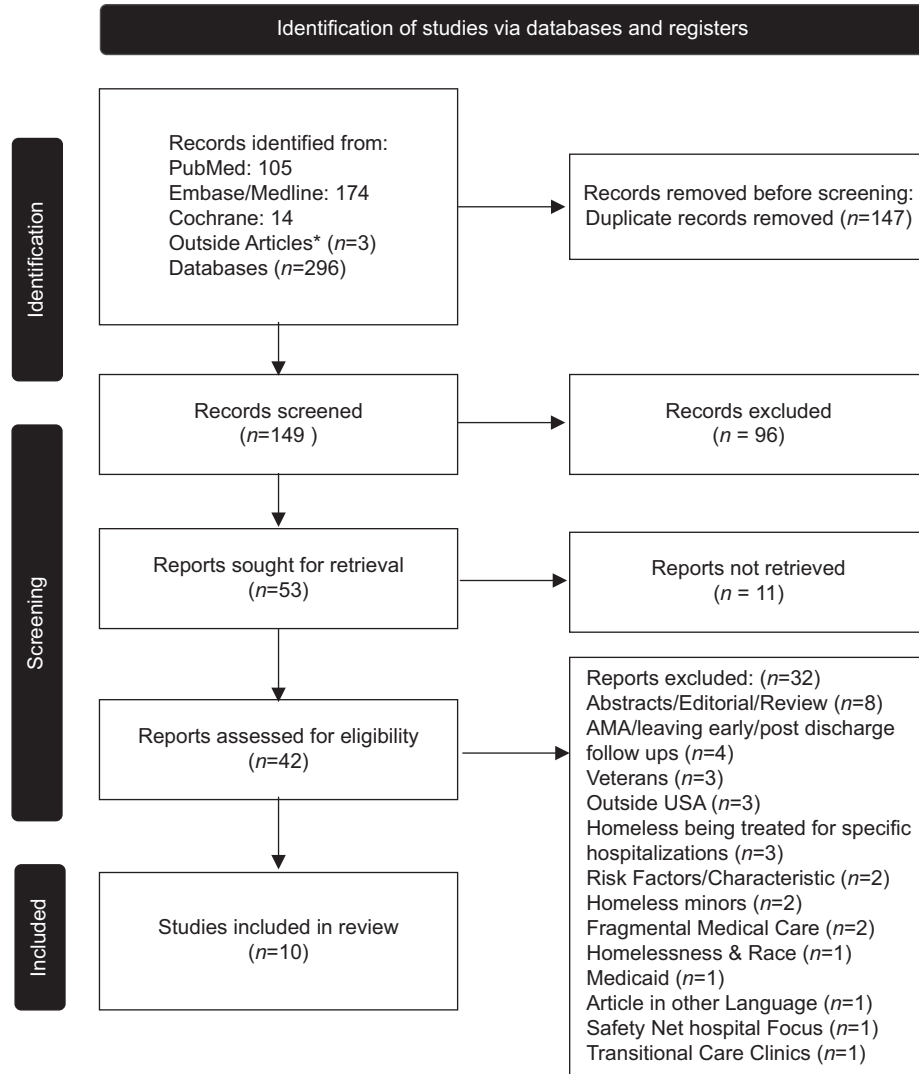
Identification of studies via databases and registers

Identification

Records identified from:
PubMed: 105
Embase/Medline: 174
Cochrane: 14
Outside Articles* (*n*=3)
Databases (*n*=296)

→

Records removed before screening:
Duplicate records removed (*n*=147)

Screening

Records screened
(*n*=149)

→

Records excluded
(*n* = 96)

Reports sought for retrieval
(*n*=53)

→

Reports not retrieved
(*n* = 11)

Reports assessed for eligibility
(*n*=42)

→

Reports excluded: (*n*=32)
Abstracts/Editorial/Review (*n*=8)
AMA/leaving early/post discharge follow ups (*n*=4)
Veterans (*n*=3)
Outside USA (*n*=3)
Homeless being treated for specific hospitalizations (*n*=3)
Risk Factors/Characteristic (*n*=2)
Homeless minors (*n*=2)
Fragmental Medical Care (*n*=2)
Homelessness & Race (*n*=1)
Medicaid (*n*=1)
Article in other Language (*n*=1)
Safety Net hospital Focus (*n*=1)
Transitional Care Clinics (*n*=1)

Included

Studies included in review
(*n*=10)

Figure 1: Reducing homelessness recidivism: A Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guided literature review on effective strategies. *Articles that were discovered beyond the established search parameters have been annotated with the appropriate citation designations. AMA: Against Medical Advice.

as it targeted the homeless population residing in shelters in Toronto, Canada.

On close examination of the methodologies employed in the eight articles included in this review, it was observed that seven of the studies utilized retrospective research designs, whereas one study implemented a Community-Based Participatory Research Program. The rigorous nature of these research approaches lends credence to the findings and conclusions drawn from the body of literature reviewed.

RESULTS

In our review of the research, we found that the studies focused on four main areas related to hospitalization for the homeless, even though their methods were different. These areas included:

1. How homelessness contributes to higher 30-day hospital readmission rates
2. Substance abuse and injuries: the dual dilemma exacerbating health struggles for the homeless
3. Unveiling the impact on homeless patients' health, hospital care, and recovery
4. Optimizing healthcare interventions to minimize hospital readmissions among homeless populations.

This research has helped us understand the many factors that affect the healthcare experiences of homeless people, giving us a starting point for future studies and new approaches to address these important issues. Further,

Table 1: Summary of the literature review.

Authors	Methods	Result
Cole *et al.* (2023)	Retrospective cross-sectional study of adult acute TBI patients at a Level 1 trauma center (2015–2020), analyzing treatment outcomes using various statistical tests with *P*<0.05 significance threshold.	In a study of 1308 neurotrauma patients, 8.5% were homeless, predominantly male and younger; these patients had more severe injuries, higher complication rates, and longer hospital stays, with homelessness being the strongest predictor of unplanned readmission, followed by factors such as lower Glasgow coma scale score and younger age.
Miyawaki *et al.* (2020)	Performed a retrospective study on the link between homelessness, hospital teaching status, and readmission/ED revisit rates in adult patients using logistic regression models.	Homeless patients experience higher healthcare utilization, but teaching hospitals demonstrate better outcomes for them, with lower readmissions and ED revisits compared to non-teaching hospitals.
Miyawaki *et al.* (2020)	Retrospective cohort study analyzing 2014 data on homeless status, site of care, and 30-day readmission/ED visits, using multivariable logistic regression models for comparison.	Homeless inpatients (3.8%) had unique profiles and higher readmission/ED visit rates; they had better outcomes at homeless-serving hospitals with no impact on non-homeless patients.
Saab *et al.* (2016)	An observational study comparing unplanned medical/surgical readmission rates in 1165 homeless adults versus low-income controls in Toronto within 30 days post-hospital discharge.	Homeless people have increased hospital readmissions due to issues like drug poisoning and pneumonia. Primary care physicians can connect them to community resources and respite care to address this problem.
Balla *et al.* (2020)	The study analyzes AMI patient data from NRD across 27 states, comparing homeless and non-homeless adults using statistical tests and propensity score matching, focusing on 30-day readmission rates and reasons (2015–2016).	Homeless AMI patients exhibit unique demographic characteristics, higher rates of mental health and substance abuse issues, and face disparities in treatment access while experiencing similar mortality, longer hospital stays, and higher readmission rates.
Kertesz *et al.* (2009)	The study analyzed 1998–2001 BMC homeless adult admissions and outpatient encounters at BHCHP, comparing 90-day readmissions and costs for respite, own care, and other planned care using multivariable logistic regression and propensity scores.	Respite patients, characterized by older age, specific substance abuse patterns, and predominantly white ethnicity, experienced longer hospital stays, higher readmission rates, and increased costs compared to own-care patients.
Kassin *et al.* (2012)	In a retrospective study at Emory University Hospital, 135 variables in General Surgery procedures were analyzed to determine factors related to 30-day hospital readmission using statistical methods.	The study shows an 11.3% general surgery readmission rate, with increased risks for specific patient groups, complications, and procedures.
Doran *et al.* (2015)	YNHH's CBPR resulted in a Medicaid-funded 12-bed respite program at Columbus House, being evaluated through a federally-funded study by the Center for Medicare and Medicaid Innovation.	Medical respite program significantly reduces 30-day readmission rates for homeless patients, fostering positive impacts on hospitals and communities through CBPR-driven multi-stakeholder collaboration and rigorous evaluation.

ED: Emergency department, AMI: Acute myocardial infarction, TBI: Traumatic brain injury, NRD: National Readmission Database, BMC: Boston Medical Center, BHCHP: Boston Health Care for the Homeless Program, YNHH: Yale-New Haven Hospital, CBPR: Community-Based Participatory Research

elaboration on these four issues are discussed down below.

How homelessness contributes to higher 30-day hospital readmission rates

Numerous articles have reported that individuals labeled as homeless experience higher hospital 30-day readmission rates.[3,8-10] While the definition of homelessness may vary, it is commonly described as residing in a shelter, public place, abandoned building, or vehicle or temporarily staying with another person within the previous seven days without having a place of their own.[10] Factors that may contribute to differences in care for homeless patients include the proficiency of teaching hospitals in managing patients with unstable housing and their ability to foster relationships with local governments and social service organizations.[8]

In addition, studies have shown that homeless patients have higher rates of 30-day readmissions and ED visits after hospital discharge compared to non-homeless patients.[7] Hospitals

with greater experience in treating homeless patients may provide better discharge planning and care coordination, resulting in lower rates of revisits post-discharge.[3,8] Potential factors contributing to the increased burden of readmissions and ED visits among homeless patients encompass inadequate insurance coverage, limited financial and social resources, challenges with medications and medical devices, environmental hardships of living on the streets or in shelters, comorbidities such as substance use disorders and mental health issues, and lower educational levels or health literacy.[1,9] Significantly higher 30-day readmission rates have been observed in homeless patients, with a larger proportion of these readmissions attributed to psychiatric causes.[1,2]

Teaching hospitals may be particularly adept at managing care for homeless individuals due to their investment in resources and care processes tailored to this population.[8,9] They may also possess more robust discharge planning procedures and greater availability of social workers and care managers. However, evidence remains limited as to whether teaching hospitals consistently outperform non-teaching hospitals in treating homeless patients.[2,8]

Substance abuse and injuries: The dual dilemma exacerbating health struggles for the homeless

In the literature review search, we discovered that homeless patients had a heightened incidence of traumatic brain injuries on admission and frequently engaged in smoking, alcohol consumption, and illegal drug use.[2] Demographic analysis revealed that these patients were predominantly younger males from racial and ethnic minority backgrounds.[1,2,8,9] They were also more likely to rely on Medicaid and face challenges with alcohol and drug addiction, leading to a higher probability of hospital admission due to drug poisoning or toxic effects, with pneumonia being the next common reason.[1,8,9]

On examining risk factors for unexpected readmissions, homelessness emerged as the most influential predictor.[2] Other notable factors contributing to increased readmission risk encompassed lower Glasgow coma scale scores at admission, younger age, abbreviated intensive care unit stays, inpatient complications, and elevated Charlson comorbidity index scores.[2] Intriguingly, Cole *et al.* study findings indicated that smoking, substance abuse, and the necessity for neurosurgical intervention during the initial hospital stay did not directly impact the likelihood of unplanned readmission.[2]

Unveiling the impact on homeless patients' health, hospital care, and recovery

Chronic morbidity, inadequate living conditions, and limited access to outpatient care contribute significantly to the high readmission rates among homeless patients.[8,10] This vulnerable population faces alarmingly high 30-day readmission rates,

primarily due to the absence of suitable discharge options and secure environments for long-term recovery.[8,9] Furthermore, the quality of hospital treatment may vary between homeless and non-homeless patients.[8,9] For instance, homeless patients with AMI are less likely to receive angiography, percutaneous coronary intervention, or coronary artery bypass grafting and more likely to be given a bare-metal stent compared to non-homeless patients.[1]

Adopting a comprehensive approach to patient care, which involves addressing both their acute conditions and overall well-being, could lead to more effective treatment outcomes.[10] Studies have revealed concerning readmission rates among homeless patients, with one Boston hospital reporting a 90-day readmission rate of 21.2% and another mid-sized northeastern US city hospital observing a 30-day readmission rate of 50.8%.[10] By understanding and addressing the unique challenges faced by homeless patients, healthcare providers can work to reduce these high readmission rates and improve patient care.[10]

Optimizing healthcare interventions to minimize hospital readmissions among homeless populations

The study found that patients who received care at Boston's respite program had a significantly lower likelihood of being readmitted to the hospital within 90 days compared to patients who received their care.[6] The program, which was established in 1987, offers round-the-clock nursing care, daily visits from nurse practitioners or physician assistants, on-site medical supervision, dental and psychiatric care, and case management.[6] This comprehensive approach has helped to alleviate the burden on local hospitals by freeing up acute inpatient services.[6] To further improve the health outcomes of this vulnerable population, it may be beneficial to provide additional resources such as intensive case management, increased access to ambulatory healthcare services, and a "housing first" approach to promote housing stability.[2,6] Future studies are needed to address this critical public health issue and implement policy changes to reduce high readmission rates.[2,3,8] Hospitals with more experience in caring for homeless patients may offer better discharge planning and coordination, resulting in lower revisit rates after discharge.[8,9] Primary care physicians could also play a role in reducing readmissions among homeless patients by connecting them to available community resources and discharging them to respite care.[10]

A comprehensive review of programs targeting the healthcare needs of the homeless has revealed a promising reduction in hospital readmission rates. To build on this progress, we advocate for an expanded collaborative care network, as visualized in Figure 2. This network would unify street medicine, case management, coordinated care, and medical respite services to form a cohesive system. The model
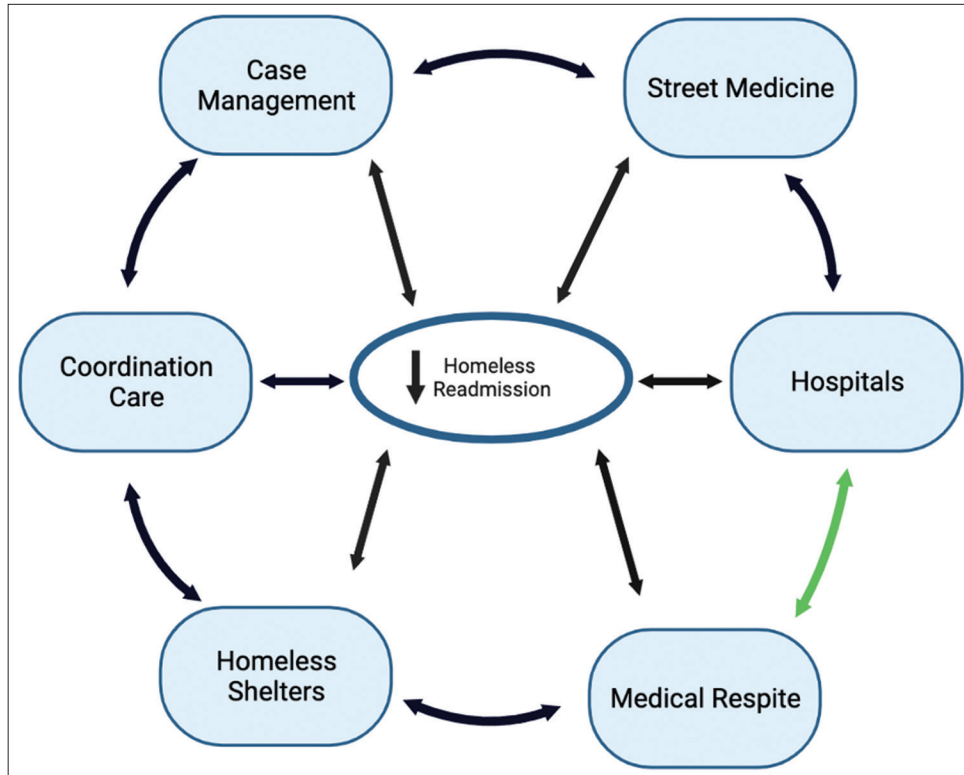
Figure 2: Collaborative care network: Reducing readmissions. The flywheel model illustrates the impact of collaboration on outcomes and suggests that further reductions in homeless readmission may be attainable by incorporating additional resources such as street medicine teams, case managers, coordination of care, and homeless shelters.

illustrated, often referred to as the flywheel, demonstrates how interlinked healthcare services can further drive down readmissions. It highlights the dynamic relationship between diverse care provisions and their collective impact on patient outcomes. Specifically, the model suggests that while individual contributions from hospitals and medical respites are impactful, a synergistic approach may yield even more substantial reductions in readmissions. This integrated strategy emphasizes the importance of a seamless transition between inpatient care and community-based support, ensuring that the homeless population receives continuous and comprehensive care.

The model underscores the potential benefits of these collaborations, signifying that further reductions may be possible by integrating resources from healthcare networks such as medical respites, hospitals, street medicine teams, case managers, care coordinators, and homeless shelters. The green arrow in the model connotes that while hospitals and medical respites individually contribute to decreased readmission rates, a collaborative approach might lead to a more significant decrease in readmissions.

Our proposal includes an innovative approach through the integration of an electronic medical record system and a

live vacancy system for post-discharge recovery spots. This integration, facilitated by technology, is poised to enhance collaborative efforts. Once a robust system is in place, other elements of the flywheel model can be incorporated, thereby fostering an integrated care system for homeless patients.

The observed decrease in readmission rates following the implementation of this collaborative model highlights the significance of inter-organizational cooperation in mitigating health disparities and reducing readmission rates among the homeless population. Neurosurgeons can contribute considerably to these efforts by acquainting themselves with available resources and coordinating with case managers and care coordinators to ensure homeless patients receive necessary postoperative care.

The integration of these resources through a software application, as illustrated in Figure 3, may offer a promising solution for improving healthcare provision for the homeless population. The theoretic diagram illustrates how resources (green), in collaboration with hospitals (blue), can integrate with the Mayo Clinic healthcare system through a software application. This enables technology to facilitate interdisciplinary collaboration among medical professionals and provide real-time notifications of available medical respite beds, which is
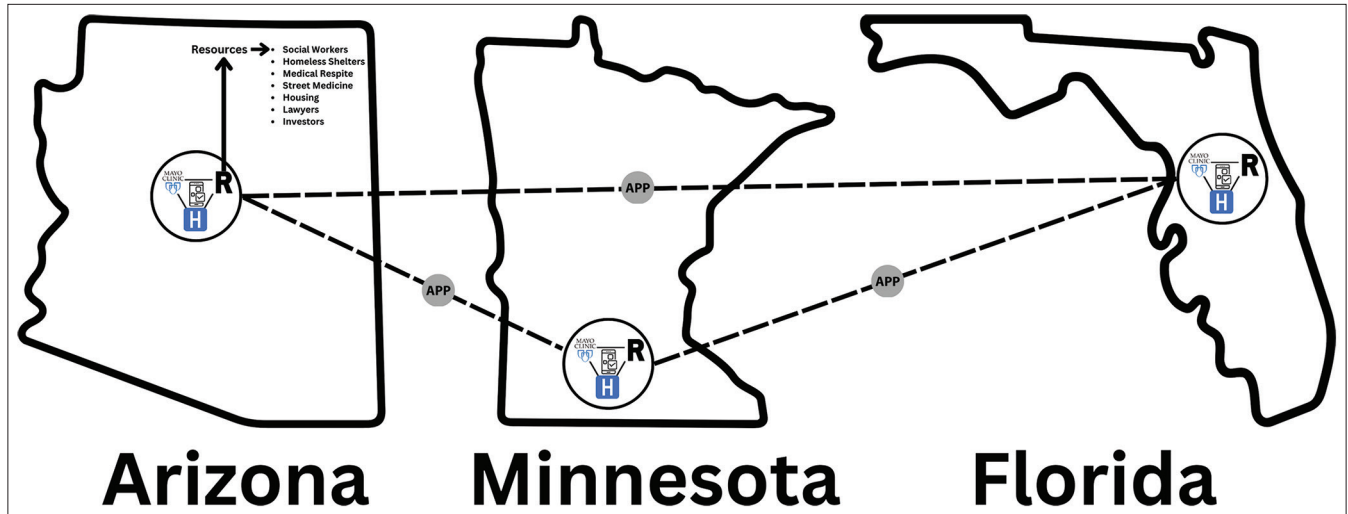
Figure 3: Ending Homelessness Task Force Integration Framework: This diagram illustrates a conceptual framework for the Ending Homelessness Task Force, highlighting the strategic integration of various resources through a software application to enhance the healthcare system for homeless individuals. The framework envisions a software program that notifies medical staff of available medical respites in proximity to hospitals. This connectivity is anticipated to facilitate a reduction in healthcare costs by streamlining access to appropriate care facilities for the homeless. Central to the framework is the Proposed Mayo Clinic Healthcare approach, which is designed to foster interdisciplinary collaboration among social workers, homeless shelters, medical respites, street medicine providers, housing authorities, lawyers, and investors. By bringing together these diverse resources, the framework aims to deliver comprehensive, quality healthcare to the homeless population and sets a precedent for standardizing care for marginalized groups. The schematic representation of the framework spans three states—Arizona, Minnesota, and Florida—indicating the scope and scalability of the initiative across different geographic regions. Within each state, hospitals identified with the Mayo Clinic symbol are connected to a centralized resource network, symbolized by the letter 'R'. This network is accessible through an application, denoted by 'APP', serving as a digital gateway to the integrated resources. The proposed framework underscores the importance of technology and cross-sector collaboration in addressing the complex challenges associated with homelessness and healthcare provision. APP: Application, R: Resources, H: Hospitals.

crucial for postoperative care for homeless patients. Initially, the model showcases the necessity for resources such as investors, engineers, and lawyers to lay down the foundation for building the application and ensuring regulatory compliance. The Mayo Clinic can be a collaborative hub where physicians, social workers, homeless shelters, Medical Respites, Street Medicine Teams, and housing agencies can work together to identify patients and secure their accommodation. This collaboration can be extended to neighboring hospitals, aiming to support homeless patients holistically. The model can be replicated in other Mayo Clinic Hospitals, connecting systems to ensure medical records and the health history of migrating patients are tracked. By streamlining healthcare services and reducing healthcare costs associated with homeless patients, this program holds significant potential to improve care quality for this vulnerable population. The Mayo Clinic Healthcare framework, introduced in this article, sets a precedent in standardizing healthcare provision to the homeless and may serve as a model for other healthcare institutions. The implementation of this framework marks a significant advancement in addressing the complex healthcare needs of homeless individuals. It is expected to stimulate further research and innovation in this field, with the ultimate aim of enhancing health outcomes for this population.

DISCUSSION

A thorough analysis of existing research reveals that homeless patients often receive inadequate medical care, leading to higher 30-day readmission rates and significant disparities in inpatient mortality compared to non-homeless individuals.[3,8-10] Moreover, these patients experience longer hospital stays, greater care costs, and an increased likelihood of readmission.[5] These findings underscore the critical need for equitable care for homeless individuals and highlight the urgency for more data to guide interventions that can improve outcomes for this vulnerable population. Insights gained from these studies suggest the potential benefits of well-coordinated strategies, such as connecting patients to medical respite facilities and effective hospital discharge planning, particularly in the field of neurosurgery.[3] While definitive conclusions about these strategies cannot be made, they warrant further exploration as a means to enhance care and outcomes for homeless patients across various medical departments and hospitals.

The results of previous research have highlighted a concerning trend: a substantial proportion of patients are readmitted to hospitals after undergoing surgical procedures, frequently due to underlying comorbidities.[5] The junction of healthcare and

homelessness constitutes a crucial arena that demands prompt attention, as addressing health disparities in this vulnerable population has the potential to reduce hospital readmissions. Medical respites have been established as a means of addressing these disparities, providing homeless patients with a secure environment for recovery, nutritious meals to foster physical healing and access to medical staff and case managers who assist patients in obtaining community resources.[6] Studies have demonstrated that medical respites can reduce post-discharge 90-day readmissions by 50% compared to discharging homeless patients back to the streets or shelters.[6] Despite these promising benefits, the data reveal a sobering reality. During the period spanning from 2019 to 2020, a significant number of hospitalizations and ED visits were recorded among the homeless population in California alone, with a staggering total of 237,541 hospitalizations and 858,644 visits to EDs. The national data reveal that there are only 133 medical respites across 38 states in the country, with a median of 17 beds; California constitutes 41 of the 133 medical respites.[4,7] This leaves many individuals with no other resources but to return to the streets or overcrowded shelters, where proper healing is not feasible. A study conducted by Bella and colleagues found that homeless patients treated for AMI had a 100% increase in 30-day readmission when an index admission AMI was performed.[1] Factors contributing to this readmission included leaving against medical advice, inability to afford medication, and lack of elective follow-up.[1] Homeless patients face numerous challenges, including a lack of transportation, inadequate space for healing, and limited access to medical respite.[6] Overcrowded shelters only offer temporary overnight stays, making it unrealistic for homeless patients to recover from serious health issues like AMI without proper care. The limited studies in neurosurgery equitable care for homeless patients suggest that they may have to implement an effective program to address the healthcare disparities in this population. Further investigation into their approach is warranted to understand better the strategies that they have employed and to determine their potential for replication in other areas.

In light of these challenges, it is imperative to explore alternative solutions such as those presented by Saab *et al.* They suggest that targeted interventions could significantly mitigate these readmission rates, primarily through the integration of primary care physicians into the care continuum. These interventions could include connecting homeless individuals with existing community resources and facilitating their transition into respite care.[10]

In addition, in a pioneering endeavor, Doran *et al.* facilitated a collaborative relationship between Columbus House, a homeless shelter, and Yale New Haven Hospital. This partnership was driven to enhance healthcare services for homeless individuals, with a focus on optimizing the discharge process from the hospital. Data from this partnership yielded encouraging results.[3] The 30-day inpatient readmission rate

for homeless patients involved in the respite program was 21.6%, a significant reduction from the previous rate of 50.8% recorded before the program was launched. The success of the program can be attributed to a coordinated care approach that included but was not limited to social workers, case managers, inpatient and ED physicians, visiting nurses, as well as state and local advocates and consultants.[3]

Bearing these findings in mind, we propose Figure 2, a collaborative care network. As evidenced in Doran *et al.*'s[3] study, this network draws together existing but often disconnected resources. When properly aligned, it has the potential to halve readmission rates, providing a beacon of hope for future initiatives. We also suggest incorporating street medicine teams into the coordinated health model, given their familiarity with the homeless population and the potential to help build bridges between the hospital, medical respite care, and the patients themselves.

To build on the groundwork laid by Doran *et al.*,[3] we further introduce Figure 3. This proposal entails the development of an electronic application system to extend these collaborative efforts beyond a single hospital-respite care partnership to a broader, potentially nationwide, scale. For example, the Mayo Clinic Hospital could utilize this theoretical framework to liaise with resources, medical respite care, and homeless shelters, allowing physicians to track bed availability and follow-up with patient care.

By integrating with other hospitals and resources, the Mayo Clinic could establish a robust system to track homeless patients' journeys through the healthcare system, even when admitted at nearby hospitals. With successful implementation in one city, this model could potentially be adapted and adopted by other Mayo Clinic locations and nearby hospitals, resulting in an organized communication network between hospitals, medical respite care, and available resources across different states. The realization of this model marks a significant stride in addressing the intricate healthcare needs of homeless individuals. It is anticipated to stimulate further research and innovative developments in this field, ultimately aiming to enhance health outcomes for this underserved population.

In this study, several limitations need to be highlighted and addressed in future research. First, research is scarce on the disparities in neurosurgical procedures and readmission rates between homeless and non-homeless individuals. Further investigation is necessary to determine if homeless patients who undergo neurosurgery have a higher likelihood of being readmitted to the hospital within 30 days and to identify the factors contributing to these differences. Second, while numerous studies indicate that homeless patients have elevated 30-day readmission rates, they often fail to elaborate on the underlying causes of this phenomenon. Future research should strive to uncover the reasons for

this disparity and explore potential solutions to enhance healthcare outcomes for this vulnerable population. Finally, the current literature lacks sufficient examination of the benefits of alternative healthcare services, such as street medicine or coordinated care, in reducing readmission rates among homeless patients. Additional research is required to assess the effectiveness of these services in improving healthcare outcomes and lowering readmission rates for this demographic. By addressing these knowledge gaps, future studies can contribute to a better understanding of healthcare disparities and inform policy development aimed at optimizing care for homeless individuals.

Existing research shows that homeless patients often receive inadequate medical care, resulting in higher readmission rates, longer hospital stays, and increased care costs. Medical respites have been found to reduce post-discharge readmissions for homeless patients. However, limited resources, including a lack of medical respites and inadequate shelter options, make proper recovery difficult for this vulnerable population. Collaboration between hospitals, medical respites, and other resources can help reduce readmissions and improve healthcare outcomes for homeless individuals. Neurosurgeons can play a crucial role in this collaboration by working closely with case managers and care coordinators. Future research should focus on understanding disparities in neurosurgical procedures, identifying underlying causes of high readmission rates among homeless patients, and assessing the effectiveness of alternative healthcare services in improving healthcare outcomes for this population.

CONCLUSION

Individuals experiencing homelessness grapple with poor living conditions and a diminished quality of life, which negatively impacts their health and places a considerable strain on the healthcare system. Neurosurgeons can play a pivotal role in alleviating these issues by implementing interventions such as collaborative care models or establishing homeless task forces to reduce hospital readmissions and ensure adequate healing time for homeless patients upon discharge. An interdisciplinary approach, which involves collaboration among various sectors, is essential for providing optimal care to homeless individuals and addressing healthcare disparities within this population. This united effort has the potential to decrease homeless readmission rates significantly. Future research should delve deeper into the impact of neurosurgical care on homelessness, specifically examining readmission rates. If subsequent studies reveal equivalent readmission rates between homeless and non-homeless patients in neurosurgery, it could serve as a model for the broader healthcare system. By uniting different forces dedicated to supporting homeless populations, the healthcare system can demonstrate the feasibility of equitable care and underscore the importance of

addressing disparities across other medical disciplines.

Ethical approval

The research/study complied with the Helsinki Declaration of 1964.

Declaration of patient consent

Patient's consent was not required as there are no patients in this study.

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Nil.

Conflicts of interest

There are no conflicts of interest.

Use of artificial intelligence (AI)-assisted technology for manuscript preparation

The authors confirm that there was no use of artificial intelligence (AI)-assisted technology for assisting in the writing or editing of the manuscript, and no images were manipulated using AI.

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