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Running Head: HOMELESSNESS AMONG VETERANS, PTSD, DEP, PHYS HLTH, MSA

Title: Homelessness among Veterans: Posttraumatic Stress Disorder, Depression, Physical Health, and the Cumulative Trauma of Military Sexual Assault

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## HOMELESSNESS AMONG VETERANS, PTSD, DEP, PHYS HLTH, MSA

Over the last 20 years, research has shown military veterans are over-represented among the homeless in the United States (Elbogen, Sullivan, Wolfe, Wagner, & Beckham, 2013; Meghan, Rian, Lily, & Azim, 2017). Despite current efforts to end veteran homelessness (US Department of Housing and Urban Development (HUD), 2018), the rates of veteran homelessness remain a prevalent problem in many states (Henry, Watt, Rosenthal, & Shivji, 2016) with veterans representing an estimated 32% of the homeless population (Elbogen et al., 2013) compared to only 10% of the general population (Meghan et al., 2017). Recent estimates suggest there are nearly 40,000 veterans experiencing *literal homelessness* defined as “lacking a fixed, regular, and adequate nighttime residence” (i.e., car, shelter, outside) (HUD, 2017). Homelessness is a complex issue with numerous individual, social, and policy level factors common amongst both the general population and veteran population (Shelton, Taylor, Bonner, & van den Bree, 2009; Tsai & Rosenheck, 2015; Washington et al., 2010). For example, the social factor of trauma has been shown to be a common precipitant and correlate of homelessness (Shelton et al, 2009; Tsai & Rosenheck, 2015; Washington et al., 2010). Within the veteran community, one traumatic experience of interest that requires further evaluation, especially among veterans experiencing homelessness, is the experience of military sexual assault (MSA).

### **Military Sexual Assault**

In a literature review of prevalence, MSA has varying estimated rates dependent upon the method of data collection (Suris & Lind, 2008). For example, mailed surveys found estimated rates of MSA between 23% and 71% among female veterans and 4% among male veterans (Suris & Lind, 2008). While clinical interviews among treatment seeking veterans found estimated rates of MSA between 9% and 43% among females and 12% among males (Suris &

## HOMELESSNESS AMONG VETERANS, PTSD, DEP, PHYS HLTH, MSA

Lind, 2008). In a recent community sample study among non-treatment seeking veterans, 41% of females and 5% of males reported experiencing MSA (Schuyler, Kintzle, Lucas, Moore, & Castro, 2017). Historically, MSA has been evaluated in combination with military sexual harassment and was found to be significantly associated with higher levels of posttraumatic stress disorder (PTSD), depression, anxiety, alcohol use, substance use, and adjustment disorders (Kimerling, Gima, Smith, Street, & Frayne, 2007; Kimerling et al., 2010), as well as poorer family relations and lower quality of life (Brignone et al., 2016). The presence of MSA has also been found to be positively associated with PTSD among female active-duty service members (Brignone et al., 2016), as well as PTSD, depression, and physical health symptoms among female veterans (Kang, Dalager, Mahan, & Ishii, 2005; Luterek, Bittenger, & Simpson, 2011; Schuyler et al., 2017) and male veterans (Schuyler et al., 2017).

### **Homelessness and Military Sexual Assault**

An association between *military sexual trauma* (e.g., experiencing military sexual harassment *or* MSA) and an increased risk of homelessness has been established among female and male veterans in recent empirical literature (Brignone et al., 2016; Pavao et al., 2013). While there are few studies that examined MSA among veterans experiencing homelessness (Washington et al., 2010), existing research has demonstrated that the presence of *military sexual trauma* has been associated with increased odds of PTSD, depression, substance abuse, and anxiety among female and male veterans experiencing homelessness (Pavao et al., 2013), as well as PTSD, psychiatric symptoms, self-esteem, and quality of life among female veterans (Decker, Rosenheck, Tsai, Hoff, & Harpaz-Rotem, 2013).

Much of the known literature on *military sexual trauma* and homelessness fails to evaluate MSA separately from the experience of military sexual harassment requiring only the

## HOMELESSNESS AMONG VETERANS, PTSD, DEP, PHYS HLTH, MSA

experience of one or the other when linking *military sexual trauma* outcomes of interest.

Therefore, it is unclear which *military sexual trauma*, military sexual harassment or MSA, is associated with the known outcomes. Separating MSA from military sexual harassment provides further context to the known literature and further clarification on potential, specific trauma needs of veterans experiencing homelessness. For example, among female and male civilians sexual harassment (not controlling for sexual assault) has been found to be significantly associated with mental health outcomes for female civilians, but not for male civilians (Rospenda, Richman, & Shannon, 2009). Varying findings are present among military service personnel, especially in regard to how military sexual harassment has been measured. For example, Magley, Waldo, Drasgow, and Fitzgerald (1999) evaluated experiences of active-duty service personnel and Street, Gradus, Stafford, and Kelly (2007) evaluated experiences of veterans and both studies found the presence of military sexual harassment among females and males was significantly associated with mental health outcomes. However, it is critical to note that military sexual harassment was evaluated using the military version of the Sexual Experiences Questionnaire (SEQ-DoD); therefore, coincidentally also including MSA within the analyzed measure of sexual harassment (Magley et al., 1999; Street et al., 2007). These findings highlight the presence of military sexual harassment as a concern among active-duty service members and veterans, but, ultimately, were also evaluating MSA within the measure of military sexual harassment: “attempted to have sex with you against your will” and “had sex with you without your consent” (Street et al., 2007). These previous studies highlight the need to evaluate military sexual harassment separate from MSA, as MSA may be impacting the outcomes. For example, in a sister sample of veterans using the same methodology as this study (separating military-related sexual traumas with the intent to analyze associations with mental health

## HOMELESSNESS AMONG VETERANS, PTSD, DEP, PHYS HLTH, MSA

outcomes), it was found female veterans who experience military sexual harassment and gender discrimination (no MSA) and male veterans who experience military sexual harassment (no MSA) did not have clinical levels of PTSD or depression (Blinded for Review). Furthermore, most of the literature on *military sexual trauma* and homelessness has focused on samples of female veterans (Brignone et al., 2016; Decker et al., 2013; Pavao et al., 2013; Washington et al., 2010), with fewer focused on samples of male veterans (Brignone et al., 2016; Pavao et al., 2013) creating a gap within the literature. Arguably, the percentage of female veterans who experience MSA is much higher compared to male veterans (Schuyler et al., 2017), however the actual estimated *number* of personnel suffering from MSA is reported to be roughly equal for both sexes as there are around 20 times more men in the US military (US Department of Veteran Affairs (VA), 2004). This highlights the integral need for information that aides in improving trauma specific (i.e. MSA) prevention and intervention efforts for both female and male veterans.

Homelessness itself is considered a traumatic experience (Goodman, Saxe, & Harvey, 1991) and a prior experience of MSA may augment the trauma of veterans experiencing homelessness, creating a cumulative effect as the experience of numerous traumatic events, or cumulative trauma, exacerbates adverse mental health outcomes (Turner & Lloyd, 1995). Combining this with the very limited evidence regarding the joint burden of homelessness and MSA on clinical levels of PTSD, depression, and physical health symptoms among female and male veterans, the study purports to expand the literature by examining (a) homeless experiences among a community sample (non-VA) of female and male veterans and (b) whether the experience of MSA moderates the relationship between homeless experiences and clinical levels of PTSD, depression, and physical health symptoms to better understand the needs of veterans experiencing homelessness. The non-VA sample allows for veterans both engaged and not

## HOMELESSNESS AMONG VETERANS, PTSD, DEP, PHYS HLTH, MSA

engaged in VA services to be evaluated. Veterans engaged in VA services are more likely to be linked up with homeless services and resources, while those that are not are less likely to be linked with services. The sample was purposely stratified by gender to expand upon what is known among both female and male veterans experiencing both homelessness and MSA. In line with the known literature, it is hypothesized female and male veterans who experience *literal* homelessness and MSA will have significant negative health outcomes (Pavao et al., 2013). Due to these known associations it is hypothesized the interaction between the experience of *literal* homelessness and MSA will be significantly greater among female and male veterans who experienced both *literal* homelessness and MSA (cumulative trauma), furthering the known literature by comparing them to female and male veterans who did not experience homelessness or MSA. However, this study will also expand beyond *literal* homelessness to include *broad* homelessness, and it is hypothesized this experience coupled with the experience of MSA will also have negative mental health and health implications when compared to female and male veterans who did not experience homelessness or MSA. To the authors' knowledge no previous study has evaluated whether MSA moderates the relationship between homelessness and these mental and physical health outcomes, especially in comparison to housed veterans who have not experienced MSA.

### **Method**

#### **Participants and Procedure**

Participants in this study were drawn from two community-based, non-clinical parent studies on veterans who reside in two metropolitan cities: San Francisco and Chicago ( $N = 1,980$ ; Blinded for Review). All variables used in the present study were identical across both surveys. In this nonprobability sample, a multi-pronged recruitment strategy was used to achieve

## HOMELESSNESS AMONG VETERANS, PTSD, DEP, PHYS HLTH, MSA

maximum variability and representativeness (Blinded for Review). Both parent studies used convenience sampling strategies by partnering with area veteran agencies, utilizing known veteran networks to reach various veteran populations, and both print and social media marketing. For example, data collection methods included: (a) invitation emails sent through known listservs of veterans living in the defined areas who were linked with the partnering agencies, (b) on-the-ground collection at veteran events (offered website or paper copies to complete the survey), (c) print advertisements marketing the survey website, and (d) social media announcements through Facebook, Twitter, and LinkedIn marketing the survey website in both San Francisco and Chicago. Participants were eligible to participate if they had served in the military, were not currently serving in the military, were 18 years or older, and lived in the greater San Francisco or Chicago area. Participants received a \$15 gift card for taking part in the survey, which took an average of 60 to 90 minutes to complete. All data collection procedures in the parent studies were approved by an institutional review board of an affiliated institution.

Participants selected for inclusion in this study were individuals who identified housing status during the past three months (female veterans,  $n = 251$  (79.6%); male veterans,  $n = 1,249$  (75.1%)). As homeless experiences are typically non-static, most participants fluctuated between various types of housing and homelessness during the three months.

### Measures

**Demographic and military-related variables.** Demographic variables included: age, race/ethnicity, sexual orientation, level of education, VA healthcare utilization, and marital status. Military-related variables included: branch of service, deployment, and discharge reason.

**Homelessness.** Questions around homelessness centered on broad and literal definitions of homeless experience, developed for this study based on housing experiences used by the US



## HOMELESSNESS AMONG VETERANS, PTSD, DEP, PHYS HLTH, MSA

Department of Housing and Urban Development (HUD, 2017). *Literal homelessness* was categorized specifically using the HUD definition, while *broad homelessness* represents the category in between *housed* and *literal homelessness* and is not defined by HUD (HUD, 2017). Respondents were asked: “Over the past 3 months, in what kinds of places have you been staying? Please indicate whether you have stayed in the following over the past three months (Not related to work or travel)” and were given several options for *housed*, *broad homelessness*, and *literal homelessness* (see Table 1; HUD, 2017). Many participants’ responses indicated that they experienced fluctuations in homelessness over the three-month period. From this, three new subgroups were created based on the participants’ most severe experience of homelessness: (a) *housed* defined as no homeless experiences, (b) *broad homelessness* defined as individuals who experienced *broad homelessness* with no reported *literal homelessness*, and (c) *literal homelessness* defined as anyone who experienced *literal homelessness* (see Table 1). Participants were only placed in the *one* subgroup that matched her or his most severe experience of homelessness. For example, if the participant experienced both *housed* and *broad homelessness* then the participant was only placed in the *broad homelessness* subgroup.

<Insert Table 1 here>

**Military sexual assault.** Within this study, five questions were used to assess MSA, adapted from (a) a Department of Justice special report on rape and sexual assault victimization among female college students (Sinozich & Langton, 2014) and (b) the Uniform Code of Military Justice (2006). The dichotomous (yes/no) questions asked about nonconsensual or unwanted sexual contact experienced during military service involving: (a) a military member or civilian, (b) someone known to the participant, or (c) a stranger. Questions included: forced touching of a sexual nature, oral sex, vaginal intercourse (females only), anal intercourse, and

## HOMELESSNESS AMONG VETERANS, PTSD, DEP, PHYS HLTH, MSA

sexual penetration with a finger or object. All five items were combined with any one experience constituting MSA. Additionally, sexual assault post-military service was included to control for post-military sexual trauma.

**Probable PTSD.** Probable PTSD was measured using the 20-item PTSD Checklist (PCL-5; Blevins, Weathers, Davis, Witte, & Domino, 2015), consistent with the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5; American Psychiatric Association (APA), 2013). The measure asks participants to rate how affected they were by exposure to a stressful event during the past month. Participants rated each item from 0 (*not at all*) to 4 (*extremely*) with scores ranging from 0 to 80. A clinical cutoff score of 33 indicated probable PTSD, i.e. a clinical level of PTSD (Weathers et al., 2013). Clinical cutoff scores provide stronger support for future interventions, as the reported symptoms are at a clinically significant level. In this study, Cronbach's alpha was .97.

**Probable depression.** Probable depression was measured using the 9-item Patient Health Questionnaire (PHQ-9; Kroenke, Spitzer, & Williams, 2001; Spitzer, Kroenke, & Williams, 2009), consistent with the DSM-5 (APA, 2013). This measure asks participants to rate the frequency of depressive symptoms on a 4-point scale: 0 (*not at all*) to 3 (*nearly every day*) during the last 2 weeks with score from 0 to 27. A clinical cutoff score of 10 indicated probable depression (moderate to severe depression; Kroenke et al., 2001). Clinical cutoff scores provide stronger support for future interventions, as the reported symptoms are at a clinically significant level. In this study, Cronbach's alpha was .94.

**Physical health symptoms.** Physical health symptoms were measured using the Patient Health Questionnaire (PHQ-15; Kroenke et al., 2001). This measure includes the most prevalent DSM-5 somatization disorder somatic symptoms (APA, 2013). This measure asks participants to

## HOMELESSNESS AMONG VETERANS, PTSD, DEP, PHYS HLTH, MSA

rate the severity of symptoms over the last 4 weeks on a 3-point scale: 0 (*not bothered at all*) to 2 (*bothered a lot*) with scores from 0 to 30. A clinical cutoff of 10 indicated moderate to severe symptom severity (Kroenke et al., 2001). Clinical cutoff scores provide stronger support for future interventions, as the reported symptoms are at a clinically significant level. In this study, Cronbach's alpha was .88.

### **Data Analysis**

Descriptive statistics, chi-square analyses, six multivariable logistic regressions, and six moderation multivariable logistic regressions were conducted using SAS 9.4. The sample demographics, military-related variables, and outcomes were stratified by sex (women and men) to identify sex specific differences. A series of chi-square tests were run with combinations of *housed*, *broad homelessness*, and *literal homelessness* experiences. In the female veteran analytical sample and male veteran analytical sample, multivariable logistic regressions included significant co-variables determined through chi-square analyses. Six logistic regressions, stratified by sex, were used to understand the relationship of homelessness experiences and associations with probable PTSD, probable depression, and physical health symptoms. Participants with missing housing status data were excluded from the final analyses. Next, six moderation logistic regressions, stratified by sex, used MSA as the moderator to demonstrate the interaction of MSA and homeless experiences in regard to probable PTSD, probable depression, and physical health symptoms. Within the moderation logistic regressions odds were calculated for (a) the same type of homelessness (i.e., *broad*) with and without MSA in regard to probable PTSD, probable depression, and physical health symptoms and (b) homelessness and the experience of MSA compared to *housed* without MSA to define cumulative trauma (e.g., the trauma of homelessness and the trauma of MSA compared to *housed* and no MSA).

<Insert Table 2 here>

<Insert Table 3 here>

### Results

In the sample of female veterans (n=251), 51% experienced homelessness within the last three months, specifically 27% experienced *broad homelessness* and 24% experienced *literal homelessness* (see Table 2). Female veterans were predominantly aged 30-39 years old (37%), and for those in this age category 32% were *housed*, 28% experienced *broad homelessness*, and the majority experienced *literal homelessness* (49%;  $\chi^2(10)=20.27, p=.027$ ). Female veterans were predominantly non-Hispanic White and were more likely to be in the *literal homelessness* subgroup (58%) compared to the *housed* subgroup (47%;  $\chi^2(6)=3.21, p=.783$ ). Among female veterans 15% of those who experienced *broad homelessness* and 5% of those who experienced *literal homelessness* were not utilizing VA healthcare services ( $\chi^2(2)=10.84, p<.01$ ). Female veterans in the *broad homelessness* (54%) and *literal homelessness* subgroups made up the largest portion of those who experienced MSA (58%;  $\chi^2(2)=7.71, p=.021$ ). Female veterans who experienced *literal homelessness* made up the largest portion of those who experienced sexual assault post-military service (53%;  $\chi^2(2)=34.21, p<.001$ ), probable PTSD (85%;  $\chi^2(2)=41.43, p<.001$ ), probable depression (78%;  $\chi^2(2)=36.39, p<.001$ ), and physical health symptoms (83%;  $\chi^2(2)=44.30, p<.001$ ).

Results from the multivariable logistic regression model can be found in Table 4. Female veterans who experienced *broad homelessness* had significantly increased odds of physical health symptoms ( $OR=3.13, 95\% CI [1.28, 7.64]$ ). Female veterans who experienced *literal homelessness* reported significantly higher odds of probable PTSD ( $OR=8.43, 95\% CI [2.14, 33.14]$ ), probable depression ( $OR=5.65, 95\% CI [1.53, 20.83]$ ), and physical health symptoms

## HOMELESSNESS AMONG VETERANS, PTSD, DEP, PHYS HLTH, MSA

( $OR=5.19$ , 95% CI [1.29, 20.94]). Next, the moderation of homelessness and the experience of MSA were evaluated (Table 5). In regard to cumulative trauma, female veterans who experienced *broad homelessness* and MSA had significantly increased odds of probable PTSD ( $OR=3.15$ , 95% CI [1.18, 8.41]) and physical health symptoms ( $OR=4.13$ , 95% CI [1.43, 11.94]), while those who experienced *literal homelessness* and MSA had significantly higher odds of probable PTSD ( $OR=11.36$ , 95% CI [4.71, 27.39]), probable depression ( $OR=4.89$ , 95% CI [1.67, 14.44]), and physical health symptoms ( $OR=5.41$ , 95% CI [1.67, 17.64]) when compared to women who were *housed* and did not experience MSA.

Among male veterans in the sample ( $n=1,249$ ), 55% experienced homelessness, specifically 25% experienced *broad homelessness* and 30% experienced *literal homelessness* (see Table 3). Male veterans were predominantly 30-39 years old (24%) and 60-69 (24%), but 30-39 years old represented the largest portion among the *literal homelessness* subgroup (49%;  $\chi^2(10)=295.52$ ,  $p<.001$ ). Male veterans predominantly served in the Army (53%) and had a higher portion present in the subgroup of *literal homelessness* (64%;  $\chi^2(8)=54.37$ ,  $p<.001$ ). Among male veterans 30% of those who experienced *broad homelessness* and 6% of those who experienced *literal homelessness* were not utilizing VA healthcare services ( $\chi^2(2)=105.49$ ,  $p<.001$ ). Male veterans in the *literal homelessness* subgroup made up the largest portion of those who experienced MSA (44%;  $\chi^2(2)=227.96$ ,  $p<.001$ ), sexual assault post-military service (20%;  $\chi^2(2)=228.01$ ,  $p<.001$ ), probable PTSD (70%;  $\chi^2(2)=244.89$ ,  $p<.001$ ), probable depression (75%;  $\chi^2(2)=310.66$ ,  $p<.001$ ), and physical health symptoms (66%;  $\chi^2(2)=230.44$ ,  $p<.001$ ).

<Insert Table 4 here>

<Insert Table 5 here>

## HOMELESSNESS AMONG VETERANS, PTSD, DEP, PHYS HLTH, MSA

Results from the multivariable logistic regression model can be found in Table 4. Male veterans who experienced *broad homelessness* had a significantly increased odds of physical health symptoms ( $OR=3.13$ , 95% CI [1.28, 7.64]). Male veterans who experienced *literal homelessness* reported significantly higher odds of probable PTSD ( $OR=2.88$ , 95% CI [1.91, 4.34]), probable depression ( $OR=5.35$ , 95% CI [3.47, 8.25]), and physical health symptoms ( $OR=4.96$ , 95% CI [3.02, 8.13]). Next, the moderation of homelessness and the experience of MSA were evaluated (Table 5). In regard to cumulative trauma, male veterans who experienced *broad homelessness* and MSA had significantly increased odds of probable PTSD ( $OR=3.74$ , 95% CI [1.64, 8.50]), probable depression ( $OR=2.68$ , 95% CI [1.19, 6.11]), and physical health symptoms ( $OR=4.61$ , 95% CI [1.77, 12.06]), while those who experienced *literal homelessness* and MSA had significantly higher odds of probable PTSD ( $OR=27.57$ , 95% CI [14.15, 54.05]), probable depression ( $OR=17.70$ , 95% CI [9.58, 32.46]), and physical health symptoms ( $OR=23.63$ , 95% CI [12.55, 44.26]) when compared to male veterans who were *housed* and did not experience MSA.

### Discussion

This study highlighted rates of homeless experiences (i.e., *broad homelessness* and *literal homelessness*) among a community sample of female and male veterans and demonstrated MSA (separate from military sexual harassment) is significantly associated with PTSD, depression, and physical health symptoms. Our findings indicated that as housing instability increases, the odds of probable PTSD, depression, and physical health symptoms also increased. These findings are consistent with previous research suggesting that increased severity in homelessness is associated with increased clinical levels of PTSD, depression, and physical health and greater presence of symptomatology (Balshem, Christensen, & Tuepker, 2011; Olusanya, 2012).

## HOMELESSNESS AMONG VETERANS, PTSD, DEP, PHYS HLTH, MSA

However, prior studies have typically defined severity of homelessness in terms of the (a) duration of homelessness and (b) cumulative effects of trauma compounded with the experience of homelessness itself. To our knowledge, few studies have focused on place of stay rather than length of homelessness in relation to PTSD, depression, and physical health symptoms. One such study reinforces the importance of exploring the ‘place of stay’ element of homeless experience demonstrating that increased transience, moving from locations with brief stays in each location, was associated with increased PTSD among youth experiencing homelessness (Bender, Ferguson, Thompson, Komlo, & Pollio, 2010). Although place of stay in this study also indicated *literal homelessness*, which is often a proxy for homeless chronicity (Cobb-Clark, Herault, Scutella, & Tseng, 2016), it is possible that veterans who experienced *literal homelessness* have become more entrenched in street life increasing their potential exposure to violence, victimization, and poverty, which may exacerbate PTSD, depression, and physical health symptomatology (Klodawski, Aubry, Nemiroff, Bonetta, & Willis 2019; Lee & Shreck, 2005; Nooe & Patterson, 2010; Padgett, Smith, Henwood, & Tiderington, 2012). Research also suggests that high levels of PTSD can serve as a barrier to exiting homelessness (McManus & Thompson, 2008) and maintaining stable housing (O’Connell, Kaspro, & Rosenheck, 2008). Thus, PTSD, depression, physical health, and increased homelessness may affect one another in a cyclical way.

This study also examined the moderating effects of MSA and found *broad homelessness* or *literal homelessness* in combination with MSA exacerbate clinical levels of PTSD, depression, and physical health symptoms. Among female veterans, the smaller sample size did not allow for nuanced findings within the same homelessness categories in regard to the experience of MSA or no MSA due to low numbers within the *broad homelessness* and *literal homelessness* subgroups,

## HOMELESSNESS AMONG VETERANS, PTSD, DEP, PHYS HLTH, MSA

supporting the need for further evaluation. However, the results among female and male veterans who experienced *broad homelessness* or *literal homelessness* and MSA compared to those who were *housed* and did not experience MSA highlight the role of cumulative trauma and its relationship to heightened maladaptive mental and physical health outcomes. As both MSA (Schuyler et al., 2017) and homelessness (Washington et al., 2010) among veterans have been associated with clinical levels of PTSD, depression, and physical health symptoms, it appears this combination makes veterans experiencing homelessness particularly vulnerable.

This study's sample is unique in that it allowed for the analysis of homelessness and MSA to be examined among a community sample of female and male veterans. Rarely have such data been available, providing a rich opportunity to speak of the role of MSA in female and male veterans' homeless experiences and clinical health outcomes. Our findings highlight that female and male veterans experiencing *broad homelessness* and *literal homelessness* who have also experienced MSA have an integral need for prevention and intervention efforts that address MSA. These findings provide an opportunity for social work to inform current practices and policy. For example, social workers (and case managers) within homeless services available to veteran populations should be trained in trauma interventions with an emphasis on those who are non-VA affiliated employees due to 15% of female veterans and 30% of male veterans experiencing *broad homelessness* and 5% of female veterans and 6% of male veterans experiencing *literal homelessness* not being engaged in VA healthcare services. Also, veterans currently have access to (a) supportive housing through a collaboration between Veteran Affairs and HUD (VAa, 2019) and (b) treatment services through Veteran Affairs (VAb, 2019), and these findings provide strong support for social workers to purposefully coordinate services between these two entities. These findings also support consideration for policy updates in regard



## HOMELESSNESS AMONG VETERANS, PTSD, DEP, PHYS HLTH, MSA

to social workers advocating for the expansion of the current HUD definition of homelessness to include *broad homelessness*. This change would be especially appropriate for veterans due to the cumulative trauma of *broad homelessness* and MSA and significant associations with mental and physical health in this population.

Despite the importance of the current findings, there are limitations to the present study. The data is cross-sectional, thereby limiting our ability to infer causality between homelessness and experiences of MSA on current clinical levels of PTSD, depression, and physical health symptoms; although the association of MSA with PTSD, depression, and physical health symptoms among female and male veterans has been documented (Schuyler et al., 2017). Our findings are most generalizable to veterans living in San Francisco and Chicago. Future research should evaluate the homeless experiences of veterans living in rural and other metropolis areas. We are also limited in our ability to determine time ordering of variables, particularly whether PTSD, depression, and physical health symptoms occurred prior to homelessness. While our study included sexual assault post-military service, future research should consider examining additional trauma factors, such as combat exposure and trauma prior to military service. Other limitations include self-reported data, inability to assess for length of homelessness, and a smaller overall sample of female veterans. Future studies would benefit from strategically sampling to gather more female representation to conduct further analyses within types of homelessness.

Despite these limitations, the increased risk of mental and physical health issues in veterans who experience homelessness, compounded by the experience of MSA, necessitates social workers taking action to further research this vulnerable population. It is recommended female and male veterans experiencing homelessness are repeatedly screened for *military sexual*

## HOMELESSNESS AMONG VETERANS, PTSD, DEP, PHYS HLTH, MSA

*trauma* with an emphasis on MSA, especially (1) among male veterans who have historically been screened less often resulting in fewer treatment interventions and (2) when clinical levels of PTSD, depression, and physical health symptoms are present among both female and male veterans (Hoyt & Klosterman Rielage, 2011). As *military sexual trauma* is a focus of the VA and DoD initial screenings for *military sexual trauma* are many times already be in place for veterans connected to homeless services. However, (1) screenings must be in place for those not connected to homeless services and (2) it is important to verify repeated screenings of MSA are present to allow female and male veterans to have opportunities to disclose, as veterans do not necessarily share their trauma experiences when new to services (Hoyt et al., 2011). Next, once veterans experiencing homelessness have been identified MSA informed evidence based care should be available within homeless services with veteran populations, as trauma informed care in the supportive housing environment can reduce veterans' risk of returning to homelessness (O'Connell et al., 2008). Finally, it is recommended to enhance homeless prevention risk strategies for veterans who are at-risk of homelessness and report MSA to veteran agencies, including housing subsidies, supportive services coupled with permanent housing, mediation within housing courts, cash assistance for rent or mortgage, and rapid exit from shelter (Burt, 2005).

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# HOMELESSNESS AMONG VETERANS, PTSD, DEP, PHYS HLTH, MSA

Table 1.

*Housing Status Over the Past 3 Months (Not Related to Work or Travel)*

| Housed   | Broad Homelessness  | Literal Homelessness  |
|--|---|---|
| (a) home or other indoor place of your own like an apartment     | (a) home or other indoor place of another person (family or friend) | (a) temporary or emergency shelter  |
| (b) home or other indoor place of a partner or significant other | (b) home or other indoor place of a stranger                        | (b) transitional housing program  |
|  | (c) hotel/motel   | (c) outside in the park, street, on beach, or under bridge                          |
|  | (d) group home  | (d) abandoned building  |
|  | (e) residential substance abuse treatment facility                  | (e) garage or shed not meant for living   |
|  | (f) psychiatric or mental health facility                           | (f) all-night theater, restaurant, subway, train/bus station, or other public place |
|  | (g) jail or prison  | (g) in a car, truck, van, or RV   |
|  |   | (h) on a bus, subway, or train  |

Table 2.

*Sample Demographics and Military-related Variables of Female Veterans and Housing Status Over the Last 3 Months*

|  | Total Female Sample <sup>a</sup><br>(n=315) |       | Housed<br>(n=124; 49%) |       | Broad Homelessness<br>(n=68; 27%) |       | Literal Homelessness<br>(n=59; 24%) |       | <i>p</i> |
|--|---|-------|------------------------|-------|-----------------------------------|-------|-------------------------------------|-------|----------|
|  | <i>n</i>                                    | %     | <i>n</i>               | %     | <i>n</i>                          | %     | <i>n</i>                            | %     |          |
| Age (n=315)  |   |       |                        |       |                                   |       |                                     |       | *        |
| 18-29  | 43  | 13.65 | 14                     | 11.29 | 12                                | 17.65 | 7                                   | 11.86 |          |
| 30-39  | 116   | 36.83 | 40                     | 32.26 | 19                                | 27.94 | 29                                  | 49.15 |          |
| 40-49  | 77  | 24.44 | 26                     | 20.97 | 21                                | 30.88 | 16                                  | 27.12 |          |
| 50-59  | 51  | 16.19 | 25                     | 20.16 | 12                                | 17.65 | 6                                   | 10.17 |          |
| 60-69  | 24  | 7.62  | 15                     | 12.10 | 4                                 | 5.88  | 1                                   | 1.69  |          |
| 70+  | 4   | 1.27  | 4                      | 3.23  | 0                                 | 0.00  | 0                                   | 0.00  |          |
| Race/Ethnicity (n=312)                               |   |       |                        |       |                                   |       |                                     |       | ns       |
| Non-Hispanic White                                   | 145   | 46.47 | 59                     | 47.58 | 31                                | 45.59 | 34                                  | 57.63 |          |
| Black or African American                            | 88  | 28.21 | 33                     | 26.67 | 19                                | 27.94 | 10                                  | 16.95 |          |
| Latino or Hispanic                                   | 39  | 12.50 | 15                     | 12.10 | 8                                 | 11.76 | 6                                   | 10.17 |          |
| Other  | 40  | 12.82 | 17                     | 13.71 | 10                                | 14.71 | 9                                   | 15.25 |          |
| Sexual Orientation (n=310)                           |   |       |                        |       |                                   |       |                                     |       | ns       |
| Heterosexual   | 262   | 84.52 | 105                    | 86.78 | 52                                | 76.47 | 47                                  | 81.03 |          |
| Lesbian or Bisexual                                  | 48  | 15.48 | 16                     | 13.22 | 16                                | 23.53 | 11                                  | 18.97 |          |
| Education (n=308)                                    |   |       |                        |       |                                   |       |                                     |       | ***      |
| Some HS, GED, HS diploma                             | 27  | 8.77  | 2                      | 1.65  | 13                                | 19.40 | 5                                   | 8.62  |          |
| Some College or Associate Degree                     | 136   | 44.16 | 45                     | 37.19 | 30                                | 44.78 | 40                                  | 68.97 |          |
| Bachelor's Degree                                    | 77  | 25.00 | 35                     | 28.93 | 16                                | 23.88 | 5                                   | 8.62  |          |
| Master's or Doctoral Degree                          | 68  | 22.08 | 39                     | 32.23 | 8                                 | 11.94 | 8                                   | 13.79 |          |
| Marital status (n=315)                               |   |       |                        |       |                                   |       |                                     |       | ns       |
| Single, Divorced, Separated, or Widowed              | 181   | 57.46 | 74                     | 59.68 | 42                                | 61.76 | 27                                  | 45.76 |          |
| Married, Domestic Partner, or Long-term Relationship | 134   | 42.54 | 50                     | 40.32 | 26                                | 38.24 | 32                                  | 54.24 |          |
| Service Branch (n=312)                               |   |       |                        |       |                                   |       |                                     |       | ***      |
| Air Force  | 52  | 16.67 | 29                     | 23.37 | 9                                 | 13.24 | 4                                   | 6.78  |          |
| Army   | 155   | 49.68 | 51                     | 41.13 | 42                                | 61.76 | 32                                  | 54.24 |          |
| Coast Guard  | 14  | 4.49  | 2                      | 1.61  | 2                                 | 2.94  | 10                                  | 16.95 |          |

HOMELESSNESS AMONG VETERANS, PTSD, DEP, PHYS HLTH, MSA

|  |     |       |    |       |    |       |    |       |     |
|--|-----|-------|----|-------|----|-------|----|-------|-----|
| Marine Corps                                 | 23  | 7.37  | 6  | 4.84  | 5  | 7.35  | 6  | 10.17 |     |
| Navy   | 68  | 21.79 | 36 | 29.03 | 10 | 14.71 | 7  | 11.86 |     |
| VA Healthcare Utilization (n=251)            |     |       |    |       |    |       |    |       | **  |
| Yes  | 207 | 82.8  | 93 | 75.61 | 58 | 85.29 | 56 | 94.92 |     |
| No   | 43  | 17.2  | 30 | 24.39 | 10 | 14.71 | 3  | 5.08  |     |
| Deployment (n=312)                           | 214 | 68.59 | 78 | 62.90 | 45 | 66.18 | 50 | 84.75 | **  |
| Discharge Reason (n=309)                     |     |       |    |       |    |       |    |       | *** |
| End of Commitment                            | 156 | 50.49 | 81 | 65.32 | 29 | 42.65 | 13 | 22.03 |     |
| Retirement                                   | 31  | 10.03 | 19 | 15.32 | 3  | 4.41  | 2  | 3.39  |     |
| Medical Retirement                           | 34  | 11.00 | 3  | 2.42  | 11 | 16.18 | 14 | 23.73 |     |
| Medical Separation                           | 31  | 10.03 | 6  | 4.84  | 11 | 16.18 | 12 | 20.34 |     |
| Administrative Separation                    | 31  | 10.03 | 4  | 3.23  | 9  | 13.24 | 16 | 27.12 |     |
| Other  | 26  | 8.41  | 11 | 8.87  | 5  | 27.35 | 2  | 3.39  |     |
| Military Sexual Assault (n=269)              | 120 | 44.61 | 47 | 38.21 | 35 | 53.85 | 34 | 57.63 | *   |
| Sexual Assault Post-military Service (n=274) | 68  | 24.82 | 15 | 12.10 | 20 | 29.41 | 31 | 52.54 | *** |
| Probable PTSD (n=278)                        | 141 | 50.72 | 42 | 33.87 | 38 | 56.72 | 49 | 84.48 | *** |
| Probable Depression (n=278)                  | 130 | 46.76 | 38 | 30.89 | 38 | 55.88 | 45 | 77.59 | *** |
| Physical Health Symptoms (n=272)             | 147 | 54.04 | 43 | 35.25 | 47 | 70.15 | 49 | 83.05 | *** |

Note. <sup>a</sup> = total sample = 315; analytical sample = 251.

\* =  $p < .05$ , \*\* =  $p < .01$ , \*\*\* =  $p < .001$ , ns = non-significant.

PTSD = posttraumatic stress disorder.

Table 3.

*Sample Demographics and Military-related Variables of Male Veterans and Housing Status Over the Last 3 Months*

|  | Total Male Sample <sup>a</sup><br>(n=1,664) |       | Housed<br>(n=571; 46%) |       | Broad Homelessness<br>(n=307; 25%) |       | Literal Homelessness<br>(n=371; 30%) |       | <i>p</i> |
|--|---|-------|------------------------|-------|------------------------------------|-------|--------------------------------------|-------|----------|
|  | <i>n</i>                                    | %     | <i>n</i>               | %     | <i>n</i>                           | %     | <i>n</i>                             | %     |          |
| Age (n=1,662)  |   |       |                        |       |                                    |       |                                      |       | ***      |
| 18-29  | 155   | 9.33  | 38                     | 6.65  | 55                                 | 17.92 | 33                                   | 8.89  |          |
| 30-39  | 404   | 24.31 | 67                     | 11.73 | 72                                 | 23.45 | 181                                  | 48.79 |          |
| 40-49  | 218   | 13.12 | 61                     | 10.68 | 29                                 | 9.45  | 71                                   | 19.14 |          |
| 50-59  | 225   | 13.54 | 87                     | 15.24 | 37                                 | 12.05 | 84                                   | 13.75 |          |
| 60-69  | 396   | 23.83 | 188                    | 32.92 | 66                                 | 21.50 | 28                                   | 7.55  |          |
| 70+  | 264   | 15.88 | 130                    | 22.77 | 48                                 | 15.64 | 7                                    | 1.89  |          |
| Race/Ethnicity (n=1,650)                             |   |       |                        |       |                                    |       |                                      |       | ***      |
| Non-Hispanic White                                   | 1,088                                       | 65.94 | 423                    | 74.34 | 200                                | 66.23 | 189                                  | 51.22 |          |
| Black or African American                            | 238   | 14.42 | 50                     | 8.79  | 29                                 | 9.60  | 92                                   | 24.93 |          |
| Latino or Hispanic                                   | 193   | 11.70 | 58                     | 10.19 | 43                                 | 14.24 | 47                                   | 12.74 |          |
| Other  | 131   | 7.94  | 38                     | 6.68  | 30                                 | 9.93  | 41                                   | 11.11 |          |
| Sexual Orientation (n=1,641)                         |   |       |                        |       |                                    |       |                                      |       | ns       |
| Heterosexual   | 1,584                                       | 96.53 | 541                    | 96.78 | 284                                | 93.42 | 353                                  | 96.19 |          |
| Gay or Bisexual                                      | 57  | 3.47  | 18                     | 3.22  | 20                                 | 6.58  | 14                                   | 3.81  |          |
| Education (n=1,626)                                  |   |       |                        |       |                                    |       |                                      |       | ***      |
| Some HS, GED, HS                                     | 229   | 14.08 | 67                     | 12.05 | 18                                 | 6.04  | 79                                   | 21.41 |          |
| Some College or Associate Degree                     | 590   | 36.29 | 193                    | 34.71 | 145                                | 48.66 | 128                                  | 34.69 |          |
| Bachelor's Degree                                    | 444   | 27.31 | 154                    | 27.70 | 80                                 | 26.85 | 98                                   | 26.56 |          |
| Master's or Doctoral Degree                          | 363   | 22.32 | 142                    | 25.54 | 55                                 | 18.46 | 64                                   | 17.34 |          |
| Marital Status (n=1,665)                             |   |       |                        |       |                                    |       |                                      |       | ***      |
| Single, Divorced, Separated, or Widowed              | 625   | 37.54 | 182                    | 31.87 | 135                                | 43.97 | 160                                  | 43.13 |          |
| Married, Domestic Partner, or Long-term Relationship | 1,040                                       | 62.46 | 389                    | 68.13 | 172                                | 56.03 | 211                                  | 56.87 |          |
| Service Branch (n=1,648)                             |   |       |                        |       |                                    |       |                                      |       | ***      |
| Air Force  | 191   | 11.59 | 76                     | 13.31 | 39                                 | 12.70 | 31                                   | 8.36  |          |
| Army   | 879   | 53.34 | 270                    | 47.29 | 150                                | 48.86 | 236                                  | 63.61 |          |
| Coast Guard  | 31  | 1.88  | 4                      | 0.70  | 7                                  | 2.28  | 19                                   | 5.12  |          |

## HOMELESSNESS AMONG VETERANS, PTSD, DEP, PHYS HLTH, MSA

|  |       |       |     |       |     |       |     |       |     |
|--|-------|-------|-----|-------|-----|-------|-----|-------|-----|
| Marine Corps                                   | 249   | 15.11 | 96  | 16.81 | 51  | 16.61 | 42  | 11.32 |     |
| Navy   | 298   | 18.08 | 125 | 21.89 | 60  | 19.54 | 43  | 11.59 |     |
| VA Healthcare Utilization (n=1,234)            |       |       |     |       |     |       |     |       | *** |
| Yes  | 924   | 74.88 | 365 | 65.06 | 211 | 69.64 | 348 | 94.35 |     |
| No   | 310   | 25.12 | 196 | 34.94 | 92  | 30.36 | 22  | 5.65  |     |
| Deployment (n=1,638)                           | 1,281 | 78.21 | 431 | 76.01 | 241 | 78.50 | 301 | 81.13 | ns  |
| Discharge Reason (n=1,610)                     |       |       |     |       |     |       |     |       | *** |
| End of Commitment                              | 1,025 | 63.66 | 402 | 70.53 | 225 | 73.29 | 136 | 36.86 |     |
| Retirement                                     | 187   | 11.61 | 72  | 12.63 | 31  | 10.10 | 39  | 10.57 |     |
| Medical Retirement                             | 134   | 8.32  | 11  | 1.93  | 10  | 3.26  | 93  | 25.20 |     |
| Medical Separation                             | 103   | 6.40  | 23  | 4.04  | 9   | 2.93  | 56  | 15.18 |     |
| Administrative Separation                      | 81    | 5.03  | 23  | 4.04  | 14  | 4.56  | 34  | 9.21  |     |
| Other  | 80    | 4.97  | 39  | 6.84  | 18  | 5.86  | 11  | 2.98  |     |
| Military Sexual Assault (n=1,370)              | 238   | 17.37 | 25  | 4.82  | 34  | 11.72 | 155 | 44.29 | *** |
| Sexual Assault Post-military Service (n=1,451) | 102   | 7.03  | 11  | 1.93  | 9   | 2.94  | 74  | 20.11 | *** |
| Probable PTSD (n=1,460)                        | 538   | 36.85 | 109 | 19.43 | 95  | 31.56 | 254 | 69.78 | *** |
| Probable Depression (n=1,462)                  | 530   | 36.25 | 103 | 18.26 | 87  | 29.00 | 270 | 74.59 | *** |
| Physical Health Symptoms (n=1,141)             | 340   | 29.80 | 59  | 13.29 | 57  | 24.57 | 193 | 65.87 | *** |

Note. <sup>a</sup> = total sample = 1,664; analytical sample = 1,249.

\* =  $p < .05$ , \*\* =  $p < .01$ , \*\*\* =  $p < .001$ , ns = non-significant.

PTSD = posttraumatic stress disorder.

## HOMELESSNESS AMONG VETERANS, PTSD, DEP, PHYS HLTH, MSA

Table 4.

*Multivariable Logistic Regression Models with Housing Status Over Last 3 Months, Probable PTSD, Depression, and Physical Health Symptoms among Female and Male Veterans*

|                         | Probable PTSD |            | Probable Depression |            | Physical Health Symptoms |            |
|-------------------------|---------------|------------|---------------------|------------|--------------------------|------------|
|                         | Adj OR        | 95% CI     | Adj OR              | 95% CI     | Adj OR                   | 95% CI     |
| <i>Female Veterans</i>  |               |            |                     |            |                          |            |
| Housing Status          |               |            |                     |            |                          |            |
| Housed (Ref)            | 1             |            | 1                   |            | 1                        |            |
| Broad Homelessness      | 1.81          | 0.76-4.33  | 1.85                | 0.79-4.31  | 3.13*                    | 1.28-7.64  |
| Literal Homelessness    | 8.43*         | 2.14-33.14 | 5.65*               | 1.53-20.83 | 5.19*                    | 1.29-20.94 |
| Military Sexual Assault | 2.60*         | 1.11-6.09  | 1.70                | 0.72-4.01  | 2.50*                    | 1.04-5.97  |
| Adjusted R <sup>2</sup> | .428          |            | .387                |            | .468                     |            |
| <i>Male Veterans</i>    |               |            |                     |            |                          |            |
| Housing Status          |               |            |                     |            |                          |            |
| Housed (Ref)            | 1             |            | 1                   |            | 1                        |            |
| Broad Homelessness      | 1.34†         | 0.91-1.97  | 1.17                | 0.77-1.76  | 1.59†                    | 0.99-2.53  |
| Literal Homelessness    | 2.88*         | 1.91-4.34  | 5.35*               | 3.47-8.25  | 4.96*                    | 3.02-8.13  |
| Military Sexual Assault | 1.90*         | 1.07-3.38  | 4.08*               | 4.08-9.44  | 3.18*                    | 1.17-8.62  |
| Adjusted R <sup>2</sup> | .419          |            | .497                |            | .445                     |            |

*Note.* PTSD = posttraumatic stress disorder. Adjusted for age, race, education, marital status, service branch, VA healthcare utilization, deployment, discharge reason, and sexual assault post-military service.

† = trending towards significance,  $p < .10$ .

\* =  $p < .05$ .

## HOMELESSNESS AMONG VETERANS, PTSD, DEP, PHYS HLTH, MSA

Table 5.

*Odds Ratios of Probable PTSD, Depression, and Physical Health Symptoms as Moderated by the Cumulative Trauma of Experiencing Homelessness and Military Sexual Assault (MSA) among Female and Male Veterans*

|  | Probable PTSD |             | Probable Depression |            | Physical Health Symptoms |             |
|--|---------------|-------------|---------------------|------------|--------------------------|-------------|
|  | Adj OR        | 95% CI      | Adj OR              | 95% CI     | Adj OR                   | 95% CI      |
| <i>Female Veterans</i>   |               |             |                     |            |                          |             |
| Compared to Same Type of Homelessness and Did Not Experience MSA |               |             |                     |            |                          |             |
| Housed*MSA (Ref, Housed*No MSA)                                  | 3.30*         | 1.36-7.92   | 2.14†               | 0.87-5.26  | 3.17*                    | 1.26-7.92   |
| Broad*MSA (Ref, Broad*No MSA)                                    | 1.49          | 0.48-4.66   | 0.82                | 0.27-2.51  | 1.00                     | 0.27-3.71   |
| Literal*MSA (Ref, Literal*No MSA)                                | 1.27          | 0.25-6.49   | 0.82                | 0.20-3.42  | 1.11                     | 0.23-5.42   |
| Compared to Housed and Did Not Experience MSA                    |               |             |                     |            |                          |             |
| Broad*MSA (Ref, Housed*No MSA)                                   | 3.15*         | 1.18-8.41   | 1.94                | 0.74-5.05  | 4.13*                    | 1.43-11.94  |
| Literal*MSA (Ref, Housed*No MSA)                                 | 11.36*        | 4.71-27.39  | 4.89*               | 1.67-14.44 | 5.41*                    | 1.67-17.64  |
| <i>Male Veterans</i>   |               |             |                     |            |                          |             |
| Compared to Same Type of Homelessness and Did Not Experience MSA |               |             |                     |            |                          |             |
| Housed*MSA (Ref, Housed*No MSA)                                  | 2.47†         | 0.98-6.17   | 5.46*               | 2.18-13.74 | 5.07*                    | 1.62-15.80  |
| Broad*MSA (Ref, Broad*No MSA)                                    | 2.59*         | 1.14-5.87   | 2.11†               | 0.91-4.90  | 2.45†                    | 0.96-6.30   |
| Literal*MSA (Ref, Literal*No MSA)                                | 9.89*         | 5.05-19.30  | 3.45*               | 1.72-6.55  | 4.05*                    | 2.08-7.92   |
| Compared to Housed and Did Not Experience MSA                    |               |             |                     |            |                          |             |
| Broad*MSA (Ref, Housed*No MSA)                                   | 3.74*         | 1.65-8.50   | 2.68*               | 1.19-6.11  | 4.61*                    | 1.77-12.06  |
| Literal*MSA (Ref, Housed*No MSA)                                 | 27.57*        | 14.15-54.05 | 17.70*              | 9.58-32.46 | 23.63*                   | 12.55-44.26 |

Adjusted for age, race, education, marital status, service branch, VA healthcare utilization, deployment, discharge reason, and sexual assault post-military service.

† =  $p < .10$ .

\* =  $p < .05$ .