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Sleep Disturbance Among Chinese Breast Cancer Survivors Living in the USA

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Abstract

Purpose—Emerging evidence suggests Chinese breast cancer survivors, a largely understudied population, are at increased risk of sleep disturbance which can have significant impacts on quality of life and other important outcomes. This study aims to describe sleep disturbance among Chinese breast cancer survivors and to examine demographic and clinical correlates as well as psychosocial correlates of sleep disturbance.

Methods—Data from 80 Chinese breast cancer survivors in the USA completed the Chinese version of the Pittsburgh Sleep Quality Index as well as measures of quality of life, depressive symptoms, and perceived stress. Participants also completed measures of demographic factors and acculturation.

Results—Two thirds (66%) of survivors experience elevated sleep disturbance. Approximately half (49%) reported sleep efficiency, the percentage of time in bed that is spent asleep, that was below the recommended cutoff. Compared to those without sleep disturbance, those with sleep disturbance had worse quality of life, more depressive symptoms, and perceived stress ($p < .01$).

Conclusions—This study is among the first to examine sleep disturbance among any Asian cancer population in the USA. Findings indicate Chinese breast cancer survivors may experience significant disparities in sleep disturbance relative to non-Hispanic Whites and suggest an urgent need for interventions to address sleep disturbance among Chinese breast cancer survivors.

Keywords

Cancer; Oncology; Sleep; Quality of Life; Chinese Cancer Survivors; Breast Neoplasms; Survivorship

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Compliance with Ethical Standards: The authors have no conflicts of interest to declare. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Informed consent was obtained from all individual participants included in the study

Introduction

Emerging evidence suggests that Americans of Asian ancestry experience significant disparities in sleep disturbance, including lower overnight sleep duration and greater daytime sleepiness than Whites[1]. Among Chinese, the largest Asian subgroup in the USA, US-born women are over twice as likely as first-generation immigrants to experience sleep disturbance[2]. These data suggest the importance of examining sleep among Asian cancer survivors.

It is important to determine rates of sleep disturbance in this large and growing population and to identify correlates of sleep disturbance. The Three-Factor Model of Insomnia[3] is useful for conceptualization. Etiological factors are categorized as predisposing factors that raise risk of sleep disturbance, precipitating factors that trigger an acute episode, or perpetuating factors, typically maladaptive cognition/behavior[4]. Data on clinical correlates of sleep disturbance could help in developing culturally targeted interventions for Chinese cancer survivors. This study aimed to describe sleep disturbance among Chinese breast cancer survivors and explore psychosocial and quality of life (QOL) correlates of sleep disturbance.

Method

Baseline data were used from 80 Chinese breast cancer survivors in the USA recruited to a randomized clinical trial to improve QOL using writing interventions. The trial methodology are reported elsewhere[5]. Briefly, participants had completed primary treatment within four years for stage 0-III breast cancer and were able to read and write in Mandarin or Cantonese. Potential participants were approached at cultural events, educational conferences, and support groups. Study procedures were approved by relevant Institutional Review Boards.

Participants completed the Chinese version of the Pittsburgh Sleep Quality Index (PSQI), which was forward and backward translated[6]. Scores ≥ 5 and sleep efficiency (percentage of time in bed that is spent asleep) $< 85\%$ are indicative of elevated sleep disturbance[7, 8]. The cutoff of a total score of ≥ 5 has a sensitivity and specificity of 90% and 67%, respectively[6]. The former definition of sleep disturbance reflects a more *subjective* experience of sleep disturbance, and the latter reflects a more *objective* experience. Participants also completed Chinese versions of the Functional Assessment of Cancer Therapy[9], the Center for Epidemiologic Studies Depression scale[10], the Perceived Stress Scale[11], and the Stephenson Multigroup Acculturation Scale[12].

T-tests, chi-squares, and Fisher's Exact tests were conducted to compare those with and without sleep disturbance on potential correlates of sleep disturbance. Those that demonstrated associations with sleep disturbance were planned to be included as covariates in multivariate analyses. Analyses of covariance were conducted to determine whether groups differed in psychosocial and QOL outcomes while controlling for covariates that were statistically significant. Analyses used an alpha level of .05.

Results

Descriptive statistics are presented in Table 1. The average sleep disturbance score was above the threshold for elevated sleep disturbance ($M=8.00$, $SD=4.90$). Most (66%) reported elevated sleep disturbance (median=7), and almost half (49%) reported sleep efficiency below 85%. Nine percent reported taking sleep aids three or more times per week. Thirty percent reported taking >30 minutes to fall asleep at least three nights per week, and an additional 16% reported doing so once or twice per week. Participants endorsed various reasons for having difficulty sleeping at night. Reasons most commonly reported at least three or more nights per week included waking to using the restroom (51%), waking during the night or early morning for other reasons (43%), feeling too hot (26%), and pain (24%). The average bedtime was 10:54PM ($SD=1.03$ hours), and the average rising time was 6:58AM ($SD=1.13$ hours). Participants reported taking an average of 37 minutes to fall asleep per night ($SD=48$) and sleeping 6.50 hours per night ($SD=1.38$). They reported a sleep efficiency of 82% ($SD=17\%$), suggesting that on average 18% of participants' time in bed was spent awake. The average time in bed of 8 hours ($SD=1.22$) suggests that participants spent approximately 86 minutes awake in bed each night

Women with less education were more likely to report elevated sleep disturbance, and older women were more likely to report sleep efficiency <85%. Thus, education and age were included as covariates in subsequent analyses comparing groups on sleep disturbance and sleep efficiency, respectively. Table 2 presents unadjusted sample means for psychosocial outcomes as well as covariate-adjusted means by group. Women with elevated sleep disturbance and with sleep efficiency <85% reported worse overall QOL, worse emotional well-being, worse functional well-being, and greater depressive symptoms ($p < .03$). Women with elevated sleep disturbance also reported worse physical and social well-being, as well as greater perceived stress ($p < .01$).

Conclusions

This study found that Chinese breast cancer survivors experienced high rates of sleep disturbance even years after diagnosis. Participants' average scores on the PSQI (8) were above the cutoff for elevated sleep disturbance, two thirds reported elevated sleep disturbance, and almost half reported sleep efficiency below the cutoff of 85%. The difference in overall QOL between survivors with and without elevated sleep disturbance and between those above or below the sleep efficiency cutoff of 85% exceeded cutoff for minimal clinically important differences[13]. These data suggest that, when compared to non-Hispanic Whites, Chinese cancer survivors may face significant disparities in sleep disturbance. Previous studies among mostly White female cancer survivors found that 45% reported elevated sleep disturbance[14] and had average PSQI scores of 6.8[15]. Education and age, predisposing factors for sleep disturbance, were associated with sleep disturbance. Neither is modifiable in a behavioral intervention, but both could be addressed when culturally targeting a new intervention to Chinese breast cancer survivors.

Limitations of this study include a small sample size, reliance on self-report, and lack of data on previous medical history. Although the study population reflects a level of education that

is similar to that of the larger population of Chinese individuals in the USA[16], future studies should examine larger and more diverse samples of Asian survivors in the USA and incorporate objective measurement of sleep. Nonetheless, this is the first study we are aware of to examine sleep with a validated instrument among Asian cancer populations in the USA. These findings call for future research to identify risk factors for and develop interventions for sleep disturbance in Asian survivors of breast and other cancers in the USA.

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References

1. Carnethon MR, et al. Disparities in sleep characteristics by race/ethnicity in a population-based sample: Chicago Area Sleep Study. *Sleep medicine*. 2016; 18:50–55. [PubMed: 26459680]
2. Hale L, et al. Acculturation and sleep among a multiethnic sample of women: the Study of Women's Health Across the Nation (SWAN). *Sleep*. 2014; 37(2):309–317. [PubMed: 24497659]
3. Spielman AJ, Caruso LS, Glovinsky PB. A behavioral perspective on insomnia treatment. *Psychiatr Clin North Am*. 1987; 10(4):541–53. [PubMed: 3332317]
4. Savard J, Morin CM. Insomnia in the context of cancer: a review of a neglected problem. *J Clin Oncol*. 2001; 19(3):895–908. [PubMed: 11157043]
5. Lu Q, et al. Expressive writing among chinese american breast cancer survivors: A randomized controlled trial. 2016
6. Tsai PS, et al. Psychometric evaluation of the Chinese version of the Pittsburgh Sleep Quality Index (CPSQI) in primary insomnia and control subjects. *Quality of Life Research*. 2005; 14(8):1943–1952. [PubMed: 16155782]
7. Buysse DJ, et al. The Pittsburgh Sleep Quality Index: a new instrument for psychiatric practice and research. *Psychiatry Res*. 1989; 28(2):193–213. [PubMed: 2748771]
8. Levenson JC, et al. A quantitative approach to distinguishing older adults with insomnia from good sleeper controls. *Journal of clinical sleep medicine: JCSM: official publication of the American Academy of Sleep Medicine*. 2013; 9(2):125. [PubMed: 23372464]
9. Wan C, et al. Validation of the simplified Chinese version of the FACT-B for measuring quality of life for patients with breast cancer. *Breast Cancer Research and Treatment*. 2007; 106(3):413. [PubMed: 17377841]
10. Cheung CK, Bagley C. Validating an American scale in Hong Kong: the center for epidemiological studies depression scale (CES-D). *The Journal of psychology*. 1998; 132(2):169–186. [PubMed: 9529665]
11. Leung DY, Lam Th, Chan SS. Three versions of Perceived Stress Scale: validation in a sample of Chinese cardiac patients who smoke. *BMC public health*. 2010; 10(1):513. [PubMed: 20735860]
12. Stephenson M. Development and validation of the Stephenson Multigroup Acculturation Scale (SMAS). *Psychological Assessment*. 2000; 12(1):77. [PubMed: 10752366]
13. Yost KJ, Eton DT. Combining distribution-and anchor-based approaches to determine minimally important differences: the FACIT experience. *Evaluation & the health professions*. 2005; 28(2): 172–191. [PubMed: 15851772]
14. Clevenger L, et al. Sleep disturbance, distress, and quality of life in ovarian cancer patients during the first year after diagnosis. *Cancer*. 2013; 119(17):3234–3241. [PubMed: 23797955]
15. Fortner BV, et al. Sleep and quality of life in breast cancer patients. *J Pain Symptom Manage*. 2002; 24(5):471–80. [PubMed: 12547047]

16. Pew Research Center. Chinese in the U.S. Fact Sheet, in Social and Demographic Trends. Pew Research Center; Washington, DC: 2017.

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Table 1

Demographic and clinical characteristics of the sample.

	Overall Sample N=80	PSQI Total < 5 (n=27)	PSQI Total 5 (n=53)	p	Sleep Efficiency 85%(n=41)	Sleep Efficiency < 85% (n=39)	p
Age, <i>M</i> (<i>SD</i>)	54.25 (7.94)	52.23 (8.06)	55.36 (7.73)	.11	52.10 (7.01)	56.85 (8.31)	.01
Months Since Diagnosis							
<i>M</i> (<i>SD</i>)	19.73 (10.44)	20.19 (9.04)	19.49 (11.19)	.79	20.27 (10.44)	19.19 (10.55)	.66
Median (range)	18.31 (2.60-44.25)	19.15 (4.08-37.55)	16.80 (2.60-44.25)		19.28 (2.60-44.25)	16.54 (2.99-43.76)	
Acculturation Score, <i>M</i> (<i>SD</i>)	1.91 (0.54)	1.98 (0.61)	1.87 (0.52)	.41	1.93 (0.55)	1.88 (0.55)	.70
Annual Income							
<\$45,000	55 (69%)	18 (67%)	37 (70%)	.19	29 (71%)	26 (67%)	.74
\$45,000	11 (14%)	6 (22%)	5 (9%)		7 (17%)	4 (10%)	
Missing/Not reported	14 (18%)	3 (11%)	11 (21%)		5 (12%)	9 (23%)	
Education							
Some college	57 (71%)	15 (56%)	42 (79%)	.02	28 (68%)	29 (74%)	.43
College graduate	22 (28%)	12 (44%)	10 (19%)		13 (32%)	9 (23%)	
Missing/Not reported	1 (1%)	0 (0%)	1 (2%)		0 (0%)	1 (3%)	
Marital Status							
Not Married	23 (29%)	22 (81%)	35 (66%)	.20	12 (29%)	11 (28%)	.92
Married	57 (71%)	5 (19%)	18 (34%)		29 (71%)	28 (72%)	
Stage at diagnosis							
0, I	37 (46%)	12 (44%)	25 (47%)	.82	20 (49%)	17 (44%)	.64
II, III	43 (54%)	15 (56%)	28 (53%)		21 (51%)	22 (56%)	
Lumpectomy or mastectomy							
Not received	7 (9%)	3 (11%)	4 (8%)	.68	5 (12%)	2 (5%)	.43
Received	73 (91%)	24 (89%)	49 (92%)		36 (88%)	37 (95%)	
Chemotherapy							
Not received	32 (40%)	13 (48%)	19 (36%)	.32	19 (46%)	13 (33%)	.27

	Overall Sample N=80	PSQI Total < 5 (n=27)	PSQI Total 5 (n=53)	p	Sleep Efficiency 85%(n=41)	Sleep Efficiency < 85% (n=39)	p
Received	47 (59%)	14 (52%)	33 (62%)		22 (54%)	25 (64%)	
Missing/Not reported	1 (1%)	0 (0%)	1 (2%)		0 (0%)	1 (3%)	
Radiotherapy				.88			.66
Not received	47 (59%)	16 (59%)	31 (58%)		26 (63%)	21 (54%)	
Received	28 (35%)	10 (37%)	18 (34%)		14 (34%)	14 (36%)	
Missing/Not reported	5 (6%)	1 (4%)	4 (8%)		1 (2%)	4 (10%)	
Aromatase Inhibitors				.60			.28
Not currently taking	28 (35%)	11 (41%)	17 (32%)		17 (41%)	11 (28%)	
Currently taking	48 (60%)	16 (59%)	32 (60%)		23 (56%)	25 (64%)	
Missing	4 (5%)	0 (0%)	4 (8%)		1 (2%)	3 (8%)	

Note: PSQI=Pittsburgh Sleep Quality Index. M=mean. SD=standard deviation.

Table 2

Group differences in psychosocial and quality of life outcomes.

	Overall Sample N=80	PSQI Total < 5 (n=27)	PSQI Total 5 (n=53)	Sleep Efficiency 85%(n=41)	Sleep Efficiency < 85% (n=39)	P
	M (SD)	M (SE)	M (SE)	M (SE)	M (SE)	P
Overall Quality of Life	72.69 (17.77)	86.52 (2.87)	66.20 (2.38)	79.70 (2.70)	66.29 (2.98)	.002 [†]
Physical Well-Being	2.72 (0.97)	3.35 (0.17)	2.38 (0.14)	2.91 (0.16)	2.51 (0.18)	.11
Social Well-Being	2.79 (0.85)	3.13 (0.16)	2.64 (0.13)	2.97 (0.13)	2.68 (0.14)	.14
Emotional Well-Being	2.86 (0.76)	3.22 (0.14)	2.71 (0.12)	3.06 (0.12)	2.66 (0.13)	.03
Functional Well-Being	2.45 (0.94)	3.12 (0.16)	2.16 (0.13)	2.88 (0.14)	2.09 (0.15)	<.001
Depressive Symptoms	0.99 (0.70)	0.45 (0.11)	1.27 (0.09)	0.78 (0.11)	1.19 (0.12)	.02
Perceived Stress	1.62 (0.43)	1.40 (0.08)	1.75 (0.06)	1.56 (0.07)	1.65 (0.08)	.41

Note: PSQI=Pittsburgh Sleep Quality Index. M=mean. SD=standard deviation. SE=standard error.

[†]=difference between groups exceeded cutoff for minimal clinically important differences. Overall sample means are unadjusted. Group means are covariate-adjusted for education (PSQI Total Score < vs. 5) or age (Sleep Efficiency vs. < 85%). Higher PSQI Total scores and lower sleep efficiencies indicate worse sleep quality. Quality of life, depressive symptoms, and perceived stress scores derived from the Functional Assessment of Cancer Therapy, Center for Epidemiologic Studies Depression scale, and Perceived Stress Scale, respectively.