The Intersection of Traumatic Brain Injury and Homelessness

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Abstract
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The first manuscript examined the temporal relationship between TBI and homelessness. This relationship is hypothesized as bi-directional, as factors associated with homelessness may increase the risk of TBI, while at the same time, factors associated with TBI may impact one's housing stability. The directionality and mental health correlates were examined. Findings showed higher rates of reported TBI among a sample of adults experiencing homelessness compared to what current literature suggests, further suggesting that TBI may be a significant risk factor of homelessness.

Manuscript two arose during the COVID-19 pandemic. Access to resources were restricted for housed and unhoused individuals. Manuscript two studied the impact that COVID-19 had on access to resources among individuals experiencing homelessness and a TBI. Qualitative findings revealed that basic/biological needs, financial needs, and lack of social support were more restricted by COVID-19 among individuals experiencing homelessness and a TBI. Continued innovations such as tiny home villages, safe parking lots, and safe camping spaces are recommended to provide safety and a sense of community among unhoused individuals.

Manuscript three studied the role of social support among individuals experiencing homelessness and a TBI. Positive social support among individuals experiencing homelessness and a TBI is important because it can serve as a protective factor against stress, substance use, and housing instability. The consequences of a TBI along with risk factors for homelessness, specifically substance use, can impact social support. Findings showed that substance use was a barrier to staying housed and rates of social support were low across the sample.

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The Intersection of Traumatic Brain Injury
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In Partial Fulfillment
of the Requirements for the Degree
Doctor of Philosophy

by
Stephanie A. Chassman
June 2022
Advisor: Dr. Daniel Brisson
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Chapter One: Introduction

Homelessness

As of January 2020, an estimated 580,000 people were without shelter (National Alliance to End Homelessness, 2021). The causes of homelessness often involve factors such as poverty, family conflict, mental health problems, substance use, early childhood adverse experiences, personal history of violence, and criminal justice system connection (Greenberg & Rosenheck, 2010; Greenberg & Rosenheck, 2008; Roos et al., 2013; Thompson et al., 2013). Furthermore, social, and emotional problems, learning disabilities, memory lapses, lack of affordable housing, loss of job, eviction, domestic violence, medical debt, lack of insurance, income inequality (Burt et al., 2001; Dykeman, 2011; Shinn, 2007) and poor executive functioning because of neurological injuries might also be contributing factors toward homelessness (Hwang et al., 2008; MacReady, 2009). In addition to these risk factors, people experiencing homelessness are more likely to have a traumatic brain injury (TBI), further increasing their risk of negative health outcomes (Hwang et al., 2008; Oddy et al., 2012; Stubbs et al., 2020).

Traumatic Brain Injury (TBI)

A TBI is an injury that disturbs brain functioning (CDC, 2021). It can be caused by a blow, bump, or jolt to the head (Menon et al., 2010). It effects a person’s judgment, reasoning, and problem-solving ability; changes in one’s emotions and one’s ability to regulate themselves are also common (Fazel et al., 2008). Thus, individuals with a history
of TBI often experience impulsivity, mood swings, and personality changes (Konrad et al., 2011). A recent systematic review and meta-analysis found that a history of TBI was associated with poor physical and mental health, suicidality, memory concerns, higher health service use, and criminal justice system involvement (Stubbs et al., 2020).

**Relationship Between Traumatic Brain Injury and Homelessness**

TBI is associated with lower subsequent employment rates (Corrigan et al., 2014; Velzen et al., 2009). One study found that, in the first five years following a TBI, 39% of individuals deteriorated in global functioning, 55% were unemployed compared to a 5.6% unemployment rate among the general population (Bureau of Labor Statistics, 2014), and 30% were not independent in their ability to perform the activities of daily living (Corrigan et al., 2014). These high rates of unemployment may be a contributing factor that results in a person experiencing housing instability and homelessness following a TBI.

Individuals experiencing homelessness are disproportionally impacted by high rates of TBI (Stubbs et al., 2020). It is estimated that more than half of individuals experiencing homelessness have a TBI history (Boseley, 2019; Hwang et al., 2008; Russell et al., 2013), whereas the national occurrence of TBI in the general population is between 2%-8.5% (CDC, 2016). Obtaining accurate estimates of TBI among individuals experiencing homelessness is challenging due to different methods of sampling participants and various definitions of TBI across studies (Stubbs et al., 2020); therefore, these rates may be low estimates. Accurate prevalence rates are important to obtain in order to implement effective prevention and intervention strategies.

**The Role of Theory**
Several theoretical frameworks have been used to examine health and mental health disparities among individuals experiencing homelessness. Historically, homelessness has often been explained by structural or individual-level factors (Neale, 1997). Structural explanations of homelessness propose that the reasons for homelessness are beyond the individual and examines contributing social and economic factors (Neale, 1997). While individual-level explanations attribute a person’s homelessness to their own doing, blaming the individual. Individual-level decisions contribute to the stereotype of individuals experiencing homelessness as deviant, an attitude prevalent until the 1960s (Neale, 1997; Weedon, 1987).

Theories to better understand TBI continue to be sparse. Theories such as theory of mind (Happe et al., 1999) and the biopsychosocial model (Engel, 1977) can be used to better explain the medical consequences of TBI such as deficits in social cognition (McDonald, 2013). However, theories that explain the risk-factors and consequences of TBI continue to be scarce in peer-reviewed literature.

To gain a better understanding of factors associated with TBI and homelessness two theories will be referenced. Maslow’s hierarchy of needs (1943) examines specific needs of individuals as well as common barriers to achieving one’s own needs. Social capital theory, on the other hand, theorizes that individuals accrue benefits by virtue of their personal relationships and by belonging to specific social networks (Warschauer, 2004).

While both Maslow’s hierarchy of needs and social capital theory have been applied to research among homeless populations (Barman-Adhikari & Rice, 2014; Barman-Adhikari et al., 2016; Fleury et al., 2021; Henwood et al., 2015), they have rarely been used to
specifically explore the needs and experiences of people who experience both homelessness and a TBI. As such, this dissertation will utilize Maslow’s hierarchy of needs and social capital theory as frameworks to better understand the unique needs and barriers of individuals experiencing homelessness and a TBI to achieve housing stability.

**Maslow’s Hierarchy of Needs**

Maslow’s hierarchy of needs remains one of the most frequently used theoretical frameworks to examine met and unmet needs (Fleury et al., 2021). Maslow viewed human needs as a hierarchical progression from physiological (basic) needs, to safety, love and belonging, self-esteem, and eventually self-actualization, which is the desire for self-fulfillment (Maslow, 1943). The first four stages are categorized into deficiency needs while the last stage is characterized as growth needs. Maslow (1954) suggested that an individual must first satisfy their deficiency needs before gaining the ability and motivation of growth needs. Maslow (1943; 1954) argued that individuals are motivated to achieve certain needs and desires inherently, and that some needs are more important than others. The most basic need, that of survival, is the first need of an individual. For example, someone who is hungry (not meeting level one needs) will not be able to focus on their relationships with others (level three need) until they eat. Research shows that housing is the most essential need among individuals experiencing homelessness, followed by food and clothing (Lee & Grief, 2008; Troisi et al., 2012). For individuals experiencing homelessness with a history of TBI, medical needs may also be essential.

Some research has criticized Maslow’s hierarchy of needs. Scholars argue that needs may be influenced by environments and shaped by culture, more so than Maslow suggested (Neher, 1991). For example, research from Tay and Diener (2011) applied
Maslow’s theory in a longitudinal study of 60,865 participants from 123 countries over the course of five years. Participants were asked about needs like those mentioned in Maslow’s model. Results showed that Maslow’s needs exist across cultures. There were, however, cultural differences in how these needs were ordered (Tay & Diener, 2011). These critics shed an important light on the lack of attention Maslow paid to environmental factors, as they contribute to and interact with the hierarchy of needs (Aron, 1977; Daniels, 1982; Geller, 1982; Smith, 1973; Trigg, 2004). Other factors, including TBI may influence the order and importance of the original 5-stage model.

Another critique of Maslow’s theory has centered around his understanding of social needs. Although social support is often viewed as a higher-level need in Maslow’s hierarchy, individuals experiencing homelessness and a TBI may have different priorities. Individuals experiencing homelessness and a TBI are a unique and vulnerable population. Needs that Maslow claimed are higher level needs, such as social support, may, in fact, be a necessity for an individual experiencing homelessness and a TBI. Due to the previously mentioned negative outcomes associated with TBI, individuals may need support paying bills, keeping medical appointments, and establishing employment. Thus, social needs may not be a higher-level need to individuals experiencing homelessness and a TBI, rather, it may have a reported TBI. As such, this dissertation will also use social capital theory to compliment this theoretical framework.

**Social Capital Theory**

Social capital theory is a useful framework that has been applied to homelessness (Barman-Adhikari & Rice, 2014; Barman-Adhikari et al., 2016) and demonstrates promise in examining the intersection of homelessness and TBI. Social capital has
significant implications for individuals experiencing homelessness’ survival through access to sources of social capital (Cook & Hole, 2020). Social capital theory can be utilized to better understand how social networks influence housing stability among individuals experiencing homelessness and a TBI.

Social support has been demonstrated to be an important factor for people experiencing homelessness. Social support plays a significant role for individuals experiencing homelessness to exit homelessness (Johnson et al., 2005; Tsai et al., 2011; Tsemberis, 2010). Additionally, social support can help alleviate stress (Rauch & Ferry, 2001) possibly leading to more support around TBI recovery by assisting individuals to integrate with society (Anderson et al., 2010) and link individuals to services. Research shows that family often serves as a crucial support network for individuals with a reported TBI (Verhaeghe et al., 2005). However, consequences of TBI may make it difficult for individuals experiencing homelessness to maintain social relationships. Without adequate social support, individuals experiencing homelessness and a TBI may continue to experience homelessness and may remain disconnected from adequate care.

While social support is generally viewed as an important protective factor for those with a history of TBI (Zeng et al., 2016), people experiencing homelessness often have diverse family relationships that may impact the role of social support. Individuals experiencing homelessness may have strained family relationships and social support may come from street-based peers, who are in a similar living situation (Ferguson & Xie, 2008; Stablein, 2011). Street-based peers may have a positive or negative influence on health outcomes, housing stability, and service use behavior (Barman-Adhiakri et al., 2016). It is important to better understand the social network composition of individuals
experiencing homelessness and a TBI as it pertains to housing and non-housing related outcomes.

**Gaps In Knowledge**

Despite the high rates of TBI among homeless populations, intervention and prevention strategies aimed to serve individuals experiencing homelessness often do not screen for TBI. This omission may overlook individuals experiencing homelessness due to a TBI or who have sustained a TBI while homeless, which may be a highly vulnerable population at risk of continued homelessness.

Currently, there is a gap in knowledge regarding the relationship between TBI, homelessness, and effective interventions (Burra et al., 2009; Topolovec-Vranic et al., 2013; Topolovec-Vranic et al., 2014). Current methods for diagnosing a TBI rely on self-reports of specific symptoms at the time of the injury. These methods have been considered problematic in terms of accuracy and accessibility (National Academies of Sciences, Engineering, Medicine, & National Research Council, 2019). There are a few specific methods such as x-rays, blood tests, and computed tomography (CT) scans that can help make a correct diagnosis (Powell et al., 2008). These tests, however, are difficult for individuals experiencing homelessness to obtain because they often need to be completed within 12 hours of the injury, which may be challenging due to transportation issues or lack of health care (Powell et al., 2008). Further, if a patient has co-occurring physical health and mental health problems they may be misdiagnosed (National Academies of Sciences et al., 2019). The challenges in diagnosing a TBI and the high rate of misdiagnosis adds to difficulty examining the link between TBI and homelessness.
Lack of awareness about TBI represents another key barrier to accessing care for homeless populations (Topolovec-Vranic et al., 2013). Brain injuries are not always well-documented in medical records. In order to access many specialty services for TBI, a properly documented diagnosis is required (Topolovec-Vranic et al., 2013). Stigma and social exclusion, as well as cognitive dysfunction, contribute to these barriers (Johnstone et al., 2015; Spence et al., 2004). Moreover, there are jurisdictional differences that come into play in terms of available treatment. In rural areas, referrals to medical specialists may be difficult because of a lack of available medical providers and thus, transportation to larger urban centers may be necessary which is costly and cumbersome and is often a significant barrier to accessing health care (Topolovec-Vranic et al., 2013).

In addition to these key gaps in knowledge about homelessness and TBI separately, there is a dearth of research examining how homelessness and TBI intersect. Specifically, there are gaps in knowledge as it pertains to the temporal relationship between TBI and homelessness, physical health problems, mental health issues, and substance use. These specific gaps will be discussed next.

**Temporal Relationship Between TBI and Homelessness**

Individuals experiencing homelessness are at a disproportionately high risk for sustaining a TBI due to some of the dangers associated with homelessness such as increased likelihood for assaults and substance abuse-related accidents (Barnes et al., 2015). It is also possible that the consequences of a TBI including memory issues and difficulties in planning can affect the ability of a person to maintain employment and housing (Oddy et al., 2012) and can lead one to homelessness. The relationship between TBI and homelessness is correlated, but it is difficult to ascertain which comes first.
Additionally, there are other correlates of homelessness and TBI such as physical health problems which may add complexity to accurately diagnosing a TBI.

**Physical Health**

Individuals experiencing homelessness have higher rates of chronic health conditions compared to housed individuals (Gicas et al., 2020). These conditions include higher rates of drug use, HIV, Hepatitis C, and other infectious diseases (Beijer et al., 2012; Fazel et al., 2008). Not only are individuals experiencing homelessness more likely to have poor physical health, they are less likely to utilize medical services compared to their housed counterparts (Nyamathi et al., 2000). Similarly, individuals with a reported TBI experience adverse health outcomes including seizures (Hwang et al., 2008), back issues, chronic hepatitis, migraine headaches, arthritis, lung disease, high blood pressure, HIV or AIDS (Nikoo et al. 2014), concentration difficulties, excessive worry or sleeping (Mackelprang et al., 2014), and epilepsy (Topolovec-Vranic et al., 2017). The cognitive sequelae of TBI may increase the risk of subsequent health problems (Hwang et al., 2008; Oddy et al., 2012; Topolovec-Vranic et al., 2012).

TBI is prevalent among individuals experiencing homelessness and may contribute to poor health and functioning compared to the general population. Individuals experiencing homelessness and TBI were found to have co-occurring physical health problems including seizures, dizziness, headaches or migraine headaches, and memory problems (Stubbs et al., 2020). The high rates of treatable chronic health conditions have implications for policy, research, and practice.

**Mental Health**
Individuals with mental illness are over-represented among homeless populations compared to the general population. Mental illness has been found to be a risk factor that contributes to homelessness (Sullivan et al., 2000). Individuals experiencing homelessness suffering from a mental illness face a myriad of health and social problems. Individuals with severe mental illness who become homeless are at a higher risk of long-term homelessness (Smartt et al., 2019). Individuals with mental illness may become homeless due to the sequelae of their mental health and/or because of broken social ties and economic networks (Sullivan et al., 2000).

There are gaps in literature regarding the relationship between TBI and mental health symptoms. The few studies that have examined mental health and TBI have found a high incidence (22.8%) of poor mental health associated with TBI (Terrio et al., 2009). Other research found that 42% of the sample had clinically significant psychiatric symptoms, and more than one symptom was common (Hart et al., 2014). More so, there is evidence of an association between TBI, depression, aggression, psychosis, and suicide (Hesdorffer et al., 2009).

Both homelessness and TBI are associated with increased mental health concerns, and these risks are further amplified among people experiencing both simultaneously. Research has shown that individuals experiencing homelessness with a history of TBI are more likely to have a history of mental health disorders (Hux et al., 2009; Hwang et al., 2008; Mackelprang et al., 2014; Svoboda & Ramsay, 2014; To et al., 2015; Topolovec-Vranic et al., 2014). It is important to mention that many studies measured mental illness in general terms and did not report specific mental health diagnoses. The few studies that have reviewed specific associations of TBI, homelessness, and mental health diagnoses...
found linkages to major depressive episodes, PTSD, panic disorder, mood disorder with psychotic features, psychotic disorders (Topolovec-Vranic et al., 2017), depression, anxiety, and bipolar disorder (Palladino et al., 2017). While TBI may increase the risk of subsequent mental health problems, it is equally likely that pre-existing mental health problems increase the risk of TBI (Hwang et al., 2008).

**Substance Use**

Substance use is a common comorbid disorder among individuals experiencing homelessness with rates being consistently higher than average (Fazel et al., 2008; O’Toole et al., 2004). Not only do individuals experiencing homelessness experience higher rates of substance use, but this vulnerable population also experiences greater severity of substance use leading to negative outcomes such as drug overdose more so than their housed counterparts (Baggett et al., 2015; Baggett et al., 2013; Doran et al., 2018). Additionally, substance use can lead to housing instability and increase victimization (Dunne et al., 2015) potentially leading to homelessness.

TBI has also been linked to substance use. Research has shown that alcohol abuse (Hurstak et al., 2017; Hwang et al., 2008; Marcoux et al., 2017), marijuana use, and crack or cocaine use was a common co-morbidity among individuals with a reported TBI (Mackelprang et al., 2014). Research has found support for a relationship between substance use and other risky behaviors and injuries, including TBI (Brenner et al., 2017). Some individuals may use substances as a coping mechanism following an injury to avoid emotional distress (Adshead et al., 2019). Data have also shown that survivors of TBI often reported intoxication at the time of their brain injury (Corrigan, 1995).
Additionally, substance use may have deleterious effects on recovery from a TBI (Corrigan, 1995), potentially exacerbating subsequent head injuries.

A history of TBI among individuals experiencing homelessness has been associated with substance use. Substance use increases both the risk of homelessness and the risk of TBI (Corrigan, 1995; Hwang et al., 2008). Substance use can decrease opportunities to establish and maintain housing and employment, and increase exposure to victimization, potentially leading to a brain injury (Dunne et al., 2015).

**Social Support**

Research has shown the importance of individuals experiencing homelessness to develop positive social support as a way to exit homelessness (Johnston et al., 2015; Tsai et al., 2011; Tsemberis, 2010). Research has shown social support plays a crucial role in the ability to integrate within society (Anderson et al., 2010). It has been found that “social needs often include the identification of resources for social and family support, development of interpersonal skills, and advocating for oneself in a challenging environment” (Dykeman, 2011, p.35). Individuals experiencing homelessness often have diverse relationships and relationships with family members may be strained (Ferguson, 2008). This is especially true for LGBT individuals and young adults, who may have been kicked out of their family home (Castellanos, 2016). Social support may come from other street-based peers in a similar living situation, who individuals can rely on for survival (Stablein, 2011)

The consequences of a TBI include impairments to physical, mental, emotional, and social functioning as well as issues such as social isolation and relationship breakdown (Adshead et al., 2019), making it difficult to develop positive social relationships.
Without social support, this highly vulnerable population may be less likely to access necessary medical care. On the other hand, sufficient social support was shown to decrease long-lasting mental fatigue among individuals with a TBI (Zeng et al., 2016). Consequences of homelessness and TBI may lead to strained interpersonal relationships, social isolation, and relationship breakdown (Adshead et al., 2019; Kamal et al., 2019).

There is scant research examining the relationship between TBI, homelessness, and social support. As previously mentioned, individuals experiencing homelessness and a TBI separately may experience low levels of social support due to the consequences of homelessness and TBI. Therefore, one may also hypothesize that individuals experiencing both a TBI and homelessness may experience low levels of social support as well. Research does show that medical care for a TBI is a critical opportunity to provide social and housing support for individuals who may be at risk of housing instability (Young & Hughes, 2020). More research is needed to examine the impact of TBI and homelessness on social relationships and social support.

COVID-19

Individuals experiencing homelessness are “invisible victims of Covid-19, marginalized not just in life, but also in death” (McFarling, 2021, paras.1). According to the Center for Disease Control and Prevention (CDC), some groups are at higher risk to become seriously ill from COVID-19, one of these risk groups include people with pre-existing health conditions (CDC, 2020). Due to their physical health vulnerabilities (Beijer et al., 2012; Fazel et al., 2008), individuals experiencing homelessness may be a high-risk group for contracting COVID-19. In addition to being at high risk of contracting COVID-19, access to care for people experiencing homelessness has been
complicated throughout the pandemic as clinics had to shut down or defer to telehealth visits which may disadvantage people experiencing homelessness as it requires reliable internet and technology which individuals may not be able to access (Chen et al., 2021).

There is limited research on the impact of COVID-19 on TBI. One study found that TBI cases reduced during COVID-19 as individuals were quarantined (Pinggera et al., 2020), and less susceptible to falls or other TBI related injuries. Another study found that 30% of individuals with a TBI found coping with the COVID-19 pandemic more difficult as participants identified mental health issues and social isolation as barriers during COVID-19 (Morrow et al., 2021).

There is limited research on the impact of COVID-19 on individuals experiencing both a TBI and homelessness. What is known is that individuals experiencing homelessness and a TBI often rely on resources and programs that assist with housing, healthcare, and food (Feeding America, 2020). Access to basic resources was impacted by COVID-19, more research is needed to better understand barriers to resources.

**The Current Study**

The extant literature clearly demonstrates that individuals experiencing both homelessness and TBI are at heightened risk for a variety of negative outcomes. There is not, however, literature that specifically explores how these topics intersect among populations of individuals experiencing homelessness and with a reported TBI. Therefore, the following three manuscripts will aim to provide a better understanding of the intersection of TBI and homelessness, specifically the rates of TBI among individuals experiencing homelessness, the temporal relationship between TBI and homelessness, the co-occurrence of mental health and substance use, the impact of social support, and
COVID-19 by answering the following research questions: 1) What are the rates of TBI among a sample of individuals experiencing homelessness? 2) Does a TBI experience precede or follow an initial period of homelessness? 3) What are the correlates of TBI prior to homelessness including self-reported mental health variables? 4) What differences may exist in social networks among individuals experiencing homelessness and a TBI compared to individuals experiencing homelessness only. 5) What is the relationship between types (instrumental, emotional, informational support) and sources (primary and secondary network) of social support among individuals experiencing homelessness and the impact on housing stability related to substance use. Finally, 6) What is the impact of COVID-19 on access to resources among individuals experiencing homelessness and a TBI?
Chapter Two: Manuscript One

Correlates of Acquiring a Traumatic Brain Injury Before Experiencing Homelessness: An Exploratory Study

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Abstract

The rates of TBI are significantly higher among individuals experiencing homelessness compared to the general population. The relationship between TBI and homelessness is likely bi-directional as factors associated with homelessness may increase the risk of acquiring a TBI, and factors associated with TBI could lead to homelessness. This study builds upon previous research by investigating the following research questions: 1) What are the rates of TBI among a sample of individuals experiencing homelessness? 2) Does a TBI experience precede or follow an initial period of homelessness? And, 3) What are the correlates of TBI prior to homelessness including self-reported mental health variables? Cross-sectional study design and purposive sampling were utilized to interview 115 English-speaking adults (ages 18-73) in two Colorado cities. Results show, 71% of total participants reported a significant history of TBI and of those 74% reported a TBI prior to experiencing homelessness. Our logistic regression models reveal a significant relationship between mental health and acquiring a TBI prior to experiencing homelessness. Implications include prioritizing permanent supportive housing followed by other supportive services.

Keywords: Homelessness; Traumatic Brain Injury; Mental Health
Introduction

On a single night in January 2020, more than 580,000 people experienced homelessness in the United States (National Alliance to End Homelessness, 2021). Compared to the previous year, homelessness increased by 2%, marking the fourth straight year of increases in homelessness nationwide (National Alliance to End Homelessness, 2021). People experiencing homelessness are more likely to have various health issues such as diabetes, heart disease, and substance use (National Alliance to End Homelessness, 2021), and are more likely to have a reported traumatic brain injury (TBI) at some point in their lifetime (Hwang et al., 2008; Oddy et al., 2012; Stubbs et al., 2020; Topolovec-Vranic et al., 2012).

A TBI is “an alteration in brain function, or other evidence of brain pathology, caused by an external force” (Menon et al., 2010, p. 1). There are several ways in which TBIs are classified, including the cause of impact, functional impairment, or physical change (Topolovec-Vranic et al., 2012). Several studies suggest that if one head injury has occurred, the likelihood of subsequent head injuries increases (Hwang et al., 2008; McMillan et al., 2015; Oddy et al., 2012).

The rates of TBI are significantly higher among individuals experiencing homelessness compared to the general population. Research has shown that more than half of individuals experiencing homelessness have sustained a TBI at some point in their lifetime; this is compared to the 12% lifetime prevalence rate among the general population (Hwang et al., 2008; Oddy et al., 2012; Stubbs et al., 2020; Topolovec- Vranic et al., 2012). More so, research shows that over 60% of individuals experiencing
homelessness with a history of TBI were found to have experienced more than one TBI (Hwang et al., 2008). Other research has shown that in a quarter of the population of individuals experiencing homelessness with a TBI history, the injury was identified as moderate to severe (Boseley, 2019).

Literature Review

Temporal Relationship Between TBI and Homelessness

Individuals experiencing homelessness are at a disproportionately high risk for sustaining a TBI. Some circumstances increase the risk of sustaining a TBI including victimization by assaults, engagement in risky behavior, and higher rates of substance use (Backer & Howard, 2007; Silver & Felix, 1999). One study found that men who were chronically homeless with an alcohol-use problem had higher rates of head injuries (Svoboda & Ramsay, 2014). Additional research has also shown that marijuana use, and crack or cocaine use was common among TBI participants (Mackelprang et al., 2014). Substance use increases both the risk of homelessness and the risk of TBI (Corrigan, 1995; Hwang et al., 2008). As a result, individuals experiencing homelessness have an increased susceptibility to brain injury, suggesting that homelessness may be a contributing factor to the increased rates of head injuries.

Alternatively, among several studies including homeless populations, the majority of participants reported their first TBI prior to becoming homeless, suggesting that TBI may be a risk factor for homelessness (Hwang et al., 2008; Mackelprang et al., 2014; Oddy et al., 2012; Topolovec-Vranic et al., 2014). TBI is associated with low subsequent employment rates (approximately 40%), and memory issues and difficulties in planning may affect the ability of someone to maintain employment and housing (Oddy et al.,
2012) which often contributes to a downward spiral into homelessness (Rogers & Read, 2007; Topolovec-Vranic et al., 2012; Velzen et al., 2009). TBI add barriers to maintaining stable housing; for instance, behavioral issues resulting from TBI may be mistaken for non-compliance by landlords and neighbors and thus impact an individual’s ability to budget, pay rent, and maintain a home (Roach, 2016).

Barnes et al. (2015; Figure 1) posited the bi-directional relationship between TBI and homelessness. Those authors argue this relationship is likely bi-directional since factors associated with homelessness may increase the risk of acquiring a TBI, and factors associated with TBI could make an individual vulnerable to becoming homeless. It is important to examine this bi-directional relationship as it pertains to pathways into and out of homelessness and the impact of TBI on this population. Determining the timeline of brain injury history in relation to the onset of homelessness is an aspect of this relationship that merits further investigation.

Figure 1. Bi-Directional Relationship Between TBI and Homelessness (Barnes et al., 2015).

Co-morbidities of TBI and Homelessness
Mental Health and Substance Use

Mental health and substance use are associated with both TBI and homelessness. The few studies that have reviewed specific associations of TBI, homelessness, and mental health diagnosis found linkages to major depressive episodes, PTSD, panic disorder, mood disorder with psychotic features, psychotic disorders (Topolovec-Vranic et al., 2017), depression, anxiety, and bipolar disorder (Palladino et al., 2017). While TBI may increase the risk of subsequent mental health problems, it is also likely that pre-existing mental health and substance use problems increase the risk of TBI (Hwang et al., 2008). It is difficult for studies to claim intersections of TBI, homelessness, and specific mental health diagnosis as it is challenging to assess if mental health symptoms are true mental health problems or consequences of TBI that may appear as mental health issues. The direction and correlates, such as mental illness, of the relationship between TBI and homelessness should be further studied.

A history of TBI among individuals experiencing homelessness has been associated with substance use. Research has found support for a relationship between substance use and other risky behaviors and injuries, including TBI (Brenner et al., 2017). Substance use increases both the risk of homelessness and the risk of TBI (Corrigan, 1995; Hwang et al., 2008). Substance use can decrease opportunities to establish and maintain housing and employment, and increase exposure to victimization (Dunne et al., 2015), which may lead one to a brain injury. Additionally, substance use may have deleterious effects on recovery from a TBI (Corrigan, 1995), potentially also exacerbating the effects of subsequent head injuries.

Barriers to Housing
TBI can impede individuals’ housing stability. Adshead et al. (2019) explain that consequences from a TBI like executive impairments, paired with challenges to engaging in social care, increase the risk for homelessness through an inability to receive the support necessary to remain in one’s home and pay their bills. Individuals’ cognitive impairments may make it difficult to understand how to pay rent, utilities, and maintain their residences (HCH Clinician’s Network, 2003). TBI can impact one’s housing stability making it difficult to maintain housing.

Pathways into homelessness often include economic factors that interact with mental health factors which include substance use, mental health problems, and family conflict (Dykeman, 2011; Harrington, 1985; Sullivan et al., 2000). Individuals with mental illness are over-represented among homeless populations compared to the general population (Hux et al., 2009; Hwang et al., 2008; Mackelprang et al., 2014; Svoboda & Ramsay, 2014; To et al., 2015; Topolovec-Vranic et al., 2014). Mental illness has been found to be a risk factor that contributes to homelessness (Sullivan et al., 2000). These individuals may become homeless due to the sequelae of their mental health and/or as a consequence of broken social ties and economic networks (Sullivan et al., 2000). Additionally, homelessness can precipitate and worsen mental illness, both independent of and in the context of substance use (Bresnahan et al., 2003). Furthermore, individuals experiencing homelessness suffering from a mental illness face a myriad of health and social problems. Individuals with severe mental illness who become homeless are also at a higher risk of long-term homelessness (Smartt et al., 2019).

Research has shown that individuals experiencing homelessness with a history of TBI are more likely to have a history of mental health disorders (Hux et al., 2009; Hwang et
al., 2008; Mackelprang et al., 2014; Svoboda & Ramsay, 2014; To et al., 2015; Topolovec-Vranic et al., 2014) and worse scores on quality of life screening measures (Hwang et al., 2008; To et al., 2015).

**The Current Study**

While previous studies provide important and critical information on the comorbidity between TBI and homelessness, more research is needed to examine the temporal relationship as it pertains to pathways into and out of homelessness. Furthermore, the direction and correlates, such as mental illness, should be further studied as this represents a gap in the literature. This paper seeks to fill this gap by examining the correlates of TBI and homelessness.

This study expands on previous research by describing with greater specificity, the rates, directionality, along with mental health correlates of TBI and homelessness.

Research questions include:

1. What are the rates of TBI among a sample of individuals experiencing homelessness?
2. Does a TBI experience precede or follow an initial period of homelessness?
3. What are the correlates of TBI prior to homelessness including self-reported mental health variables?

**Materials and Methods**

**Study Setting**

In 2020, researchers from The University of Denver (the Center for Housing and Homelessness Research and the Graduate School of Professional Psychology) partnered with two community organizations across Colorado serving individuals experiencing
homelessness. The dataset came from a two-site study (The Murphy Center for Hope in Fort Collins and Catholic Charities’ Marian House in Colorado Springs) examining the relationship between TBI and homelessness.

**Study Design**

Cross-sectional study design and purposive sampling across two sites were utilized to interview a total of 115 English-speaking adults (ages 18-73). Quantitative questions examined rates of TBI, experiences of homelessness, time sequencing of TBI and homelessness events, and correlates of housing instability including self-reported mental health variables.

**Sample and Recruitment**

Community partners supported the study by hanging recruitment flyers in service provision areas in their offices as well as encouraging service recipients to visit on the day of the data collection.

A standardized protocol for recruiting and screening potential participants was used across sites. The eligibility screener assessed if a participant was over 18 years old and experiencing homelessness or in unstable housing by self-report. Written informed consent was given from eligible participants before beginning data collection. The Institutional Review Board (IRB) at the University of Denver approved all study procedures prior to data collection.

**Data Collection Procedures**

Participants were given the written consent form and asked if they would like to read it themselves or have it read to them. Once written consent was obtained, researchers read each survey question to participants and allowed participants to answer. Participants were
told they could skip any questions they were uncomfortable answering and trained staff was available for support. The survey took approximately 25 minutes to complete. Participants were given a $15 gift card to a local grocery store as compensation for survey completion.

Measures

Sociodemographic Characteristics

Sociodemographic characteristics included the following variables: study sites (Fort Collins or Colorado Springs). Gender identity was originally measured using three categories (male, female, other-specify). Since a majority of participants identified as either male or female (98.8% of the sample), a dichotomous variable identified participants as male or female, those who did not identify as gender-binary were dropped from analysis. Sexual orientation was originally categorized into five categories (bisexual, gay, heterosexual, lesbian, not listed). Similarly, 85.2% of the sample identified as heterosexual, therefore a dichotomous variable identified participants as heterosexual and LGB or not listed. Race was originally categorized into eight categories (American Indian/Alaska Native, Asian, Native Hawaiian or Other Pacific Islander, Black or African American, White, Hispanic, more than one race, unknown/not reported) and recoded into two categories (white and BIPOC) for analysis, due to limited representation in some subgroups. Levels of education were originally measured using the following: less than a high school diploma; high school degree or equivalent; Associate degree; Bachelor’s degree; Master’s degree; Doctorate; other; and recoded into two categories (high school degree or less and more than high school degree), similarly, due to limited representation in some subgroups (e.g., Master’s degree, Doctorate).
Two standardized measures were used to assess homelessness status and TBI history. The Vulnerability Index- Service Prioritization Decision Assistance Tool (VI-SPDAT; Community Solutions, 2015) was used to assess homelessness status and the Ohio State University TBI Identification Method (OSU TBI-ID; Corrigan & Bogner, 2007) was used to assess TBI history.

**VI-SPDAT**

The VI-SPDAT is the homelessness status tool used by the Continuum of Care (COC) directed by the Department of Housing and Urban Development (HUD) to assess homelessness status to prioritize which clients should receive housing assistance first (Community Solutions, 2015). The VI-SPDAT was used to assess history of housing and homelessness, risk behavior, socialization and daily functioning and wellness.

**Mental Health- Housing Stability (Dependent Variables)**

The impact of mental health on housing stability was measured through the VI-SPDAT, specific questions included: Have you ever had trouble maintaining your housing, or been kicked out of an apartment, shelter program or other place you were staying, because of: A mental health issue or concern? And, do you have any mental health or brain issues that would make it hard for you to live independently because you would need help? (1=yes, 0=no).

**OSU TBI-ID**

The OSU TBI-ID (Corrigan & Bogner, 2007) was used to collect information on participants’ history and experiences with TBI. The OSU-TBI-ID is a standardized structured interview procedure designed to elicit reports of lifetime TBI histories from participants. Participants were considered to have a significant history of TBI if they
reported a “first” TBI with loss of consciousness (LOC) before age 15, a “worst” TBI with LOC longer than 30 minutes, or a “multiple” TBI event, defined as “a period where three or more blows to the head caused altered consciousness OR two or more TBIs with LOC within a 3-month period” (Glover et al., 2018, p. 16). For analysis, scores of “first” “worst,” or “multiple” were utilized and if a participant screened positive for any of the criteria, they were scored as having a reported TBI (1=yes, 0=no).

To determine whether a TBI came before or after homelessness, the age at which a participant first reported a TBI was compared to the age a participant reportedly first experienced homelessness. If the age of TBI was younger than the age when first homeless, it was coded “TBI first.” If the age of homelessness was younger than the age of the first reported TBI, it was coded “homelessness first”. Participants who did not have a reported TBI or who had a reported TBI at the same age they first experienced homelessness were excluded.

**Analytic Approach**

Study data were collected and managed using REDCap electronic data capture tools hosted at The University of Denver. REDCap (Research Electronic Data Capture; Harris, et al., 2009) is a secure, web-based application designed to support data capture for research studies, providing: 1) an intuitive interface for validated data entry; 2) audit trails for tracking data manipulation and export procedures; 3) automated export procedures for seamless data downloads to common statistical packages; and 4) procedures for importing data from external sources. Listwise deletion was utilized for missing data because less than 10% of the data were missing.
Data analysis was conducted using SPSS (version 26). First, a series of descriptive analyses were conducted to describe sample characteristics in terms of TBI variables as well as all independent variables. Dependent variables were chosen based on our review of previous literature, specifically literature that examines the relationship between mental health and housing stability (Hux et al., 2009; Hwang et al., 2008; Mackelprang et al., 2014; Sullivan et al., 2000; Svoboda & Ramsay, 2014; To et al., 2015; Topolovec-Vranic et al., 2014). The sample characteristics were described for the full sample. Binary logistic regression analysis was then conducted by regressing the 2-category mental health dependent variables on the independent variables which include demographic and TBI first variable. There were two dependent, self-report mental health variables: one measure of mental health challenges impacting housing stability and one measure of mental health.

**Results**

Fifty-nine participants completed the survey on March 3rd and 56 participants on October 2nd, 2020 for a total of 115 participants. Out of 115 participants, 85 participants had reported a TBI prior to experiencing homelessness for the first time. Quantitative descriptive characteristics, homelessness-related variables, and TBI-related variables for the 85 participants who had reported a TBI prior to experiencing homelessness, are reported in Table 1.1

**Descriptive Characteristics**

Out of the 85 participants from Fort Collins and Colorado Springs who sustained a TBI prior to experiencing homelessness, 66% identified as male, and 33% as female. Regarding sexual orientation and race, most participants identified as heterosexual (85%).
and 61% identified as white. As far as education, 63% of participants had completed a high school degree or less.

**Homelessness Variables**

Regarding homelessness characteristics, 53% reported they slept in shelters most frequently, followed by 32% who slept outdoors, 10% slept in other-non listed locations, and 4% who slept in transitional housing. On average, participants who sustained a TBI before experiencing homelessness were 31 years old (SD=13) and had experienced homelessness an average of 3.5 times (SD=4.4).

**Brain Injury**

Out of 115 total participants, 71% reported a significant history of TBI. Out of the participants who reported a history of TBI, 74% had a reported TBI prior to their first experience of homelessness. The OSU TBI-ID screening revealed that 46% of participants reported at least one head injury with a LOC for more than 30 minutes (worst). More than 24% of participants reportedly experienced a TBI with LOC before the age of 15 (first). Additionally, almost 50% of participants reported experiencing either three or more head injuries resulting in an altered state or two or more TBIs with LOC within a 3-month period (multiple). Regarding reported mechanisms of participants’ TBI, 55% of participants experienced a fall-related injury, 53% reported a motor vehicle accident, 53% of participants reported an assault, and 21% who were near an explosion or blast.

**Mental Health (Dependent Variables)**
When examining mental health-related variables, participants who sustained a TBI prior to experiencing homelessness reported that mental health was a contributing factor toward housing instability. Specifically, 18% of participants reported they had trouble maintaining their housing, or had been kicked out of an apartment, shelter program or other place they were staying because of a mental health issue or concern. And, 16% reported they had a mental health or brain issue that would make it hard to live independently because they would need help.

**Impact of TBI Prior to Homelessness and Mental Health**

Multivariate findings are presented in Table 1.2 and Table 1.3. There were two outcomes of interest relating to mental health: one measure of mental health challenges impacting housing and one measure of mental health. While demographic variables were not significantly associated with either mental health dependent variables, the TBI first variable was. Specifically, for participants who had a reported TBI prior to experiencing homelessness, they were less likely to have experienced housing instability due to a mental health issue or concern (OR=.27, p<.01, CI=.11, .67). Additionally, for participants who had a reported TBI prior to experiencing homelessness, they were less likely to have a mental health or brain issue that would make it hard for them to live independently (OR=.36, p<.05, CI=.13, .96).

**Discussion**

This study aimed to address three research questions: What are the rates of TBI among a sample of individuals experiencing homelessness? Does a TBI experience precede or follow an initial period of homelessness? And, what are the correlates of experiencing a TBI prior to homelessness including self-reported mental health variables?
Several significant findings emerged from this study that broaden our knowledge of the correlates of TBI preceding homelessness among a sample of adults experiencing homelessness.

Overall, 71% of total participants reported a significant history of TBI and of those 74% reported that their TBI occurred before experiencing homelessness. In comparison, research indicates approximately half of individuals experiencing homelessness have a TBI history (Boseley, 2019; Hwang et al., 2008; Russell et al., 2013). This study found higher rates of reported TBI among a sample of adults experiencing homelessness compared to what extant literature suggests. Further suggesting that TBI may be a significant risk factor of homelessness. More so, these data were collected during the COVID-19 pandemic, perhaps showing the impact of COVID-19 on homelessness and brain injuries. More research is needed to examine the relationship between homelessness and TBI and the impact that COVID-19 had on housing stability.

Our logistic regression models revealed a negative relationship between mental health variables and a reported TBI prior to experiencing homelessness. Specifically, for participants who had a reported TBI prior to experiencing homelessness, they were less likely to have experienced housing instability due to a mental health issue or concern and they were less likely to have a mental health or brain issue that would make it hard for them to live independently. These important and counterintuitive findings may suggest that the relationship between TBI and homelessness is perhaps driven by other factors related to the injury including health issues, cognitive impairment, substance use, and victimization. Additionally, structural level factors such as lack of affordable housing, loss of job, eviction, domestic violence, medical debt, lack of insurance, and income
inequality are associated with homelessness (Burt et al., 2001; Dykeman, 2011; Shinn, 2007) and may also be associated with TBI. More research is needed to understand the impact of structural level factors on housing instability and TBI.

A history of TBI has been found to be strongly associated with several adverse health outcomes among individuals experiencing homelessness including seizures (Hwang et al., 2008), cognitive impairment (Gicas et al., 2020), back problems, chronic hepatitis, migraine headaches, arthritis, lung disease, high blood pressure, HIV or AIDS (Nikoo et al. 2014), concentration difficulties, excessive worry or sleeping (Mackelprang et al., 2014), and epilepsy (Topolovec-Vranic et al., 2017). More research is needed to evaluate the health problems and cognitive impairments associated with TBI which may contribute to the chronicity of homelessness and risk of subsequent TBI.

Additionally, research has found support for a relationship between substance use and other risky behaviors and injuries, including TBI (Brenner et al., 2017). Substance use increases the risk of TBI (Corrigan, 1995; Hwang et al., 2008). And, substance use may have deleterious effects on recovery from a TBI (Corrigan, 1995), potentially exacerbating subsequent head injuries. Additionally, data have shown that victims of a TBI often reported alcohol intoxication at the time of injury (Corrigan, 1995), further demonstrating that substance use increases the risk of TBI. More research is needed to evaluate substance use as a risk factor for TBI among individuals experiencing homelessness.

Furthermore, research shows that individuals experiencing homelessness experience high levels of stress and victimization (Robinson, 2010; Toro et al., 2008). The stress of victimization and stigmatization may put one at higher risk of acquiring TBI. Robinson
(2010) further states that the longer a period of homelessness is prolonged, particularly when complicated by mental health, the more likely it is for a person to experience repeated victimization potentially leading to brain injuries.

**Implications**

This study found 71% of total participants reported a significant history of TBI and of those 74% reported that their TBI occurred before experiencing homelessness. Prevention strategies are recommended to prevent individuals with head injuries from experiencing housing instability and homelessness. It is recommended that individuals with a TBI be referred to social support groups, money management classes, and job trainings to establish and/or maintain stable housing while recovering from a TBI. These prevention strategies should take place in medical and clinical settings and include other individuals with TBI to increase social support. Prevention efforts should also emphasize low barriers to housing services to reduce isolation associated with homelessness. Additionally, partnerships across disciplines and organizations are recommended to improve outcomes for individuals experiencing homelessness (Toplovec-Vranic et al., 2013).

As previously mentioned, this study shows a negative relationship between having a TBI prior to experiencing homelessness and mental health variables which may suggest the relationship between TBI is driven by other risk factors related to the injury. More research is needed to further study risk factors related to TBI and homelessness. Increasing knowledge and awareness among caregivers and medical professionals may lead to more TBI screening for those seeking medical care following a head injury, more
screening for TBI may aid in accurate diagnosing to determine if an individual has a TBI, mental health issues, or both.

The comorbidity of TBI and mental health conditions can also create a challenge in diagnosing and treating TBIs in the unhoused population. An initial diagnosis of a TBI typically relies on self-reporting of specific symptoms at the time of injury which can be missed or challenging to gather (National Academies of Sciences, Engineering, Medicine, & National Research Council, 2019). This study used the OSU TBI-ID which gathers information about TBI history across the lifespan. Because TBIs are so prevalent among people experiencing homelessness, the OSU TBI-ID can be an important screening tool for practitioners to use in conjunction with mental health screening instruments to gather information about history of TBIs and parse out symptoms from a TBI from symptoms from a mental health condition - as many symptoms are the same. Incorporating the OSU TBI-ID into intake assessments or other health assessments can help practitioners identify TBIs and recommend additional assessment.

TBI can impede individuals’ housing stability (Adshead et al., 2019; HCH Clinician’s Network, 2003). The mental health variables that we used in this study specifically explored how mental health impacted housing stability. We found that people who reported their first TBI prior to experiencing homelessness were less likely to have issues with housing stability due to a mental health condition. With this in mind, programs that prioritize housing like those that use a Housing First model can allow individuals to be placed in permanent housing and then focus on other treatment that may have contributed to housing instability.

Limitations
Certain study limitations should be noted. The study results are based on cross-sectional data. Future research on examining the correlates of TBI before homelessness may consider longitudinal data to draw causal relationships. Furthermore, the mental health-related dependent variables used in this study came from the VI-SPDAT, a measure designed to screen for housing assistance. Future studies should consider using validated mental health measures to assess the impact of TBI and homelessness on mental health and housing stability. Additionally, the data used were self-report and could be biased due to the sensitive topics asked of participants. Further, participants were recruited from service agencies serving adults experiencing homelessness, so the sample is likely not representative of all adults experiencing homelessness, especially those who are disconnected from services. Furthermore, individuals who did not identify as gender-binary were dropped from analysis. Future research should consider using diverse samples of participants to better understand the impact of gender identity on homelessness and TBI related outcomes. Also, this study was limited geographically to two cities in Colorado and while the demographic information is largely reflective of the demographics of the city and state, additional research should consider using probability samples from diverse geographic areas to obtain more generalizable findings. Furthermore, this study only included English-speaking adults. Researchers should consider administering their study in multiple languages in the future.

**Conclusion**

These findings demonstrate that rates of reported TBI and rates of reported TBI prior to experiencing homelessness are high. Our findings suggest that participants with a reported TBI prior to homelessness were less likely to have housing instability related to a
mental health concern. While our findings are preliminary, they offer important implications for intervention efforts when assisting individuals experiencing homelessness. In particular, given the prevalence of reported TBIs among our sample of individuals who are unhoused, it may be prudent to expand screening for TBI in medical or clinical settings among individuals experiencing homelessness. In addition, because of the prevalence rates of mental health variables, intervention and prevention efforts aimed to address homelessness should focus on mental health screening and treatment.
Table 1.1: Descriptive Characteristics of Participants with a Reported TBI Before Experiencing Homelessness

<table>
<thead>
<tr>
<th></th>
<th>n (%) or M (SD)</th>
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<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>56 (65.9)</td>
</tr>
<tr>
<td>Female</td>
<td>28 (32.9)</td>
</tr>
<tr>
<td><strong>Sexual Orientation</strong></td>
<td></td>
</tr>
<tr>
<td>Heterosexual</td>
<td>72 (84.7)</td>
</tr>
<tr>
<td>Not heterosexual</td>
<td>13 (15.3)</td>
</tr>
<tr>
<td><strong>Race and Ethnicity</strong></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>52 (61.2)</td>
</tr>
<tr>
<td>Not white</td>
<td>33 (38.8)</td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
</tr>
<tr>
<td>High school degree or less</td>
<td>54 (63.5)</td>
</tr>
<tr>
<td>More than high school degree</td>
<td>31 (36.5)</td>
</tr>
<tr>
<td><strong>Homelessness Variables</strong></td>
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<tr>
<td>Sleep in shelters</td>
<td>45 (52.9)</td>
</tr>
<tr>
<td>Sleep outside</td>
<td>27 (31.8)</td>
</tr>
<tr>
<td>Other</td>
<td>9 (10.6)</td>
</tr>
<tr>
<td>Transitional housing</td>
<td>4 (4.7)</td>
</tr>
<tr>
<td>No. episodes of homelessness</td>
<td>3.5 (4.4)</td>
</tr>
<tr>
<td><strong>Age (years)</strong></td>
<td>31 (13)</td>
</tr>
<tr>
<td><strong>Housing Stability-Mental Health</strong></td>
<td></td>
</tr>
<tr>
<td>Have you had trouble maintaining housing due to a mental health issue or concern (1=yes)</td>
<td>16 (18.8)</td>
</tr>
<tr>
<td>Do you have a mental health or brain issue that would make it hard for you to live independently? (1=yes)</td>
<td>14 (16.5)</td>
</tr>
<tr>
<td>Do you have planned activities that make you feel happy and fulfilled? (0=no)</td>
<td>23 (27.1)</td>
</tr>
<tr>
<td><strong>TBI Variables For Total Sample (n=115)</strong></td>
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</tr>
<tr>
<td>“Worst” injury</td>
<td>53 (46.1)</td>
</tr>
<tr>
<td>“First” injury</td>
<td>28 (24.3)</td>
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<tr>
<td>“Multiple” injury</td>
<td>57 (49.6)</td>
</tr>
</tbody>
</table>
Table 1.2: Multivariate Findings

<table>
<thead>
<tr>
<th>Factors</th>
<th>OR</th>
<th>95% CI</th>
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<tbody>
<tr>
<td>Race/Ethnicity</td>
<td>.63</td>
<td>.24-1.65</td>
</tr>
<tr>
<td>Gender</td>
<td>.66</td>
<td>.24-1.8</td>
</tr>
<tr>
<td>Sexual Orientation</td>
<td>2.53</td>
<td>.48-13.3</td>
</tr>
<tr>
<td>Education</td>
<td>1.75</td>
<td>.63-4.89</td>
</tr>
<tr>
<td>TBI before Homelessness</td>
<td>.36*</td>
<td>.13-.96</td>
</tr>
</tbody>
</table>

Note. Reference category for: Do you have any mental health or brain issues that would make it hard for you to live independently because you would need help? (0=no). Note. OR=Odds Ratio; 95% CI=95% confidence interval. *p <.05. **p <.01 *** p <.001

Table 1.3: Multivariate Findings

<table>
<thead>
<tr>
<th>Factors</th>
<th>OR</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Race/Ethnicity</td>
<td>.94</td>
<td>.37-2.39</td>
</tr>
<tr>
<td>Gender</td>
<td>.92</td>
<td>.35-2.3</td>
</tr>
<tr>
<td>Sexual Orientation</td>
<td>.74</td>
<td>.21-2.56</td>
</tr>
<tr>
<td>Education</td>
<td>1.67</td>
<td>.62-4.45</td>
</tr>
<tr>
<td>TBI before Homelessness</td>
<td>.27**</td>
<td>.11-.69</td>
</tr>
</tbody>
</table>

Note. Reference category for: Have you ever had trouble maintaining your housing, or been kicked out of an apartment, shelter program or other place you were staying, because of: A mental health issue or concern? (0=no). Note. OR=Odds Ratio; 95% CI=95% confidence interval. *p <.05. **p <.01 *** p <.001
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Chapter Three: Manuscript Two

The Impact of COVID-19 on Access to Resources Among Individuals Experiencing Homelessness and Traumatic Brain Injury

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Abstract

The rates of traumatic brain injury (TBI) are higher among individuals experiencing homelessness compared to the general population. Individuals experiencing homelessness and a TBI may experience additional barriers to care. COVID-19 may have further impacted access to basic resources, such as food, shelter, and transportation for individuals experiencing homelessness. This study aimed to answer the following research question: What is the impact of COVID-19 on access to resources among individuals experiencing homelessness and TBI? Cross-sectional study design and purposive sampling were utilized to interview 38 English-speaking adults experiencing homelessness and who had sustained a TBI (ages 21-73) in one Colorado city. Qualitative questions related to the impact of COVID-19 were asked and qualitative analysis was used to analyze responses. Three primary themes emerged regarding the types of resources that were restricted by COVID-19: basic/biological needs, financial needs, and lack of connection. COVID-19 has shown the social work field the need for continued innovation, updated policies, and better practice standards for individuals who are not housed. For those living with a reported TBI history and experiencing homelessness, COVID-19 made it difficult to access basic services for survival. It is evident that additional policies are needed to support people experiencing homelessness and TBIs.

Keywords: Homelessness, Traumatic Brain Injury, COVID-19
Introduction

Overview of Homelessness

In 2020 more than 580,000 people experienced homelessness in the United States (National Alliance to End Homelessness, 2021). The National Alliance to End Homelessness (2021) explains that experiencing homelessness is accompanied by risk factors for poor health, such as uninhabitable living conditions, violence, substance use, decreased access to health care, and health issues in general, including but not limited to traumatic brain injury (TBI).

Overview of TBI

A TBI is a head injury that disrupts brain functioning, often caused by an external force (Menon et al., 2010; Topolovec-Vranic et al., 2012). There are various potential causes of TBI, including exposure to violence (e.g., assault), falls, motor vehicle accidents, substance-use related accidents, and sports (Mayo Clinic, 2019). Several studies suggest that if one head injury has occurred, the likelihood of subsequent head injuries increases, with repeat head injury found in 45%-60% of cases (Hwang et al., 2008; McMillan et al., 2015; Oddy et al., 2012).

TBI is associated with many negative outcomes including lifelong cognitive impairments that harm an individual’s memory processing, attention, communication, and executive functioning (Beijer et al., 2012). A TBI can meaningfully impact a person’s capability to self-regulate, plan, and organize. A TBI affects a person’s judgment, reasoning, and problem-solving ability; changes in one’s emotions and behaviors as well as one’s ability to regulate themselves are also common (Fazel et al., 2008). A recent systematic review and meta-analysis found that a history of TBI was
associated with poor physical and mental health, suicidality, memory concerns, higher health service use and criminal justice system involvement (Stubbs et al., 2020). The risk factors associated with TBI may also lead someone to experience housing instability.

**Intersection of TBI and Homelessness**

The rates of TBI are significantly higher among individuals experiencing homelessness than compared to the general population. Research has shown that more than half of individuals experiencing homelessness have sustained a TBI at some point in their lifetime compared to 2%-8.5% of housed individuals (CDC, 2016; Hwang et al., 2008; Oddy et al., 2012; Stubbs et al., 2020; Topolovec-Vranic et al., 2012). Individuals experiencing homelessness are at a disproportionately high risk for sustaining a TBI. This is in part because individuals experiencing homelessness are more likely to be victimized by assaults, have a higher propensity for risk-taking, and have higher rates of substance use (Backer & Howard, 2007; Silver & Felix, 1999). The relationship between TBI and homelessness is not well understood. In order to better understand the intersection of TBI and homelessness this study will utilize Maslow’s hierarchy of needs as a theoretical framework.

**Impact of COVID-19**

Individuals experiencing homelessness may be at higher risk for contracting COVID-19 and experience more difficulty recovering from the virus, as they often have higher rates of physical health challenges compared to their housed counterparts (Beijer et al., 2012; Fazel et al., 2008). In addition to potentially being at high risk of contracting COVID-19, access to care for people experiencing homelessness was further complicated in the pandemic as clinics deferred in-person care for telehealth visits (Chen et al., 2021).
While using telehealth has expanded healthcare access for some, it disadvantages people experiencing homelessness as it requires reliable internet and particular technology, which people experiencing homelessness may not be able to access. Many businesses and libraries were closed to the public during the pandemic, further limiting access to reliable internet (Yelvington, 2020). Additionally, people experiencing homelessness may be less likely to have a smartphone due to costs. A study by Raven et al. (2018) found that of 350 adults experiencing homelessness in Oakland, CA, more than 72% of participants had access to a mobile phone, most of which were not smart phones. Just over half (55%) reported using the internet, whether on a phone, in a library, day shelter, friend or family’s home, a coffee shop or restaurant, social service agency, motel/hotel, or church (Raven et al., 2018). Participants with executive function impairment were even less likely to have access to a mobile phone (Raven et al., 2018).

COVID-19 also impacted access to basic resources, such as food, shelter, and transportation. Feeding America (2021) estimated that between 10.5 and 17 million more people in the U.S. will experience food insecurity during and after the pandemic and reported that food banks are serving 55% more people than before the pandemic. Particularly in the beginning months of the pandemic, hundreds of pantries closed after older volunteers stayed home and staff called out sick (Feeding America, 2021). An increased demand for food, as well as an initial decline in food bank operating capacity, likely further impaired food access for people experiencing homelessness and living with a TBI.

Access to homeless shelters was also affected by the COVID-19 pandemic. A HUD (2021) report explains that for the first time since the Point in Time data collection began,
more individuals experiencing homelessness were unsheltered than sheltered. The number of unsheltered individuals increased by 7% in 2020 (Henry et al., 2021). Two potential reasons for the decline in shelter stays are decreased shelter capacity and the risk of COVID-19 transmission. To decrease the risk of transmission, shelter operators were tasked with implementing social distancing measures, thus reducing their capacity (Batko, 2020). Additionally, Perri and colleagues (2020) explain that shelters may be a dangerous place regarding COVID-19 transmission because of the shared spaces, amount of people, difficulty implementing physical distancing measures, and clientele turnover.

Transportation access for people experiencing homelessness during the pandemic has been impacted by a decrease in public transit service and diminished ability to receive rides from others due to the risk of COVID-19 transmission (Chen et al., 2021). Transportation is essential to accessing basic needs like food, shelter, and healthcare. Individuals with disabilities, like a TBI, generally need access to healthcare services more often and are more likely to have delayed or not received necessary care than those without disabilities (Henning-Smith et al., 2016). Individuals with disabilities are also more likely to utilize transportation, such as public transportation, that exposes them to others (Chen et al., 2021).

Theoretical Framework

Maslow’s hierarchy of needs (1943) is a theory that incorporates a five-tier model of human needs. These needs are organized as hierarchical levels, where the needs lower down need to be satisfied before needs higher up can be attained. The five tiers are as follows (Maslow, 1943; from the bottom to the top): physiological needs are biological requirements for human survival, which include food, water, warmth, and rest. Safety
needs include security and safety. Physiological and safety needs are considered basic needs. Belongingness and love needs refer to intimate relationships and friends. Esteem needs include prestige and feelings of accomplishment. These two are considered psychological needs. Lastly, the self-actualization tier includes achieving one’s full potential and creative activities. This tier is considered self-fulfillment needs.

When utilizing Maslow’s theory, one needs to examine homelessness as a social problem that affects various dimensions of human needs. Limited access to services, in general, have the potential to exacerbate homelessness. Additionally, limited access to social and medical services may complicate treatment for a TBI. Homeless service organizations have warned that COVID-19 could cause catastrophic harm to homeless communities due to the absence of a coordinated plan for these often-overlooked individuals (Lima et al., 2020). Individuals experiencing homelessness often have more unmet needs compared to the general population (Baggett et al., 2010), potentially making it more difficult to progress up the hierarchy of needs. Considering that individuals experiencing homelessness and TBI are more likely to have a greater extent of unmet needs, there is a clear need for programs that are equipped to respond in times of crisis. Utilizing Maslow’s hierarchy of needs to better examine the relationship between TBI and homelessness, this study will review existing barriers to care in access for people experiencing homelessness and TBI.

**Literature Review**

**Barriers to Care**

*Health Care*
Individuals experiencing homelessness and living with a TBI may experience additional barriers to care due to the consequences of a TBI. Memory loss, a common consequence of a TBI (Beijer et al., 2012), may affect one’s ability to remember appointments. People experiencing homelessness, and without a mailing address may have a difficult time receiving important documents related to healthcare and health insurance. Research has shown health insurance to be a key factor in obtaining healthcare (Baggett et al., 2010). Individuals experiencing homelessness may lack access to health insurance which further impacts one’s ability to receive vitally important medical care for diagnosing and treating a TBI, like neuroimaging and clinical documentation. One study found that out of 134 people experiencing homelessness, 70% were unaware of their potential Medicaid eligibility (Fryling et al., 2015). The researchers also found that people experiencing homelessness were less likely to have knowledge of the Affordable Care Act than housed participants (Fryling et al., 2015).

**Financial Barriers**

In addition to the financial hardship that may have led to homelessness, individuals experiencing homelessness and living with a TBI may face additional financial barriers. TBIs can affect one’s cognitive functioning causing confusion, difficulty with memory and making decisions, planning, and organization (Brain Injury Alliance of Colorado, 2017), which may make it difficult to obtain and maintain employment. Research suggests that moderate to severe TBIs can also affect financial decision-making skills, such as managing a checking account, paying bills, and other more complex tasks, particularly within the first six months of sustaining a TBI (Dreer et al., 2012). These
difficulties can exacerbate existing financial hardship for people experiencing homelessness and living with a TBI.

**Identification**

Another barrier to care that people experiencing homelessness often encounter is obtaining and accessing services that require personal identification (Sanders et al., 2020). Without personal identification, it may be difficult to access resources like health care, housing, banking services, employment, and public benefits. It is also often challenging to access emergency food services, like food banks, without personal identification and proof of residence (Sanders et al., 2020). This issue is particularly pronounced for people experiencing homelessness, who may be more susceptible to have belongings stolen or lost. Sanders and colleagues (2020) explain that people experiencing homelessness are less likely to have the resources to obtain new personal identification, such as funds for fees and an understanding of the process and forms. A TBI may further impact barriers to health insurance, personal identification, and managing finances due to the negative consequences of a TBI. Upon examining barriers to care for people experiencing homelessness and living with a TBI, it becomes clear that the intersection of TBI and homelessness is multifaceted. The mentioned barriers to care were likely exacerbated during the COVID-19 pandemic.

**The Current Study**

Based on a universal lack of access to resources during COVID-19 and the unique vulnerabilities of persons with a history of brain injury who are homeless, this study aims to answer the following research question: What is the impact of COVID-19 on access to resources among individuals experiencing homelessness and a TBI?
Methods

Study Design

The full dataset came from a two-site study examining the relationship between TBI and homelessness. The qualitative questions examined the impact that COVID-19 had on access to resources among individuals experiencing homelessness and a TBI among 38 participants from one study site (Colorado Springs).

Sample and Recruitment

In 2020, researchers from The University of Denver (the Center for Housing and Homelessness Research and the Graduate School of Professional Psychology) partnered with a community organization in Colorado serving individuals experiencing homelessness. Community partners supported the study by hanging recruitment flyers in service provision areas in their offices as well as encouraging service recipients to visit on the day of the data collection. Cross-sectional study design and purposive sample were utilized to interview a total of 56 English-speaking adults (ages 21-73).

A standardized protocol for recruiting and screening potential participants was used across sites. The eligibility screener assessed if a participant was over 18 years old and experiencing homelessness or in unstable housing. Written informed consent was given from eligible participants before beginning data collection. The Institutional Review Board (IRB) at the University of Denver approved all study procedures prior to data collection.

Data Collection Procedures

First, participants were given the written consent form and asked if they would like to read it themselves or have it read to them. Once written consent was obtained, researchers
read each survey question to participants and allowed participants to answer. Participants had the option to skip any questions and seek support from trained staff if needed. The survey took approximately 25 minutes to complete. Participants were given a $15 gift card to a local grocery store after completing the survey.

**Measures**

**Sociodemographic Characteristics**

Sociodemographic characteristics included the following variables: gender identity [male, female, other (specify)]. Sexual orientation was measured into five categories (heterosexual or straight, gay, lesbian, bisexual, not listed above). Race was categorized into eight categories (American Indian/Alaska Native, Asian, Native Hawaiian or Other Pacific Islander, Black or African American, White, Hispanic, more than one race, unknown/not reported). Levels of education were assessed using the following: less than a high school diploma; high school degree or equivalent; Associate’s degree; Bachelor’s degree; Master’s degree; Doctorate; other). Date of birth, age, and military service (yes, active; yes, veteran; no) information was collected.

Two standardized measures were used to assess homelessness status and TBI history. The Vulnerability Index- Service Prioritization Decision Assistance Tool (VI-SPDAT) was used to assess homelessness and the Ohio State University TBI Identification Method (OSU TBI-ID) was used to assess TBI history.

**VI-SPDAT**

The VI-SPDAT is the homelessness status tool used by the Continuum of Care (COC) directed by the Department of Housing and Urban Development (HUD) to assess homelessness status to prioritize which clients should receive assistance first (Community
Solutions, 2015). The VI-SPDAT was used to assess history of housing and homelessness, risk behavior, socialization, and daily functioning and wellness.

**OSU TBI-ID**

The OSU TBI-ID (Corrigan & Bogner, 2007) was used to collect information on participants’ history and experiences with traumatic brain injury. The OSU-TBI-ID is a standardized structured interview procedure designed to elicit reports of lifetime TBI histories from participants. Participants were considered to have a significant history of TBI if they reported a “first” TBI with loss of consciousness (LOC) before age 15, a “worst” TBI with LOC longer than 30 minutes, or a “multiple” TBI event, defined as “a period where three or more blows to the head caused altered consciousness OR two or more TBIs with LOC within a 3-month period” (Glover et al., 2018, p. 16). For analysis, scores of first, worst, or multiple were utilized and if a participant scored any of the criteria they were scored as having a TBI (1=yes, 0=no).

**COVID-19**

COVID-19 related questions were included in Colorado Springs among 56 total participants. COVID-19 related questions were not included at the first data collection site (Fort Collins) because data collection took place before COVID-19.

Questions related to the impact of COVID-19 included quantitative questions where participants answered yes or no including: Have you tested positive for COVID-19? Has having COVID-19 resulted in other medical conditions to worsen? Did you experience homelessness for the first time due to COVID-19? Are you currently experiencing homelessness due to COVID-19? And a qualitative component where participants were asked: Has COVID-19 restricted your access to resources (e.g., medical, food pantries,
shelters, housing, etc.)? Participants were asked to specify and expand upon which specific resources were restricted during COVID-19.

Analytic Approach

Study data were collected and managed using REDCap electronic data capture tools hosted at The University of Denver. REDCap (Research Electronic Data Capture; Harris, et al., 2009) is a secure, web-based application designed to support data capture for research studies, providing: 1) an intuitive interface for validated data entry; 2) audit trails for tracking data manipulation and export procedures; 3) automated export procedures for seamless data downloads to common statistical packages; and 4) procedures for importing data from external sources. Listwise deletion was utilized for missing data because less than 10% of the data were missing. Quantitative analysis was used for analyzing sociodemographic characteristics, the VI-SPDAT, the OSU TBI-ID, and the quantitative portion of the COVID-19 questions.

Qualitative analysis was used to analyze the open-ended COVID-19 related questions: Has COVID restricted your access to resources (e.g., medical, food pantries, shelters, housing, etc.)? Specify which resources were restricted. COVID-19-related responses were analyzed using qualitative methods including open, first, and second cycle coding (Saldana & Omasta, 2016). Researchers first used open coding, documenting initial reactions to the data. Once researchers completed open coding independently, we came together to discuss and reach agreement on the codebook. We then used code mapping to categorize codes followed by axial coding to reduce redundancy. This allowed the researchers to see emerging themes.

Results
A total of 56 individuals experiencing homelessness completed the survey on October 2nd, 2020. Out of 56 participants, 38 had a TBI. Quantitative descriptive characteristics, homelessness-related variables, and TBI-related variables for the 38 participants experiencing homelessness with a TBI are reported in Table 2.1.

**Descriptive Characteristics**

Out of the 38 participants from Colorado Springs who had a TBI, 76% identified as male followed by 21% who identified as female, and 2% who identified as neither. Regarding sexual orientation, most participants identified as heterosexual (92%), while 5% identified as bisexual, and 2% as gay. Most participants identified as White (58%), followed by American Indian/Alaska Native (13%). The mean age was 48.7 (SD=11.6), most of the participants did not identify as a Veteran (76%). Half of participants had earned a high school degree or equivalent (50%) followed by a bachelor’s degree (13%) and an associate’s degree (10%).

**Homelessness Variables**

Regarding homelessness characteristics, 42% of participants claimed they slept outdoors most frequently, followed by 37% who slept in shelters, 13% slept in other locations not listed, 5% slept in safe havens, and 2% slept in transitional housing most frequently. On average, participants had not lived in permanent stable housing in 4.3 years (SD 9.2) and had experienced 3.6 different episodes of homelessness (SD=6). The mean age when participants first experienced homelessness was 32.4 years old (SD =14.8).

**Brain Injury**
When examining brain injury-related variables, participants reported that living with a brain injury was a barrier to housing stability. Specifically, 29% of participants claimed that a past brain injury had served as a barrier to maintain housing or was the reason a participant was kicked out of their apartment or shelter program. The OSU TBI-ID screening revealed that 63% of participants reported at least one head injury with a LOC for more than 30 minutes (worst). And 28% of participants reported experiencing a TBI with LOC before the age of 15 (first). Additionally, 58% of participants reported experiencing either three or more head injuries resulting in an altered state, meaning a LOC or being dazed or two or more TBIs with LOC within a three-month period (multiple).

**COVID-19 and Homelessness**

Several participants reported that COVID-19 had impacted their homelessness status as well as access to resources. While no participants claimed they had tested positive for COVID-19, 71% of persons with a reported TBI history said that COVID-19 had restricted access to resources (e.g. medical, food pantries, shelters, housing, etc.) compared to 50% of participants with no reported history of TBI. Additionally, 13% of persons with a reported TBI history said they experienced homelessness for the first time due to COVID-19, compared to 11% of participants with no reported history of TBI. More so, 36% of persons with a reported TBI history said they were experiencing homelessness currently due to COVID-19 compared to 22% of participants with no reported history of TBI.

**Emergent Themes**
While four participants reported “everything is closed.” Three primary themes emerged regarding the types of resources that were restricted by COVID-19: basic/biological needs, financial needs, and lack of connection. Subthemes within these larger themes are described below.

**Basic, Biological Needs: Food, Shelter and Hygiene**

Food, shelter, and hygiene resources were all categorized as basic needs. Lack of access to food resources including food pantries and organizations that offer meals were common responses among participants. Multiple participants reported that “food pantries” were closed. Additionally, participants reported that “shelters” were closed and they lacked access to “housing” resources. Another basic need that was impacted was hygiene resources. Public places such as churches where participants could take a shower were shut down. One participant claimed, “It is harder to find a place to take a shower.” Other basic needs that were restricted include access to health care, medical resources, and clothing, as one participant reported, “I can’t access a psychiatrist due to telehealth and not having a computer.”

**Financial Needs**

Lack of access to financial needs came up as a central theme. Participants reported lacking access to income and money services, the bank, mail, employment, government services including the DMV to get identification, and public transportation. As one participant reported, “The mail is backed up and slow to receive Disability” and another, “I can’t get through to Social Security or go to the office.” Other resources that were restricted were accessing stimulus checks sent out for COVID-19 relief. These resources can also be considered basic needs in that before an individual can consider addressing
basic needs such as food insecurity, they need money to purchase food and a way to get to the food bank.

**Lack of Connection**

Having a sense of connection is important among individuals experiencing homelessness as a means of exiting homelessness and improving non-housing outcomes (Johnstone et al., 2015). Participants identified sources of social support that were restricted including “internet access” at libraries as a means to communicate with friends and family, “social gatherings” at food courts and public spaces, church services, and being able to see friends and family. One participant reported it was “hard to find places to hang out” as many public spaces were closed and unsafe to go to.

**Discussion**

The present study examined the impact that COVID-19 had on access to resources among individuals experiencing homelessness and TBI. The results suggest that overall access to resources was impacted by COVID-19 more so for participants with a reported TBI history (71%) compared to participants with no reported history of TBI (50%), more participants (13%) with a reported TBI history experienced homelessness for the first time compared to participants with no reported history of TBI (11%), and participants with a reported TBI (36%) reported experiencing homelessness currently due to COVID-19 compared to 22% of participants with no reported history of TBI: further showing the unique vulnerabilities faced by individuals experiencing homelessness with a reported history of TBI. These findings and their implications are discussed next.

**TBI**
As expected, our results align with previous research that found more than half of individuals experiencing homelessness had a history of TBI at some point in their lifetime (Stubbs et al., 2020). TBI can bring many emotional and social consequences which can add challenges maintaining housing, additionally, a lack of awareness about TBI may be one of the largest barriers to accessing care among individuals experiencing homelessness (Topolovec-Vranic et al., 2013). Organizations serving homeless populations may consider screening for a history of TBI as a first step toward getting a client appropriate care.

**Homelessness and COVID-19**

Results showed 36% of participants with a reported TBI history were currently experiencing homelessness due to COVID-19 compared to 22% of participants with no reported history of TBI. Additionally, 13% of participants with a reported TBI history experienced homelessness for the first time due to COVID-19 compared to 11% of participants with no reported history of TBI. And, 71% of individuals with a reported TBI history and experiencing homelessness reported restricted access to resources, compared to 50% of participants experiencing homelessness with no reported history of TBI. Themes that emerged from interviews with participants with a reported history of significant brain injury were that participants experienced a lack of basic needs (food, shelter, and hygiene) and a lack of access to financial needs. Connection was also negatively impacted by COVID-19. Across the country, homeless service providers struggled to respond to the COVID-19 pandemic. Some shelters were forced to reduce services, restrict admittance, or close entirely in order to follow public health guidelines and help ensure people’s safety (National Low Income Housing Coalition, 2021). The
results of this study highlight the need to open a dialogue addressing the unique needs and vulnerabilities of individuals experiencing homelessness and living with a TBI and address planning, responding, and recovery efforts during times of crisis.

**Results Examined Through Maslow’s Hierarchy of Needs**

We found that access to resources that help meet one’s safety needs, including financial assistance, as described by Maslow (1943)—security, employment, resources, health, and property—were also impaired during the COVID-19 pandemic. Participants experienced difficulty accessing transportation and financial services which may aid in meeting one’s safety needs. A decrease in public transit service and carpooling during the pandemic likely made accessing transportation to essential services like food, shelter, employment, and healthcare, even more difficult than before the pandemic. Participants also reported a lack of access to income, employment, and banking services during the pandemic. A lack of access to banking and social security services and slower mail times also impeded participants’ access to income. Without income and/or employment, it is difficult to meet one’s biological and safety needs.

Participants also reported a lack of access to connection and social interaction during the pandemic, which connects to Maslow’s third tier of love and belonging (Maslow, 1943). Participants referenced a lack of access to places for social infrastructure, like the library, food courts, restaurant lobbies, and “places to hang out.” These locations are typically used for gatherings and/or staying connected to friends and family via the internet and email. Participants also cited a lack of social gatherings and connection, whether through not being able to go to church or see family and friends. While these needs do not necessarily fall into the categories of biology or safety, connection and
social interaction are important for people in general. They are especially important for people experiencing homelessness and living with a TBI because social support can help connect individuals to resources (Lam & Rosenheck, 1999). Lam and Rosenheck (1999) found that social support was correlated with better health and greater usage of social services among people experiencing homelessness. Additionally, homelessness can be isolating, making a sense of connection even more important for this vulnerable population.

**Implications**

COVID-19 has illuminated the need for updated policies and better practice standards for individuals who are not housed. For those with a reported history of TBI and experiencing homelessness, COVID-19 made it more difficult to access basic services for survival, as highlighted above. It is evident that additional policies are needed to support people experiencing homelessness and TBIs.

The popular policy, Lifeline, coined “Obama phones,” is an example of a policy filling a noticeable need in services, supporting millions of Americans in obtaining phone and internet service (Nasr et al., 2021). For people experiencing homelessness and a TBI, a heavily subsidized phone plan may help them stay in contact with their social networks as well as manage various responsibilities. The Federal Communications Commission (FCC) under the Trump administration decreased the budget and capacity of the Lifeline program, impacting how many people can access this government program (Nasr et al., 2021). COVID-19 has demonstrated how critical it is for people to have the ability to maintain contact with their social networks and minimize the effects of quarantine and isolation.
Throughout the pandemic, it was apparent to the local government in Denver, CO that the current number of congregate shelters in Denver and the surrounding counties were not enough to shelter and quarantine all those unhoused (Bryson, 2020). In an effort to provide basic shelter to those in need, local governments utilized existing coliseums and public spaces to transform them into temporary congregate shelters (Bryson, 2020). However, there was still a need for additional sheltering options as the temporary shelters only served a small percentage of the population (Bryson, 2020). Food, another basic need, was more difficult to access due to COVID-19. Low income families were especially impacted by food insecurity due to lost paychecks or social distancing measures (Siddiqi et al., 2020). Medical services transitioned from in-person services to telehealth, requiring consistent access to internet, computers or a phone (Chen et al., 2021). For people experiencing homelessness, access to the equipment necessary for medical services was limited as day shelters were unable to fully open, libraries were closed, and public access to internet was restricted (Yelvington, 2020). The closing of various community organizations coupled with many medical services transitioning to telehealth may have negatively impacted how accessible these necessary provisions were. COVID-19 severely impacted how people experiencing homelessness and a TBI were able to acquire the most basic physiological needs for survival, including shelter, food, and medical care.

Social work practices continue to evolve to match the level of need created by society’s circumstances. Community organizations adjusted how they provide services to follow CDC guidelines and public health protocols (CDC, 2021). For example, organizations shifted to drive-through services to maintain proper social distancing
protocols (Draut, 2020). It is evident that additional social practice and policy innovation is necessary to better support those living with a TBI and experiencing homelessness. COVID-19 has provided a unique policy window to implement additional social welfare benefits and change the mechanism in which society appropriates funds toward shelters and alternative options. All levels of government administration have taken advantage of this policy opportunity. An example of this is the CARES Act (2020) and the various levels of social welfare programs incorporated into the larger policy. Built into the CARES Act (2020) are additional funds for housing vouchers allocated to city and county governments, funding for 501c(3) organizations, and stimulus checks (HUD, 2020). It is critical to consider the accessibility of various acts to those who are experiencing homelessness and brain injuries. For instance, three stimulus checks were passed by Congress throughout 2020 and 2021 to provide additional support during the pandemic. However, many individuals that were experiencing homelessness and brain injuries did not have constant access to a bank account, banking institution, mail, computer, or smartphone (Oreskes, 2021). Beyond the unique vulnerabilities faced by individuals experiencing homelessness, individuals experiencing homelessness and a brain injury faced more barriers to access housing and financial resources during COVID-19.

Limitations

Certain study limitations should be noted. The study results are based on cross-sectional data, reducing the ability to draw causal conclusions. Future research on the impact of COVID-19 may consider longitudinal data to draw causal relationships. Additionally, the data used were self-report and could be biased due to the sensitive
topics asked of participants. While the survey was designed not to cause any distress; participants may have been uncomfortable. Further, participants were recruited from service agencies serving adults experiencing homelessness, so the sample is likely not representative of all adults experiencing homelessness, especially those adults who are not seeking services. Also, this study was limited geographically to one city in Colorado and while the demographic information is largely reflective of the demographics of the city and state, additional research should consider using various geographic areas where there are more diverse populations. Furthermore, the qualitative data collected were designed to elicit mostly short answer responses. Researchers may consider open-ended interview style data collection in the future to gain a better understanding of the lived experiences of individuals experiencing homelessness and TBI during COVID-19. Additionally, this study only included English-speaking adults. Researchers should consider administering their study in multiple languages in the future. Lastly, access to care is an issue for all people experiencing homelessness, not only individuals experiencing homelessness with a reported TBI, this study does not suggest there are different access issues, rather, examines access issues specifically for a subpopulation of individuals experiencing homelessness with a reported TBI.

**Conclusion**

In the case that there is another global pandemic, there needs to be additional social systems in place to prevent further marginalization of people experiencing homelessness and TBIs. Individuals experiencing homelessness and TBI rely on social services for food services, financial assistance, and a place of social connection and closed agencies and limited transportation can increase the risk of isolation. Maintaining social
connections is important for people experiencing homelessness and living with a TBI because social support can help connect individuals to resources (Lam & Rosenheck, 1999). Rather than continue to invest in congregate shelters, funds should be allocated to more permanent supportive housing structures, tiny home villages, safe parking lots, and safe camping spaces. Investing funds into supportive systems that not only provide for physiological needs but also psychological needs will alleviate additional difficulties experienced by those who have a TBI and experiencing homelessness.
Table 2.1: Descriptive Characteristics of Participants

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<tr>
<td>Sleep in shelters</td>
<td>14 (36.8)</td>
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<tr>
<td>Sleep outside</td>
<td>16 (42.1)</td>
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<tr>
<td>Other</td>
<td>5 (13.2)</td>
</tr>
<tr>
<td>Transitional housing</td>
<td>1 (2.6)</td>
</tr>
<tr>
<td>Safe haven</td>
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</tr>
<tr>
<td>Time without stable housing</td>
<td>4.3 yrs (9.2)</td>
</tr>
<tr>
<td>No. episodes of homelessness</td>
<td>3.6 (6)</td>
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<tr>
<td>Age of first experience homeless</td>
<td>32.4 (14.8)</td>
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<tr>
<td><strong>TBI Variables</strong></td>
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<td>Head injury as a barrier to housing</td>
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<tr>
<td>“Worst” injury</td>
<td>24 (63.2)</td>
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<tr>
<td>“First” injury</td>
<td>11 (28.9)</td>
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<tr>
<td>“Multiple” injury</td>
<td>22 (57.9)</td>
</tr>
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<td>Variables</td>
<td>Count (Percentage)</td>
</tr>
<tr>
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<td>--------------------</td>
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<tr>
<td>Restricted access to resources</td>
<td>27 (71.1)</td>
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<tr>
<td>Experienced homelessness for the first time due to COVID-19</td>
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</tr>
<tr>
<td>Currently experiencing homelessness due to COVID-19</td>
<td>14 (36.8)</td>
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Chapter Four: Manuscript Three

Substance Use and Housing Stability Among Individuals Experiencing Homelessness and a Traumatic Brain Injury:

The Role of Social Support

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Abstract

Purpose

When compared to the general population, people experiencing homelessness have significantly higher rates of TBI. Individuals experiencing homelessness and a TBI require social support because it can serve as a protective factor in reducing the risks of substance use and positively impact housing stability. This study aimed to better understand how social networks influence housing stability among individuals experiencing homelessness and a TBI.

Materials and methods

A purposive sampling design was utilized to recruit and survey 115 adults experiencing homelessness. Quantitative questions captured data on demographic information, brain injury-related variables, homelessness-related variables, social network support types and characteristics, and correlates of housing instability including self-report substance use variables.

Results

Findings showed that substance use was, indeed, a barrier to stay or afford housing. Additionally, rates of social support were uniformly low across the sample showing the unique vulnerabilities associated with homelessness and TBI and homelessness in general.

Conclusion

Intervention efforts may consider fostering support networks, as social support has been linked to both housing stability and non-housing outcomes such as reduced substance use, improved health, and community reintegration.
Keywords: Homelessness; Traumatic Brain Injury; Social Support; Substance Use;
Housing Stability
Introduction

Homelessness-Navigating a Precarious Existence

As of January 2020, an estimated 580,000 people were without shelter (National Alliance to End Homelessness, 2021). In 2020, homelessness had increased by 2% compared to 2019, marking the fourth consecutive year of increases in homelessness in the United States (National Alliance to End Homelessness, 2021). Causes of homelessness are complex and nuanced for each individual but often involve interactions between individual-level and structural risk factors (Busch-Gerrtsema et al., 2010; Burt et al., 2001; Pleece, 2000).

Individual-level factors such as family conflict, mental health problems, substance use, early childhood adverse experiences, personal history of violence, and criminal justice system involvement (Greenberg & Rosenheck, 2010; Greenberg & Rosenheck, 2008; Roos et al., 2013; Thompson et al., 2013) all contribute to increased risk of homelessness. Further, social and emotional problems, learning disabilities, memory lapses, and poor executive functioning as a result of neurological injuries (i.e., traumatic brain injury -- TBI), might also be risk factors of homelessness (Hwang et al., 2008; MacReady, 2009). Lack of affordable housing, loss of job, eviction, domestic violence, medical debt, lack of insurance, and income inequality (Burt et al., 2001; Dykeman, 2011; Shinn, 2007) are thought to be structural level factors that have been linked to homelessness. Once homeless, individuals are often exposed to many other deleterious circumstances that increase their vulnerability to detrimental health and mental health.
outcomes (i.e., toxic stress, victimization, and cognitive dysfunction including TBI) (Brisson et al., 2020; Stubbs et al., 2020; Tinland et al., 2018).

**Traumatic Brain Injury (TBI) and Homelessness**

TBI is defined as a neurological injury that impacts how the brain works (CDC, 2021). There are various causes of TBI, including violence (e.g., assault), falls, motor vehicle accidents, substance-use related accidents, and sports. TBI can meaningfully impact a person’s capabilities for self-regulation, planning and organizing, judgment, reasoning, and problem-solving; emotional and behavioral changes often occur (Fazel et al., 2008). Consequently, individuals with TBI history may suffer from impulsivity, mood swings, and personality changes (Konrad et al., 2011) which often impacts one's ability to maintain employment and stable housing.

The rates of TBI are significantly higher among people experiencing homelessness (over 50%) when compared to the general population (12%) (Hwang et al., 2008; Oddy et al., 2012; Stubbs et al., 2020; Topolovec-Vranic et al., 2012). Research shows over 60% of individuals experiencing homelessness with a history of TBI had experienced more than one TBI (Hwang et al., 2008). Other research has shown that in a quarter of the population of individuals experiencing homelessness with a TBI, the injury was identified as moderate to severe; this statistic is “10 times that of the general population” (Boseley, 2019, paras. 4). Individuals experiencing homelessness are at a disproportionately high risk for sustaining a TBI due to victimizations by assault, housing instability, and substance abuse related injuries (Backer & Howard, 2007; Silver & Felix, 1999). One study found homeless status to be highly predictive of higher rates of head injuries (Svoboda & Ramsay, 2014). Thus, individuals experiencing homelessness have an
increased susceptibility to brain injury, suggesting that homelessness status may be a contributing factor in the increased rates of TBI, potentially due to the dangerous circumstances associated with street life.

In addition to the direct consequences of a TBI (i.e., lifelong cognitive impairments -- Beijer et al., 2012), individuals may also experience psychosocial difficulties such as unemployment, social isolation, relationship breakdown and potentially homelessness, as individuals struggle to manage and come to terms with the functional impact of their injuries (Adshead et al., 2019). According to Hwang et al. (2008), a history of TBI is strongly associated with many adverse health conditions among individuals experiencing homelessness including seizures, poor mental health, and substance abuse problems.

**Homelessness and Substance Use**

Substance use is a common comorbid disorder among individuals experiencing homelessness (Doran et al., 2018; Stubbs et al., 2020). Rates of substance use among individuals experiencing homelessness are consistently above average (Fazel et al., 2008; O’Toole et al., 2004). A meta-analysis found alcohol dependence ranged from 8.1% to 58.5% and drug dependence ranged from 4.5% to 54.2% among individuals experiencing homelessness (Fazel et al., 2008). Not only do individuals experiencing homelessness have higher rates of alcohol and drug use, but research also shows this vulnerable population to have greater severity of alcohol and drug use, leading to high rates of drug overdose compared to housed individuals (Baggett et al., 2015; Doran et al., 2018). A study among veterans experiencing homelessness found that substance use can decrease opportunities to establish and maintain housing and employment, and increase exposure to victimization (Dunne et al., 2015). While substance use may serve as a risk factor for
homelessness, it may also serve as a barrier to transition from homelessness to stable housing (Davidson et al., 2014).

**TBI, Homelessness, and Substance Use**

A history of TBI among individuals experiencing homelessness has been associated with substance use. Research has found support for a relationship between substance use and other risky behaviors and injuries, including TBI (Brenner et al., 2017). Substance use increases both the risk of homelessness and the risk of TBI (Corrigan, 1995; Hwang et al., 2008). Additionally, substance use may have deleterious effects on recovery from a TBI (Corrigan, 1995).

Research has also shown that alcohol abuse (Hurstak et al., 2017; Hwang et al., 2008; Marcoux et al., 2017), marijuana use, and crack or cocaine use was common among TBI participants (Mackelprang et al., 2014). Moreover, victims of a TBI often reported alcohol intoxication at the time of injury (Corrigan, 1995), further supporting substance use as a risk factor of TBI.

**Social Support-Attenuating the Risks Associated with Homelessness**

Adequate social support can serve as a protective factor in reducing the risks of substance use among individuals experiencing homelessness. There is evidence that demonstrates that those who have a strong social support system have a higher chance of recovery from substance use and are less likely to return to substances in the future (Dobkin, et al., 2002; Kamal et al., 2019). Not only is social support correlated with lower substance use, social support has also been seen to benefit physical, mental, and emotional well-being (Johnson et al., 2005; Tsai et al., 2011; Tsemberis, 2010). Without adequate social support, individuals experiencing homelessness may remain disconnected
from social services and have less support in navigating stressors, such as substance use and housing instability (Kamal et al., 2019; Rauch & Ferry, 2001). TBI may add additional barriers to maintaining social support, housing stability, and low substance use due to the consequences of a TBI such as personality problems, behavioral issues, and social and intellectual problems (Verhaeghe et al., 20015).

**Social Support Among Individuals with a TBI**

Individuals with a reported TBI may face strained interpersonal relationships, social isolation, and relationship breakdown (Adshead et al., 2019; Holloway, 2014; Kamal et al., 2019) potentially leading to low levels of social support. Low social support was found to be associated with higher severity of alcohol abuse, higher likelihood of relapse following substance use treatment, and fatigue among TBI patients (Dobkin et al., 2002; Zeng et al., 2016). The consequences of a TBI, especially in conjunction with substance use, lead to impairments in physical, mental, emotional, and social functioning (Adshead et al., 2019); this, in turn, makes it difficult to develop and maintain positive social relationships. Without adequate social support, this highly vulnerable population may experience housing instability, homelessness, and may be less likely to access necessary medical care for TBI or substance use treatment (Johnstone et al., 2015; Wenzel et al., 2012). Individuals experiencing homelessness and a TBI may face longer and more frequent periods of housing instability, lower levels of social support, and higher rates of substance use (Adshead et al., 2019; Brooks et al., 2017; Dobkin et al., 2002).

**Social Network Composition Among Individuals Experiencing Homelessness and a TBI**
Research has identified the importance of developing positive social support as a means of exiting homelessness and increasing housing stability (Johnston et al., 2015; Tsai et al., 2011; Tsemberis, 2010) because social support can help buffer the effect of stress on well-being (Rauch & Ferry, 2001). Qualitative research has shown positive social support can help individuals experiencing homelessness find more stable housing, specifically, when the support is provided by family or caseworker (Nebbitt et al., 2007; Wenzel et al., 2012). Family support is also important for people with a TBI (Verhaeghe et al., 2005). Sufficient social support from family, friends, and partners was shown to decrease the occurrence of long-lasting mental fatigue among individuals with a TBI (Zeng et al., 2016). However, for individuals experiencing homelessness, family relationships might be tenuous (Ferguson, 2008) as isolation and conflict with family members is often a contributing factor toward homelessness (Castellanos, 2016; Rew, 2008).

Street-based peers may serve as primary sources of social support among individuals experiencing homelessness because individuals experiencing homelessness often rely on each other for survival and resources (Stablein, 2011). And, street-based peers may not provide positive support; research has found that networks of street-based peers can increase distress among individuals experiencing homelessness and unhealthy behaviors (Lincoln, 2000). More so, networks of street-based peers may be a negative influence on health-related outcomes, service use behavior, and greater dependence on the street economy (Barman-Adhikari et al., 2016; Ferguson et al., 2011; Whitbeck, 2009). Understanding social support may be particularly pertinent for people who are both experiencing homelessness and have a TBI as social support has been found to be
important for housing outcomes among this population (Johnston et al., 2015; Tsai et al., 2011; Tsemberis, 2010; Verhaeghe et al., 2005).

While these aforementioned studies shed light on some of the social-network characteristics of individuals experiencing homelessness and individuals with a reported TBI, there are important limitations to consider. These studies did not utilize samples of individuals experiencing homelessness and a TBI. While these studies contributed to the literature in terms of examining the impact of social network characteristics, comparing social network characteristics among two groups (with and without a reported TBI) enables researchers to understand with more specificity the impact that social networks can have on individuals (Barrera, 1986; Wasserman, 1994).

This study will attempt to address this gap in the literature by examining the social network characteristics among individuals experiencing homelessness and a TBI in order to gain a better understanding of the influence of social networks on housing stability.

Theoretical Framework

Social Capital Theory

Social capital theory (Lin, 1999) provides a helpful and concise framework to understand how social networks influence housing stability among individuals experiencing homelessness and a TBI. Social capital has been defined as one’s ability to accrue benefits by virtue of their personal relationships with others and by belonging to social networks (Warschauer, 2004). Lin (1990, 1999) explains social capital theory as an investment in social relations with expected returns, such as facilitating the flow of information, and views social capital as resources that are accessed through social ties. Lin et al., (2001) focuses on the resources embedded within social networks and argues
that not all resources are equal (i.e., social capital’s impact on individual well-being is variable). Individual’s social capital may differ depending on the type of network they have.

Research has used this theory among young adults and adults experiencing homelessness (Barman-Adhikari et al., 2016; Barman-Adhikari & Rice, 2014; Hagan & McCarthy, 1997; Irwin et al., 2008; O’Sullivan, 2003; Oliveira & Burke, 2009; Whitbeck & Hoyt, 1999). Results showed social capital was a significant correlate of service engagement, potentially leading to housing stability (Barman-Adhikari & Rice, 2014; Chew ng et al., 2013; Hudson et al., 2010; Kozloff et al., 2013; Pergamit & Ernest, 2010). More specifically, mixed results highlight how social capital from street-based peers can have a positive or negative influence on service engagement, housing stability, and well-being (Bao et al., 2000; Barman-Adhikari & Rice, 2014). Support from home-based peers and caseworkers, however, has been consistently found to have a positive impact on service engagement as a way to transition out of homelessness (Kurtz et al., 2000; Raleigh-Durloff, 2004).

Although this theory has been applied to young adults and adults experiencing homelessness, their samples did not include individuals experiencing homelessness with a TBI. Specific to the TBI population, research has found that individuals who had stronger social support had lower levels of emotional distress and were more likely to be employed, in school, or a training program (Kaplan, 1990; 1991). These results demonstrate the importance of social support and positive social capital in assisting with recovery from TBI and maintaining employment. This study will further analyze and apply social
capital theory to adults experiencing homelessness and a TBI to determine its applicability to this population.

**Types of Support**

There are three primary types of social support: instrumental support, emotional support, and service/informational support (Boateng-oku, et al, 2020). Instrumental support comes when social connections provide tangible help (Boateng-Poku, et al. 2020, p. 5), such as delivering a meal or providing a place to stay for the night. Emotional support is defined as “instances in which the participant was able to confide in loved ones about problems and worries” (Boateng-Poku, et. al, 2020, p. 5). Emotional support is the most well-known type of support, as it is the type that people usually consider when we think of family and friend relationships (Boateng-Poku, et. al, 2020). Informational support, sometimes referred to as service support, encompasses the exchange of information (Munoz-Laboy et al., 2014, p. 228) such as a case worker/social worker: someone who may provide a service in a time of need. Research has shown that among various social networks of individuals experiencing homelessness, unhoused and housed peers provide instrumental, emotional, and informational support to one another (Stablein, 2011).

**Bridging and Bonding Social Capital**

The social ties that individuals keep span two kinds of social capital, bridging and bonding social capital (Putnam, 2001). Studies show that individuals experiencing homelessness who are able to access these two sources of social support have both
positive and negative outcomes across domains including housing stability and retention (Nelson et al., 2015; Rosenheck et al., 2001; Wong & Stanhope, 2009).

Bridging social capital refers to the social support provided by heterogeneous networks, such as family members who are able to assist with housing (Stablein, 2011) or service providers who are able to provide professional support after a TBI (Tomberg et al., 2007). These relationships may expose individuals to information and resources (Barman-Adhikari et al., 2016) that may help distance themselves from the challenges of living on the streets and achieve housing stability.

Alternatively, bonding social capital refers to the social support provided by homogeneous networks (i.e., others who are experiencing homelessness) (Irwin et al., 2008; Stablein, 2011). Studies show that these sources of social capital do not provide opportunities for mobility, rather, relationships with others in the same social position may be unstable (Whitbeck, 2009; Whitbeck & Hoyt, 1999). These unstable relationships may decrease the likelihood of exiting homelessness (Mitchell & LaGory, 2002), as support from other street-based peers may not provide many opportunities to transition out of homelessness (Irwin et al., 2008).

The Current Study

While previous research provides important information on the relationship between social support and homelessness, more research is needed to study the impact that TBI has on an individual’s homelessness status. This paper seeks to examine social networks among individuals experiencing homelessness and a TBI. This study will organize social network composition through the use of primary and secondary networks. The primary
network typically fulfills most of the social support functions and consists of a romantic partner, family, and close friends (Dean & Lin, 1977; Henderson et al., 1978). While the secondary network includes more formal relationships (Bennet & Morris, 1983) such as caseworkers, co-workers, and people from school. Research questions and hypotheses include:

1) What differences may exist in social networks among individuals experiencing homelessness and a TBI compared to individuals experiencing homelessness only?
   a) We hypothesized that individuals experiencing both homelessness and TBI will have lower overall social support than individuals experiencing only homelessness due to the potential negative impact of TBI on social support.

2) What is the relationship between types (instrumental, emotional, informational support) and sources (primary and secondary network) of social support among individuals experiencing homelessness and the impact on housing stability related to substance use?
   a) We hypothesized that social support from the primary network is associated with increased housing stability. Studies have found the beneficial effects of family members on housing stability (Nebbitt et al., 2007; Stablein, 2011; Tomberg et al., 2007; Wenzel et al., 2012). Alternatively, social support from the secondary network will be associated with decreased housing stability, as evidenced by studies (Hagan & McCarthy, 1997; Irwin et al., 2008; Mitchell & LaGory, 2002; Whitbeck, 2009; Whitbeck & Hoyt, 1999) demonstrating the potentially detrimental influence of street-based peers.

**Materials and Methods**
Study Setting

In 2020, researchers from The University of Denver (the Center for Housing and Homelessness Research and the Graduate School of Professional Psychology) partnered with two community organizations across Colorado serving individuals experiencing homelessness. The dataset came from a two-site study (The Murphy Center for Hope in Fort Collins and Catholic Charities’ Marian House in Colorado Springs) examining the relationship between TBI and homelessness. Community partners supported the study by hanging recruitment flyers and encouraging service recipients to visit on the day of the data collection.

Sample and Recruitment

Purposive sampling was used to recruit and survey 115 English-speaking adults (ages 18-73). A standardized protocol for recruiting and screening potential participants was used. The eligibility screener asked if a participant was over 18 years old and experiencing homelessness. Written informed consent was given from eligible participants before beginning data collection.

Quantitative questions captured data on demographic information, brain injury-related variables, homelessness-related variables, social network characteristics, and correlates of housing instability including self-report substance use variables. The Institutional Review Board (IRB) at the University of Denver approved all study procedures prior to data collection.

Data Collection Procedures
Participants were given the written consent form and asked if they would like to read it themselves or have it read to them. Once written consent was obtained, researchers read each survey question to participants and allowed participants to answer. Participants were informed they could skip any questions they were uncomfortable answering and trained staff was available for support. The survey took approximately 25 minutes to complete. Participants were given a $15 gift card to a local grocery store as compensation for survey completion.

Study data were collected and managed using REDCap electronic data capture tools hosted at The University of Denver. REDCap (Research Electronic Data Capture; Harris, et al., 2009) is a secure, web-based application designed to support data capture for research studies, providing: an intuitive interface for validated data entry; audit trails for tracking data manipulation and export procedures; automated export procedures for seamless data downloads to common statistical packages; and, procedures for importing data from external sources.

**Measures**

**Sociodemographic Characteristics**

Sociodemographic characteristics were controlled for in the analyses. They included the following variables: study sites (Fort Collins or Colorado Springs). Gender was captured by three categories (male, female, other-specify). Sexual orientation was categorized into five categories (bisexual, gay, heterosexual, lesbian, not listed). Since a majority of participants identified as one of either male or female and heterosexual or LGB (99% of the sample identified as male or female and 85% of the sample identified as heterosexual), gender identity and sexual orientation were dichotomized (male or
female; heterosexual and LGB and not listed), all other cases were dropped from analyses. Race/ethnicity was originally categorized into eight categories (American Indian/Alaska Native, Asian, Native Hawaiian or Other Pacific Islander, Black or African American, White, Hispanic, more than one race, unknown/not reported) and recoded into two categories (white and BIPOC) for analysis, due to a small sample in some racial categories (e.g., Asian, American Indian/Alaska Native). Educational attainment was measured using the following categories: less than a high school diploma; high school degree or equivalent; Associate degree; Bachelor’s degree; Master’s degree; Doctorate; other; and then recoded into two categories (high school degree or less and more than high school degree), similarly, due to a small sample size in some categories (e.g., Master’s degree, Doctorate).

VI-SPDAT

The Vulnerability Index- Service Prioritization Decision Assistance Tool (VI-SPDAT; Community Solutions, 2015) is a standardized measure that was used to capture information on homelessness status. The VI-SPDAT is the homelessness status tool used by the Continuum of Care (COC) under the Department of Housing and Urban Development (HUD) to capture information on homelessness status to determine who should receive housing assistance first (Community Solutions, 2015). The VI-SPDAT was used to assess history of housing and homelessness, risk behavior, socialization and daily functioning, and wellness.

Substance Use Related Housing Stability (Dependent Variables)

The impact of substance use on housing stability was measured by the VI-SPDAT, examples of the questions included: “Has your drinking or drug use led you to being
kicked out of an apartment or program where you were staying in the past?” and, “Will drinking or drug use make it difficult for you to stay housed or afford your housing?” All the responses were coded to 1=yes and 0=no.

**OSU TBI-ID**

The Ohio State University TBI Identification Method (OSU TBI-ID; Corrigan & Bogner, 2007) is a standardized screening measure which was used to capture data on brain injury. The OSU TBI-ID was used to collect information on participants’ history of TBI (Corrigan & Bogner, 2007) and information served as control variables. The OSU-TBI-ID is a standardized structured interview procedure designed to capture information on lifetime TBI histories. Participants are considered to have a significant history of TBI if they reported a “first” TBI with loss of consciousness (LOC) before age 15, a “worst” TBI with LOC longer than 30 minutes, or a “multiple” TBI event, defined as “a period where three or more blows to the head caused altered consciousness OR two or more TBIs with LOC within a 3-month period” (Glover et al., 2018, p. 16). For analysis, scores of “first” “worst,” or “multiple” were used and if a participant screened positive for any of the criteria (first, worst, and/or multiple), they were coded as TBI (1=yes, 0=no).

**Social Network Variables: Social Capital**

A social network interview was utilized during data collection (Barman-Adhikari et al., 2016). Information collected were key independent variables. The survey involved a face-to-face social network interview conducted by a trained research staff member. The following prompt was first read: “Think about the past three months. Who are five people that you are closest to and have interacted and talked to (this could be face-to-face or over
email, text, phone, social media, etc.) the most in the past three months.” Participants were then asked to describe their relationship to each nominee, options consisted of: “friends from home or from before you were homeless; friends or other peers you know from the streets or peers you interact with at this agency; family (could be both biological and foster family); person you are romantically, intimately or sexually involved with; case workers, social worker, agency staff or volunteer; people from school; people from work; other.” Participants were then asked, “who of the five people in your social network do you: talk to or see at least once per week; in the past 3 months: who have you spent time with, hung out with, chilled with, partied with, or had conversations with in person (i.e., face-to-face)?; interacted with via your phone, exchanged communication with via a tablet or computer; when you have been in crisis, feeling depressed or dealing with drama and major issues, who have you gone to for help or advice? (emotional support); who have you borrowed money or other material things from when you needed it? (instrumental support); who have you talked to about where to get social services (help with housing, food, clothes, casework, etc.; informational support)?” Social network data were exported from REDCap (Research Electronic Data Capture; Harris, et al., 2009) and imported into SPSS for subsequent statistical analyses.

**Primary and Secondary Support Networks**

Social networks can be divided into primary (Dean & Lin, 1977; Henderson et al., 1978) and secondary networks (Bennet & Morris, 1983), and this categorization is appropriate for individuals with a reported TBI (Rauch & Ferry, 2001). Primary support networks consist of a romantic partner, family and close friends. While secondary support networks consist of more formal and less personal relationships (Rauch & Ferry, 2001),
including friends or peers from the streets or who the participants interacts with at this agency, caseworker, and people from school or work.

Primary social networks were assessed by calculating the proportion of nominees who serve a primary support role (i.e. a romantic partner, family, or home-based peer) to total nominees. Secondary social networks were assessed by calculating the proportion of nominees who serve a secondary support role (i.e. street-based peers, caseworkers, or friends from school or work). We recoded categorical variables to address result skewness (Davey-Rothwell & Latkin, 2007; Tucker et al., 2012; Tyler, 2013). The median can then be used to create a threshold for dichotomizing skewed variables (Wang et al., 1996). The primary support variable was then dichotomized as either the presence of a nominee in the primary network (coded as 1) or the absence of a nominee in the primary network (coded as 0). Secondary support was dichotomized on the median to address the skewed distribution, similar to primary support. The secondary support variable was then dichotomized as either the presence of a nominee in the secondary network (coded as 1) or the absence of a nominee in the secondary network (coded as 0). Primary and secondary networks were then merged with types of support including, emotional, instrumental, and informational. Therefore, social network variables were categorized as the following: primary network, secondary network, primary emotional support; primary instrumental support; primary informational support; secondary emotional support; secondary instrumental support; secondary informational support.

Analytic Approach
Data were exported and analyzed using SPSS (version 25; IBM Corp, 2017). To examine the relationship between social network variables and the dependent housing stability-substance use, bivariate logistic regressions were run to determine whether social capital variables were significantly associated (p < .05) with the dependent substance use variables. Only those social capital variables that were significant at the bivariate level were retained for the final multivariable logistic regression models in order to ensure statistical power and preserve degrees of freedom (Hosmer & Lemeshow, 2000). All demographic variables including race/ethnicity, gender, sexual orientation, educational attainment, and all TBI-related demographic variables including TBI (yes/no), first, worst, and multiple were retained for the multivariable logistic regression models. Listwise deletion was utilized for missing data because less than 10% of the data were missing.

Results

Sociodemographic, TBI-related variables, dependent variables, and all social capital characteristics are presented in Table 3.1.

**Sociodemographic Characteristics**

Out of 115 total participants, 66% identified as male and 34% identified as female. The majority of participants, 85%, identified as heterosexual, and 64% identified as White. Additionally, 61% of participants had received a high school diploma or less and notably, 39% received more than a high school diploma.

**Substance Use- Housing Stability**
When examining housing instability related to substance use, 26% of participants reported that drinking or drug use had led them to be kicked out of an apartment or program where they were staying in the past. Additionally, 13% of participants reported that drinking or drug use will make it difficult for them to stay housed or afford housing.

**TBI Demographics**

Out of 115 total participants, 70% reported a significant history of TBI. The OSU TBI-ID screening showed that 42% of participants reported at least one head injury with a LOC for more than 30 minutes (worst). Additionally, 22% of participants reportedly experienced a TBI with LOC before the age of 15 (first). And, 45% of participants reported experiencing either three or more head injuries resulting in an altered state or two or more TBIs with LOC within a 3-month period (multiple).

**Social Capital Variables**

*Primary and Secondary Support Networks*

Social capital variables were categorized into two groups (primary and secondary support networks). Participants nominated a total of five people in their support network and these nominees were divided into a primary and secondary support role and then merged into types of support provided including emotional support, instrumental support, and informational support. Overall, 51% of nominees were someone who served a primary support role, meaning someone who was categorized as a family member, partner, or friend from before homelessness. And, 49% of nominees were someone who served a secondary support role, meaning a street-based peer, caseworker, or friend from school or work.

*Sources of Support: Emotional, Instrumental, and Informational Support*
Primary and secondary support was then merged with various types of support provided including emotional support, instrumental support, and informational support. Of those nominees who were categorized into the primary support category, 60% provided emotional support, 54% provided instrumental support, and 63% provided informational support to the participant. More so, of those nominees who provided secondary support, meaning acquaintances rather than close family/friends, 65% provided emotional support to the participant, 61% provided instrumental support, and 55% provided informational support.

**Social Network Composition: Differences between Participants with and without a Reported TBI**

Differences in social network composition among individuals experiencing homelessness and a TBI compared to individuals experiencing homelessness only are displayed in Table 3.2. For example, 52% of participants with a reported TBI nominated someone in their primary network compared to 50% of participants without a reported TBI. As far as secondary networks, 48% of participants with a reported TBI nominated someone in their secondary network, compared to 50% of participants without a reported TBI. When examining network composition and types of support provided, 63% of participants with a reported TBI nominated someone who serves a primary emotional support role while 54% of participants without a reported TBI nominated someone in their primary emotional support network. Regarding primary instrumental support, 56% of participants with a reported TBI nominated someone compared to 50% of participants without a reported TBI. As far as primary informational support, 63% of participants with
a reported TBI nominated someone compared to 62% of participants without a reported TBI. When examining secondary emotional support, 63% of participants with a reported TBI nominated someone serving a secondary emotional support role compared to 69% of participants without a reported TBI. As far as secondary instrumental support, 59% of participants with a reported TBI nominated someone compared to 65% of participants without a reported TBI. And, regarding secondary informational support, 56% of participants with a reported TBI nominated someone compared to 54% of participants without a reported TBI.

**Bivariate Findings**

As noted before in the analyses section, all demographic variables including race/ethnicity, gender, sexual orientation, educational attainment, and all TBI-related demographic variables including TBI (yes/no), first, worst, and multiple were retained for the multivariable logistic regression models as control variables. Social capital variables that were significant at the bivariate level were retained for the multivariable models. All secondary support variables (secondary emotional support, secondary instrumental support, and secondary informational support) were significant at the bivariate level and were therefore retained for the multivariable models.

**Multivariable Findings**

Multivariable models are presented in Table 3.3. There were two outcomes of interest (has your drinking or drug use led you to being kicked out of an apartment or program where you were staying in the past? And, will drinking or drug use make it difficult for you to stay housed or afford your housing?) Significant findings for each model are reported.
Participants who reported having been kicked out of an apartment or program due to drinking or drug use were more likely to have emotional support from a secondary network (OR=45.85, p<.01, CI = 4.61, 455.94) and less likely to have instrumental support from a secondary network (OR=.08, p<.05, CI = .01, .88) compared to participants who had not been kicked out of an apartment or program due to drinking or drug use. Participants who said yes, drinking or drug use will make it difficult to stay or afford housing were more likely to identify as White (OR=.18, p<.05, CI = .04, .96), were less likely to have reported informational support from a secondary network (OR=.06, p<.05, CI = .00, .98) and, were more likely to have a reported “worst” TBI (OR=7.83, p<.05, CI = .96, 63.29) compared to participants who reported that drinking or drug use will not make it difficult to stay or afford housing.

Discussion

Our study sought to provide answers to two research questions. The first research question investigated differences in social networks between people experiencing homelessness and a TBI and people experiencing only homelessness. We hypothesized that people experiencing both homelessness and TBI would have lower levels of social support overall than people experiencing only homelessness, due to the potential negative effect of TBI on social support (Verhaeghe et al., 2005). The second research question examined the relationship between types (instrumental, emotional, informational support) and sources (primary and secondary network) of social support among individuals experiencing homelessness and their impact on housing stability related to substance use. We hypothesized that support from the primary network would be correlated with more housing stability while support from the secondary network would be associated with less
housing stability. Several significant findings came from this study that broadens our knowledge about social support among individuals experiencing homelessness and a TBI.

Findings showed high rates of reported TBI overall (70%), which is higher than some literature suggests (Stubbs et al., 2020). This finding may further prove that individuals experiencing homelessness may be more likely to sustain a brain injury (Backer & Howard, 2007). Alternatively, this finding may show that TBI may be a risk factor for homelessness (Hwang et al., 2008; Mackelprang et al., 2014; Oddy et al., 2012; Topolovec-Vranic et al., 2014). Prevention strategies to prevent individuals with head injuries from experiencing homelessness is recommended. Additionally, interventions such as low barriers to housing services and rent supplements are recommended to improve one’s living situation and provide safety.

Findings also revealed a lack of social support for participants with and without a reported TBI, highlighting the potential impact of homelessness and/or TBI on interpersonal relationships. Low levels of social support may result from homelessness; however, the unique vulnerabilities that lead to homelessness may also make these individuals vulnerable to low levels of social support, regardless of TBI status. Homelessness may be a symptom of other issues, such as mental health problems, physical health issues, and substance use (Beijer et al., 2012; Doran et al., 2018; Fazel et al., 2008; Stubbs et al., 2020), all of which can lead to a lack of social support. Additionally, overall rates of emotional support were higher than instrumental support regardless of source, suggesting that participants are more likely to have someone to meet emotional support needs than someone that provides tangible resources such as food,
clothing or shelter. This finding may suggest that individuals experiencing homelessness and a TBI connect with other individuals experiencing homelessness (Stablein, 2011) who are also resource poor (Barman-Adhikari et al., 2016) and may be able to provide emotional support but not tangible help. It is recommended that efforts be made to connect individuals experiencing homelessness and TBI to home-based peers and family who may be able to provide instrumental support to help transition one out of homelessness.

Furthermore, support from the primary (51%) and secondary (49%) networks was comparable, implying that bridging social capital provided roughly half of overall support (primary network; family, partner, friend from before homelessness). This is a promising finding because previous research has linked bridging social capital to positive outcomes (Barman-Adhikari & Rice, 2014), such as housing resources, which may lead to improved health and housing stability (Johnstone et al., 2015; Wenzel et al., 2012). Along with efforts to increase housing stability, intervention efforts may consider focusing on bridging social capital and building support networks.

While we expected to find lower levels of social support among people experiencing homelessness and a TBI compared to people experiencing only homelessness, our findings contradicted our hypothesis. Specifically, participants with a reported TBI nominated more people as sources of social support in a primary network (52% vs. 50%), higher rates of nominees from a primary network who provide emotional (63% vs. 54%) and instrumental support (56% vs. 50%), and nominees from a secondary network who provide informational support (56% vs. 54%) compared to participants without a reported TBI. One potential explanation is that individuals experiencing homelessness are often
stereotyped and discriminated against (Belcher, 2012; Corker et al., 2013; Phelan et al., 1997), potentially leading to low levels of social support. Individuals with a reported TBI may be less stigmatized due to their physical and cognitive disability, therefore they may have higher levels of social support. More studies are needed to better understand why individuals with a TBI have higher levels of social support in this area.

Secondary support was associated with substance use related to housing stability in multivariable analyses. This finding may further show the role of secondary support specifically street-based peers on substance use behaviors. Previous research has found that longer periods of homelessness along with substance use behaviors were associated with increased engagement with street-based social networks (Rice et al., 2008). It may be that substance use is a function of socialization with street-based peers who also use substances and this substance use may contribute to housing instability. Comprehensive service models that assess social networks among individuals experiencing homelessness and a TBI and help these individuals establish and maintain connections to positive sources of support are recommended.

Additionally, participants who stated that their drinking or drug use would make it more difficult to maintain or afford housing were significantly more likely to report a TBI classified as "worst," defined as a TBI with LOC lasting more than 30 minutes (Glover et al., 2018). This finding may imply that in addition to the direct consequences of TBI, individuals may experience unstable housing and substance use as individuals struggle to manage and cope with the functional impact of their TBI (Adshead et al., 2019). Case management and rent supplements are recommended first to improve one’s living
situation and safety (Stergiopoulos et al., 2015) followed by substance use treatment and treatment for TBI.

Individuals who reported that substance use would make it difficult to stay or afford housing were also significantly less likely to have reported secondary informational support than participants whose housing was unaffected by substance use. Substance use is complex on its own, and when combined with TBI, it presents a number of challenges to TBI recovery and social support. TBI may contribute to lower levels of informational support due to the consequences of TBI, such as poor planning and organization (Brain Injury Alliance of Colorado, 2017); individuals with a TBI may find it more difficult to remember appointments with case workers or to complete paperwork for medical care or housing services. To follow a harm reduction approach, low barrier and flexible treatment models should be recommended for housing services and case management.

Participants who indicated that they had been kicked out of housing in the past due to drinking or drug use, on the other hand, were more likely to have secondary emotional support than participants who had not been kicked out of housing in the past due to substance use. Emotional support from peers on the streets can foster important relationships as well as a sense of community and familiarity. According to research, individuals who do not have stable housing and then move to stable housing frequently have to leave a familiar street culture (Paul et al., 2018); perhaps a familiar environment with emotionally supportive peers is more important to some than stable housing.

Additionally, drinking or drug use leading to being kicked out of housing in the past was associated with less likelihood of secondary instrumental support, meaning someone who the participants had borrowed money or other material things from when they
needed it. Perhaps substance use is more of a function of socialization with peers who also use substances; these substance-using peers provide companionship and emotional support instead of instrumental support (Barman-Adhikari et al., 2016). Interventions that help establish and maintain instrumental support through caseworkers or through the primary network are recommended.

Limitations

Study limitations should be noted. Cross-sectional data were used for this study limiting causal conclusions. Utilizing longitudinal data in future studies may clarify the causal relationships between homelessness, TBI, social networks, substance use, and housing stability. Furthermore, data were self-reported and could be biased due to the sensitive topics asked of participants. Another limitation is that participants were recruited from service agencies serving adults experiencing homelessness, so the sample is likely not representative of all adults experiencing homelessness, especially those who are disconnected from services. Measurement limitations were that substance use-related variables came from the VI-SPDAT, a measure designed to screen for housing assistance. Future studies should consider using validated substance use measures to assess the impact of TBI and homelessness on substance use related to housing stability. Also, this study was limited geographically to two cities in Colorado, future research should consider using samples from diverse areas for more generalizable findings. Lastly, this study only included English-speaking adults. Researchers should consider administering studies in multiple languages in the future.

Conclusion
Our study findings demonstrate that social support among adults experiencing homelessness is low regardless of TBI status. While we expected to find differences in social network composition and types of support provided between individuals experiencing homelessness with a TBI and without a TBI there is more commonality in the rates of reported social support. While our findings are preliminary, they offer important implications for interventions among individuals experiencing homelessness and a TBI. For example, research has shown that the combination of rent supplements and intensive case management led to greater housing stability and increased social networks for veterans experiencing homelessness with psychiatric or substance use disorders (Rosenheck, 2003). Perhaps low barriers to permanent supportive housing along with intensive support will yield positive results for adults experiencing homelessness with a TBI.
Table 3.1: Descriptive Characteristics of Participants

Descriptive Characteristics of Participants (N = 115)

<table>
<thead>
<tr>
<th></th>
<th>n (%) or M (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age (years)</strong></td>
<td>45.3 (13.3)</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>75 (66.4)</td>
</tr>
<tr>
<td>Female</td>
<td>38 (33.6)</td>
</tr>
<tr>
<td><strong>Sexual Orientation</strong></td>
<td></td>
</tr>
<tr>
<td>Heterosexual</td>
<td>98 (85.2)</td>
</tr>
<tr>
<td>Not Heterosexual</td>
<td>17 (14.8)</td>
</tr>
<tr>
<td><strong>Race and Ethnicity</strong></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>73 (63.5)</td>
</tr>
<tr>
<td>Person of Color</td>
<td>42 (36.5)</td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
</tr>
<tr>
<td>High school diploma or less</td>
<td>70 (60.9)</td>
</tr>
<tr>
<td>More than high school diploma</td>
<td>45 (39.1)</td>
</tr>
<tr>
<td><strong>TBI Variables</strong></td>
<td></td>
</tr>
<tr>
<td>TBI total</td>
<td>81 (70.4)</td>
</tr>
<tr>
<td>“Worst” injury</td>
<td>53 (42.1)</td>
</tr>
<tr>
<td>“First” injury</td>
<td>28 (22.2)</td>
</tr>
<tr>
<td>“Multiple” injury</td>
<td>57 (45.2)</td>
</tr>
<tr>
<td><strong>Substance Use Variables (dependent variables)</strong></td>
<td></td>
</tr>
<tr>
<td>Has your drinking or drug use led you to being kicked out of an apartment or program where you were staying in the past? (1=yes).</td>
<td>30 (26.3)</td>
</tr>
<tr>
<td>Will drinking or drug use make it difficult for you to stay housed or afford your housing? (1=yes)</td>
<td>15 (13.4)</td>
</tr>
<tr>
<td><strong>Social Network Variables (N=80)</strong></td>
<td></td>
</tr>
<tr>
<td>Nominated someone in primary support (family, partner, friend from before homelessness; 1=yes)</td>
<td>41 (51.2)</td>
</tr>
<tr>
<td>Secondary support</td>
<td>39 (48.8)</td>
</tr>
<tr>
<td>Primary emotional support</td>
<td>48 (60)</td>
</tr>
<tr>
<td>Primary instrumental support</td>
<td>43 (53.8)</td>
</tr>
<tr>
<td>Primary informational support</td>
<td>50 (62.5)</td>
</tr>
<tr>
<td>Secondary emotional support</td>
<td>52 (65)</td>
</tr>
<tr>
<td>Secondary instrumental support</td>
<td>49 (61.3)</td>
</tr>
<tr>
<td>Secondary informational support</td>
<td>44 (55)</td>
</tr>
</tbody>
</table>
Table 3.2: Differences in social network among individuals experiencing homelessness and a TBI compared to individuals experiencing homelessness only

<table>
<thead>
<tr>
<th>Nominated someone in primary support (family, partner, friend from before homelessness; 1=yes)</th>
<th>TBI (1=yes)</th>
<th>No TBI (0=no)</th>
</tr>
</thead>
<tbody>
<tr>
<td>28 (52)</td>
<td>13 (50)</td>
<td></td>
</tr>
</tbody>
</table>

| Secondary support | 26 (48) | 13 (50) |
| Primary emotional support | 34 (63) | 14 (54) |
| Primary instrumental support | 30 (56) | 13 (50) |
| Primary informational support | 34 (63) | 16 (62) |
| Secondary emotional support | 34 (63) | 18 (69) |
| Secondary instrumental support | 32 (59) | 17 (65) |
| Secondary informational support | 30 (56) | 14 (54) |
Table 3.3: Multivariable Findings

<table>
<thead>
<tr>
<th>Demographics</th>
<th>Has your drinking or drug use led you to being kicked out of an apartment or program where you were staying in the past?</th>
<th>Will drinking or drug use make it difficult for you to stay housed or afford your housing?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OR</td>
<td>95% CI</td>
</tr>
<tr>
<td>Race/Ethnicity</td>
<td>2.6</td>
<td>0.59-11.34</td>
</tr>
<tr>
<td>Gender</td>
<td>0.62</td>
<td>0.16-2.44</td>
</tr>
<tr>
<td>Sexual Orientation</td>
<td>2.84</td>
<td>0.28-29.01</td>
</tr>
<tr>
<td>Education</td>
<td>2.32</td>
<td>0.52-10.42</td>
</tr>
<tr>
<td><strong>TBI related variables</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TBI (1=yes)</td>
<td>0.39</td>
<td>0.03-4.68</td>
</tr>
<tr>
<td>First</td>
<td>0.39</td>
<td>0.06-2.75</td>
</tr>
<tr>
<td>Worst</td>
<td>2.75</td>
<td>0.45-16.79</td>
</tr>
<tr>
<td>Multiple</td>
<td>2.82</td>
<td>0.48-16.67</td>
</tr>
<tr>
<td><strong>Social network characteristics</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Secondary emotional support</td>
<td>45.85**</td>
<td>4.61-455.94</td>
</tr>
<tr>
<td>Secondary instrumental support</td>
<td>0.08*</td>
<td>0.01-0.88</td>
</tr>
<tr>
<td>Secondary informational support</td>
<td>1.05</td>
<td>0.14-7.84</td>
</tr>
</tbody>
</table>

*Note. Reference category for: Has your drinking or drug use led you to being kicked out of an apartment or program where you were staying in the past? And, will drinking or drug use make it difficult for you to stay housed or afford your housing? (0=no); Race/ethnicity (BIPOC); gender minority; sexual orientation (sexual minority); less than high school education. Note. OR=Odds Ratio; 95% CI=95% confidence interval. *p <.05. **p <.01 *** p <.001
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Chapter Five: Conclusion

Individuals experiencing homelessness are a vulnerable population impacted by high rates of TBI. Although a history of TBI is indicated among a large percentage of homeless populations (Hwang et al., 2008), intervention and prevention strategies often do not screen for TBI. This omission may overlook individuals experiencing homelessness due to the consequences of a TBI or who have sustained a TBI while homeless. Additionally, the relationship between TBI and homelessness is multifaceted and further complicated by the intersections of health, mental health, substance use, and social support which may impact housing and non-housing outcomes (Hwang et al., 2008; Johnston et al., 2015; Stubbs et al., 2020; Tsai et al., 2011; Tsemberis, 2010). Separately and jointly, these common co-morbidities are associated with homelessness and TBI.

Overall, the research undertaken for this dissertation found the impact of TBI on individuals experiencing homelessness may be an overlooked risk factor and a consequence of homelessness. This dissertation addressed notable substantiative and methodological gaps in literature specifically pertaining to prevalence rates of TBI among individuals experiencing homelessness, the temporal relationship between TBI and homelessness, along with other co-occurring factors including mental health, substance use, social support and the impact of COVID-19 on access to resources. Additionally, this dissertation utilized logistic regression, qualitative data collection and analysis, and social
network analysis to better understand pathways into and out of homelessness. Better understanding the epidemiology of TBI and its associated consequences is crucial for prevention efforts so that individuals with a reported TBI do not experience housing instability and homelessness. More so, better understanding the unique vulnerabilities associated with TBI among individuals experiencing homelessness will aid in more effective intervention efforts to assist individuals exit homelessness. Major findings from the manuscripts are discussed below followed by recommendations.

**Major Findings From The Manuscripts**

**Prevalence Rates**

Research from this dissertation provided TBI prevalence rates among individuals experiencing homelessness. This dissertation found 71% of participants experiencing homelessness had a TBI history. This prevalence rate is higher than literature estimates suggesting literature estimated prevalence rates may, in fact, be low due to the mentioned barriers as well as stigma, discrimination, and difficulties accessing health care (Johnstone et al., 2015; Spence et al., 2004).

**Recommendations**

Lack of awareness about TBI among individuals experiencing homelessness may be a barrier to obtaining accurate prevalence rates (Topolovec-Vranic et al., 2013). Clinicians serving individuals experiencing homelessness may not know that their clients need to be screened for TBI. Additionally, symptoms may be misdiagnosed as mental health issues or a consequence of substance use (National Academies of Sciences et al., 2019). Implementing screening measures including the OSU TBI-ID in settings servicing
individuals experiencing homelessness is recommended because results of the screening measures may be needed to refer clients for additional care.

Moreover, increasing knowledge and awareness among caregivers, clinicians, and medical professionals may lead to more TBI screening. For example, Topolovec-Vranic and colleagues (2013) ran a multidisciplinary workshop with frontline workers working with individuals experiencing homelessness, doctors, nurses, researchers, policy-makers, students, and individuals with lived experiences of homelessness to discuss research gaps pertaining to TBI and homelessness. Findings showed that among the participants little was known about the relationship between TBI and homelessness. Future work should consider participatory models and partnerships across disciplines and organizations to improve outcomes for individuals experiencing homelessness (Toplovec-Vranic et al., 2013). Findings should continue to be disseminated to key stakeholders and community members.

Additional workshops are recommended across disciplines to raise awareness and knowledge about TBI and homelessness. Screening measures such as the OSU-TBI-ID should be discussed and thoroughly taught during workshops to allow clinicians to become trained in how to administer the OSU TBI-ID with clients. Screening clients in service settings may assist in making appropriate referrals to medical care.

**Directionality**

This dissertation captured data on the timing of the first experience of homelessness and first TBI to calculate the directionality of the relationship between these two variables. Results showed 74% of participants reported the first occurrence of TBI preceded their first experience of homelessness. Participants reported that living with a
TBI would be a barrier to exiting homelessness. Specifically, 27% of participants claimed that a past TBI was an obstacle to staying housed or to affording housing. These findings show that TBI may be a risk factor for homelessness. Gaps in literature exist regarding the directionality between TBI and homelessness. Barnes et al., (2015) argue this relationship is likely bi-directional since factors associated with homelessness, including assaults and substance use, may increase the risk of acquiring a TBI, and factors associated with TBI such as low levels of income and low social support, could make an individual vulnerable to becoming homeless. Findings from this dissertation further suggest that acquiring a TBI may lead one to experience housing instability and homelessness.

**Recommendations**

Prevention strategies are recommended to prevent individuals with head injuries from experiencing housing instability and homelessness. It is recommended that individuals with reported brain injuries be referred to social support groups, money management classes, and job trainings to establish and/or maintain stable housing while recovering from a TBI. These prevention strategies should take place in medical settings with other individuals with a reported brain injury. Additionally, there should be lower thresholds to refer clients to specialty care. Easier access to specialty care, including neurological treatment, may be needed for accurate diagnosis and long-term care for recovery from TBI. Lastly, it is recommended that clinicians and medical providers consider specific barriers for individuals experiencing homelessness such as lack of access to health care, transportation issues, and financial barriers. These barriers may be a deterrent for an individual experiencing homelessness to seek medical care. Without an accurate
diagnosis and potentially specialty care, individuals experiencing homelessness and a TBI may be at risk for long-term consequences of a TBI, including being at higher risk to sustain more than one TBI (Hwang et al., 2008).

**Social Support**

Findings from this dissertation showed low levels of social support across all participants, both with and without a reported TBI. This finding illustrates the potential consequences of homelessness status and/or TBI on relationships. Social support is important for individuals experiencing homelessness and TBI because social support can benefit physical, mental, and emotional well-being (Johnson et al., 2005; Tsai et al., 2011; Tsemberis, 2010), potentially leading individuals experiencing homelessness to stable housing and help individuals cope with their TBI.

Barnes et al., (2015) claim that low levels of social support were associated with TBI. This claim is furthered by research that found the consequences of TBI including personality problems, behavioral problems, emotional and intellectual problems were correlated with family member’s feelings of pressure, anxiety, and depression (Verhaeghe et al., 2005), potentially leading to strained relationships. Strained relationships with family members along with the consequences of TBI may eventually lead one to experience housing instability and homelessness. This finding was supported in this dissertation as evidenced by 74% of participants who reported they experienced a TBI prior to experiencing homelessness. Establishing and maintaining supportive relationships is recommended in intervention efforts as it may prevent individuals with a reported TBI from experiencing housing instability.

**Recommendations**
Social support groups for individuals with a reported brain injury are recommended to establish emotional support with peers also going through recovery from TBI. These social support groups may, in turn, increase other types of support including instrumental and informational. Additionally, due to the consequences of TBI individuals may be disconnected with home-based peers or family. It is recommended that efforts be made to connect individuals experiencing homelessness and TBI to home-based peers and family who can provide support. Perhaps qualitative data collection may be a useful method to explore social networks of individuals experiencing homelessness and a TBI to better understand the barriers associated with low social support. Furthermore, services should also emphasize low barriers to housing services to reduce isolation associated with homelessness.

**Qualitative Data**

This dissertation utilized qualitative data surrounding the impact of COVID-19 on access to resources. Comparison groups (participants with a reported TBI vs participants without a reported TBI) were studied to identify unique barriers to medical care due to COVID-19. Results showed that participants with a TBI were impacted by COVID-19 more than participants without a reported TBI regarding access to health-care resources. This finding further illuminates the unique vulnerabilities faced by individuals experiencing homelessness and a TBI.

**Recommendations**

More qualitative data collection is recommended to further understand the experiences of individuals experiencing homelessness and a TBI, specifically during
COVID-19. Qualitative data may also aid in diagnosing and screening for a TBI. Currently, neuroimaging and/or clinical documentation is considered the gold standard for diagnosing a TBI (American Association of Neurological Surgeons, 2020); however, most research studies rely on self-report due to potential lack of documentation and the high cost of neuroimaging (Brenner et al., 2017; Hwang et al., 2008; Oddy et al., 2012; Topolovec-Vranic et al., 2017). Also, individuals experiencing homelessness may lack access to health care and health insurance which further impacts one’s ability to receive neuroimaging and clinical documentation. Individuals experiencing homelessness and a TBI may not know they have had an injury that is classified as a TBI and may have distrust for medical professionals.

Training research staff and clinicians to use screening measures such as The HELPS screening tool (Picard et al., 1991), the BISQ TBI screening tool (Dams-O’Connor et al., 2014), or the more recently developed, OSU TBI-ID (Corrigan & Bogner, 2007) may aid in accurately screening vulnerable populations for TBI. Training clinicians to use TBI screening measures in clinical and therapeutic settings may also allow clients to process any uncomfortable feelings that arise during the screening process, such as the incidence of domestic violence.

**Mental Health**

This dissertation found a significant negative relationship between mental health variables and a reported TBI prior to homelessness, filling in a gap in literature and knowledge regarding the relationship between mental health disorders, TBI, and homelessness. Specifically, for participants who had a reported TBI prior to experiencing
homelessness, they were less likely to have experienced housing instability due to a mental health issue or concern and they were less likely to have a mental health or brain issue that would make it difficult to live independently. This finding may imply that the relationship between TBI and homelessness is driven by factors other than mental health, including but not limited to substance use. The hypothesis that TBI and homelessness is perhaps driven by other factors including substance use was also found to be true in manuscript three. Manuscript three found that substance use was related to TBI and homelessness and may be an influential factor leading to homelessness. More research is needed to further evaluate relevant and important risk factors associated with TBI that may contribute to housing instability and the chronicity of homelessness.

**Recommendations**

Housing First models and rent supplements, are recommended to reduce isolation and to provide housing for individuals experiencing homelessness prior to assisting with substance use and mental health therapy. Data from a randomized trial showed that rent supplements in combination with case management improved the living situation, safety, and community functioning among individuals experiencing homelessness and mental illness (Stergiopoulos et al., 2015). These findings may imply that stable housing may lower the risk for brain injury. Individuals experiencing homelessness and a TBI are diverse and often at different points in their homeless trajectory and recovery from TBI. Intervention strategies should consider the cognitive and emotional stage of an individual and consider flexible treatment approaches and harm reduction tactics to better house and assist these individuals.

**Subpopulations**
Many intersections were discussed across the three manuscripts such as the impact of COVID-19, substance use, mental health, and social support, however there are many more intersections that need to be further discussed and researched. These include veteran status, TBI as a result of domestic violence, gender identity, and sexual orientation.

Vulnerable subpopulations of individuals experiencing homelessness are disproportionately impacted by high rates of TBI. For example, victims of domestic violence are impacted due to the high frequency of head and neck injuries inflicted through abuse (Zieman et al., 2017). TBI is often seen to be more common among victims of domestic violence. One study that looked at 109 females and 6 males who were victims of domestic violence found that 88% reported more than one serious injury, with 81% reporting having experienced a loss of consciousness (LOC) from that injury (Zieman et al., 2017).

**Recommendations**

The intersection of TBI, homelessness, and interpersonal violence warrants additional research and intervention. This dissertation found that participants who self-identified as Female or Other had a greater likelihood of experiencing a violently incurred TBI. In addition to providing a safe place to stay, service providers that primarily serve women and/or gender non-conforming individuals may consider partnering with medical clinics or bringing medical personnel onsite to conduct cognitive assessments for clients who reported experiencing a head injury as a result of a violent attack.

**Limitations**
Dissertation Limitations

Limitations for the dissertation as a whole are similar to the limitations mentioned in each manuscript. Cross-sectional data were used for this study limiting causal conclusions. Data were also self-report and could be biased due to some of the sensitive topics asked of participants. It is recommended that future studies use longitudinal data to explore the causal relationships between TBI, homelessness, and associated risk factors, including the impact of COVID-19 on housing stability and homelessness status.

Measurement limitations were that variables including mental health and substance use-related variables came from the VI-SPDAT, a measure designed to screen to prioritize housing for individuals experiencing homelessness. Future studies should consider using validated mental health and substance use measures to assess the impact of TBI and homelessness on mental health and substance use related to housing stability.

Another limitation is that participants were recruited from service agencies serving adults experiencing homelessness, therefore the data used for all manuscripts are likely not representative of all adults experiencing homelessness, especially those who are disconnected from services. Data were limited to two cities in Colorado, further reducing generalizable findings. Future research may consider using samples from diverse areas. Furthermore, data collection occurred only among English-speaking adults. Measures should be administered in other languages.

Notably, half of the data were collected in October 2020, during the COVID-19 pandemic. Therefore, those data may not be generalizable for all individuals experiencing homelessness, especially those who experienced homelessness due to COVID-19. Qualitative findings regarding access to resources during COVID-19 concluded that
access to resources were restricted more so for individuals experiencing homelessness and a TBI compared to individuals experiencing homelessness only. It is important to mention that access to care is an issue for all people experiencing homelessness, not only individuals experiencing homelessness with a reported TBI, results do not suggest there are different access issues, rather, examines access issues specifically for a subpopulation of individuals experiencing homelessness with a reported TBI.

**Future Directions**

Rates of homelessness have increased over the past 30 years, with a significant increase in the number of children and families who experience homelessness (United States Interagency Council on Homelessness, 2015). The United States relies on the point-in-time (PIT) count to capture the number of individuals experiencing homelessness each year.

The United States conducts an annual PIT count, where communities across the United States count the number of sheltered and unsheltered (sleeping outside and in other locations not meant for human habitation), individuals experiencing homelessness on a single night during the last ten days in January (HUD, 2019). The PIT is one of the only ways to assess national, state, and local data regarding individuals experiencing homelessness (Schneider et al., 2016).

Obtaining accurate prevalence rates is important in order to implement effective interventions. Variation in count methodology year-to-year within and across communities often produce a significant undercount of homeless populations at any given point in time, often resulting in overestimates of chronic homelessness and underestimates of shorter periods of homelessness (Bogle & Blinder, 2010; Fazel et al.,
The most challenging group to obtain accurate prevalence rates from are individuals who live on the streets and are unsheltered because they are often disconnected from services (Fazel et al., 2014).

Research often relies on rates of homelessness that come from the PIT count as it is the main source of data for research on individuals experiencing homelessness (HUD, 2014). After data collection, the data are analyzed and utilized to plan for services and strategies to eliminate homelessness (HUD, 2014). PIT data are used to inform policy, practice, and fund services (Schneider et al., 2016). A fault of the PIT count is that there are often significant methodological and survey variations in how different cities conduct the PIT count (Schneider et al., 2016). Therefore, research and policies may be using inaccurate rates of individuals experiencing homelessness in any given year in the United States.

Changes to improve the accuracy of the PIT count include increased local community support, more rigorous methodology, and increased dissemination of methods and results to allow different regions to learn different ways others are collecting data (Schneider et al., 2016). Community social workers may aid in helping the PIT count and assist with relationship building across disciplines and sectors. These changes may aid in providing accurate research and strategies to eradicate and prevent homelessness.

Concluding Thoughts

This dissertation has provided knowledge and insight into the complex interrelationships among TBI, homelessness, and associated risk factors. Individuals experiencing homelessness are a vulnerable and marginalized population impacted by intersections of health and mental health issues, substance use, low levels of social
support, TBI, and other factors. Increasing awareness of TBI among individuals experiencing homelessness may lead to increased screening in medical and clinical settings. Increasing screening measures may lead to appropriate medical services, social support, and money management services that may prevent individuals from experiencing homelessness due to the consequences of a TBI. Investments in continued innovation including tiny home villages, safe parking lots, and safe camping spaces are recommended to address homelessness by providing safe spaces for individuals to live. A safe place to live may help prevent individuals from acquiring a TBI by reducing dangers of living on the street. Access to healthcare including expanding access to smart phones and reliable internet is recommended to allow individuals experiencing homelessness to seek support and care through telehealth. Finally, the provision of stable housing might also lower the risk for TBI, permanent supportive housing, rent supplements along with intensive case management is recommended as it may significantly improve one’s living situation, safety, and well-being.
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Appendices

Appendix A: Questions Used from the Vulnerability Index Service Prioritization Decision Assistance Tool

History of Housing and Homelessness
1. Where do you sleep most frequently?
   - Shelters
   - Transitional Housing
   - Safe Haven
   - Outdoors
   - Other (specify):
   - Refused

2. How long has it been since you lived in permanent stable housing?
   - Years:
   - Refused

3. How many times have you been homeless in your lifetime?
   - Number of times:
   - Refused

4. How old were you the first time you were homeless? (asked up until the twentieth time)
   - Age:
   - Refused

Risks
5. In the past six months, how many times have you...
   - Received health care at an emergency department/room?
   - Taken an ambulance to a hospital?
   - Been hospitalized as an inpatient?
   - Used a crisis service, including sexual assault crisis, mental health crisis, family/intimate violence, distress centers and suicide prevention hotlines?
   - Talked to police because you witnessed a crime, were the victim of a crime, or the alleged perpetrator of a crime or because the police told you that you must move along?
   - Stayed one or more nights in a holding cell, jail or prison, whether that was a short-term stay like the drunk tank, a longer stay for a more serious offense, or anything in between?

   Risk of Harm (Yes, No, Refused)

6. Have you been attacked or beaten up since you've become homeless?
7. Have you threatened to or tried to harm yourself or anyone else in the last year?

Legal Issues (Yes, No, Refused)
8. Do you have any legal stuff going on right now that may result in you being locked up, having to pay fines, or that make it more difficult to rent a place to live?

Risk of Exploitation (Yes, No, Refused)
9. Does anybody force or trick you to do things that you don’t want to do? (Yes, No, Refused)
10. Do you ever do things that may be considered to be risky like exchange sex for money, run drugs for someone, have unprotected sex with someone you don't know, share a needle, or anything like that? (Yes, No, Refused)

Socialization and Daily Functioning (Yes, No, Refused)
Money Management
11. Is there any person, past landlord, business, bookie, dealer, or government group like the IRS that thinks you owe them money?
12. Do you get any money from the government, a pension, an inheritance, working under the table, a regular job, or anything like that?

Meaningful Daily Activity
13. Do you have planned activities, other than just surviving, that make you feel happy and fulfilled?

Self-care
14. Are you currently able to take care of basic needs like bathing, changing clothes, using a restroom, getting food and clean water and other things like that?

Social Relationships
15. Is your current homelessness in any way caused by a relationship that broke down, an unhealthy or abusive relationship, or because family or friends caused you to become evicted?

Wellness (Yes, No, Refused)
Physical Health
16. Have you ever had to leave an apartment, shelter program, or other place you were staying because of your physical health?
17. Do you have any chronic health issues with your liver, kidneys, stomach, lungs or heart?
18. If there was space available in a program that specifically assists people that live with HIV or AIDS, would that be of interest to you?
19. Do you have any physical disabilities that would limit the type of housing you could access, or would make it hard to live independently because you'd need help?
20. When you are sick or not feeling well, do you avoid getting help?

21. Are you currently pregnant? (Yes, No, N/A, Refused) Substance Use

22. Has your drinking or drug use led you to being kicked out of an apartment or program where you were staying in the past?

23. Will drinking or drug use make it difficult for you to stay housed or afford your housing?

Mental Health
24. Have you ever had trouble maintaining your housing, or been kicked out of an apartment, shelter program, or other place you were staying, because of…?
   a. A mental health issue or concern?
   b. A past head injury?
   c. A learning disability, developmental disability, or other impairment?

25. Do you have any mental health or brain issues that would make it hard for you to live independently because you'd need help?

Medications
26. Are there any medications that a doctor said you should be taking that, for whatever reason, you aren’t taking?

27. Are there any medications like painkillers that you don't take the way the doctor prescribed or where you sell the medication?

Abuse and Trauma
28. Has your current period of homelessness been caused by an experience of emotional, physical, psychological, sexual, or other type of abuse, or by any other trauma you have experienced?
Appendix B: Ohio State University TBI Identification Method (modified for Colorado)

Step 1
Ask questions 1-5 below.
Record the cause of each reported injury to the right of this box in “Step 1 Continued”

I am going to ask you about injuries to your head or neck that you may have had anytime in your life.

1. In your lifetime, have you ever been hospitalized or treated in an emergency room following an injury to your head or neck?
   Think about any childhood injuries you remember or were told about.
   □ No □ Yes—Record cause in chart to right

2. In your lifetime, have you ever injured your head or neck in a car accident or from crashing some other moving vehicle like a bicycle, motorcycle or ATV?
   □ No □ Yes—Record cause in chart to right

3. In your lifetime, have you ever injured your head or neck in a fall or from being hit by something (for example, falling from a bike or horse, rollerblading, falling on ice, being hit by a rock)?
   Have you ever injured your head or neck playing sports or on the playground?
   □ No □ Yes—Record cause in chart to right

4. In your lifetime, have you ever injured your head or neck in a fight, from being hit by someone, or from being shaken violently? Have you ever been shot in the head?
   □ No □ Yes—Record cause in chart to right

5. In your lifetime, have you ever been nearby when an explosion or a blast occurred? If you served in the military, think about any combat- or training-related incidents
   □ No □ Yes—Record cause in chart to right

Interviewer instruction:
If the individual has been exposed to repeated injuries such as through DV or football etc. those incidences should be recorded in Step 3, see step 3.

Step 2
For each reported injury ask the following questions
Record answers in Step 2 Continued below
(Additional space on back if needed)

Where you knocked out or did you lose consciousness (LOC)?
- If yes, how long?
- Were you dazed or did you have a gap in your memory from the injury?
- How old were you?
Record answers in Step 2 Continued below

Step 3
Ask the following questions to identify a history of multiple TBIs
Record answers in Step 3 (Additional space on back if needed)

Have you ever had a period of time in which you experienced multiple, repeated impacts to your head (e.g. history of abuse, contact sports, military duty)?
- If yes, what was the typical or usual effect—where you knocked out (Loss of Consciousness—LOC)?
- If no, were you dazed or did you have a gap in your memory from the injury?

What was the most severe effect from one of the times you had an impact to the head?
How old were you when these injuries began? Ended?

Step 1 Continued...

<table>
<thead>
<tr>
<th>Cause</th>
<th>Loss of consciousness (LOC)/knocked out</th>
<th>Dazed/Mem Gap</th>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No LOC</td>
<td>&lt;30 min</td>
<td>30 min-24 hrs</td>
</tr>
<tr>
<td>Dazed/Mem Gap</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No LOC</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

How many injuries total have you had in your lifetime? _______

Step 3

<table>
<thead>
<tr>
<th>Cause of repeated injury</th>
<th>Typical Effect</th>
<th>Most Severe Effect</th>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dazed/mem gap, no LOC</td>
<td>LOC</td>
<td>LOC 30 min-24 hrs</td>
<td>Began</td>
</tr>
<tr>
<td>LOC &lt;30 min</td>
<td>LOC &gt;24 hrs</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Appendix C: Open-Ended Responses

1. What services have you found to be most helpful to address issues related to homelessness? Why have you found these services helpful?

<table>
<thead>
<tr>
<th>Fort Collins:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food resources</td>
</tr>
<tr>
<td>The shelter services provide food and housing</td>
</tr>
<tr>
<td>Neighbor to Neighbor, it gives homeless people a way to get themselves back into housing.</td>
</tr>
<tr>
<td>The Murphy Center. They are helpful because they are willing to help you.</td>
</tr>
<tr>
<td>Being able to have a shower. It helps to have good hygiene in order to get a job.</td>
</tr>
<tr>
<td>Clothing services, food programs, employment. Helps me be fulfilled, and it’s something to do (applying for jobs). Puts something on my schedule.</td>
</tr>
<tr>
<td>Food stamps: you can’t waste the money. Medicaid: just in case you get hurt.</td>
</tr>
<tr>
<td>Murphy Center because it helps with bus tickets and offers warming, laundry, and mail.</td>
</tr>
<tr>
<td>Rescue Mission, Salvation Army, SummitStone, CSU</td>
</tr>
<tr>
<td>Other than this place and Fort Collins Rescue Mission, I haven’t had a whole lot of luck or help in any services. I have lost 4 jobs in the last week because I have lost bus passes. Nobody has been able to help me resolve issues with unemployment. I have had to do everything on my own. I come here to shower and go over there to sleep.</td>
</tr>
<tr>
<td>Case worker to find housing</td>
</tr>
<tr>
<td>This place because you get food, showers, laundry, bus tickets, gear. Have a base.</td>
</tr>
<tr>
<td>SNAP</td>
</tr>
<tr>
<td>Homeward Alliance</td>
</tr>
<tr>
<td>Therapist, Rescue Mission, mental health help</td>
</tr>
<tr>
<td>Shelters, human services, Murphy Center, food bank</td>
</tr>
<tr>
<td>Murphy Center, their resources are amazing and they actually care.</td>
</tr>
</tbody>
</table>
The Denver Rescue Mission because they help me with clothes, food, and spirituality. 
Shelter, able to get a shower.
Homeless gear because they provide clothes or supplies you may need.
Food stamps and Hands Up helped get clothes. 
SummitStone services, it helps me deal with my mental health issues.
Homeward Alliance, Neighbor to Neighbor (rent and utilities/housing help), Hand Up Program (clothing, boots, work attire), 2-1-1 (United Way, help with resources for housing and jobs), Northern Colorado Health Network/NCAP (Food, substance use, HIV and mental health services). Helpful because it made everything else line up. They help people who want the services.
Homeward Alliance, because they manage my Section 8.
This agency- Sister Alice had a good idea about unifying services. They have unified services.
The Murphy Center, Catholic Charities, Human Resources (food stamp card), the work force, it does not matter if you are homeless, they will help you.
Medicaid, food stamps, Murphy Center
Murphy Center, friendly and informative
VOA, SummitStone, and The Mission- provides therapy and helps out by telling you where to look and what resources are available
Murphy Center because they have different counselors that guide me and work programs as well.
Outreach program in Fort Collins because they help me get my yearly bus pass and gym membership.
Murphy Center because I can take showers and stay warm and drink coffee/get food
Rescue Mission, Salvation Army, SummitStone, CSU
Murphy Center because they offer a variety of resources. Especially helpful are computer
resources, clothing, showering. All these beneficial resources are in one place.

**Outreach**
- Homeward Alliance, lots of secretaries know me by name, and Murphy Center
- Murphy Center helped me get a job and resources
- Shelters because they save our lives and it's freezing outside
- Shelters in general for housing
- Health, physical and mental. Salud because they have great access to the Health District and to quit smoking.
- People who give us showers. Shelters are definitely helpful. The most help we have experienced are the ones that are welcoming of sexual orientation.
- Murphy Center because it gives back to everyone.
- Homeward Alliance because people are real here.

**Colorado Springs:**

- Food banks, clothing banks, and employment services
- Food services
- Food and water
- Shower services
- Springs Rescue Mission most helpful, have everything
- Getting clothes, showering at The Mission. This is helpful so personal items are not stolen.
- The Mission- showering, single night stay programs/shelter
- Rescue Mission helped with getting an ID and sleeping
- Springs Rescue Mission- they provide you with a place to shower, do your laundry, charge your phone, and look for work
- SRM (The Mission)- shelter during cold weather
The Mission because it gave me a place to stay.
RJ Montgomery- better than having to sleep on the street.
RJ Montgomery- shelter, gives me a place to sleep and makes it easier to function because I have a place to sleep every night.
RJ Montgomery- housing
Marion House- they house and feed us
Marion House- helpful in looking for jobs and resumes, getting help with/vouchers for birth certificates, bus passes, vouchers for IDs
Marion House and Rescue Mission because they help with food and clothing
Marion House (they feed everyday no matter what)
Marion House, easy access
Marion House- helped find a job and help with food and other resources.
Marion House- they are always feeding us.
Being able to eat at the Marion House helps you save money and you get a good meal.
Program with employment that helps you get an ID, having a bed and food through the shelter
Access to telephone
Catholic Charities because of the hot meal
Catholic Charities, keeping me on track
Catholic Charities, food
Salvation Army was helpful with showering.
Salvation Army- they let you stay somewhere
EMS helped with food and showering
Homeless team at fire department- helpful, not judgmental, offer lotions
Aspen Pointe therapy and career services
Veteran’s Services/Housing- help keep me out of cold, bus fare, help me find housing voucher)
VA for bus passes, helps with housing, helps maintain
Shelter, soup kitchen
Shelter, anywhere to get food
Shelter, place to stay, human necessities, shower
Fort Collins:

Doctors or emergency rooms. They are helpful because they know more than I do.

Chiropractor

SummitStone’s mental health program. It helps to talk with my therapist. When things get rough sometimes it is good to talk.

Physician and SummitStone. They provide tools to help cope with injury.

N/A smoked pot

Murphy Center

Medical doctor, therapist, mental health help

Disabled Resources helped with bus pass

Colorado Medicaid because they pay for medical help.

Medical services. There is a lot of stuff all over this area that has been helpful, but it is important when people help themselves.

A hot meal twice a day and a restroom because it is the basis for getting started

Doctor Eban, provided services since 2002

My doctor because she is really helpful and addresses the problem.

The Crisis Center and the 24-hour hotline because when I’m scared or emotional they help me get back to where I need to be and get my life back on track.

Medical Center of the Rockies

SummitStone

School helped in the past- student services, education aid

Crisis Center in town that helps people who have been through trauma (accessed through

Library and computer because of access to email and internet

Therapy

DBT program

Hygiene and food

Medicaid

Food stamps, Medicare

Medical services
safehouse shelter). Helpful because they have helped when I had medical problems and needed a safe place to stay.
Emergency room
Salud and doctors are helpful
Getting referred to Dr. Bryan for TBI and mental health

Colorado Springs:

Therapist because it helps to talk it out with someone
Doctors
Doctor and Medicine
Catholic Charities, an RN
Peak Vista
Peak Vista Clinic - You can go there without Medicaid and they will send you to the hospital and they will have to serve you since you have been diagnosed.
Aspen Pointe
Doctor follow up after concussion
Doctors from Marion House
Services at the Hospital in Michigan
Drug counseling company
Hospital
Help Center
Going to classes for learning about my mental illness has helped me manage it so I don’t go into crisis.
Talking to friends, family and other people

<table>
<thead>
<tr>
<th>3. What services do you wish would be available for you to deal with issues around housing and homelessness? Why?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fort Collins:</td>
</tr>
<tr>
<td>Unemployment services</td>
</tr>
<tr>
<td>A quiet room for people to be as long as they could keep themselves at a certain noise level</td>
</tr>
<tr>
<td>Sliding-scale fee for housing. Helpful because it would make it more affordable.</td>
</tr>
<tr>
<td>Animal day care because my main problem is that I want to get off of the street and work,</td>
</tr>
</tbody>
</table>
however I do not have anyone that I trust to watch my dog so I am unable to work.
Program to help get into affordable housing because I need a place to be and have something to look forward to so I can keep going and sustaining. Also, would want to have somebody to talk to about homelessness who can talk to me in a positive way.
Besides shelter, I wish there was an actual home/apartment for me.
Housing
Translator and advocate
Everyone wants money. In order to get money I need a job. I can’t get a job because I can’t get bus tickets. It turns into a landslide of problems from one simple thing.
Accessible housing
Somewhere safe to live and a job. I had a job and got hurt.
More laundry services in order to clean my own clothes.
Medical diagnoses
A safe place of congregation. During the winter have warming centers, but during the summer it is not that.
Most of us have head trauma from substance abuse or drugs. A safe place to come to is what I want.
Sober living homes for women
Food pantries
Help with housing, especially a deposit
Budgeting and banking services along with better casework for people with stress and anxiety issues and can offer more one-on-one support.
Peer counseling groups to discuss a variety of reasons why the situation is the way it is and come to understand your situation better by sharing with others.
Heart therapy, music therapy and dance therapy
Colorado Springs:
Housing services and access to vehicles because that would help with job access
Financial help
Housing services for people who need it
Short-term housing assistance, just to have a place to go and stop sleeping in the car
Housing for college students at schools that do not have dorms
Resource Center- mental health and abuse/trauma support
Available housing
Services for felons- difficult to get housing with a felony
Better shelters
Longer-term care
More availability of people to help
Housing and employment services and people that help with that
Counselors or field workers- homeless people are afraid to go into building and would rather meet with people in public
A website for Colorado Springs resources that has all information in one location
More people other than shelter staff- need other organizations to help get you into another shelter or housing, someone who can tell what space is available.
Need shelters to partner with Office of Human Services, Legal Aid, Social Security, social workers Publishers and clearing house
Money services- need money to be a part of society Better, safer, cleaner environments for shelters- more sanitary, where people have bathed, and have clean clothes and bedding)
Shelters with gardening and healing programs
More government help with paying for deposits and bills
Services that are specialized for older homeless individuals (ages 50-65) and provide help with getting a job, housing, transportation
<table>
<thead>
<tr>
<th>Programs for free bus rides or discounted rides for low income and homeless individuals</th>
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<tbody>
<tr>
<td>Help with taxes and job search</td>
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<tr>
<td>Section 8 to help me find a place to live</td>
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<tr>
<td>More affordable apartments for people who are working and not on drugs</td>
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<td>Collaboration amongst surgeons and research institutions to affect the system and provide resources</td>
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<td>More available housing</td>
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<td>Public showers and bathrooms (even if you have to pay) that are not at a shelter</td>
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<tr>
<td>Computer and internet access to look for employment</td>
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<td>Bus passes when you get out of jail or lose a job</td>
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<tr>
<td>More shelters that accommodate married couples and families</td>
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<tr>
<td>More Native American housing</td>
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<tr>
<td>A better shelter system that helps keep me in the mindset I need to be in. There are a lot of people out there that are actually trying to do something better with their life. Being thrown in with people who aren’t is a drain.</td>
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<tr>
<td>Job preparedness to help with interview, clothes, and callback numbers</td>
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<tr>
<td>More apartments for long-term homeless people</td>
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<tr>
<td>More phone chargers</td>
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<td>More men’s facilities because there isn’t enough access</td>
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<td>Mental health advocate</td>
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<tr>
<td>Two-year housing program that will allow me to get myself together</td>
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<tr>
<td>Help getting IDs and recovering from lost computer.</td>
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<tr>
<td>One-on-one interactions, social support- better social communication in the community and support from others</td>
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<tr>
<td>Social workers</td>
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<tr>
<td>Motel vouchers, better long-term shelter services</td>
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<tr>
<td>Storage services</td>
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<tr>
<td>Program for homeless that provides an actual place to live</td>
</tr>
</tbody>
</table>
4. What services do you wish would be available for you to deal with issues around traumatic brain injury? Why?

Fort Collins:

Native American services
Brain Injury Alliance because they understand what is going on and would be able to give me answers
Access to a chiropractor
More mobile medical services
Diagnosis and medical help to prove I am not faking it
People to talk to in order to find out what is going on
Extra resources
Somewhere to live
I’d just like the right doctor, the right nurses, the right people and places to know what it’s going to take to get better. Be able to think better, stronger again. I want back what they took from me.
More affordable resources
CAT scan and diagnosis
Medical assistance
Talk therapy so there is someone to talk to that will care about my situation and not just see me as a number
Support groups because it is helpful to get advice from people who have the same experiences
More knowledge on TBI
Therapy for exercising the brain to cope with anger, autism, relaxing the brain, and helping with repetitive thoughts
Rehabilitation programs that can help me with my memory
Services to help me deal with my panic attacks other than my therapist. So that I can have help with understanding and dealing with my issues.
People need to be more aware because I get confused and lost all the time and I don’t recognize anything in that state of mind. People need to be more mindful and realize it is not always due to a substance.
Colorado Springs:

Talk therapy
Counseling
A place where you could access a free counselor, that is not a hospital
More mental health services that can help with brain injuries
More mental health information
More information about diagnosis
Neuropsychologist
General support- getting me to the right people and doctors
Affordable medical care
More affordable health care
Follow up
Neurologist
Surgeons
Psychiatrist
Outpatient services at Memorial Hospital
More recognition of/help for TBIs from doctors, employers and service providers
Help with memory- whatever a physician recommends
Faster, affordable and available diagnostic services-portable diagnostic and screening services
Universal healthcare
Services that don’t just want to put you on pills
A social worker who is knowledgeable about brain injuries and traumatic experiences
VA help
Long-term support and long-term bus passes
I don’t know what there is

5. What other services are missing for you, considering your situation?

Fort Collins:

Hygiene services and housing
Psychology services related to disability
An all-day shelter
Art space
Counseling
Storage, huge problem to carry all your stuff and there is a risk of getting it stolen if you leave
Help getting into rehab
Financial loan program
How to blend in or socialize in order to not stick out
Creative aspects
Access to bathrooms and proper sanitation
Doctors
Resources to relax the brain through music or relaxing sounds
Safety and legal help
Career/job services
More help for homeless seniors
How to defend yourself and keep your resources safe
Transportation and employment services

Colorado Springs:

Affordable housing
More housing availability that supports disabilities
Affordable housing programs that can help you get started, that are not too expensive and can work with you
More housing services to get inside
Access to affordable vet clinics
Financial help
Financial support
Stable place to work and live
Places that offer day labor, vouchers, or stipends
Job help
A better work program to help people find work and work training
A better shelter system
| Making clients earn their spots in the shelter, like having a job and trying to not live in a shelter |
| A shelter that is safe and where I would not have to be concerned with getting sick |
| Testing for learning disabilities and TBIs |
| Help that is not medication/pills |
| Internet access |
| Telephone and computer access like at the library |
| Workshops at the library for getting back into the workplace |
| Access to education |
| More financial assistance |
| Basic services |
| Higher amounts for food stamps |
| Food stamps |
| Night soup kitchen and a place to help people more in the afternoon and evening |
| More places to get food and drinks |
| Being able to take a shower |
| Clothing |
| Everything |
| A new approach on healthcare for the homeless |
| Restructure how people work with the homeless |
| Stabilization services |
| Church- it's hard to find good people |
| Social support |
| Not necessarily “missing” services- better executed services |
| Gardening opportunities and healing programs |
| Transportation |
| Access to reliable transportation |
| Transportation to go back to hometown |
| Counseling |
| Therapy |
| Skin doctor |
| Affordable medical services |
| Clinician |
| Banker |
| Someone to help me access and fill out Medicare and insurance applications and to help with credit |
| More access to faith-based programs |
| Services that cater more to seniors |