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Brief communication

Differences in sleep apnea among veterans with PTSD and other mental health conditions

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ABSTRACT

The current study compared polysomnography results of 200 consecutive VA sleep clinic referrals with PTSD, other mental health diagnoses (OTHMH), and no mental health diagnoses (NOMH). There were 59 (29.5%) NOMH cases, 62 (31.0%) PTSD cases, and 79 (39.5%) OTHMH cases. SA was diagnosed in 105 cases (52.5%), and rates of SA diagnosis did not differ by MH diagnosis. PTSD SA cases were younger than NOMH cases. NOMH cases had less sleep and higher apnea-hypopnea index than OTHMH cases. PTSD cases were not different on any sleep variable, hypertension frequency, or body-mass index.

Sleep apnea (SA) is often comorbid with posttraumatic stress disorder (PTSD), with an aggregate SA prevalence rate of 63% among individuals with PTSD compared to a non-PTSD rate of 7% (Zhang et al., 2017). The few studies examining SA in individuals with PTSD compared to SA in other populations have yielded inconsistent results (e.g., Baird et al., 2018; Rezaeitalab et al., 2018). Understanding comorbidity of PTSD and SA is important; SA complicates the overall presentation of PTSD and presents treatment challenges (e.g., Reist et al., 2017). Further, comorbid PTSD is associated with lower SA treatment adherence (Zhang et al., 2017). To facilitate continued development of assessment and treatment of sleep in Veterans Health Administration (VHA), the current study examined frequency of PTSD and other mental health conditions among individuals referred for polysomnograms and compared SA in individuals with PTSD to SA in other populations. Based on theories of PTSD-SA comorbidity (Kinoshita et al., 2012), it was hypothesized that PTSD cases diagnosed with SA would have higher rates of hypertension and higher body-mass index (BMI) scores than SA cases without PTSD.

Method

Participants were 200 consecutive veterans receiving diagnostic in-laboratory polysomnograms through the sleep clinic of a VHA medical center in southern New England from June-December 2015, identified and reviewed using the VHA computerized patient record system. Referrals for CPAP titration, split-night polysomnograms, and at-home actigraphy were excluded.

This study employed a chart review methodology. Medical records of identified cases were reviewed and presence/absence of PTSD, other mental health diagnoses, insomnia, and hypertension, gender, era of service, nightmares, and medication, age, height, and weight at the time of the polysomnogram were recorded. Height and weight were used to calculate BMI. Veterans completing in-laboratory polysomnograms were monitored using the Compumedics polysomnography data acquisition system. Data were collected, scored, and interpreted based on the rules, terminology, and technical specifications of the American Academy of Sleep Medicine (2015). Polysomnogram results yielded time in bed, sleep onset latency, wake time after sleep onset, total sleep time, sleep efficiency, apnea/hypopnea index (AHI; total apneas and hypopneas divided by hours of sleep), average/nadir blood oxygen saturation, and average heart rate.

Analyses of variance (ANOVAs) and chi-square analyses were used to compare referrals for polysomnograms with PTSD, other mental health conditions (OTHMH), and no mental health conditions (NOMH) on demographic and clinical variables.

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Table 1
Sleep/demographic variables by mental health diagnosis in veterans diagnosed with sleep apnea.

Variable	PTSD, n = 33,(mean (SD)/ n(%)	OTHMH, n = 37,mean(SD)/ n(%)	NOMH, n = 35,mean (SD)/n(%)	F/df/p/ χ^2/df/p
Age	**59.3 (11.7)[a]**	**60.6 (13.9)**	**67.3 (14.2)[a]**	**3.7/2/ .03**
Body-mass index	32.3 (6.8)	31.1 (6.1)	31.9 (4.9)	.4/2/ .69
Female gender	3 (8.6%)	2 (6.5%)	4 (10.8%)	.8/2/ .65
Hypertension diagnosis	12 (36.3%)	13 (35.1%)	11 (30.5%)	.3/2/ .86
Time in bed (minutes)	444.5 (57.9)	455.4 (53.1)	422.2 (73.9)	2.7/2/ .07
Sleep onset latency (minutes)	35.4 (45.4)	40.1 (44.3)	29.9 (38.2)	.5/2/ .59
Wake time after sleep onset (minutes)	96.1 (62.3)	92.1 (64.1)	111.6 (69.6)	.9/2/ .41
Total sleep time (minutes)	**299.1 (85.0)**	**313.3 (88.6)[a]**	**257.9 (107.8)[a]**	**3.4/2/ .04**
Sleep efficiency (%)	68.4 (18.0)	69.6 (18.0)	60.9 (24.3)	1.9/2/ .15
Apnea-hypopnea index	**14.2 (14.5)**	**9.4 (4.0)[a]**	**18.9 (22.2)[a]**	**3.5/2/ .03**
Sleeping oxygen saturation (%)	93.6 (1.9)	93.0 (2.2)	92.9 (1.6)	1.2/2/ .32
Nadir oxygen saturation (%)	84.3 (4.5)	84.2 (4.9)	86.3 (3.6)	2.5/2/ .09
Sleep heart rate (beats per minute)	63.1 (9.5)	66.6 (11.5)	59.9 (10.1)	2.9/2/ .06

Note. OTHMH = mental health diagnosis other than PTSD; NOMH = no mental health diagnosis. Means with the same superscript significantly differed.

Results

The sample of 200 consecutive referrals receiving in-laboratory polysomnograms was 57.5 years of age, sd=16.2, and 88.5% male. Mean BMI was 31.1, sd=5.6, and 56.5% were diagnosed with hypertension. An average of 2.1 psychiatric medications, sd=1.1, range 1-6, and 4.1 other medications, sd=2.3, range 1–12, were prescribed to 117 (58.5%) and 162 (81.0%) cases respectively. PTSD cases, $\overline{X}$=53.0, sd=15.4, were significantly younger than NOMH, $\overline{X}$=63.0, sd=16.8, and OTHMH, $\overline{X}$=56.8, sd=15.3, cases, $F(2)$=6.2, p<.02. There were 59 (29.5%) NOMH cases, 62 (31.0%) PTSD cases, and 79 (39.5%) OTHMH cases. OTHMH cases averaged 1.7 mental health diagnoses (most common depressive (65.8%), anxiety (35.4%), and substance use (31.6%) disorders).

Of the 200 referrals, 105 (52.5%) were diagnosed with SA. PTSD cases (33/62, 53.25%) were not more likely to be diagnosed with SA than NOMH cases (35/59, 59.3%) or OTHMH cases (37/79, 46.8%), $\chi^2(2)$=.57, p=.75. Consistent with the pattern in overall referrals, PTSD cases were significantly younger than NOMH cases. OTHMH cases got significantly more minutes of sleep and spent a significantly higher percentage of time in stage N2 sleep than NOMH cases, with PTSD cases not differing from either group on either variable. NOMH cases had a significantly higher mean AHI than OTHMH cases, with PTSD cases not differing from either group (Table 1).

Discussion

The rate of PTSD among 200 consecutive referrals receiving in-laboratory polysomnograms (31%) was nearly three times the rate of PTSD among veterans receiving care in the VHA system (Harpaz-Rotem & Hoff, 2014). Mental health concerns including PTSD appear to be the norm among veterans receiving in-laboratory polysomnograms, suggesting it would be beneficial for sleep clinics and mental health clinics to collaborate and ensure thorough assessment and treatment-planning.

Veterans diagnosed with PTSD were younger than NOMH cases; it is possible that something about PTSD potentiates earlier onset of SA, or that more frequent mental health contacts facilitate earlier detection of sleep difficulties. SA was not associated with BMI or hypertension. PTSD cases did not differ in SA frequency or on any sleep variable. These results were comparable to those of Capaldi et al. (2011), who found PTSD present in 26% of cases (compared to 31% in the present study), and that PTSD was not associated with SA, among recently deployed service members referred for polysomnograms. Numerous anatomical factors contribute to airway openness/obstruction (e.g., Lindman & Ståhl, 2002); it is possible that variance in SA due to physical factors exceeds variance due to mental health.

The current study was slightly underpowered for detecting small-to-medium effects (Faul et al., 2007). The cases examined had all been referred for a polysomnogram and therefore were not representative of the general population. The use of chart review methodology limited data to what could be found in the medical record, and diagnoses were based on provider documentation.

These results suggest that veterans with PTSD receiving in-laboratory polysomnograms in a VA sleep clinic do not have more severe sleep disruption. PTSD and other mental health concerns are common in veterans referred for sleep studies, and it may be beneficial for VA mental health providers and sleep clinics to collaborate.

Declaration of Competing Interest

None of the authors reports any interests that might be interpreted as influencing the research. APA ethical standards were followed in the conduct of the study.

Author statement

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