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## **Exposure to Violence and Sleep Inadequacies among Men and Women Living in a Shelter Setting**

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# Exposure to Violence and Sleep Inadequacies among Men and Women Living in a Shelter Setting

## Abstract

Exposure to violence may explain sleep inadequacies reported by homeless adults, with women being potentially more susceptible to violence and sleep disturbances than men. This study examined the association between violence and sleep inadequacies among homeless adults and explored differences by sex. Adult participants were recruited from a shelter ( $n = 194$ ; 71.1% men,  $M_{\text{age}} = 43.8 \pm 12.2$ ).

Participants self-reported victimization and/or witnessing violence (mugging, fight, and/or sexual assault) at the shelter, sleep duration (over an average 24 hours), insufficient sleep (days without sufficient rest/sleep), and unintentional daytime sleep (days with unintentional sleep) in the past month. Linear regressions were used to estimate associations between violence and sleep inadequacies, controlling for sex, age, race, months homeless, and depression. Moderation by sex was examined via an interaction term following mean-centering of variables. Overall, 20.6% of participants ( $n = 40$ ) reported victimization since moving to the shelter. In the last month, participants reported witnessing an average of  $2.9 \pm 5.1$  acts of violence. Over the same timeframe, participants reported  $6.9 \pm 2.0$  hours of sleep nightly,  $11.2 \pm 10.7$  days of insufficient sleep, and  $6.2 \pm 8.8$  days with unintentional daytime sleep. In adjusted analyses, witnessing violence was associated with insufficient sleep ( $p = .001$ ). Men and women differed only in age and race in unadjusted analyses; sex was not a significant moderator of any association between violence and sleep in adjusted analyses. Links between witnessing violence and sleep inadequacies should be considered in shelter health promotion efforts. Successful efforts to minimize violence may reduce insufficient sleep amongst both sexes.

## Keywords

health disparities, homelessness, sleep, victimization, violence

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### **Abstract**

Exposure to violence may explain sleep inadequacies reported by homeless adults, with women being potentially more susceptible to violence and sleep disturbances than men. This study examined the association between violence and sleep inadequacies among homeless adults and explored differences by sex. Adult participants were recruited from a shelter ( $n = 194$ ; 71.1% men,  $M_{\text{age}} = 43.8 \pm 12.2$ ). Participants self-reported victimization and/or witnessing violence (mugging, fight, and/or sexual assault) at the shelter, sleep duration (over an average 24 hours), insufficient sleep (days without sufficient rest/sleep), and unintentional daytime sleep (days with unintentional sleep) in the past month. Linear regressions were used to estimate associations between violence and sleep inadequacies, controlling for sex, age, race, months homeless, and depression. Moderation by sex was examined via an interaction term following mean-centering of variables. Overall, 20.6% of participants ( $n = 40$ ) reported victimization since moving to the shelter. In the last month, participants reported witnessing an average of  $2.9 \pm 5.1$  acts of violence. Over the same timeframe, participants reported  $6.9 \pm 2.0$  hours of sleep nightly,  $11.2 \pm 10.7$  days of insufficient sleep, and  $6.2 \pm 8.8$  days with unintentional daytime sleep. In adjusted analyses, witnessing violence was associated with insufficient sleep ( $p = .001$ ). Men and women differed only in age and race in unadjusted analyses; sex was not a significant moderator of any association between violence and sleep in adjusted analyses. Links between witnessing violence and sleep inadequacies should be considered in shelter health promotion efforts. Successful efforts to minimize violence may reduce insufficient sleep amongst both sexes.

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Sleep inadequacies have been linked to adverse health outcomes, such as cardiovascular disease, obesity, and cognitive impairments (Al Lawati, Patel, & Ayas, 2009). Homeless adults are particularly susceptible to sleep inadequacies relative to their domiciled counterparts (Chang et al., 2015; Léger, Beck, & Richard, 2017; Reitzel et al., 2017). For example, research suggests that up to 50% of homeless adults fail to obtain the recommended seven to nine hours of sleep a day (Chang et al., 2015), versus 35% in the domiciled population (Liu et al., 2016). Further, homeless women may be particularly affected, as research suggests they are twice as likely as homeless men to report < 4 hours of sleep a night (Léger et al., 2017).

Sleep inadequacies among homeless adults may be partially due to fear of victimization, as homeless adults are more likely to experience victimization than domiciled adults (Lee & Schreck, 2005; Morgan & Truman, 2018; North, Smith, & Spitznagel, 1994). Specifically, whereas violent victimization is reported by 1% of the domiciled population over the last six months (1.17% men vs. 1.11% women; Morgan & Truman, 2018), approximately 12% of homeless men and 10% of homeless women reported being mugged, assaulted, or raped during the same timeframe (North et al., 1994). However, some studies support that homeless women report higher rates of sexual assault, but similar rates of physical assault compared to homeless men (Dietz & Wright, 2005; Kushel, Evans, Perry, Robertson, & Moss, 2003; Lee & Schreck, 2005; Wenzel, Koegel, & Gelberg, 2000).

Witnessing violence may also explain sleep inadequacies due to vicarious trauma; however, very few studies have examined rates of witnessing violence among either domiciled or homeless adults (Fitzpatrick, LaGory, & Ritchey, 1999; Meinbresse et al., 2014). One study found that 32% of homeless individuals reported witnessing a violent attack in the past 30 days, and 81% reported witnessing a violent attack within the past year (Meinbresse et al., 2014). The associations of victimization versus witnessing violence with sleep inadequacies have only been previously examined in a study among domiciled adolescents, which found that witnessing violence, but not direct victimization, contributed to sleep difficulties (Kliwer & Lepore, 2015).

Given sparse literature on exposure to violence and sleep inadequacies among homeless adults, coupled with the potential for sex differences within each domain, the purpose of this study was to address these gaps. We hypothesized that greater exposure to violence (experiencing victimization and/or witnessing violence, such as in a mugging, fight, or sexual assault) would be associated with sleep inadequacies, with a stronger association among women than men. Better understanding these associations could inform interventions to promote healthy sleep among this vulnerable population.

## Methods

### Participants

Participants ( $N = 394$ ) comprised a convenience sample of homeless adults who were recruited from a large shelter in Dallas, TX, in 2013 via flyer advertisement. Screening, consenting, and data collection were conducted on site. Inclusion criteria were: aged 18 or over, English-speaking and literate at the seventh grade level or more as indicated by a score of  $\geq 4$  on the Rapid Estimate of Adult Literacy in Medicine-Short Form (Arozullah et al., 2007), and having spent at least the previous night at the shelter. Only one wave of the parent study (Businelle et al., 2015) included sleep inadequacy items, limiting the potential sample size to 244. More information about the sample demographics can be found in a previous study (Chang et al., 2015).

### Procedures

This study was approved by the IRBs of associated universities. Written informed consent was obtained. Enrolled participants completed questionnaires in a private area and received a \$20 department store gift card as remuneration.

## Measures

**Participant characteristics.** Participant characteristics included lifetime homelessness (in months) and demographic variables (sex, race, and age). Depression was assessed using the Center for Epidemiological Studies Depression 10-item self-report measure of depressive symptoms over the past week (Irwin, Artin, & Oxman, 1999;  $\alpha = .852$ ). Scores could range from 0-30;  $\geq 10$  was coded as depressed.

**Violence.** Exposure to violence was measured through two variables: victimization and witnessing violence. Victimization was assessed through the question: “While you have lived at the [shelter name], has anyone ever used violence, such as in a mugging, fight, or sexual assault, against you or any member of your family?” (0 = no; 1 = yes). Witnessing violence was measured through the question: “In the past month, how many times have you been a witness to acts of violence?” Items were from a measure (Sampson, Raudenbush, & Earls, 1997) adapted for the shelter setting.

**Sleep inadequacies.** Sleep inadequacies were assessed using items from the Behavioral Risk Factor Surveillance System (Centers for Disease Control and Prevention [CDC], 2011). Participants reported: (1) the number of days over the past month in which they did not get enough rest or sleep (insufficient sleep); (2) the average number of hours of sleep they typically obtain in a 24-hour period (sleep duration); and (3) the number of days over the past month in which they found themselves unintentionally falling asleep during the day (unintentional sleep).

## Data Analysis

The analytic sample was limited to adults who were shelter guests for  $\geq 3$  weeks ( $N = 207/244$ ; 84.8%) to align with the timeline for the assessment of sleep inadequacies, and then further limited to participants with no missing data ( $n = 194$ ; 93.7% of the relevant sample). There were no significant differences between those with and without missing data on the variables of interest.

Data were explored using frequencies, descriptives, and correlations; simple *t*-tests and chi-square tests examined differences by sex. Linear regressions were used to estimate the associations between victimization and inadequate sleep, controlling for sex, age, race, months homeless, and depression. Moderation by sex was examined via an interaction term following mean-centering of variables. All analyses were conducted using IBM SPSS Statistics for Windows, Version 25.0.

## Results

Overall, 20.6% of participants reported victimization since living at the shelter, whereas 55.7% of participants reported witnessing violence over the past month (see Table 1). Those witnessing violence reported seeing an average of  $2.9 \pm 5.1$  acts of violence over the last month. The correlation between witnessing violence and victimization in this sample was  $r = .196$  ( $p < .01$ ; see Table 1). On average, in the past 30 days, participants reported  $6.9 \pm 2.0$  hours of sleep nightly,  $11.2 \pm 10.7$  days of insufficient sleep, and  $6.2 \pm 8.8$  days with unintentional daytime sleep. Men and women differed only on age and race in unadjusted analyses.

Table 1

*Participant Characteristics and Correlations between Study Variables (n = 194 sheltered homeless adults from Dallas, TX).*

| Variable                      | Age                         | Sex<br>(Male) | Race<br>(White)           | Lifetime<br>months<br>homeless | Depression <sup>a</sup> | Victimization | Witnessed<br>violence | Insufficient<br>sleep<br>(days) | Sleep<br>duration<br>(hours) | Unintentional<br>sleep (days) |
|-------------------------------|-----------------------------|---------------|---------------------------|--------------------------------|-------------------------|---------------|-----------------------|---------------------------------|------------------------------|-------------------------------|
| Age                           | --                          |               |                           |                                |                         |               |                       |                                 |                              |                               |
| Sex                           | .168*                       | --            |                           |                                |                         |               |                       |                                 |                              |                               |
| Race                          | -.054                       | .163*         | --                        |                                |                         |               |                       |                                 |                              |                               |
| Lifetime months<br>homeless   | .240**                      | .111          | .083                      | --                             |                         |               |                       |                                 |                              |                               |
| Depression <sup>a</sup>       | -.112                       | -.025         | -.174*                    | -.007                          | --                      |               |                       |                                 |                              |                               |
| Victimization                 | -.126                       | -.041         | -.101                     | .030                           | .159*                   | --            |                       |                                 |                              |                               |
| Witnessed<br>violence         | .042                        | .017          | -.228*                    | .092                           | .113                    | .196**        | --                    |                                 |                              |                               |
| Insufficient sleep<br>(days)  | -.036                       | -.078         | -.167*                    | .059                           | .464**                  | .085          | .255**                | --                              |                              |                               |
| Sleep duration<br>(hours)     | -.045                       | -.037         | .034                      | .030                           | -.210**                 | -.047         | -.139                 | -.394**                         | --                           |                               |
| Unintentional<br>sleep (days) | -.101                       | -.068         | -.030                     | -.028                          | .339**                  | .054          | .167*                 | .580**                          | -.192**                      | --                            |
| <i>M (SD)/% [n]</i>           | 43.8<br>(12.2) <sup>b</sup> | 71.1<br>[138] | 27.8<br>[54] <sup>c</sup> | 45.6<br>(53.4)                 | 62.4<br>[121]           | 20.6<br>[40]  | 2.9<br>(5.1)          | 11.2<br>(10.7)                  | 6.9<br>(2.0)                 | 6.2<br>(8.8)                  |

*Note.* Correlations were assessed using Spearman's correlation coefficient for continuous variables and Point-Biserial correlation coefficients with binary variables. Sex was coded as follows: 0 = female; 1 = male. Race was coded as follows: 0 = minority; 1 = white.

<sup>a</sup>Depression was measured by the 10-item Center for Epidemiological Studies Depression, with scores of  $\geq 10$  indicative of depression.

<sup>b</sup>Age statistically differed between men [45.1 (12.0)] and women [40.6 (12.2)] at  $p = .023$ .

<sup>c</sup>Minority race statistically differed between men (76.8 [106]) and women (60.7 [34]) at  $p = .019$ .

\* $p < .05$ , \*\* $p < .01$ .

In adjusted analyses, victimization was not associated with insufficient sleep ( $p = .914$ ), sleep duration ( $p = .740$ ), or unintentional sleep ( $p = .928$ ). Witnessing violence was positively associated with insufficient sleep (see Table 2), but not with sleep duration ( $p = .071$ ) or unintentional sleep ( $p = .066$ ). Sex was not a significant moderator of any associations.

Table 2

*Associations between Witnessing Violence and Insufficient Sleep ( $n = 194$  sheltered homeless adults from Dallas, TX).*

|                                          | <i>B</i> | <i>SE B</i> | $\beta$ | <i>p</i> |
|------------------------------------------|----------|-------------|---------|----------|
| (Intercept)                              | 5.978    | 3.344       |         |          |
| Age                                      | -.010    | .060        | -.011   | .875     |
| Sex (Male referent category)             | -1.922   | 1.505       | -.080   | .203     |
| Race (White referent category)           | -.335    | .431        | .052    | .438     |
| Lifetime Months Homeless                 | .012     | .013        | .059    | .370     |
| Depression (Depressed referent category) | 9.694    | 1.396       | .441    | .000     |
| Witnessing Violence                      | .432     | .133        | .207    | .001     |

Note.  $R^2 = 0.267$ ,  $p = 0.000$ .

## Discussion

Witnessing violence, but not experiencing victimization, was associated with more days with insufficient sleep/rest in this sample of sheltered homeless adults. Prior research has suggested that different mechanisms may underlie witnessing versus experiencing victimization in relation to subsequent feelings of helplessness, with lower mastery/agency playing a unique role in the former (Muller, 2016). Although more research is needed, it may be that witnessing violence lowers mastery/agency and heightens helplessness, which may have a particular effect on sleep sufficiency (Lepore & Kliever, 2013). Alternatively, the differing timeframes of witnessing violence and victimization may have affected results, whereby witnessing violence in the last month (i.e., recency) may have more salience to sleep insufficiency than experiencing victimization since living at the shelter. Findings are broadly consistent with several studies in adolescents that have found witnessing violence to be associated with sleep disturbances (e.g., Kliever & Lepore, 2015), with one study finding that witnessing violence may lead to greater psychological harm (e.g., feelings of hopelessness) than victimization (Bolland, Lian, & Formichella, 2005). The current work extends the literature by examining these associations among homeless adults and by establishing a unique association with a single manifestation of sleep inadequacy. The reasons for the lack of significant association between witnessing violence and sleep duration or unintentional daytime sleep are unknown and require replication; however, it is notable that associations were marginal ( $ps < .10$ ) and may emerge as significant with larger samples. Further, qualitative research may provide better understanding of why witnessing violence, but not victimization, is linked with sleep insufficiency. Present results, however, suggest that links between witnessing violence and sleep insufficiency should be considered in health promotion efforts at shelters.

Consistent with prior literature (Meinbresse et al., 2014; North et al., 1994), homeless adults in this sample experienced victimization and witnessed violence at high rates, highlighting the critical need for prevention efforts. Unlike some previous research (e.g., Lee & Schreck, 2005), the current study found null relations for sex differences in victimization or witnessing violence. This could be because our study did not separate sexual victimization from other forms of violent victimization, like in aforementioned studies. Nevertheless, null relations suggest that successful efforts to minimize witnessing violence may reduce insufficient sleep among both sexes.

As previously reported (Chang et al., 2015) and as consistent with another study (Reitzel et al., 2017), sleep inadequacies were prevalent in the current sample and greater than those reported in the domiciled population (cf. Chang et al., 2015). There were also no sex differences in sleep inadequacies in the current sample. This is contrary to at least one prior study (Léger et al., 2017) conducted in France. Differing results could be due to differing measurements of sleep inadequacies (Léger et al., 2017). Further, the Leger study sample included participants who did not live in sheltered housing (Léger et al., 2017), unlike the current study. Null sex differences in sleep inadequacies may simply reflect the realities of living in sheltered housing, where individuals have little privacy and are in close physical contact with one another; conditions that may not differ by sex. Previous research among domiciled adults has shown that sex differences in sleep duration decrease among those with few family responsibilities (Burgard & Ailshire, 2013), which could help explain our findings.

Limitations include the use of a sample from a single shelter in Dallas; thus, results may not be broadly generalizable. Additionally, this convenience sample might not be representative of all homeless adults (e.g., pregnant women and women with accompanying minors could not stay there). However, the current sample was from a shelter that provides services to the majority of homeless adults in a large city (Metro Dallas Homeless Alliance, 2013) and the use of a single shelter facilitated context specific recommendations. Future studies should replicate findings and assess where victimization or witnessing violence occurred (on or off shelter grounds). Analyses were limited to variables collected in the parent study and thus factors such as the identity of the perpetrator or victim (e.g., sex) of witnessed violence and other manifestations of sleep inadequacies (e.g., fragmented sleep) were not accounted for. Other unexplored health conditions (e.g., diabetes, chronic pain) may have influenced sleep inadequacies and were not accounted for. Another limitation is the cross-sectional design: temporal relations could not be determined. Future studies may consider using a longitudinal study design and objective measures of sleep inadequacies to verify the accuracy of self-report.

### **Implications for Health Behavior Theory**

While homeless shelters may offer some security and protection against the day-to-day exposure to violence and victimization experienced by homeless adults on the streets, violence and victimization remains a reality in this population and may contribute to sleep insufficiency even within sheltered settings. The social-ecological model would suggest that health promotion efforts to address these associations should include policies and procedures implemented at multiple levels of influence (Bronfenbrenner, 1994). For example, efforts at the individual level could include providing life skills and/or crisis management training at shelters, as well as easily accessible recovery/trauma counseling for those who witness violence or experience victimization. At the relationship level, violence prevention strategies may include mentoring or

peer-to-peer programs that develop problem solving skills. Change at the community level could consist of the establishment of cameras and monitoring at/around shelters and ensuring penalties for violence perpetration. At the societal level, strategies such as working closely with local law enforcement to prevent victimization, reporting it when it occurs, and securing additional government funding for housing first initiatives could reduce exposure to violence and victimization among homeless adults.

### Discussion Question

1. Findings suggest that witnessing violence over the previous month contributes to sleep insufficiency amongst homeless individuals. What are ways that shelters or programs can reduce violence exposure among adults experiencing homelessness?

### Acknowledgements

This work was supported by institutional funding provided by the University of Texas School of Public Health (to Michael S. Businelle (MSB)) and the University of Texas MD Anderson Cancer Center (to Lorraine R. Reitzel (LRR)). Additional support for this work came from American Cancer Society grant MRSRG-12-114-01-CPPB (to MSB) and MRSRG-10-104-01-CPHPS (to Darla E. Kendzor (DEK)). Work to complete the current manuscript was supported by the National Cancer Institute (1P20CA221697-02 to LRR, on which Chisom Odoh (CO) was supported as a postdoctoral fellow; and P30CA225520 for MSB and DEK). Conclusions drawn in this work are solely the responsibility of the authors and do not necessarily represent the official views of the sponsoring organizations.

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