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SLEEP DISTURBANCE IN BATTERED WOMEN LIVING IN TRANSITIONAL HOUSING

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This study describes objective and subjective sleep in a convenience sample of 29 battered women living in specialized transitional housing programs compared to 30 women living in their own stable home environment. Compared to healthy controls, battered women living in transitional housing experienced longer sleep onset latencies by both subjective and objective measures and higher percentage of time awake during the night by objective measure. Poor sleep quality may reflect the relative contributions of less total sleep time, difficulty falling asleep, and more awakenings during the night rather than just one aspect of disturbed sleep. Findings suggest that battered women in transitional housing programs may improve daytime alertness and benefit from interventions directed toward reducing sleep onset latency as well as increasing total sleep time.

Battered women are subject to repeated deliberate, often severe physical and psychological abuse at the hands of their intimate male partners (Humphreys & Campbell, 2004). The prevalence of battering is difficult to ascertain; however, most authorities estimate that from 20%

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to 40% of all women have suffered abuse by their partners (Campbell, 2002; Rennison, 2003; Shalala, 1994). In California, half of women receiving treatment in emergency departments have suffered some form of abuse (Domestic Violence Advisory Council, 1998) and a third of female homicide victims were killed by their intimate partner (California Department of Health Services, 2003). Many women in the process of resisting abuse seek safety in emergency shelters; Due to limited capacity, however, emergency shelters generally restrict length of stay to 60 days.

Transitional housing programs are increasingly being offered with the primary goal of assisting battered women toward self-sufficiency (Winston, 2001). These programs provide counseling, education, and other services. Battered women and their children are permitted to stay one to two years, depending on the program and their progress toward meeting personal goals. For a variety of reasons that include not only the exposure to trauma but also crowded sleeping arrangements with their children and financial worries, this population of women is at great risk for sleep loss and poor daytime functioning. Since sleep is essential for healthy physical and cognitive functioning, chronically disturbed sleep may impede battered women's abilities to achieve their personal goals within the limited time frame of most transitional housing programs. No studies have described the types of sleep problems experienced by battered women in transitional housing programs. Therefore, the purpose of this study was to: (1) describe sleep disturbance in a sample of battered women residing in transitional housing programs, in comparison with a group of healthy women living with children in their own stable home environment, and (2) compare subjective and objective measures of their sleep.

METHOD

Participants and Procedures

Prior to any participant contact, approval was received by the University's Committee on Human Research. English speaking women over 18 years of age who were living in residence for at least 21 days were eligible. A recruitment flyer was read at a regular transitional housing group meeting and then posted in a communal area. Women also were informed that the study included wearing a wrist actigraph. Of the 34 eligible women, one indicated that she did not have time to complete all parts of the study, and two did not want to be seen wearing an actigraph. Therefore, a convenience sample of 31 women who resided in

one of four battered women's transitional housing programs in the San Francisco Bay Area participated during a seven-month period. After agreeing to participate and giving informed consent, the women completed the self-report measures and were instructed in wearing a wrist actigraph and completing the sleep diary. After 48 hours, the sleep diary and actigraph were retrieved and the woman was paid $25.00 in cash.

Measures

Data on demographic characteristics were collected using an investigator-developed form that included age, number of children, pregnancy status, ethnicity, educational preparation, employment status, and an indication of their general health status on a scale of 0 (poor) to 10 (good or great). In addition to these individual characteristics, transitional housing characteristics (number of accompanying children, number of people sleeping in the bedroom, number of persons in residence, and length of stay in the shelter) were also collected.

Traumatic experiences as a battered woman were measured with the Conflict Tactics Scale (CTS) (Straus & Gelles, 1990) and the Symptom Checklist 90-Revised (SCL-90R) (Derogatis, 1994). The CTS asks participants to indicate which of 19 possible strategies they experienced in the prior year during times of conflict with their intimate partners, and how often each strategy was used. Questions about sexual assault and physical injury and severity resulting from conflicts were added to the instrument (Saunders, 1994). The CTS has adequate reliability in samples of husbands and wives (Straus & Gelles). The Cronbach alpha coefficient for the current study was acceptable (0.89). The SCL-90R contains a 28-item subscale to assess for the severity of posttraumatic stress disorder (PTSD). A mean score of 0.89 or higher indicates current PTSD (Arata, Saunders, & Kilpatrick, 1991). The Cronbach alpha coefficient for the current study was also acceptable (alpha = .96).

Objective Sleep

Each participant wore a wrist actigraph (Mini Motionlogger Actigraph AAM-32, Ambulatory Monitoring, Inc., Ardsley, NY) continuously for 48 hours on two consecutive week days. The actigraph records continuous activity using a battery-operated microprocessor that senses motion with a piezoelectric beam and detects movement in all three axes. There is also an event marker for participants to indicate "lights out" and "lights on" time. The waterproof actigraph was worn continuously for 48 hours without discomfort. Activity was recorded in 30-second intervals,

and the autoscoring program within Action 3© software (Ambulatory Monitoring, Inc. Ardsley, NY) was used to determine sleep onset latency in minutes, number of wake episodes, total sleep time, sleep efficiency and wake after sleep onset (Hauri & Wisbey, 1992). Sleep onset latency is the period of time from "lights out" as indicated by the event marker, to first two minutes of continuous sleep. Sleep efficiency is the percentage of time spent asleep during the time spent in bed trying to sleep, from "lights out" to "lights on" while wake after sleep onset is the percentage of time spent awake after sleep onset until "lights on" is indicated by the event marker. All sleep times and event markers were cross-checked and validated with the woman's sleep diary entries.

Subjective Sleep

Each morning in the sleep diary, women were asked to indicate how long it took them to fall asleep at night and how many times they awakened during the night. They were also asked to indicate their sleep quality ("very good," "good," "fair," "poor," or "very poor") and the extent to which they felt rested ("very rested," "rested," "somewhat rested," or "not at all rested") and felt alert upon awakening ("very alert," "alert," "somewhat drowsy," or "very drowsy"). These responses were then coded on a 0–4 scale (sleep quality) or 0–3 scale ("rested," "alert") with higher scores indicating better sleep, more rested, and more alert. The sleep diary also included an 18-item fatigue severity scale, which was completed in the evening prior to lights out and in the morning before getting out of bed. Scores for evening and morning fatigue could range from 0 (none/low fatigue) to 10 (high fatigue).

Analysis Plan

In order to describe the extent of sleep disturbance for the group of women residing in transitional housing programs with their children, they were matched with a sample of 30 healthy women in the same age range who were also living with children, but in their own homes. As part of a larger study of pre-menopausal women's health, these healthy controls also completed a sleep diary and wore an actigraph for two consecutive weekdays.

Data were first examined for any significant correlations (Pearson's correlation coefficients) or significant differences (paired t-tests) between the two nights in total sleep time. Since the two nights were highly correlated and not significantly different, data for both nights were averaged and are reported as means $\pm$ standard error of the means

(S.E.M.). Correlations and paired *t*-tests were also used to compare each woman's subjective and objective sleep variables and fatigue measures. Independent *t*-tests were used to compare the sleep variables between battered women living in transitional housing and the healthy controls living with children in their own stable home environments.

RESULTS

Sample Characteristics

Of the 31 battered women who participated in the study, data were incomplete for two women due to actigraph equipment failure and for one woman who did not complete all the questionnaires. These three participants were excluded from analyses. The average length of stay in the transitional housing programs was 203 ± 154 days, (median = 180 days). The battered women ranged in age from 18 to 50 years (35 ± 8.5). The healthy controls ranged in age from 40 to 50 years and were, on average about 10 years older than the group of battered women. Other demographic characteristics are reported in Table 1 for both the battered women and the healthy controls. All of the women had children and 90% had their children with them in transitional housing. All accompanying children were lodged in the same unit with their mothers. Ages of their children and numbers of children were similar in both the healthy controls and battered women samples. The number of people sleeping

TABLE 1. Demographic Characteristics (Means + SD)

Variable	Women in transitional housing ($n = 29$)	Healthy controls in home environment ($n = 30$)	Significance t (p)
Age	34.7 ± 8.53	44.1 ± 2.05	5.74 (<.001)
General health rating (0–10)	6.5 ± 2.90	7.2 ± 2.06	1.00 (NS)
Number of children	2.5 ± 1.57	2.1 ± 0.93	1.05 (NS)
Ethnicity			
White	23%	64%	
Black	26%	11%	
Hispanic	16%	25%	
Asian or other	35%	0%	
Education			
High school or less	67%	8%	
Some college	30%	11%	
College degree	3%	81%	

in each transitional housing unit ranged from one to four (1.87 ± .92). Only one woman had a housing unit to herself.

The women in transitional housing indicated during interviews with the researchers that their current sleep felt comfortable, very calm, safe, and good, but that their sleep had been much worse before entering the transitional housing program, and their sleep still varied from day to day. Five of the women attributed their poor sleep to "bad dreams." Not surprisingly, the troubling content of their dreams was of someone or something trying to harm either them or their children. These dreams were either unchanged since they began living in the transitional housing program or growing worse. One participant said she had bad dreams because "I got more rest and I got more time to think about all the things that had happened to me and I really suffer from nightmares. I can't sleep at night."

Scores on the CTS reflected that battered women in these transitional housing programs had experienced minor assaults (34.4 ± 29.0) as well as severe assaults (39.3 ± 39.3) that included sexual assaults (64.7 ± 55.3). It was interesting to note that battered women who had more severe and more frequent assaults also had longer total sleep time ($r = .41$, $p = .027$). There was no other correlation with either objective or subjective sleep measures, but there was a trend in the relationship between experience of assaults and morning fatigue ($r = .32$, $p = .08$).

Mean scores of 0.89 or higher for the 28 items in the SCL-90R subscale for posttraumatic stress disorder (PTSD) were used to categorize women as currently having PTSD (Arata, Saunders, & Kilpatrick, 1991). Seventy percent of the battered women ($n = 20$) had PTSD. Higher PTSD scores were significantly related to self-report of poorer health ($r = -.58$, $p < .001$), feeling less rested after a night of sleep ($r = .54$, $p = .002$), and perceiving more severe morning fatigue ($r = .39$, $p = .029$). There was also a trend for higher PTSD scores associated with reporting poorer sleep quality ($r = -.30$) but the correlation was not statistically significant in this small sample. There was no relationship between PTSD scores and quantitative actigraphy measures of sleep.

Objective Sleep

Actigraphy results are shown in Table 2 as means ± SEM for the two consecutive nights of sleep. Compared to the healthy controls sleeping in their own stable home environments, the battered women living in transitional housing had less sleep and more awakenings, but the differences between the groups were not statistically significant in this small

TABLE 2. Subjective and Objective Sleep Measures (Mean ± SEM) for Battered Women Living in Transitional Housing Compared to Healthy Women Living in Their Own Stable Home Environments

	Self-report measures			Wrist actigraphy measures		
Variable	Battered ($n = 29$)	Controls ($n = 30$)	Significance $t(p)$	Battered ($n = 29$)	Controls ($n = 30$)	Significance t (p)
Total sleep time (minutes)				399 ± 12.4	423 ± 14.9	1.37 (NS)
Wake after sleep onset (%)				12.6 ± 1.75	7.2 ± 1.64	2.23 (.03)
Awakenings (number)	2.6 ± 0.55	1.7 ± 0.19	1.43 (NS)	15.2 ± 1.29	11.7 ± 1.45	1.81 (NS)
Sleep onset latency (minutes)	29.8 ± 5.5	15.9 ± 2.91	2.23 (.03)	16.3 ± 2.22	10.4 ± 0.64	2.56 (.015)
Quality of sleep (0–4)	2.8 ± 0.18	3.3 ± 0.20	2.10 (.04)			
Awaken feeling alert (0–3)	2.6 ± 0.12	2.7 ± 0.12	0.50 (NS)			
Awaken feeling rested (0–3)	2.7 ± 0.14	2.9 ± 0.14	0.88 (NS)			
Evening fatigue (0–10)	5.6 ± 0.40	6.3 ± 0.34	1.34 (NS)			
Morning fatigue (0–10)	4.1 ± 0.43	4.2 ± 0.44	0.23 (NS)			

sample. As indicated in Table 2, the women in transitional housing spent significantly more time trying to fall asleep ($p = .015$) and had significantly more wake time after sleep onset (WASO%) than controls ($p = .03$).

Subjective Sleep

Subjective sleep and fatigue variables are also reported in Table 2 as means ± SEM for the two consecutive nights and mornings. Although the women in transitional housing reported more awakenings, this difference was not statistically significant in this small sample, but their self-report of minutes to fall asleep was significantly longer ($p = .03$) than controls. Both groups were similar on how alert they felt upon awakening in the morning and how rested or fatigued they felt, but quality of sleep was rated significantly poorer for women in transitional housing compared to controls ($p = .04$). It was interesting to note that the comparison group of healthy women felt more fatigued in the evening than battered women, but fatigue severity was similar in the morning and fatigue was not associated with any objective sleep measure.

As indicated in Table 3, objective sleep onset latency was only weakly related to subjective sleep onset latency, but significantly related to rating of sleep quality and unrelated to how they felt in the morning. Objective number of awakenings was correlated with both subjective number of awakenings as well as rating of sleep quality. Neither total sleep time nor wake after sleep onset was correlated with subjective sleep or fatigue variables.

TABLE 3. Correlations Between Objective and Subjective Sleep ($n = 56$ Women)

	Subjective sleep onset latency	Subjective number of awakenings	Subjective sleep quality
Objective sleep onset latency	.233[a]	−.025	−.289*
Objective number of awakenings	.146	.359**	−.275*
Objective wake after-sleep onset (WASO %)	.134	.208	−.146
Objective total-sleep time (TST minutes)	−.091	.002	.041

[a] $p = .089$ (2-tailed).
* $p < .05$ (2-tailed).
** $p = .007$ (2-tailed).

DISCUSSION

On average, women in transitional housing took more than 15 minutes to fall asleep, spent more than 12% of the night awake, and slept 6.5 hours. This is very poor sleep considering their age, the minimally invasive monitoring method (i.e., wrist actigraphy), and their length of stay in the transitional housing program (e.g., at least 3 weeks as an inclusion criterion). The comparison group of healthy women was from a similar age range, also had children, but was living in their own stable home environments. While the healthy controls were on average ten years older than the battered women, they had at least 7 hours of sleep, spent only 7% of the night awake, and took an average of only 10 minutes to fall asleep.

Findings from this study reinforce clinical impressions that battered women residing in transitional housing frequently suffer from disturbed sleep, particularly initiation insomnia (difficulty falling asleep) and maintenance insomnia (difficulty staying asleep). Results are similar to findings of disturbed sleep among battered women living in emergency shelters (Humphreys, Lee, Neylan, & Marmar, 1999). The significance of these findings is reinforced by the fact that PTSD symptoms were correlated with subjectively poor sleep quality, more perceived morning fatigue, and feeling less rested upon awakening in the morning. These results suggest that interventions directed toward improving sleep for battered women should consider the possible role of PTSD and trauma history in their ongoing subjective sleep complaints.

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