

BREAST CANCER, HYPOVITAMINOSIS D AND SLEEP DISTURBANCE AMONG ADULT WOMEN

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ABSTRACT

Objective: To determine sleep disturbances among adult women with breast cancer and hypovitaminosis D (BCHD).

Methodology: A cross sectional self-report predictive study was conducted between March 2017 to July 2017 in Allied Hospital, Faisalabad. Sample was recruited through purposive sampling and consisted of 120 women diagnosed with BCHD. Sleep Disturbance Adult Scale (SDAS), Short Form, translated by researchers in Urdu was used to measure sleep disturbance in patients with BCHD. SPSS version 21 was used for statistical analysis.

Results: The mean age of sample was 43.58 ± 9.5 years. The hierarchical multiple regression model revealed $F = 9.1\%$ of variance in sleep disturbance. Duration of diagnosis and marital status were significant predictors of sleep disturbance (.208 and -.182 respectively), with $p < .05$.

Conclusion: Women with BCHD have mild level of sleep disturbance. Marital status and duration of diagnosis were significant predictors of sleep disturbance in women with BCHD.

Key Words: Breast cancer, Hypovitaminosis D, Sleep Disturbance, Women

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INTRODUCTION

Cancer is leading cause of death around the world. In 2015, total deaths counted 8.8 millions due to different cancers including breast¹. Breast cancer (BC) is the most common cancer among US women, accounting for 29% of newly diagnosed cancers². BC incidence and death rates generally increase with age. During 2008-2012, the median age at the time of BC diagnosis was 61 years signifying as half of women diagnosed with BC were in this age or younger at the time of diagnosis³. Every 8th women in US has a lifetime risk of being diagnosed with BC. In the 1970s, the lifetime risk of being diagnosed with BC was 1 in 11. This increase in risk is due to longer life expectancy, changes in reproductive patterns, menopausal hormone use, the rising prevalence of obesity and increased detection through screening³. BC incidence rate is high among blacks as compared to white women before age 45 and are more likely to die from BC at every age. Asian/Pacific Islander (API) women have the lowest incidence and death rates⁴. The number

of invasive and non-invasive BC cases among women significantly increased during 1975-2012 in the age 50 years and above but the cases in the age range of 0-49 years indicated stability in change. It further clarify that increase in invasive BC cases is higher than non-invasive BC cases⁵.

The majority of new BC cases and BC deaths are observed in less developed states of the world⁶. In Pakistan Between 2010 and 2012, in Lahore, about 16000 new cancers were diagnosed amongst which 57% were in female. The age-standardized incidence rate of BC among women was 47.6⁷. Association of various risk factors i.e. age, body mass index (BMI), marital status, lack of breast feeding, smoking, lack of physical activity and post-menopausal status with BC risk is reported among Pakistani women⁸. Difference in prognosis between the genders, socio-demographic and clinical characteristics were observed in BC cases⁹. BC patients demonstrated significant knowledge gaps and priorities in tumor biology and heterogeneity, supportive care, psychoso-

cial and functional well-being¹⁰. South African male BC patients' were evaluated for perception of their loss of masculinity¹¹. Needs and involvements of BC survivors were explored in India¹². Role of sunlight and nutritional vitamin D to reduce the threat of BC was considered in last century¹³. Appraisals of brain regions interrelated with sleep-wake regulation and vitamin D target neurons in the diencephalon and several brainstem nuclei suggested direct central effects of vitamin D on sleep; thus sleep disorders have become epidemic because of widespread hypovitaminosis D (HD)¹⁴. A shortened duration of nocturnal sleep is linked with a greater risk of BC progression¹⁵.

Sleep disturbances can cause BC or can be caused by BC as sleep-wake disturbances are a persistent problem linked to poor quality of life in women surviving with BC¹⁶. The rationale behind the present study was to study breast cancer and its impact on sleep disturbance because sleep problems are very common in the patients with breast cancer.

METHODOLOGY

This cross sectional self-report predictive study was conducted during March to July 2017 in Surgical Department of Allied Hospital, Faisalabad. Ethical considerations were followed while conducting the study. Informed consent was taken from the participants. Purposive sampling technique was used to recruit the sample. The total sample was 120 women diagnosed with breast cancer and hypovitaminosis D (BCHD). Only women were included due to high lifetime risk to develop BC that is every 1 in 7 compared to men having minimum lifetime risk of BC of 1 in 1,000¹⁷. Moreover, Vitamin D deficiency is more prevalent among women and younger age¹⁸.

Sample size was calculated for its statistical power 0.93 (F= 2.451) against four predictors using G*power 3.1.9.2 software. Input parameters for sample calculation were linear multiple regression; fixed model, R² deviation from zero; effect size f²= 0.15 and alpha= 0.05. Sample of the present study included women diagnosed by the physicians for hypovitaminosis D and any type and stage of breast cancer diagnosed for the last six months. Women diagnosed with other cancers

and those not having hypovitaminosis D were excluded from the study.

Sleep disturbance—adult (short form) developed by PROMIS Health Organization (PHO) and PROMIS Cooperative Group (2008-2012)¹⁹ and translated by researchers in Urdu version to improve response rate in all educational levels was used to measure sleep disturbance in patients with BCHD. Its Cronbach's alpha value was 0.66, which indicated fair internal consistency of SDAS Urdu version. Scoring method of Sleep Disturbance Adult Scale (SDAS) Urdu was same as original scale in which total score of the participants was compared with T-score to obtain the level of sleep disturbances. Interpretation of T-scores included: less than 55 indicated none to slight sleep disturbance; 55.0—59.9 was a sign of mild sleep disturbance; 60.0—69.9 reflect moderate; and 70 and above showed severe sleep disturbance.

SPSS version 21 was used for statistical analysis. Reliability analyses were run to measure consistency in results of SDAS. Descriptive statistics as well as Pearson product moment correlation, independent sample t-test and regression analysis were used.

RESULTS

Age range of participants was 21-66 years. Descriptive statistics of age, duration of diagnosis and SDAS are shown in Table 1. In this study, 85% women with BCHD were educated up to matric and 15% were educated up to intermediate and above. Majority was married, only 4% were unmarried. Duration of BCHD diagnosis was 1 year (32%), 2 years (39%), 3 years (19%), 4 years (4%), 5 years (5%) and 6 years (1%).

In Table 2 regression analysis model (age, marital status, number of children and duration of diagnosis) explains 9.1% of variance in sleep disturbance. Duration of diagnosis made strongest and significant contribution in prediction of sleep disturbances with Beta value of .208 when the variance explained by all other variables in this model is controlled for. Marital status was another significant contributor to explain sleep disturbances with 0.05 alpha level. On the other hand, number of children and age of women were not significant contributors in this study (alpha level >0.05).

Table 1: Descriptive statistics of age, duration of diagnosis and SDAS (n=120)

Variables	Minimum	Maximum	Mean	SD
Age	21	66	43.58	9.49
Duration of Diagnosis	1	6	2.15	1.13
SDAS	9.00	37.00	24.13 (T = 55.3)	4.96

Table 2: Regression analysis for sleep disturbances among female patients with BCHD (n=120)

Predictors	B	SE	Beta
Duration of Diagnosis	.903	.392	.208*
Marital Status	-4.514	2.319	-.182*
Number of Children	-.459	.253	-.174
Age	.038	.050	.073
ΔR^2	.091*		

*p <.05

DISCUSSION

In 2016, total estimated deaths due to BC were 40890; among these 40450 were women²⁰. Descriptive statistics (Table 2) indicated mild level of sleep disturbance in adult female patients with BCHD. BC patients having significant sleep problems had greater deficits in many areas of health-related quality of life (QoL)²¹. Less educated women with metastatic BC are at higher risk for having sleeping problems²². Depressive symptoms predicted sleep disturbance among BC patients²³. Arab nations have younger population with BC as compared to western countries²⁴. Older & married women were at decreased risk for mortality after a diagnosis of BC²⁵.

Table 3 showed 9.1% of variance in sleep disturbance. Duration of diagnosis made strongest and significant contribution in prediction of sleep disturbances with Beta value .208 when variance explained by all other variables in this model was controlled for. Marital status was another significant contributor to explain sleep disturbances with 0.05 alpha level. On the other hand, number of children and age of women were not significant contributors in this study as alpha level was >0.05.

Duration of diagnosis explained 4% of the variance in sleep disturbances among adult women with BC. Marital status indicated a contribution of 3% to explain variance in sleep disturbances. BC patients had multiple factors that predicted both prevalence and severity of poor sleep²⁶. BC is linked with age according to American Cancer Society; women should start annual screening between 40 to 45 years and continue screening annually from the age of 45 to 54 years and then screen biennial at age 55 years and older²⁷. Reproductive concerns after BC treatment are a significant contributor to consistent depressive symptoms²⁸. If BC is detected during pregnancy, termination of the pregnancy does not necessarily improve the cancer prognosis²⁹. HD is common at the time of BC diagnosis and is linked with

a poorer prognosis in terms of overall survival and distant disease free survival particularly in postmenopausal women³⁰⁻³³.

LIMITATIONS

Our study has several limitations. Male patients diagnosed with BC were not included and they can be approached in future studies. Women with particular type and stage of BC can be specifically observed. Similarly, regional constraint can be resolved by extending the sampling frame.

CONCLUSION

The present study highlighted the importance of sleep and factors that may increase the sleep disturbance. Women with BCHD have mild level of sleep disturbance. Marital status and duration of diagnosis were significant predictors of sleep disturbance in women with BCHD.

RECOMMENDATIONS

Our results may increase the level of awareness. Standardized vitamin D supplementation in veterans can be effective in improving their sleep and various aspects of QoL.

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CONTRIBUTORS

SMIHZ conceived the idea, designed the study, and translation of scale. NY did conceptualization, scale translation, analysis, and interpretation and drafted the manuscript. KMB proof read the scale, Literature review. MN data acquisition, Literature review and proof read of manuscript. SJ data acquisition and Literature review. AI data acquisition and Literature review. All authors contributed significantly to the submitted manuscript.