

The Neurological Effects of Chronic Social Isolation Stress on the Homeless and Their Implications on Homeless Outreach Policy

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Executive Summary

It is important to recognize how homelessness in of itself can be a source of “psychological trauma” leading to measurable and detrimental biological as well as behavioral effects.¹ This paper will explore the neurological and behavioral effects of chronic social isolation through an analysis of existing neurological research. It is important to take the effects of chronic social isolation stress into consideration when structuring public health and other social programs for the homeless. As such, taking the neurological findings into consideration, this paper will also recommend certain changes to social and health programs that will further help increase their effectiveness and effect better outcomes.

Background

A substantial amount of research literature surrounding the homeless population focuses on factors, such as poor socioeconomic status, a positive AIDS status, or mental illness, that are associated with a higher risk of homelessness.² However, it is also crucial to consider the effects associated with homelessness. Members of the homeless population are at risk of an increased chance of sexual and physical assault (and PTSD as a result) as well as a variety of communicable diseases.² It is often difficult to distinguish physical and mental health conditions that may cause homelessness from the physical and mental health conditions that homelessness causes.

All too common for the homeless population is the experience of chronic social isolation, or the long-term absence of social contact.³ As Paul, a homeless service user in London wishes, “...there would be someone to be there just to talk to me, even for five minutes...”⁴ Another homeless service user in the area, Sarah recalls “It was horrible, the worst time I’ve ever had...cos I was all on my own...you don’t want to wake up in the mornings cos you don’t want to spend another day on your own.”⁴ In the United Kingdom, 77% of homeless service users said they felt lonely “often” or “sometimes.”⁴ Chronic social isolation as a type of psychological trauma can have vast and marked effects on the neurological health of the afflicted. There are two types of social isolation that can exert their effects. Social isolation itself is the absence of social contact and/or ostracization by society that often accompanies homelessness. On the other hand, perceived social isolation “... represents a mismatch between an individual's social needs and the provisions the social environment offers or is perceived to offer.”⁵ and is often colloquially referred to as

loneliness. Loneliness is also often experienced by the homeless population and is a useful proxy for social isolation. Most of the neurological research comes from animal models of social isolation itself (which often leads to perceived social isolation).³

The pathophysiological effects of homelessness and the accompanying social isolation stress can be extremely detrimental. In fact, research shows that “... social isolation was as strong a risk factor for morbidity and mortality as smoking, obesity, sedentary lifestyle, and high blood pressure.”⁶ In fact, chronic social isolation is associated with a 29% higher risk of mortality over time than baseline populations.⁷ In 1988, a landmark and provocative review of five large prospective studies concluded that the quality and quantity of social relationships a person has can predict risk of mortality.⁸ This review spurred a dramatic increase in research studies concerning social relationships and their causal effects on both physical and mental health. In recent years, this field of research turned to the brain, with researchers asking how chronic social isolation stress exerts its influence on the brain health of isolated individuals. To understand these effects, scientists have conducted a multitude of experiments on animal models. Researchers have been able to pinpoint a brain region, the dorsal raphe nucleus (DRN), which is associated with loneliness and the emotional distress that is perceived after long periods of social isolation in mice.⁹ Researchers saw a surge in DRN activity in isolated mice after the isolation period ended.⁹ This change in neural activity occurs because the neurons in the DRN are more sensitive to social contact after the mice are subjected to social isolation.⁹ These findings point to the idea that neurons in the DRN, are essential to sociability and may drive our “motivation to socialize.”⁹ In addition to individual neurons in the DRN, researchers have also found that chronic social isolation stress can alter key pathways in the brain linked to fear and aggression by triggering an increase in the production of specific neuropeptides.¹⁰ Zelikowsky et al. 2018 found that the production of tachykinin or *Tac2*, a neuropeptide, was increased as a result of social isolation stress.¹¹ Researchers showed that after two weeks of social isolation, mice exhibited about a three to eight-fold increase in the amount of *Tac2* in key brain regions such as the antero-dorsal bed nucleus of the stria terminalis (dBNSTa), central amygdala (CeA), dorsomedial hypothalamus (DMH), as well as the anterior cingulate cortex (ACC).¹¹ An increase in neurokinin B (NkB), the protein that *Tac2* transcribes, was also evident in the same brain areas.¹¹ This body of research has proved that chronic social isolation stress, similar to what is experienced by homeless populations, has real biological effects on neural signaling. Furthermore, these biological changes can lead to behavioral effects due to the brain regions that are affected. As a result of increased *Tac2* signaling, researchers were also able to prove that mice undergoing chronic social isolation stress were more likely to exhibit hostile behavior and prolonged fear responses.¹¹ For example, only mice that had undergone social isolation

stress exhibited biting behaviors when an intruder was introduced to their space.¹¹ In another behavioral test, only mice that had undergone SIS exhibited prolonged fear reactions (i.e. freezing behavior) in response to overhead looming discs placed to imitate an flying predators.¹¹ These behavioral reactions, increased aggression and prolonged fear responses, were the direct result of chronic social isolation stress and dramatically changed how the mice who underwent such conditions reacted to normal situations. In studies with human subjects, researchers pinpointed brain regions that were affected by social isolation using fMRI analysis. Like in the mice, the anterior cingulate cortex was far more active when socially isolated or excluded than the control group of subjects.¹²

Such biological and consequently, behavioral conditions that are the direct result of chronic social isolation stress prevent the homeless population from accessing services to the fullest extent. Underuse of homeless services is rampant and “care avoidance” is oftentimes due to “...characteristics of the homeless person (e.g. having complex problems, other priorities) as well as of the system (e.g. complex system, conditions and requirements of organizations).¹³ Getting homeless people into care and having them access services that can help them is extremely difficult. The multitude of complicating factors that exacerbate care avoidance of homeless social and health services are only more complicated when the biological and behavioral effects of chronic social isolation stress are taken into account.

Recommendations

The biological and behavioral effects of chronic social isolation stress (i.e. prolonged fear response and increased aggression) should be taken into consideration when structuring social and health-related homeless programs. There is a wide variety of structures when it comes to homeless programs. However, there is one type of homeless program, known as outreach programs, that “...involves moving outside the walls of the agency to engage with people experiencing homelessness who may be disconnected and alienated not only from mainstream services and supports, but from the services targeting homeless persons as well.”¹⁴ These types of programs are incredibly important because they allow members of the homeless population establish supportive relationships with professional social workers that will hopefully increase the change that they will engage with and access the services necessary to find more permanent housing.¹⁴ Research shows that homeless populations that receive outreach services value the respect and understanding that they receive as the most important aspect of the services themselves. In other words, it is not enough to simply offer services. It is equally, if not more important to consider the manner in which those services are being offered.¹⁵ The human connection between an outreach worker and a homeless person can allow that member of the homeless population rediscover dignity, hope, and

human connection. The neurological research exploring the social isolation that members of the homeless population experience further emphasizes the importance of outreach programs. Over the course of the entire year, 15,000 people experience homelessness in Philadelphia while only 6,000 members of the homeless population would interface with outreach programs.^{16 17} Unfortunately, it is clear that there are not nearly enough homeless people developing relationships or interacting with outreach programs currently. The image below depicts the traditional structure of homeless programs, which lacks true outreach.



Source: Overview of the City of Seattle's Homeless Services System¹⁸

It is recommended that larger portions of public health and homeless program budgets should be allocated towards outreach and engagement in the form of licensed social workers, volunteers, and outreach training. If more resources and time were to be spent on addressing the biological effects of chronic social isolation stress, homeless people would be far more likely to make use of the services that have been put in place to help them find permanent housing, healthcare, or employment opportunities.

Conclusion

It is important that policymakers take into consideration how difficult it is for many members of the homeless population to access and use services in the first place due to the severe biological and behavioral effects a person experiences while undergoing chronic social isolation. Policymakers must rethink how resources for homeless programs are currently allocated. Budgets for homeless programs all over the country consistently place emphasis on the homeless services themselves instead of the outreach programs that will get people to use those valuable services in the first place. Instead, policymakers should prioritize the wellbeing of the homeless through outreach and engagement, which have been proven to make homeless people far more likely to use other resources.

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