Neurobiological Determinants as Barriers to Housing Stability

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Abstract

This dialogic-centered—discussion explores the neurological and biological determinants often identified as psychiatric disorders and/or medical conditions measured through non-invasive brain imaging. Improved measures within housing stability; specifically Housing First models, sets the stage for a range of additional screenings to be incorporated as a means to better diagnose and treat comorbid conditions of persons struggling with housing stability. Contemporary conceptualizations of chronic homelessness need to be challenged as advanced neurobiological imaging reveals astounding correlations between neurological health and housing stability.

Keywords: Cerebral imaging, Homelessness, Housing First, Neurological health, Radiology

Introduction

Often, social science research seeks to generate an understanding of a myriad of social issues spanning numerous potential settings, agencies, programs, and services. Chronic homelessness is a social issue, often widely understood and over simplified (Zufferey, 2017), and those impacted by chronic homelessness have their own unique social needs. As such, it is critically important to explore the social needs of chronically homeless individuals who report disabling conditions—often severe and persistent mental illness, acute and chronic medical conditions, or a combination of both medical and mental health symptomologies may require specialized care (Perkins, 2016).

One example of specialized care for chronically homeless individuals can be found within Housing First Permanent Supportive Housing Programs (HF-PSH). As chronically homeless individuals find stable housing through the efforts of the HF-PSH, social service providers have noted that participants tend to "relax out of crisis." As a result, there are decreases in psychiatric and medical symptoms. Theoretically, this suggests housing stability through HF-PSH changes participants' health by reducing stressors brought on by unmet housing needs; this theory is worthy of discussion.

Theoretical Dialogic

Correlations between neurobiological detriments and homelessness could change contemporary conceptualizations of chronic homelessness. This article will discuss the use of nuclear imaging to better diagnose individuals that are participating in HF-PSH programs and their implications for social work practice.

The primary focus of this written work will be a discussion-based exploration (Kim & Wilkinson, 2019) of the neurological and biological determinants often identified as psychiatric disorders and/or medical conditions measured through non-invasive brain imaging. Improved measures of housing stability through HF-PSH sets the stage for participants to use neurobiological imaging equipment such as nuclear tomography to better diagnose and treat disorders (Rosendale et al, 2019). Of equal importance is the notion that contemporary conceptualizations of chronic homelessness need to be challenged as advanced neurobiological imaging reveals astounding correlations between brain functions and poor housing stability (Macia et al., 2020).

To explore this phenomenon, it is important to first revisit the history, definitions, and terms associated with HF-PSH. The dominant continuum of care treatment first model will provide context as to how efforts that target housing stability; such as, HF-PSH may be the catalyst behind an emerging paradigmatic shift in the delivery and scope of housing services (Frederick, 2014).

Chronic Homelessness

To understand Housing First, it is important to acknowledge the history and landscape that provided the fertile grounds for this concept to flourish. Providing housing for the homeless to meet their physiological needs has not always been given. The way scientists, politicians, social workers, service providers, and community members conceptualize chronic homelessness has changed over time (Baranski, 2019). These wayward conceptualizations have had a diminishing effect on the treatment and wellbeing of the chronically homeless (Weisz & Quinn, 2018; Zufferey, 2017). Historically, the homeless in America have been shunned, partially because the public emphasized homeless people's lack of morality as the rudimentary cause of the problem (Baranski, 2019). For this reason, non-governmental or faith-based organizations were called to action.

In the late 1800s to early 1900s, homelessness was severely stigmatizing as people attributed homelessness to a dysfunction or immoral lack of self-regulation (Main, 2016). Homeless persons were often deemed as deserving of their conditions and situations (Pimpare, 2008) or seen as "derelicts" and "vagrants" lacking moral gumption to care for themselves (Main, 2016), which subsequently caused service providers and religious authorities to require some form of self-regulation as a prerequisite to housing or services (Macia et al, 2020). The attributes of these prerequisites were less than appealing and often counterproductive whereas the person suffering from psychiatric and/or major medical disorders were expected -- if not outright required, to regulate the very disabling conditions that contributed to their homelessness before reaping any benefits from participation in social service programming (Weisz & Quinn, 2018; Zufferey, 2017).

Remnants of these attitudes toward homelessness continued to linger. In the 1930s, the Great Depression precipitated policies designed for the commonwealth of the people. As more community members struggled financially, there undoubtedly was a shift in the conceptualizations of welfare, and subsequently, of persons struggling with homelessness (Pimpare, 2008). As poverty and homelessness became the epicenter of domestic policy, the conceptualization of homelessness shifted yet again. This change provided the opportunity for president Franklin Delano Roosevelt (FDR) to enact The New Deal. This was a major piece of legislation aimed at alleviating the effects of poverty and homelessness, and improving the welfare of impoverished American citizens (Pimpare, 2008).

The lessons learned during the FDR administration faded over time. Eventually, the conservatives ushered in governmental policies to make short sighted efforts to address poverty and homelessness, often in non-substantial ways (Mayer, 2017). In 1982, during the Reagan administration, a housing crisis emerged just as neoliberal policies began to dominate the landscape and the effects were devastating. For the first time an unprecedented and unrelenting form of homelessness surfaced (Tsemberis, 2012).

As housing programs and psychiatric facilities failed to deal with chronic homelessness, social service providers began to look for options and solutions (Parsell, 2017). The failing paradigmatic assumptions of the time were referred to as the Treatment First model, which continued to hinge self-regulating efforts through forced treatment compliance (Parsell, 2017). Industry standards for psychiatric and medical care were experiencing failings with this "hard to treat" and "difficult to house" population (Tsemberis, 2004).

This continued failure perpetuated increased instances of chronic homelessness and prompted transient cycles between programs (Markowitz & Syverson, 2019). Participants misused agency resources to have their physiological needs met. A young psychologist, Sam Tsemberis, began to take notice of the issue and formulated a plan (Tsemberis, 2012) fueled by the failures of programs and witnessing of indignities suffered by persons struggling with chronic homelessness. Medical providers, scientists, and researchers began the arduous task of setting aside their notions of professional expertise in favor of listening to participant's expressions on the topic of physiological needs and programmatic services (Tsemberis, 1999; 2012). The Housing First model emerged from these patient-centered listening sessions and Dr. Sam Tsemberis, Chief Executive Officer (CEO) and founder of Pathways to Housing, began to serve the chronically homeless with success.

Housing First Model

The Housing First model targeted the very people that were labeled "treatment resistant" or not yet "housing ready," and who were routinely being rejected by other permanent supportive housing programs. Founded on the belief, that people are entitled to housing as a basic human right, services are not a condition of access to housing, and continued use of services are not required to remain housed (Tsemberis & Asmussen, 1999). Housing First continues to be an efficacious pathway to increased housing stability (Brown, Malone, & Jordan, 2015) and decreased psychiatric symptoms among the chronically homeless (Markowitz & Syverson, 2019). Not only is this approach more humane, it is cheaper. This is because it offsets medical, legal, and housing costs to the public (Tsemberis et al., 2012).

Today, Housing First is challenging the predominant Treatment First model marked by requiring a priori psychiatric or addictions treatments or services before access to supportive housing, and for continued access to supportive housing (Brown, Malone, & Jordan, 2015). The Housing First Model does not use the obligatory

demands of housing programs and the very people that were deemed undeserving or unready, gained access to stable housing. This difference marks a distinct change in the conceptualizations of chronic homelessness as now this population was being viewed as housing ready, despite not having accessed treatments (Brown et al, 2015; Frederick, 2014). As asserted earlier, this emerging paradigmatic shift in both conceptualization and implementation of programming for those impacted by chronic homelessness is worth researching and discussing.

Interwoven in the efforts of the Housing First model is the intent to intervene and support the needs of the chronically homeless. It is then prudent to two additional foci within this dialogue: 1) Explore neurobiological determinants of housing stability among the chronically homeless and 2) Explore HF-PSH and nuclear imaging technology as efficacious and holistic approaches to increasing housing stability and changing contemporary perceptions of the chronically homeless. This next section of writing provides a synopsis of these foci.

Neurobiological Determinants

Disabling conditions under examination include severe and persistent mental illness, often referred to as psychiatric disorders, as well as any history of acquired or traumatic brain injuries (ABI/TBI). The brain is a complex system of neural networks and interconnected circuits. A healthy brain uses its various systems of neural circuitry to intercommunicate in a way that allows the person to function normally (Applegate & Shapiro, 2005). It is worth noting that a simple concept emerges when neurobiological determinants are considered, if research is willing to look at the brain, then providers can enhance diagnosis and intervention with exacting precision (Amen, 2013). Nuclear imaging technology examines various areas of the brain and can detect neurobiological deficits in functioning. By looking at the cerebral imaging in terms of normative activity, hypo-activity, and hyperactivity in areas of the brain such as the hemispheres, cortexes, and lobes; psychiatric diagnosis and outcomes improved drastically.

Cerebral Imaging
SPECT imaging allows technicians to see brain functions. SPECT was not initially selected during exploration and designation of the neurobiological imaging technique to be used. Some scrutiny was given to other types of imaging for distinct reasons. Top considerations included; computerized tomography (CT), functional magnetic resonance imaging (fMRI), positron emissions tomography (PET), and SPECT imaging. The two areas of HF-PSH and neurobiological brain imaging have been explored. Various forms of tomography and the nuclear imaging technology called SPECT will be explained.

CT scans are essentially x-ray recorders that continuously capture information through images of the brain. When looking at a CT scan it appears as if you are looking through layers of the brain via x-rays. With the use of dyes, CT scans can even act as an angiogram to the trained eye. Because this technology works from radiation, there are carcinogens released that over time can cause cancer (Nguyen, 2012).

Another type of scanner that works on electromagnetism is the fMRI. This type of imaging is closely related to the MRI, only fMRIs are more popular among scientists for their ability to show blood flow to various parts of the brain. Although blood flow is suggestive of activity, it should not be confused with activity (Nguyen, 2012). The main drawback to using fMRIs in research is that small movements can distort results, and in a strictly research setting sedation may be too invasive. If done correctly, an fMRI will look like a high-resolution x-ray.

PET scans were also considered. PET scans use radioactivity to capture images of the brain. If done correctly, images look like low resolution thermal scans that indicate brain functioning. Drawbacks include exposure to radiation (Nguyen, 2012). SPECT imaging was highlighted within this article for many reasons. First, SPECT is a nuclear imaging technology that shows the functioning of the brain. Second, it shows normal activity, excessive activity, or deficits in activity. Third, images look like three-dimension scales of the brain, with holes in sections where there is a lack of functioning, and red sections showing overactivity (Mayo Clinic, 2014). Lastly, there is robust literature available on the increased effectiveness of SPECT imaging when diagnosing patients with psychiatric disorders and acquired or traumatic brain injury (ABI/TBI).

Single-Photon Emission Computed Tomography (SPECT) and HF-PSH
This dialogic-centered writing seeks to explore the question of how and where should SPECT and homelessness intersect? SPECT imaging can detect how the brain is being affected by ABI and/or TBI. In a Canadian study drawing from a population of over 900 homeless people, 70% of respondents indicated that they suffered TBIs before their first instance of homelessness (Hwang, 2008). In addition, TBIs were not only common among homeless people, but were correlated with poor health, addictions, and psychiatric disorders (Hwang, 2008). This high association gives rise to the idea that SPECT imaging can be used to better treat and diagnose the chronically homeless. HF-PSH and SPECT imaging can potentially impact social work practice.

Implications for Intervening with the Chronic Homeless Population

At its commencement, Housing First was seen as little more than a newfangled nuance. Today, HF-PSH has become a serious competitor in the body of supportive housing literature. This is attributed to its ability to effectively increase housing stability, decrease psychiatric and addictions symptomologies, and yield cost effective outcomes. Davidson and colleagues (2014) discovered that participants in high fidelity Housing First programs reaped the benefits of improved housing stability and that Housing First participants suffering from addictions "showed reduced measures of substance abuse" (p. 1322). Although this sample did not include people with serious mental illnesses, it is well known that those with poor housing stability often self-medicate to deal with psychiatric issues (Weisz & Quinn, 2018). Applying SPECT imaging to even a small subset of this sample could provide insight on the origins and escalation of symptomologies. Smaller-in-scale research efforts have the potential to not only diagnose psychiatric and/or major medical disorders, but also illuminate precise interventions which could improve measures of self-sufficiency.

Macnaughton and colleagues (2015) implemented a mixed method research project model that used a quantitative housing fidelity scale and qualitative interviews to explore how high-fidelity Housing First programs could be implemented. In looking at items that either promoted or impeded fidelity to Housing First, several significant findings were revealed. First, training, and technical assistance led to housing fidelity, and a lack of array of services diminished housing fidelity (Macnaughton et al., 2015). Second, this finding suggests that additional specialists bring to the table a myriad of services that would improve fidelity to Housing First, which in turn would improve behavioral health outcomes. Lastly, it is possible that a follow-up mixed method study on housing fidelity after the addition of psychiatrists and SPECT imaging to the array of services would prove useful here.

The United States Department of Veterans Affairs (VA) initiative facilitated by Austin and colleagues (2014) employed a qualitative study conducted across eight VA facilities over four regions that made clear the challenges of housing for dually diagnosed veterans. The study identified logistical issues such as funding and the lack of units (Austin, 2014), which exacerbate the symptomologies of participants over time. This reaffirms without a plan to quickly secure housing to meet the demands of homeless veterans, VA programs transitioning to Housing First will not generate the needed threshold of stability. Although psychiatric and/or major medical outcomes are not directly addressed in this article, the critical point of the work is the need for proactive, responsive logistical planning. Without carefully considering the coordination of such a plan, efforts could be quagmired by either the lack of trained psychiatrists or an insufficient supply of equipment (Kuehn, 2019).

SPECT Imaging

Studies on SPECT imaging have clearly indicated that it can be used effectively to help psychiatrists diagnose and treat neurobiological conditions. Thornton (2014) compared the progress of those who received SPECT guided treatment to those who received treatment as usual and discovered participants who received SPECT guided treatment improved significantly on the Global Assessment of Functioning (GAF) over those receiving treatment as usual (p. 55). This study demonstrates that if psychiatrists are willing to look at the brain, they can more precisely diagnose and treat it. With this simple fact in mind, it necessitates consideration the chronically homeless population is often dually-diagnosed with mental illness, substance abuse (MISA), and/or major medical conditions, and tend to function low on the GAF scale. This finding confirms that state of the art treatments and imaging could help improve GAF scores, and quality of life for individuals impacted by chronic homelessness.

Amen and colleagues (2013) demonstrated the efficaciousness of SPECT Imaging with various evaluations, outside of GAF, to measure improvements across four locations of 500 patients. The data demonstrated that SPECT guided treatment more accurately helped inform diagnosis and guide treatment (Amen, 2013). Having access to equipment that more effectively guides practice could have a dramatic effect on Housing First participants that frequently incur a dual diagnosis and struggle with chronic homelessness.

Romero and colleagues (2015) address the use of SPECT imaging to detect mild or hard to detect TBIs and predict patient prognosis by looking at profusion and hypo-activity in cortical functioning. This body of research speaks to using SPECT imaging in congruence with blood flow quantification analysis as a viable option for detecting even mild TBIs (Romero, 2015). The value of such sensitive nuclear imaging equipment cannot be underscored. Chronically homeless populations, especially veterans, often suffer ABIs/TBIs that have gone undetected and untreated; having access to these highly trained professionals that possess both the techniques and equipment to reveal the true extent of trauma is critical to their care.

Findings

Housing First and SPECT imaging have remained two separate entities in the literature (author, year). The importance of merging these two distinct issues is clear. TBIs are associated with higher rates of addictions and psychiatric disorders, it is no wonder that chronically homeless individuals are often MISA patients. There is a

correlation between ABIs/TBIs and chronic homelessness, which requires social workers and other providers to be more attentive to the diagnosis and treatment of these injuries (Topolovec-Vranic et al., 2014).

Additionally, TBI often precipitates homelessness. According to Hwang (2008), "For seventy percent of respondents, their first traumatic brain injury occurred before the onset of homelessness" and concludes by saying, "Prior traumatic brain injury is quite common among homeless people and is associated with poorer health" (p. 779). The outcomes of this study are critically important as they demonstrate a need for SPECT. There are a multitude of studies that point to hypo-activity in the prefrontal cortex of homeless people (Kuehn, 2019), the use of neuropsychological tests to record brain functioning (Maalouf et al, 2021), and studies that chronically homeless individuals have reduced neuropsychological functioning (Mejia-Lancheros et. Al, 2021), all of which may contribute to the chronicity of their homelessness (Davidson et al., 2013). SPECT imaging can confirm with certainty that the findings from the growing body of literature are accurate.

For example, Liberzon and colleagues (1999) discovered that neural stimulation implicates parts of the cortex and limbic system with SPECT imaging for hyperactivity or hypo-activity, and general lack of regulation in veterans with ABIs/TBIs and/or profound mental health disorders associated with trauma. These disarmed cortical systems can directly affect reactions to stimuli, which could lead to homelessness and further traumas (Liberzon et al., 1999).

The evidence is affirming, but there is a need for continued research. One such recommendation would be to replicate SPECT imaging of pre-existing studies on ABIs/TBIs for validation. For example, a group of Canadian researchers examined the effects of ABI/TBI on individuals impacted by chronic homelessness and during replication SPECT imaging confirm the extent of brain dysfunction and tracked the progress of those who received SPECT-guided treatments versus those who receive treatment as usual (Hwang, 2008; Topolovec, 2014). These type studies can be carried out in HF-PSH programs, to help social workers better diagnose and treat neurobiological conditions associated with chronic homelessness. By improving brain functioning, this could lead to greater measures of self-sufficiency. Once participants are unfettered from the ailments of these neurobiological detriments, and successful treatments phases reach completion, funds can be reallocated to help other participants. Certainly, grant funding may be limited (Markowitz & Syverson, 2019), and it may be necessary for Housing First researchers to pilot their studies to build a base for reiteration of benefits (Sannino, 2018) and the promotion of cost savings benefits (Mejia-Lancheros et al, 2021).

Conclusion

Housing First has not gone uncriticized. Critics of the programming have labeled it enabling, claiming that it unfairly provides housing to those who have not earned it (Belcher & Deforge, 2012). In addition, Housing First programs are accused of demotivating participants by placing them in housing without requiring treatments. In contrast, proponents of the programming argue that housing should be a basic human right, and that persons suffering from chronic homelessness should not be held captive in a perpetual state of homelessness until they comply with forced treatment options. By providing high fidelity HF-PSH a responsive protocol could mitigate the impact of chronic homelessness and assuage the critiques.

In turn, SPECT imaging has received some harsh criticism. Critics argue that SPECT is not a stand-alone method to diagnose disorders, and that DSM clustering is still the most effective way to diagnose. Interestingly, the research efforts on SPECT assert the same conclusion and reaffirm the need for multiple approaches to diagnosis and intervention (Macia et al. 2020). Yet, SPECT-guided diagnosis and treatments are far more accurate and reliable than traditional symptom clustering with the usual treatments (Maalouf et al, 2021). The impact of HF-PSH on housing stability provides an immediate foundation, essential to psychiatric and/or major medical treatments involving individuals that are impacted by chronic homelessness. It is well known that until physiological needs have been met, it is difficult to conceptualize or engage in treatments.

Housing First is already changing conceptualizations of chronic homelessness - a group that was once deemed as not housing ready or deserving of housing, is now being given humane preferential care that addresses their needs (Sannino, 2018). Studies on ABI/TBI are making inroads toward changing conceptualizations (Maalouf et al, 2021). The more knowledge generated on the direct correlation between homelessness and ABIs/TBIs, the more the conceptualization of chronic homelessness changes and moves from the stigma of moral failings (Belcher & Deforge, 2012). Fiske (2009) asserts the importance of neuroimaging in restoring human dignity and emotional regulation through the recognition of triggers. It was found that, "All this neuroimaging research illustrates the utility of social cognitive affective neuroscience for empathy and for human well-being" (p. 4).

The unifying thread of the growing body of social science research was to get others to begin empathizing beyond their xenophobic responses to stimuli, thereby reversing these automated responses. That being said; via scientific methodologies and philosophical theories such as Social Constructionism, the greatest undertaking, and the most rewarding, will be using humane state of the art approaches to subdue wayward dehumanizing conceptualizations of homelessness that have perpetuated the pain and suffering of those we serve.

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