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Brain injury, mental health and substance use in homeless populations: community-generated recommendations for healthcare service delivery and research

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Abstract

Background The prevalence of acquired brain injury (ABI) and mental health/substance use (MHSU) disorders is high amongst people experiencing homelessness, yet guidance for addressing these complex comorbidities is lacking. Therefore, the objective of this study was to engage community-based stakeholders in a health priority-setting process to generate, identify and prioritize recommendations for clinical practice and research to improve healthcare services for individuals with concurrent ABI-MHSU who are experiencing homelessness.

Methods Data were collected during a one-day workshop as part of the BC Consensus on Brain Injury. Participants were 163 stakeholders in the ABI-MHSU and homeless communities ($M_{age} = 46.40$, $SD = \pm 13.80$, 72% female), including service providers, people with lived experience, healthcare professionals and other community-based stakeholders. Stakeholders participated in concurrent focus groups based on the nominal group technique. Initial recommendations were generated then collated, themed and rank-ordered by priority and a consensus voting method was used to identify the top five priorities for research and clinical practice.

Results Stakeholders discussions and subsequent prioritization evaluations identified the following recommendations for clinical practice: (1) Provide accessible and affordable supportive housing; (2) enhance resources (financial, human) for healthcare service providers; (3) design needs-based services that promote quality of life; (4a) improve communication and collaboration between service providers; (4b) adopt a long-term and integrated approach; and (5) reduce stigma and discrimination through public health education. Recommendations for research, also ordered by priority, included: (1) Evaluate and optimize existing interventions for immediate implementation; (2) develop specialized interventions and diagnostic techniques; (3) collect meaningful data to better understand impacts and intersections; (4) increase mechanisms for knowledge transfer; and (5) explore methods for risk identification and prevention.

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Conclusions This is the first study to identify and prioritize recommendations for research and clinical practice related to healthcare services for people experiencing homelessness with concurrent ABI-MHSU conditions. The stakeholder-generated recommendations from this study provide a valuable resource for researchers, clinicians and policymakers to enhance care for this underserved population.

Keywords Acquired brain injury, Mental health, Substance use, Addiction, Neuropsychiatry, Nominal group technique, Health service research, Community-engaged research

Introduction

It is estimated that there are more than 100 million people experiencing homelessness globally [1]. Decades of research has documented disproportionately high rates of physical and mental disability across homeless and marginally housed populations [2, 3]. Approximately 67% of people who experience homelessness have a mental health/substance use (MHSU) disorder [2], including mood disorders, alcohol or drug use disorders, or trauma and stress-related disorders. Rates of severe mental illness such as psychosis or schizophrenia are especially high in this population, with estimates of 21% and 10%, respectively [4]. In Canada, approximately 76% of the estimated 235,000 people experiencing homelessness have a MHSU disorder [5], with substance use disorders being the most common. The presence of health comorbidities has been associated with poorer long-term outcomes for people who experience homelessness, including sustained homelessness [6, 7], higher burden of disease [8] and premature death [9].

Rising in concern are the number of homeless or marginally housed individuals who are living with the impacts of acquired brain injury (ABI), including mild, moderate and severe traumatic brain injury (TBI) or cerebrovascular injuries, such as stroke and hypoxia. Meta-analytical evidence has shown that over 50% of those experiencing homelessness have a history of TBI [10], a rate which is 2.5 to 4-times higher than the general population [11]. Cerebrovascular injuries have also been found to be disproportionately prevalent [12, 13] and emergent evidence suggests that those experiencing homelessness are at greater risk for opioid-related overdose [14], which can lead to a type of ABI known as hypoxic-ischemic brain injury [15]. Substance intoxication and violence are both leading causes for ABI in housed populations [16, 17], which may, in part, explain why individuals have a greater likelihood of experiencing an ABI while unhoused [10].

There are several avenues that lead to becoming homeless, such as physical abuse, criminality and loss of employment [6, 7], all of which are aetiologically interrelated with ABI and MHSU [9, 18, 19]. In their systematic review and meta-analysis, Nilsson et al. [7] found that psychiatric illness of any kind was a leading risk factor for becoming homeless. Similarly, Stubbs et al. [10] meta-analysis found that between 51% and 92% of individuals experienced their first TBI before becoming homeless. There are several ways in which ABI can lead to homelessness. For instance, survivors of ABI and their families often report not knowing where to access the proper services [20]; without adequate treatment, ABI can lead to MHSU disorder onset [17], impulsivity and aggression [21], which can, in turn, lead to loss of employment, family breakdown or other known causes of homelessness [6, 7]. Indeed, ABI and MHSU are two prevalent and interconnected forms of disability that cause and perpetuate homelessness [7, 10].

Servicing individuals experiencing homelessness is a costly challenge for the healthcare system [22]. The high rates of physical and mental health conditions experienced by this group often results in increased healthcare utilization, typically in community outreach or emergency care settings [22–24]. Sheltered sites (e.g., emergency, extreme weather and domestic violence shelters) and transitional housing are also spaces where some people experiencing homelessness receive healthcare services [25], though short lengths of stays, shelter restrictions and limited resources make it difficult to sustain care in these settings. Although there are healthcare services dedicated to supporting individuals struggling with ABI, MHSU and homelessness, these services are usually offered independently with lack of coordination between them [23, 26]. Not only does this create gaps in knowledge among healthcare service providers about the multifaceted relationships between ABI, MHSU and homelessness, it also acts as a significant barrier to accessing care [26, 27].

Navigating the system of disconnected healthcare services is made more challenging by the cognitive aftermath of ABI. Decreased self-awareness [28], long-term attention and memory impairments [29], in addition to difficulties with initiative, planning, problem solving, decision-making and self-regulation [30] can make it difficult to access and engage with healthcare services [21, 28, 31]. Further compounding this problem, people experiencing homelessness also report encountering stigma and discrimination from healthcare workers [32], factors which are well known to negatively impact every aspect of healthcare service delivery [33]. Stigma against people with concurrent ABI-MHSU has also been recognized as a barrier to healthcare services [20], exacerbating this health services inequity even further for those with concurrent presentations.

The need for integrated ABI-MHSU and homelessness healthcare services has been underscored as a top priority by stakeholders [34], yet such services remain 'a call to action' rather than a reality for most communities. Investigators have also called for greater research on elucidating ABI-specific considerations for responding to the healthcare needs of people experiencing homelessness [10, 27]. Leaders in the field have suggested that the most effective intervention frameworks require integration of services which are only possible with collaborative efforts across health and housing services [35]. However, research into ABI specific-factors is scarce. To date, there is little guidance for researchers and healthcare providers on how to best address ABI and MHSU in the delivery of healthcare services for people experiencing homelessness. Meaningful involvement of community-based stakeholders, including healthcare service providers and end users, is essential for fostering effective solutions and meaningful change.

The objective of this study was to engage community-based stakeholders in a health priority-setting process to generate, identify and prioritize community-driven recommendations for healthcare services for individuals with concurrent ABI-MHSU who are experiencing homelessness. We also sought to identify recommendations for future research, to help support the advancement of clinical services. Importantly, we aimed to include the perspectives of multiple stakeholder groups, including people with lived experience of ABI and/or homelessness, family members, healthcare professionals, government representatives and other community-based stakeholders, in an effort to generate and prioritize recommendations that are equitable, efficacious and representative.

Methods

Study design

The present study was conducted as part of the *British Columbia (BC) Consensus on Brain Injury, Mental Health and Addiction* (hereafter referred to as the BC Consensus on Brain Injury), a three-year research initiative to improve healthcare services for people with ABI and concurrent concerns in BC, Canada. The current study involves data collected from the third *BC Consensus on Brain Injury Day* (June 20, 2024), which focused on housing and homelessness. More detailed information on the objectives, methodologies and proceedings of the overarching *BC Consensus on Brain Injury* research initiative are described elsewhere [20, 34, 36].

The design of this community-engaged and participatory action research (PAR) study was based on a modified Nominal Group Technique (NGT). The NGT approach involves engaging stakeholders in small (6 to 12 participants) group discussions to generate ideas in relation to problems, solutions, or both, which are then ranked in order of importance or priority [37]. The NGT procedure has been used extensively to identify and prioritize recommendations or research topics for a variety of healthcare-related questions, conditions and contexts [38, 39], including TBI [40], MHSU [41, 42] and homelessness [43].

The combination of PAR and NGT methodologies employed in our study design leveraged community knowledge systems by engaging participants as co-researchers to inform practical, context-specific recommendations that directly address the needs of knowledge users and the broader population of study. Importantly, the study design is distinctly PAR such that it embodied knowledge co-production and created space for in vivo action towards reducing health inequities by involving those directed affected who, in turn, are empowered to take action to improve their own health and the health of others [44]. Aligned with both guiding methodologies, we also adopted an appreciative inquiry epistemological approach [45, 46], whereby we oriented conversations towards more of a positive (solution-focused) outlook, as a means to generate ideas for an improved future. Notably, this approach can also be helpful when participants vary in their levels of technical knowledge and language [37, 45, 46], such as in the case of working with stakeholders of diverse experiences.

The interdisciplinary research team was jointly led by scientist-practitioners and people with lived experience to actively champion representation and guide equitable decision-making across the research process. Importantly, reflexivity was employed within the research team dynamic from the study's outset and continuously evaluated. The research team met regularly to collaboratively make decisions and engage in open-ended reflexive discussion, whereby members reflected upon how their own subjectivity, experiences and context might interact with research processes [47]. As per recommendations for community-engaged and PAR studies [44, 48], strategies were implemented to reduce the potential influence of power imbalances (e.g., each research team meeting was led by a person with lived experience) and by fostering an environment of mutual respect, understanding and compassion [34]. Approval for this study was obtained from the University of Victoria (#22–0614) and the University of British Columbia (#H22-03403) Human Research Ethics Boards. All recruitment processes followed the best practices in equity, diversity and inclusion in research as recommended by the New Frontiers in Research Fund and the Canadian Research Coordinating Committee.

Participants

Stakeholders were invited to attend a one-day workshop-based research event, the *BC Consensus on Brain Injury*

Day. Using the same approach as the years prior [20, 34], stakeholders were purposively recruited through professional associations, health authorities, government agencies and other community-based organizations. Invitations to participate were delivered in-person or via email, with a request to forward other potentially interested stakeholders or organizations to members of the research team for more information. We made particular efforts to include equity-deserving groups, including persons with disabilities, members of Indigenous groups and members of the LGBTQ2IA + community, to generate recommendations that are culturally informed, equitable and representative of groups who are disproportionately affected by ABI, MHSU and homelessness [49–51] and often overlooked in ABI research [26, 52]. Consistent with previous years, individuals who chose to participate provided informed consent prior to attending the event. Additional information on recruitment procedures are reported in publications involving data collected from the first *BC Consensus on Brain Injury Day* [20, 34].

Table 1 Participant sociodemographic characteristics

Characteristic	*n*(%) of sample[a]
Age ($M \pm$ SD)	46.40 ± 13.80
Sex[b]	
Female	114 (72%)
Male	39 (25%)
Prefer not to say	6 (4%)
Gender[c]	
Woman	114 (72%)
Man	40 (17%)
Prefer not to answer	5 (3%)
Sexual orientation	
Heterosexual	123 (77%)
Homosexual	8 (5%)
Bisexual	8 (5%)
Pansexual	2 (1%)
Asexual	1 (1%)
Other	2 (1%)
Prefer not to answer	15 (9%)
Race or ethnic background	
White (e.g., British, French, German, European background)	126 (79%)
Indigenous Person (e.g., First Nations, Métis, Inuit, Coast Salish)	18 (11%)
East Asian (e.g., Chinese, Korean, Japanese, Taiwanese)	7 (4%)
Latinx/Hispanic (e.g., Mexican, Argentinian, Cuban)	5 (3%)
Black (e.g., African American, African)	4 (3%)
Middle Eastern (e.g., Syrian, Egyptian, Iranian, Saudi Arabian)	3 (2%)
South Asian (e.g., Indian, Pakistani, Punjabi, Tamil)	2 (2%)
Other	3 (2%)
Prefer not to answer	5 (3%)
Education	
Less than high school	3 (2%)
Some high school	6 (4%)
Highschool diploma	7 (4%)
Some post-secondary education	23 (14%)
College diploma	30 (19%)
Bachelor's degree	47 (30%)
Master's degree	28 (18%)
Doctoral degree	12 (8%)

[a] Four participants did not consent to the collection of their demographic information

[b] Sex at birth

[c] Current gender identity

A total of 163 stakeholders participated in this study. Four participants did not consent to share their demographic data and were therefore excluded from all demographic analyses. The age of participants ranged from 20 to 70 years ($M = 46.40$, $SD = \pm 13.80$). The majority (72%) of participants reported their sex or gender as female and most participants (77%) self-identified as heterosexual. A large portion (76%) of participants reported their racial or ethnic background as White (including British, French, German, North or South American of European descent). In total, 13% of stakeholders identified as gender or sexually diverse and 11% self-reported their ethnicity as Indigenous or mixed-Indigenous ancestry. Table 1 provides a detailed breakdown of the sample's sociodemographic characteristics. Regarding stakeholder type, service providers ($n = 84$), people with lived experience ($n = 74$), and healthcare professionals ($n = 34$) were the three most represented groups (participants could identify with more than one stakeholder group). In keeping with PAR principles and best practices in community-engaged research [44, 48], stakeholders who identified as people with lived experience (i.e., people with lived experience of brain injury and/or homelessness, family members) were compensated for their time according to the BC Centre for Disease Control Peer Payment Standards [53]. Table 2 details participants by stakeholder group and years of experience in their roles.

Data collection

Data were collected during concurrent in-person and virtual (via Zoom) focus groups through two (1-hour) sessions within the one-day workshop. Table 3 outlines the questions and ranking criteria for focus group sessions one (i.e., morning) and two (i.e., afternoon). Participants were assigned to focus groups based on their role(s) and experiences (i.e., each group aimed to include a person with lived experience, a caregiver, a healthcare professional, etc.), with group sizes ranging from 7 to 11 participants per group. The goal of our multi-stakeholder group assignment strategy was to bring balanced and complimentary perspectives to the discussions and incorporate a diversity of experiences into the conversations. The

Table 2 Participants organized by type of stakeholder and years of experience in their roles

Type of stakeholder	*n*(%) of sample[a]	Years in role (M ± SD)[b]
Person with lived experience of brain injury	24 (15%)	19.20 ± 11.03
Person with lived experience of homelessness	20 (13%)	14.64 ± 9.64
Family member	30 (19%)	18.82 ± 11.68
Service provider for people with brain injuries	51 (32%)	13.01 ± 10.23
Service provider for people who are homeless	33 (21%)	11.28 ± 9.81
Researcher	10 (6%)	9.58 ± 7.74
Government representative	10 (6%)	14.56 ± 10.07
Public safety worker	4 (3%)	16.17 ± 10.24
Healthcare professional	34 (21%)	15.44 ± 10.68
Administration	6 (4%)	20.83 ± 8.47
Occupational therapist (OT)	3 (2%)	12.50 ± 12.02
Social worker	3 (2%)	12.33 ± 15.37
Nurse (RN, nurse practitioner)	7 (4%)	17.20 ± 9.12
Clinical psychologist (R. Psych)	2 (1%)	30.00 ± 14.14
Counsellor	2 (1%)	24.00 ± 10.00
Physician (MD)	2 (1%)	20.00 ± 4.24
Community support worker	5 (3%)	11.20 ± 8.53
Trainee (OT, R. Psych)	2 (1%)	3.00 ± 2.00
Other	4 (3%)	N/A
Other[c]	6 (4%)	N/A
Prefer not to answer	4 (3%)	N/A

SD standard deviation

[a] Many participants identified as more than one type of stakeholder and therefore the number of stakeholder types exceeds the overall sample size

[b] Average (mean) number of years in occupation or years affected by ABI and/or homelessness (for people with lived experience)

[c] Other, not specified

Table 3 Questions and corresponding ranking criteria organized by discussion session

Discussion Session	Discussion Question	Ranking Criteria
Session 1: Clinical Practice	With an emphasis on housing and homelessness, if you could change one thing about how brain injury is managed, what would that be?	What is the order of importance you would place on each idea? Rank the ideas in order of the difference they would make to you or to those you work with. Think about: 1. How doable is each idea? 2. What impact would it have? 3. How urgent do you feel the need is to see the change implemented?
Session 2: Research	Given what you learned, what would you ask researchers to do next?	Out of the following ideas for future research, which ones do you think are most important for researchers to answer first? Think about: 1. How doable is each idea? 2. What impact would it have? 3. What sense of urgency do you feel about each research idea?

focus group sessions were facilitated by 16 trained facilitators who had prior experience working with diverse and vulnerable populations. Facilitators were provided with training materials and participated in a 1-hour course focused on managing group dynamics, ensuring that all voices are heard and the importance of recognizing and managing personal assumptions and biases. Additionally, facilitators were encouraged to consider their own personal biases and misconceptions to promote reflexivity in data collection [54]. Each group also had a designated scribe to help facilitators record participants' ideas. The overall event was led by an experienced head facilitator external to the research team.

The NGT procedure in this study involved four steps. First, a brief overview of the *BC Consensus on Brain Injury* was provided by the project leadership, followed by a live panel discussion exploring the intersections of ABI, MHSU and homelessness from different perspectives (i.e., a person with lived experience of concurrent ABI-MHSU and homelessness, two service providers and an Indigenous community health nurse). Then, individual focus groups began with a brief introduction. Each participant shared their connection to the topic(s) (e.g., person with lived experience, family member, service provider, etc.), followed by an explanation of the purpose of the discussion session from the facilitator. The introduction step was not repeated for the second discussion session as participants remained in the same focus groups throughout the day.

The second step was idea generation. Traditionally, this step occurs in silence (e.g., 5-minutes of silence where participants record initial ideas) [38]; however, we chose to use a pre-elicitation technique [37, 46], whereby we sent the discussion questions to participants one-week prior to the workshop, providing them with the opportunity to generate initial ideas on their own time. This procedure ensured that participants with physical, cognitive or mental health challenges had adequate time to reflect on the questions prior to the workshop, and it has been used in previous healthcare-related NGT studies [37, 39]. Despite this adaptation, participants were still provided with the questions, time and materials (pencil, notebook) to record their ideas prior to engaging in discussion with their focus group members.

The third step invited participants to work around the table and share their ideas ('round robin' style). When doing so, facilitators ensured equal opportunity for expression while recording participants' ideas. Once initial ideas were generated, facilitators guided participants to discuss them further to promote clarification, elaboration and refinement. As is recommended for this step, we kept this process as 'value neutral' as possible, avoiding judgment and criticism [38].

The final step, prioritization, involved three key components. First, facilitators instructed groups to present their top three ideas, then confirmed whether the recorded responses reflected the thoughts of all participants before submitting them to the organizing committee. Second, the top three ideas from each individual focus group were provided to the head facilitator and a researcher (JS), who collated individual responses to eliminate redundancies and themed them to create overarching recommendations. The recommendations were then input into a web-based live crowd-voting platform in preparation for whole-group level voting. In the third and final phase, participants were presented with the recommendations and the head facilitator instructed them to anonymously rank-order the recommendations by priority (see Table 3 for ranking criteria) through the voting platform. This procedure was duplicated for each discussion session.

Following the conclusion of the workshop, a participant feedback survey was distributed to all attendees (see Additional file 1). The survey contained 10 Likert-style questions querying experiences related to participating in the workshop (e.g., how comfortable participants felt sharing their perspectives, length of discussions sessions, etc.) as well as five open-ended response questions (e.g., what worked well, what could have been improved, etc.). Completion of the participant feedback survey was entirely optional and all responses were collected anonymously.

Data analysis

Qualitative data in the form of ideas recorded during individual focus groups were retained to provide insight into the concepts underlying each recommendation and to promote further reflexivity in data interpretation [54]. Quantitative ranking data was compiled in preparation for data analysis. The Borda count method [55] was used to analyze quantitative ranking data, whereby each recommendation was given a number of points corresponding to the number of competing options and a composite score was produced. For example, in a case where participants are tasked to prioritize (i.e., rank-order) four recommendations, if 43 participants ranked a given recommendation as their top priority (i.e., first place), 38 participants ranked the same recommendation as second, 21 as third, and 18 as fourth, then the total points for the recommendation would be $(4 \times 43) + (3 \times 38) + (2 \times 21) + (1 \times 18) = 346$. The recommendation with the most points is the top priority, the recommendation with the second most points is the second highest priority, and so on and so forth, for all the recommendations. This method encourages a consensus choice, as it accounts for the collective preferences of all voters (i.e., not just their top choice) and has been used in other health priority-setting NGT studies [55–57]. The top five highest priorities were retained, in congruence with the NGT and previous studies [37, 39, 42, 56, 58, 59]. Descriptive frequency analyses were computed to examine participants' responses to Likert-style questions on the participant feedback survey. All analyses were conducted using the statistical computing environment R (version 4.3.3).

Results

The first discussion session led to the generation of nine recommendations for clinical practice, which were subsequently prioritized. The second discussion session led to the generation of five recommendations for research, which were prioritized using the same procedure. In total, 2282 prioritization (ranking) votes were cast by participants. The recommendations for clinical practice and research are presented below in order of priority, as determined by participants' priority evaluations. A brief description of each recommendation is provided for context. Table 4 lists the prioritized recommendations with accompanying examples of representative quotations gathered during the focus group discussion sessions.

Table 4 Recommendations with representative quotes, rank-ordered by priority

Ranked Recommendations	Representative Quote(s)
Clinical Practice	
1. Provide accessible and affordable supportive housing	"The funding provided [to affected individuals] needs to be realistic for the housing options… We need to bridge the time gap between waiting for funding and housing options and actually receiving them."
2. Enhance resources (financial, human) for service providers	"We must ensure those working with brain injured people are trained and aware, police, nurses, social workers", "Expanding community supports for people with brain injury living on the streets."
3. Design needs-based services that promote quality of life	"Improved psychosocial quality of housing, such as safety, physical location. Some locations are triggering, with drug presence, that can be mentally straining."
4a. Improve communication and collaboration between service providers	"Better communication between places, like bigger databases, so that if a person moves they can stay or get connected to the appropriate healthcare services."
4b. Adopt a long-term and integrated approach	"The system is a closed loop. We need to address the gaps in care so that when a mental health crisis, brain injury, or homelessness event happens, the system helps them all the way to stability."
5. Reduce stigma and discrimination through public health education	"There's a lot of discrimination, stigma, lack of public visibility… We need to provide better education in regard to brain injury, and the impact of being unhoused, to the general public."
Research	
1. Evaluate and optimize existing interventions for immediate implementation	"Focus on smaller communities to find the most effective programs. More creative, grass roots approaches.", "Research the impact of community services."
2. Develop specialized interventions and diagnostic techniques	"Researchers need to find out how best to measure, monitor, screen and treat brain injury, especially brain injury caused by toxic drug poisoning, in people who are homeless."
3. Collect meaningful data to better understand impacts and intersections	"Brain injury has previously been recognized as an issue, but the intersection of these existing groups—addiction, homelessness, and brain injury—being recognized, that's important."
4. Increase mechanisms for knowledge transfer	"It's important for researchers to take their results or knowledge and dumb it down so that every day average people can understand it and be better for it."
5. Explore methods for risk identification and prevention	"Researchers need to create or improve risk assessment for identifying people most at risk of brain injury and homelessness."

Items 4a and 4b of the clinical practice recommendations were tied

Recommendations for clinical practice

The recommendations for clinical practice in order of priority are as follows: *Provide accessible and affordable supportive housing*; *enhance resources (financial, human) for service providers*; *design needs-based services that promote quality of life*; *improve communication and collaboration between service providers*; *adopt a long-term and integrated approach*; and *reduce stigma and discrimination through public health education*. Although we set out to only report the top five highest priority recommendations, two of the items were tied (*improve communication and collaboration between care providers* and *adopt a long-term and integrated approach to care*) and therefore six recommendations are reported (see Additional file 2: Supplementary Table 1 for prioritization scores).

Provide accessible and affordable supportive housing

The need to make supportive housing services accessible and affordable emerged as the top recommendation for clinical practice. Participants articulated that services must consider brain injury-specific challenges and accommodate accordingly, such as providing alternative transportation options for people who cannot ride public transit due to nausea or sensory sensitivities. Other examples of strategies to improve accessibility included providing housing by age group (i.e., separate housing for younger people and seniors) and offering a variety of housing options with multi-layered supports (e.g., independent living, semi-independent living, etc.). Affordability, and the lack thereof, was a salient pattern in participants responses. Most expressed that disability and welfare payments do not 'match' the cost of housing. Lack of financial resources, difficulty maintaining employment, family/relationship breakdown or other complications associated with ABI and/or MHSU were consistently described as key factors which can lead to loss of housing and homelessness. Overall, participants emphasized the importance of a housing-first approach in healthcare service delivery.

Enhance resources (financial, human) for service providers

Participants recommended enhanced and expanded resources for service providers. These encompassed human resources in the form of specialized ABI-MHSU healthcare workers, in addition to increased ABI-MHSU training for public service workers who commonly interact with people experiencing homelessness (e.g., outreach workers and police). Policy-based resources, such as facilitators for decreasing reliance on the referral system (e.g., enhanced prescribing rights), were mentioned as well. The expansion of brain injury healthcare services into homeless communities was a commonly cited recommendation, with particular emphasis on screening and diagnostic services as the first step to connecting people to more specialized care. Above all, the most commonly shared call to action was increased financial resources. To support advances in these areas, participants acknowledged the need for greater financial investments from government agencies into improving healthcare services.

Design needs-based services that promote quality of life

The recommendation to design and implement needs-based services stemmed from a recognition amongst participants that people experiencing homelessness have basic needs that are often overlooked by healthcare services. For example, one suggestion for providers was to offer storage, even without ID, so that patients can safely store their belongings while visiting healthcare facilities. The importance of promoting quality of life when designing services was emphasized. Participants recognized that improving quality of life, not just housing, must be a central component of all services, as doing so will empower individuals to lead healthier lives, both mentally and physically. For those in shelters or transitional housing, strategies for promoting quality of life included having more functional spaces and independence-supporting activities available for residents.

Improve communication and collaboration between service providers

The lack of communication between healthcare service providers and the need to improve it arose as a consistent pattern across participants' discussions. For the most part, this recommendation was described in the context of improving communication between health authorities and housing service providers. It was expressed that improving communication between these entities might facilitate smoother transition from hospital (post-ABI) to housing, in turn preventing people with ABI from being discharged to the streets. Participants also recommended strategies, such as the integration of people with lived experience into the healthcare system (i.e., peer-support workers) or having advocates within the system, describing how ABI and MHSU symptoms can make it difficult for individuals to self-advocate for their own healthcare needs. Overall, increased inter-agency communication to monitor and maintain well-being was cited as of utmost importance for improving the current state of healthcare services.

Adopt a long-term and integrated approach

Participants called for greater collaboration between healthcare professionals (e.g., nurses, social workers, psychiatrists, occupational therapists, etc.) and highlighted the need for services that are continuous and sustained across time. Continuity of care was a strong feature of this idea, with participants expressing that ABI is a life-long condition that in many cases requires life-long supports to maintain stable housing and mental well-being. The idea of 'care with distinction' was also raised, that a team of multidisciplinary healthcare professionals are needed to understand differences and needs specific to ABI and MHSU, and how these clinical conditions interact in people who are experiencing homelessness. Lastly, participants called for equity in care, noting that long-term and integrated approaches are already being used to treat other health conditions (e.g., cancer) and therefore can be adapted and extended to meet the needs of those with concurrent ABI-MHSU who are experiencing homelessness.

Reduce stigma and discrimination through public health education

Public health education was the recommended strategy to reduce stigma and discrimination commonly experienced by people when they engage with healthcare services. The need to foster greater awareness for the inter-connections between ABI, MHSU and homelessness was one suggested pathway for promoting greater compassion. This recommendation extended beyond the healthcare system, with statements that better education in regard to ABI-MHSU, and the impact of being unhoused, should be provided to the general public as well. Many participants suggested that public health education campaigns and integration of this information into the education system are two promising means of promoting awareness and reducing stigma across broader society.

Recommendations for research

The recommendations for research generated from stakeholders' discussions and subsequent ranking evaluations were: *Evaluate and optimize existing interventions for immediate implementation*; *develop specialized interventions and diagnostic techniques; collect meaningful data to better understand impacts and intersections*; *increase mechanisms for knowledge transfer*; and *explore methods for risk identification and prevention* (see Additional file 2: Supplementary Table 2 for prioritization scores).

Evaluate and optimize existing interventions for immediate implementation

The call to evaluate interventions that are currently being used and modify the most efficacious approaches to support immediate and widespread implementation emerged as the top recommendation for research. This recommendation arose from the sentiment that there are interventions addressing ABI and homelessness currently being delivered (e.g., supportive housing, community outreach), but knowledge on what approaches are most effective is missing. Identifying what needs are and are not being met, then improving interventions based on unmet needs, was the strategy most commonly put forth by participants. Participants suggested that this approach seemed the most cost-effective and may lead to timelier and more widespread uptake, as it leverages resources already in place. In designing and conducting interventional studies, participants emphasized the importance of involving people with lived and living experience.

Develop specialized interventions and diagnostic techniques

Participants recommended that researchers develop innovative interventions and diagnostic techniques to address concurrent ABI-MHSU in people experiencing homelessness. Examples of suggested interventional approaches included mindfulness-based therapies, dietary and nutritional treatments, recreational therapy and how to best integrate trauma-informed practices into healthcare service delivery. One salient pattern across participants responses was the idea that researchers must also create interventions for family members, acknowledging that healing families may provide them with greater psychological capacity to better understand their loved one's afflictions and support them more effectively. In relation to the second component of the recommendation, participants expressed that researchers must focus on developing sensitive screening and diagnostic measures. The complexities of accurately distinguishing between ABI, MHSU and other chronic conditions commonly experienced by people who are unhoused were acknowledged, calling on researchers to come up with innovative tools and strategies to address this problem.

Collect meaningful data to better understand impacts and intersections

The recommendation to collect meaningful data spanned multiple areas of emphasis. Generating more 'proof' for the interconnections between ABI, MHSU and homelessness was one common feature of participants' recommendations, with the idea that doing so will mobilize greater financial resources dedicated to addressing these intersectional issues. Related, participants called for researchers to conduct economic analyses on the impact of housing-first approaches (i.e., the cost to house vs. the cost to leave people unhoused) with this same idea in mind. Participants also emphasized that researchers should take a more geographically grounded approach to their studies given that the needs of homeless populations can differ greatly based on their physical environment (e.g., large city or rural area, climate, etc.). The role of technology was mentioned throughout several discussions, with recommendations such as developing pilot studies using 'portable tech' to locate clients and bring them to healthcare appointments, or studies examining the current limitations of health information systems to support better data linkage across jurisdictions and service modalities.

Increase mechanisms for knowledge transfer

The idea that researchers should place greater efforts on identifying pathways for increasing knowledge translation and uptake arose from participant's discussions. This recommendation encompassed different relationships of knowledge transfer between the scientific community and government officials, community organizations, healthcare practitioners, patients, families and the general public. Data sharing (i.e., between researchers, government, hospitals, etc.) at the preliminary stages of research, publication via open-access journals and knowledge mobilization activities (e.g., ad campaigns, community presentations, integration into educational curricula) were common examples of mechanisms for increasing knowledge transfer between researchers and knowledge users. Participants emphasized the importance of presenting research findings in accessible language and formats to promote information uptake, relating to the general sentiment that the research process should not end with publication, but rather continue through knowledge translation and mobilization.

Explore methods for risk identification and prevention

In the context of the interactions between psychiatric illness, substance use, ABI and housing, participants recommended that researchers explore different strategies for identifying individuals' levels of risk for developing a problem in one or more of these areas. It was felt that by understanding someone's risk level (e.g., risk of becoming homeless if they experience an ABI, risk of experiencing an ABI if they are homeless, risk of becoming homeless if they have both an ABI and a psychiatric disorder, etc.), healthcare practitioners could better triage patients and monitor them based on their probability of developing issues in 'high risk' areas of functioning. Prevention, particularly early prevention, was an important component of this idea, with participants' suggesting that identifying an individual's areas of 'high' risk can inform the selection of targeted preventative strategies. Participants acknowledged that clinicians do not currently have a tool, formula or system to produce such a 'risk index', nor do they have a comprehensive rolodex of targeted prevention strategies at their disposal, which is why researchers must explore these areas to identify efficacious methods that can be implemented in clinical practice.

Participant feedback

Fifty-three participants completed the anonymous post-workshop feedback survey (see Additional file 3 for results summary table). In response to the prompt, *"I was able to share my thoughts and experiences openly"*, majority (93%) of respondents selected 'strongly agree' or 'agree' (57% and 36%, respectively), suggesting the environment and workshop structure promoted honest and respectful dialogue between participants. Majority (75%) of respondents felt that there was enough time for discussion and questions, while others (17%) disagreed and some (8%) felt neutral. Related, 24% of respondents felt that the overall duration of the event was 'too long', 2% thought it was 'too short', and 73% thought it was 'just right'. Most (94%) respondents either agreed or strongly agreed that the information presented was clear, relevant and interesting, and many (89%) felt that they gained valuable knowledge that they could transfer to their personal and professional lives. From participants' open-ended responses, our strategy of combining stakeholders of diverse backgrounds and perspectives into each discussion group appeared to be a highlight for participants, with many explaining how they felt this approach fostered positive collaboration between groups of people who do not often work together (see Additional file 4 for all qualitative responses). Overall, 98% of respondents felt that the event was valuable.

Discussion

This study generated and prioritized recommendations regarding ways to improve healthcare services for individuals with concurrent ABI-MHSU who are experiencing homelessness. One of the core strengths of this study was its community-based approach. Studies including insights from the most directly affected or at risk of homelessness are largely scarce [60]. The involvement of people with lived experience in designing and implementing services for this population is essential, as they can bring forth insightful recommendations based on their direct experiences with the healthcare system [61].

Our findings identified the provision of accessible housing that considers the complexity and unique needs of individuals with ABI-MHSU as a top priority amongst community-based stakeholders. Our data aligns with previous research demonstrating that accessible housing for individuals with concurrent ABI-MHSU is limited, often due to limited housing supply and affordability issues [27, 62]. In the recent decades, Canada's housing market has become increasingly unaffordable [63], even more so for individuals with ABI and MHSU who often experience financial constraints due to decreased employment and reliance on disability or welfare payments [6, 27]. Individuals may find themselves on long waitlists to receive rent-geared-to-income housing [27, 62], a problem which was expressed by stakeholders in our sample. In line with our findings, increased government funding is chief among the strategies for making supportive housing accessible and affordable.

Housed individuals with concurrent ABI-MHSU frequently use healthcare services [64] and in some cases, may be forced to relocate closer to healthcare service centres as they often rely on walking or public transit to commute to appointments. However, once housing is provided, it can be difficult for individuals to relocate, due to either an inability to afford market rent or not being given priority for alternative housing, since they already have accommodation [27]. This can create a situation where people are forced to pick between discontinuing treatment or losing housing, both of which are associated with poorer long-term health outcomes [8–10]. Strategies like those described in our results, including integrating healthcare services into shelters and assisted living facilities, may help ameliorate this problematic situation [26, 27].

Our findings support policies that promote safe and affordable housing, but also indicate the necessity for brain injury-specific healthcare services provided alongside housing solutions. Programs that address housing as a priority, such as Housing First approaches, are in line with the recommendations identified in our study. The Housing First strategy shows promise for remediating homelessness and its associated consequences on health and well-being, including reducing emergency room visits and hospitalizations [65], even for those with persistent MHSU disorders [66], though research on this efficacy in ABI populations is scarce. While interventions like Housing First approaches are associated with positive outcomes (i.e., housing stability, improved quality of life), when an individual has a brain injury their baseline well-being may be lower, in comparison to those without a brain injury. As highlighted in our results as well as previous research, individuals with concurrent ABI and MHSU have unique treatment needs that must be addressed through healthcare services [17, 21, 28, 29, 31]. Future research should explore how existing interventions for MHSU can be adapted for ABI populations, or if developing relationships between service and housing providers can improve access to market rent housing.

Community-based stakeholders also identified the importance of implementing services that meet the unique needs of individuals experiencing ABI, MHSU and homelessness to enhance quality of life. Aligned with previous research findings [27], our study underscored the importance of putting strategies in place to ensure that people can live independently and comfortably in their physical spaces. For example, case managers can help seek and maintain housing situations, occupational therapists can support the person to learn skills to improve independence in daily living (e.g., bill paying, grocery shopping, meal preparation), psychiatric nurses can support prescription management and other mental health professionals, including psychologists, counsellors and social workers can provide counselling and related psychosocial support services [21, 67, 68].

Our results emphasized the need for healthcare service providers to receive specialized training on brain injury-specific issues, given that this population has additional complexities [27, 62]. These findings are similar to previous research identifying the need for enhanced training for healthcare providers on harm reduction strategies and mental health crisis support [27]. Researchers can support these efforts by creating tools to understand an individual's risk level (e.g., risk of MHSU crisis, risk of losing housing, risk of ABI incidence) that healthcare service providers can use to triage and monitor the clients they support. As identified by our participants, surveillance systems are also in need of further development, such as longitudinal follow up to best identify diverse trajectories to homelessness [6, 69], effective pathways of integrated care and risk factors that facilitate the establishment of vicious cycles [26]. A data-driven approach would allow researchers, policy makers and health authorities to develop creative and strategic interventions that best fit the needs of those experiencing homelessness along with MHSU and ABI [70].

Our findings also speak to the challenges of collaboration between service providers and the need for interdisciplinary care. Aligning with previous research [27, 35], our study underscores the importance of enhanced collaboration between service providers and housing providers to improve a disjointed system. Not only can a collaborative relationship between healthcare and housing service providers address housing accessibility and affordability, it can also provide mutual support for each other, enhancing supports for individuals in need [27]. As such, an integrated approach to care can result in improved outcomes, such as reduced symptom burden and improved community engagement [20, 26, 71]. Creating integrated networks of care is a challenging process, mostly due to capacity limitations within organizations [35]. Integrated approaches providing a continuum of care require creative thinking and identification of strong leaders that can serve as facilitators of communication and collaboration among services and systems of care, provided that sufficient funding is allocated to support the networks [20, 26, 35].

This study highlighted the importance of knowledge transfer between researchers, stakeholders (e.g., patients, families, healthcare practitioners) and the general public. Increasing knowledge transfer through strategies such as open-access publication and community presentations, among others, can help promote awareness and ensure information reaches the audiences who need it most [72]. Accordingly, our study emphasized the importance of public education to address stigma and discrimination commonly faced by individuals experiencing ABI, MHSU and homelessness [27, 32, 73]. Stigma, often stemming from a lack of education and understanding of ABI and MHSU [27, 32], frequently leads to discrimination against individuals with ABI and MHSU when they seek housing, employment and healthcare services [27, 32, 73]. While there are existing interventions, policies and community platforms that aim to decrease stigma for individuals with MHSU [74], efforts to address stigma for individuals with ABI and homelessness are limited in comparison. Equity-oriented health care, which rests on foundations of trauma-informed care, harm reduction and cultural safety, shows promise in improving healthcare service delivery and reducing health disparities experienced in homeless and vulnerably housed populations [32].

Limitations

We identified four key limitations of this study. First, participants with lived experience may have had personal physical, cognitive or emotional challenges that made fully engaging in some of the workshop activities difficult. To ensure accessibility, there was roughly one facilitator for every six participants (i.e., to clarify instructions or assist as needed) and efforts were made (e.g., providing questions in advance, offering virtual format) to accommodate for functional challenges. Second, we lacked sufficient time to conduct a more systematic analysis of the raw discussion data as these were collated live during the workshop, in preparation for voting. While formal qualitative analyses, such as content or thematic analysis are considered optional (i.e., complementary) components of NGT studies [37, 38], such analysis may have offered unique insights into the underlying structure of the recommendations. Third, voting during the final prioritization stage was done anonymously and therefore we did not have the ability to conduct sub-group analyses to examine for differences in priority evaluations based on stakeholder type (e.g., person with lived experience versus healthcare professional). However, our goal was to understand the collective recommendations of a broad range of stakeholders, not differences in perspectives between them. We ensured this objective through our recruitment and group assignment strategies, promoting collaboration between stakeholders of diverse perspectives and experiences, which was reported as an area of strength by participants who completed the feedback survey. Fourth, since our sample primarily comes from one geographical region (i.e., BC, Canada), their perspectives may not represent those of stakeholders from other parts of Canada, or the world at large. However, this is a common limitation for NGT-based studies [37, 40, 42, 58]. Moreover, our sample size was comparably large relative to previous related studies [20, 27, 32, 34] and the recommendations generated are broad and widely applicable to numerous healthcare service delivery contexts.

Conclusions

The purpose of this study was to generate and prioritize community-driven recommendations for research and clinical practice to improve healthcare services for people experiencing homelessness with concurrent ABI and MHSU disorders. To the best of our knowledge, this is the first ever study undertaken to identify strategies related to the unique treatment needs of this understudied sub-group of the homeless population. The results of this study offer healthcare providers a number of strategies for improving healthcare service delivery for the populations they support. Our findings also provide researchers with an agenda for supporting advances in clinical practice. Future research should expand upon these recommendations by exploring the impacts and benefits to implementing them in healthcare service delivery, evaluation and innovation.

Abbreviations

MHSU	Mental Health/Substance Use
ABI	Acquired Brain Injury
TBI	Traumatic Brain Injury
BC	British Columbia
PAR	Participatory Action Research
NGT	Nominal Group Technique

Supplementary Information

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Supplementary Material 1.

Supplementary Material 2.

Supplementary Material 3.

Supplementary Material 4.

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Authors' contributions

Conceptualization (C.J.K., J.G., J.S., J.B.B., M.G.B), investigation (C.J.K., J.G., G.W., J.S., J.B.B., M.G.B.), methodology (C.J.K., J.G., J.S., M.G.B.), validation (C.J.K., M.G.B.), formal data curation and analysis (C.J.K.), project administration (C.J.K., J.S., M.G.B., J.B.B.), funding acquisition (C.J.K., J.S., J.B.B., M.G.B.), supervision (J.S., J.B.B., M.G.B.), writing–original draft (C.J.K., J.G., G.W., M.G.B.), writing–review and editing (C.J.K., J.G., G.W., J.S., J.B.B., M.G.B.).

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Data availability

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request. Data is provided within the supplementary information files.

Declarations

Ethics approval and consent to participate

Ethics approval was obtained by the Research Ethics Boards of the University of British Columbia (#H22-03403) and University of Victoria (#22–0614) and all methods were performed in accordance with the relevant guidelines and regulations approved by the Research Ethics Boards. All participants provided informed consent to participate.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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References

1. United Nations. SDG indicator metadata. 2021. Available from: https://unstats.un.org/sdgs/metadata/files/Metadata-11-01-01.pdf. [cited 2024 Aug 26].
2. Barry R, Anderson J, Tran L, Bahji A, Dimitropoulos G, Ghosh SM, et al. Prevalence of mental health disorders among individuals experiencing homelessness: a systematic review and Meta-Analysis. JAMA Psychiatry. 2024;81(7):691–9.
3. Beijer U, Wolf A, Fazel S. Prevalence of tuberculosis, hepatitis C virus, and HIV in homeless people: a systematic review and meta-analysis. Lancet Infect Dis. 2012;12(11):859–70.
4. Ayano G, Tesfaw G, Shumet S. The prevalence of schizophrenia and other psychotic disorders among homeless people: a systematic review and meta-analysis. BMC Psychiatry. 2019;19(1):370.
5. Gaetz S, Gulliver T, Richter T. The State of Homelessness in Canada 2014. Toronto: The Homeless Hub Press; 2014. Available from: [cited 2024 Aug 26]. https://homelesshub.ca/resource/the-state-of-homelessness-in-canada-2014/.
6. Chamberlain C, Johnson G. Pathways into adult homelessness. J Sociol. 2013;49(1):60–77.
7. Nilsson SF, Nordentoft M, Hjorthøj C. Individual-Level predictors for becoming homeless and exiting homelessness: a systematic review and meta-analysis. J Urban Health. 2019;96(5):741–50.
8. Subedi K, Ghimire S. Comorbidity profiles of patients experiencing homelessness: a latent class analysis. PLoS One. 2022;17(5):e0268841.
9. Nielsen SF, Hjorthøj CR, Erlangsen A, Nordentoft M. Psychiatric disorders and mortality among people in homeless shelters in Denmark: a nationwide register-based cohort study. Lancet. 2011;377(9784):2205–14.
10. Stubbs JL, Thornton AE, Sevick JM, Silverberg ND, Barr AM, Honer WG, et al. Traumatic brain injury in homeless and marginally housed individuals: a systematic review and meta-analysis. Lancet Public Health. 2020;5(1):e19–32.
11. Corrigan JD, Yang J, Singichetti B, Manchester K, Bogner J. Lifetime prevalence of traumatic brain injury with loss of consciousness. Inj Prev J Int Soc Child Adolesc Inj Prev. 2018;24(6):396–404.
12. Nanjo A, Evans H, Direk K, Hayward AC, Story A, Banerjee A. Prevalence, incidence, and outcomes across cardiovascular diseases in homeless

individuals using National linked electronic health records. Eur Heart J. 2020;41(41):4011–20.

13. Zhou LW, Panenka WJ, Jones AA, Gicas KM, Thornton AE, Heran MKS, et al. Prevalence and risk factors of brain infarcts and associations with cognitive performance in tenants of marginal housing. J Am Heart Assoc. 2019;8(13):e011412.
14. van Draanen J, Tsang C, Mitra S, Karamouzian M, Richardson L. Socioeconomic marginalization and opioid-related overdose: a systematic review. Drug Alcohol Depend. 2020;214:108127.
15. Kiyatkin EA. Respiratory depression and brain hypoxia induced by opioid drugs: morphine, oxycodone, heroin, and Fentanyl. Neuropharmacology. 2019;151:219–26.
16. Faul M, Coronado V. Epidemiology of traumatic brain injury. Handb Clin Neurol. 2015;127:3–13.
17. Ponsford J, Alway Y, Gould KR. Epidemiology and natural history of psychiatric disorders after TBI. J Neuropsychiatry Clin Neurosci. 2018;30(4):262–70.
18. Elbogen EB, Wolfe JR, Cueva M, Sullivan C, Johnson J. Longitudinal predictors of criminal arrest after traumatic brain injury: results from the traumatic brain injury model system National database. J Head Trauma Rehabil. 2015;30(5):E3–13.
19. Haag HL, Jones D, Joseph T, Colantonio A. Battered and brain injured: traumatic brain injury among women survivors of intimate partner violence–a scoping review. Trauma Violence Abuse. 2022;23(4):1270–87.
20. Grewal J, Kennedy CJ, Mamman R, Biagioni JB, Garcia-Barrera MA, Schmidt J. Understanding the barriers and facilitators of healthcare services for brain injury and concurrent mental health and substance use issues: a qualitative study. BMC Health Serv Res. 2024;24(1):881.
21. McAllister TW. Neurobehavioral sequelae of traumatic brain injury: evaluation and management. World Psychiatry. 2008;7(1):3–10.
22. Mitchell MS, León CLK, Byrne TH, Lin WC, Bharel M. Cost of health care utilization among homeless frequent emergency department users. Psychol Serv. 2017;14(2):193–202.
23. Hwang SW, Chambers C, Chiu S, Katic M, Kiss A, Redelmeier DA, et al. A comprehensive assessment of health care utilization among homeless adults under a system of universal health insurance. Am J Public Health. 2013;103(Suppl 2):S294–301.
24. Lang T, Davido A, Diakité B, Agay E, Viel JF, Flicoteaux B. Using the hospital emergency department as a regular source of care. Eur J Epidemiol. 1997;13(2):223–8.
25. Government of Canada. Housing, infrastructure and communities Canada - reaching home: Canada's homelessness strategy directives. 2022. Available from: https://housing-infrastructure.canada.ca/homelessness-sans-abri/directives-eng.html. [cited 2024 Aug 26].
26. Chan V, Toccalino D, Omar S, Shah R, Colantonio A. A systematic review on integrated care for traumatic brain injury, mental health, and substance use. PLoS One. 2022;17(3):e0264116.
27. Estrella MJ, Kirsh B, Kontos P, Grigorovich A, Colantonio A, Chan V et al. Critical characteristics of housing and housing supports for individuals with concurrent traumatic brain injury and mental health and/or substance use challenges: a qualitative study. Int J Environ Res Public Health. 2021;18(22):1211–29.
28. Hunt AW, Turner GR, Polatajko H, Bottari C, Dawson DR. Executive function, self-regulation and attribution in acquired brain injury: a scoping review. Neuropsychol Rehabil. 2013;23(6):914–32.
29. Ponsford JL, Downing MG, Olver J, Ponsford M, Acher R, Carty M, et al. Longitudinal follow-up of patients with traumatic brain injury: outcome at two, five, and ten years post-injury. J Neurotrauma. 2014;31(1):64–77.
30. Garcia-Barrera MA, Agate FT, Wong RE, Smart CM, Karr JE. Executive dysfunction after traumatic brain injury. In: Ardila A, Fatima S, Rosselli M, editors. Dysexecutive syndromes: clinical and experimental perspectives. Cham: Springer International Publishing; 2019. pp. 83–122. https://doi.org/10.1007/978-3-030-25077-5_5.
31. Dindo L, Johnson AL, Lang B, Rodrigues M, Martin L, Jorge R. Development and evaluation of an 1-day acceptance and commitment therapy workshop for veterans with comorbid chronic pain, TBI, and psychological distress: outcomes from a pilot study. Contemp Clin Trials. 2020;90(101242342):105954.
32. Purkey E, MacKenzie M. Experience of healthcare among the homeless and vulnerably housed a qualitative study: opportunities for equity-oriented health care. Int J Equity Health. 2019;18(1):101.
33. Reilly J, Ho I, Williamson A. A systematic review of the effect of stigma on the health of people experiencing homelessness. Health Soc Care Community. 2022;30(6):2128–41.
34. Kennedy CJ, Woodin E, Schmidt J, Biagioni JB, Garcia-Barrera MA. Ten priorities for research addressing the intersections of brain injury, mental health and addictions: a stakeholder-driven priority-setting study. Health Expect. 2024;27(4):e14136.
35. Mosley JE. Cross-Sector collaboration to improve homeless services: addressing capacity, innovation, and equity challenges. Ann Am Acad Pol Soc Sci. 2021;693(1):246–63.
36. BC Consensus on Brain Injury. Available from: https://bcconsensusonbraininjury.com/. Accessed 15 Aug 2024.
37. McMillan SS, Kelly F, Sav A, Kendall E, King MA, Whitty JA, et al. Using the nominal group technique: how to analyse across multiple groups. Health Serv Outcomes Res Methodol. 2014;14(3):92–108.
38. Harvey N, Holmes CA. Nominal group technique: an effective method for obtaining group consensus. Int J Nurs Pract. 2012;18(2):188–94.
39. Khurshid F, O'Connor E, Thompson R, Hegazi I. Twelve tips for adopting the virtual nominal group technique (vNGT) in medical education research. MedEdPublish. 2016;13(18):2023.
40. Bridger K, Kellezi B, Kendrick D, Kettlewell J, Holmes J, Timmons S, et al. Patients views on which return-to-work outcomes should be prioritised: a nominal group technique focus group. Br J Occup Ther. 2022;85(9):704–11.
41. Maguire T, Garvey L, Ryan J, Olasoji M, Willets G. Using the nominal group technique to determine a nursing framework for a forensic mental health service: a discussion paper. Int J Ment Health Nurs. 2022;31(4):1030–8.
42. Muthulingam D, Bia J, Madden LM, Farnum SO, Barry DT, Altice FL. Using nominal group technique to identify barriers, facilitators, and preferences among patients seeking treatment for opioid use disorder: a needs assessment for decision making support. J Subst Abuse Treat. 2019;100:18–28.
43. Tariq S, Grewal EK, Booth R, Nat B, Ka-Caleni T, Larsen M, et al. Lessons learned from a virtual community-based participatory research project: prioritizing needs of people who have diabetes and experiences of homelessness to co-design a participatory action project. Res Involv Engagem. 2023;9(1):46.
44. Baum F, MacDougall C, Smith D. Participatory action research. J Epidemiol Community Health. 2006;60(10):854–7.
45. Trajkovski S, Schmied V, Vickers M, Jackson D. Using appreciative inquiry to transform health care. Contemp Nurse. 2013;45(1):95–100.
46. Gonzales CK, Leroy G. Eliciting user requirements using appreciative inquiry. Empir Softw Eng. 2011;16(6):733–72.
47. Olmos-Vega FM, Stalmeijer,Renée E, Varpio, Lara, and, Kahlke R. A practical guide to reflexivity in qualitative research: AMEE Guide No. 149. Med Teach. 2023;45(3):241–51.
48. Newman SD, Andrews JO, Magwood GS, Jenkins C, Cox MJ, Williamson DC. Community advisory boards in community-based participatory research: a synthesis of best processes. Prev Chronic Dis. 2011;8(3):A70.
49. Bingham B, Moniruzzaman A, Patterson M, Distasio J, Sareen J, O'Neil J, et al. Indigenous and non-indigenous people experiencing homelessness and mental illness in two Canadian cities: a retrospective analysis and implications for culturally informed action. BMJ Open. 2019;9(4):e024748.
50. Caspersen J, D'Souza S, Lupick D. 2023 report on homeless counts in B.C. British Columbia: The Homelessness Services Association of BC; 2023. Available from: https://www.bchousing.org/research-centre/housing-data/homeless-counts
51. Salaheen Z, Moghaddamjou A, Fehlings M. Neurotrauma in indigenous populations of Canada—challenges and opportunities at a global level: a scoping review. World Neurosurg. 2022;167:213–e2212.
52. Johnson LW, Diaz I. Exploring the social determinants of health and health disparities in traumatic brain injury: a scoping review. Brain Sci. 2023;13(5):707.
53. BC Centre for Disease Control. BC Centre for Disease Control (CDC) peer payment standards. 2018. Available from: http://www.bccdc.ca/resource-gallery/Documents/Educational%20Materials/Epid/Other/peer_payment-guide_2018.pdf.
54. Jamieson MK, Govaart GH, Pownall M. Reflexivity in quantitative research: a rationale and beginner's guide. Soc Personal Psychol Compass. 2023;17(4).
55. Emerson P. The original Borda count and partial voting. Soc Choice Welf. 2013;40(2):353–8.
56. Fellenor J, Britten N, Courtenay M, Payne RA, Valderas J, Denholm R, et al. A multi-stakeholder approach to the co-production of the research agenda for medicines optimisation. BMC Health Serv Res. 2021;21(1):64.
57. Khilnani NM, Meissner MH, Learman LA, Gibson KD, Daniels JP, Winokur RS, et al. Research priorities in pelvic venous disorders in women: recommendations from a multidisciplinary research consensus panel. J Vasc Interv Radiol. 2019;30(6):781–9.

58. Fournier JP, Escourrou B, Dupouy J, Bismuth M, Birebent J, Simmons R, et al. Identifying competencies required for medication prescribing for general practice residents: a nominal group technique study. BMC Fam Pract. 2014;15(1):139.
59. Onu JU, Akase I, Ohaka J, Kida IM. Barriers and enablers of post-COVID-19 acute care follow-up in Nigeria from service providers' perspective: a nominal group technique. BMC Health Serv Res. 2024;24(1):549.
60. Miler JA, Carver H, Masterton W, Parkes T, Maden M, Jones L, et al. What treatment and services are effective for people who are homeless and use drugs? A systematic review of reviews. PLoS One. 2021;16(7):e0254729.
61. Brallier S, Southworth S, Ryan B. Rolling forward: addressing needs in the homeless community. J Soc Distress Homelessness. 2019;28(2):186–92.
62. Colantonio A, Howse D, Kirsh B, Chiu T, Zulla R, Levy C. Living environments for people with moderate to severe acquired brain injury. Healthc Policy Polit Sante. 2010;5(4):e120–138.
63. Zhu Y, Yuan Y, Gu J, Fu Q. Neoliberalization and inequality: disparities in access to affordable housing in urban Canada 1981–2016. Hous Stud. 2023;38(10):1860–87.
64. Kureshi N, Clarke DB, Feng C. Association between traumatic brain injury and mental health care utilization: evidence from the Canadian community health survey. Inj Epidemiol. 2023;10(1):16.
65. Rog DJ, Marshall T, Dougherty RH, George P, Daniels AS, Ghose SS, et al. Permanent supportive housing: assessing the evidence. Psychiatr Serv. 2014;65(3):287–94.
66. Urbanoski K, Veldhuizen S, Krausz M, Schutz C, Somers JM, Kirst M, et al. Effects of comorbid substance use disorders on outcomes in a housing first intervention for homeless people with mental illness. Addiction. 2018;113(1):137–45.
67. Brocht C, Sheldon P, Synovec C, Synovec CE. A clinical description of strategies to address traumatic brain injury experienced by homeless patients at Baltimore's medical respite program. Work. 2020;65(2):311–20.
68. Chan V, Estrella MJ, Baddeliyanage R, Shah R, Babineau J, Colantonio A. Rehabilitation among individuals experiencing homelessness and traumatic brain injury: a scoping review. Front Med. 2022;9:916602.
69. Somerville P. Understanding homelessness. Hous Theory Soc. 2013;30(4):384–415.
70. Wright NM, Tompkins CN. How can health services effectively Meet the health needs of homeless people? Br J Gen Pract. 2006;56(525):286–93.
71. Laver K, Lannin NA, Bragge P, Hunter P, Holland AE, Tavender E, et al. Organising health care services for people with an acquired brain injury: an overview of systematic reviews and randomised controlled trials. BMC Health Serv Res. 2014;14(1):397.
72. Grimshaw JM, Eccles MP, Lavis JN, Hill SJ, Squires JE. Knowledge translation of research findings. Implement Sci. 2012;7(1):50.
73. Topolovec-Vranic J, Ennis N, Ouchterlony D, Cusimano MD, Colantonio A, Hwang SW, et al. Clarifying the link between traumatic brain injury and homelessness: workshop proceedings. Brain Inj. 2013;27(13–14):1600–5.
74. Sukhera J, Knaak S, Ungar T, Rehman M. Dismantling structural stigma related to mental health and substance use: an educational framework. Acad Med. 2022;97(2):175.

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