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The relationship between death anxiety and sleep quality among Moroccan women with breast cancer

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ABSTRACT

This study aims to examine the relationship between the death anxiety level and the sleep quality level among women with breast cancer in a cancer center in Rabat in order to understand the impact of psychological factors on the health and social status of patients. This study is a descriptive correlational study which included 101 women with breast cancer from Friends of the National Institute of Oncology Association in Rabat (AMINO). Sleep quality was measured using the Sleep Quality Index (PSQI), and the level of death anxiety was assessed using the Death Anxiety Scale (DAS). The data were statistically analyzed using IBM SPSS version 25. The results of the study showed a significant decrease in the level of sleep quality among the participants; with an average sleep quality score of 8.32 ± 5.26, which was particularly represented by difficulty falling asleep and short sleep duration. The results also showed a statistically significant correlation between the DAS scores and the total PSQI score (r=0.41, P <0.01). Regarding the sleep quality index, the results did not show statistically significant differences between the variables. Women residing in rural areas recorded higher scores on the death anxiety scale than those residing in urban areas (P=0.030). Shorter diagnosis time was associated with higher levels of death anxiety than longer periods (P=0.007), while the results showed that participants in the post-treatment phase recorded lower death anxiety scores than participants in the treatment phase (P=0.002). The results showed a significant correlation between the study variables in a sample of women with breast cancer. This study recommended to provide psychological support to this group with a focus on treating sleep problems and reducing death anxiety levels to improve their psychological and physical condition. The importance of integrating psychological and health care as an essential part of the comprehensive treatment plan lies on improving quality of life and helping patients adapt to the psychological and physical challenges associated with the disease.

Keywords: Sleep quality; Death anxiety; Breast cancer

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INTRODUCTION

Breast cancer is one of the most prominent global health problems and one of the most important causes of death worldwide, with 2,088,849 new cases of breast cancer recorded worldwide according to the GLOBOCAN report for 2018. In 2022, this disease caused 670,000 deaths worldwide, with 2.3 million cases recorded among women [1]. In Morocco, breast cancer is the most common type of cancer among women [2], with incidence rates witnessing a significant increase during the last decade according to the cancer registries in Casablanca (RCRC) and Rabat (RCR) for 2012 where the standard incidence rate of this disease reached 39.9 and 49.2 per 100,000 women, respectively. It is noted that the average age of diagnosis in Morocco ranges between 45 and 50 years that is lower than its counterpart in Western countries which is about 55 years [3]. Breast cancer patients suffer from a variety of psychological and physical symptoms including anxiety, depression, fatigue, exhaustion, low self-esteemand many other forms of suffering [4]. We find death anxiety one of the most common psychological problems which is an emotional experience that includes fear and panic emotions resulting from the individual's awareness of the end of life [5, 6]. This anxiety causes the patient to face uncertainty, anxiety about the effects of treatment and fear of disease progression [7].

Death anxiety is an intense emotional response that arises as a result of facing negative thoughts related to death and it is a feeling of fear associated with the realistic perception of the possibility of death [8]. Individuals with terminal illnesses such as cancer show higher levels of death anxiety than those with other illnesses. This anxiety being particularly evident during the stages of diagnosis, treatment, and the expectation of recurrence [9]. Death anxiety impairs patients' ability to cope with their illness and hinders the realization of their dreams and future plans [10]. Death anxiety persists even after treatment is completed and patients are followed up on their health condition. In this context, the term breast cancer survivors are used to refer to women who were diagnosed with breast cancer and were able to survive after completing treatment and subject to long-term follow-up to reduce the risk of recurrence or secondary cancer. However, many survivors suffer from long-term side effects that include the most important of which is psychological anxiety [11], as the prevalence of anxiety disorders among breast cancer survivors ranges from 6% to 23% [12] Sleep disorders are common among cancer patients, as studies indicate that about 50% of them suffer from this problem and the percentage is particularly high among breast cancer patients, ranging from 67% to 90%, and these disorders

continue for years after treatment which may reach 10 years [13].

Studies have shown that women with breast cancer suffer from poor sleep quality and sleep disturbances compared to women without the disease, as they scored higher on the PSQI. These disorders include insufficient sleep duration, excessive sleep duration, insomnia, Restless Legs Syndrome (RLS), and sleep apnea [14] and are associated with deterioration of physical and psychological functions such as anxiety, fatigue, and depression [11,14].

Despite the growing global interest in studying factors associated with sleep quality in breast cancer patients, research on the association between sleep quality and death anxiety is still limited, especially in Arab countries such as Morocco. Most previous studies [2,11,15,16] focused on revealing the general psychological and physical effects resulting from breast cancer or the relationship between sleep quality and anxiety disorders and depression, while neglecting death anxiety as an independent psychological variable that particularly affects sleep quality.

In the Moroccan context, it is important to evaluate this relationship in light of social, cultural and economic factors that may explain the different responses of patients to the disease on the one hand and fears related to death on the other. Taking into account the scarcity of studies that address the correlation between death anxiety and sleep quality so it becomes necessary to shed light on this issue in order to provide a knowledge base that contributes to the development of psychological intervention strategies that take care of the psychological and physical needs of patients.

The problem of this study revolves around the following main question: Is there a correlation between death anxiety and sleep quality in women with breast cancer? A set of sub-questions branch out from this main question:

- What is the level of death anxiety in women with breast cancer?
- What is the level of sleep quality in women with breast cancer?
- Are there statistically significant differences in the level of death anxiety among women with breast cancer due to the variables of age, social status, economic status, educational level, place of residence, duration of diagnosis, location of the disease and type of treatment?
- Are there statistically significant differences in the level of sleep quality among women with breast cancer due to the variables of age, social status, economic status, educational level, place of residence, duration of diagnosis, location of the disease and type of treatment?

METHODOLOGY AND PROCEDURES

Study methodology and context

The current study relies on the Descriptive Correlational Method as it is the appropriate method to achieve the study objectives. In this context, two tests were used to examine the correlation between the variable of death anxiety and sleep quality among women with breast cancer in Friends of the National Institute of Oncology Association (AMINO) in Rabat, Morocco.

Study participants and sample: The study sample included 101 Moroccan women diagnosed with breast cancer, including women newly diagnosed, undergoing treatment and survivors of the disease. 6 participants were excluded from the study due to incompleteness of some elements of the questionnaire, especially with regard to the type of treatment and some other data. The participants filled out the questionnaire and answering the items of the study scales. The questionnaire was distributed individually in Friends of the National Institute of Oncology Association (AMINO) in Rabat. The women took between 10 and 15 minutes to fill out the questionnaire completely. The study conditions required that the participant be Moroccan and diagnosed with breast cancer. All participants gave their consent to participate in the current scientific study after the instructions and the study objective were explained.

Data collection tools demographic information

Demographic information: The demographic information of the participants was collected using a questionnaire, which included variables such as age, educational level, marital status, duration of diagnosis, place of residence, income level, type of treatment, and location of the disease. This demographic data helps provide a deeper understanding of the characteristics of the sample, which is essential in interpreting the results and understanding how these factors affect the results of the study.

Pittsburgh Sleep Quality Index (PSQI): The Pittsburgh Sleep Quality Index (PSQI) is a tool developed by Buysse and his colleagues to assess sleep quality over the past month. The scale consists of 19 self-assessment items divided into seven main dimensions: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, hypnotic drug use, and daytime dysfunction [15]. Each dimension is assessed using a scale ranging from 0 to 3 [2], with the total score of the index ranging from 0 to 21. A higher score indicates poor sleep quality [14,15,17]. The final item scores of the scale which include questions directed to the bed partner, are usually not counted, and a score of less than 5 indicates good sleep quality while as core equal to or greater than 5 indicates problems with sleep quality [18]. The PSQI was translated into Arabic and its psychometric properties were tested in the study of Suleiman, et al. [18] where the results showed that the scale's reliability was acceptable. There were medium to high correlations between its components and the total score ($r=0.53$ to $.82$, $p<0.01$). The scale also showed strong convergent validity, through a high positive correlation with the Insomnia Severity Index ($r=0.76$) and a medium correlation with the Medical Outcome Study Short Form-36 vitality subscale ($r=-0.33$).

Templer's Death Anxiety Scale (DAS): The Death Anxiety Scale (DAS) was developed by Donald Templer in 1970 to measure and assess death anxiety. This scale measures four main dimensions: anxiety about the dying process, death as an absolute and final reality, anxiety related to corpses, and anxiety about the burial process. Despite its design to measure these four dimensions, factor analyses have shown that the scale

is multidimensional. However, in its final form, it is considered one- dimensional, reflecting a main dimension that expresses anxiety about death in general [19].

Templer's Death Anxiety Scale was translated into Arabic in Abdel-Khalek's study [19] where the psychometric properties of the scale showed strong results in the reliability test. The correlation coefficient between the Arabic and English versions was 0.87, reflecting a high agreement between the two versions. The results of the retest reliability of the Arabic version also showed high values, reaching 0.70 for males and 0.73 for females. In addition, a positive correlation was found between death anxiety and both the Taylor Explicit Anxiety Scale, the State and Trait Anxiety Inventory, and the Neuroticism subscale of the Eysenck Personality Inventory. Factor analysis of a number of variables showed that death anxiety and general anxiety are independent factors. The scale consists of 15 items that are answered with yes or no [8]. Its scores range from 0 to 15, where a higher score indicates higher death anxiety [20]. The responses of the subjects to determine the level of death anxiety are estimated based on correcting the items according to the following method: one point is awarded for items corrected with (S) that the subject answered correctly, and one point is awarded for items corrected with (X) that the subject answered incorrectly. In contrast, a score of zero is given to items that are corrected with(S) and the examinee answers incorrectly, as well as to items that are corrected with (X) and the examinee answers correctly.

RESULTS

To process the study data, the statistical analysis program IBM SPSS version 25 was used. The results showed, regarding the distribution of participants by age group, that 13.9% of them are under 40 years old, while the age group between 41 and 59 years old constitutes the largest percentage at 57.4%, while the percentage of participants over 60 years old reaches 28.7%. As for the marital status, it was found that 40.6% of the participants in the study are married while 17.8% are single, 23.8% are divorced, and 17.8% are widows. As for the educational level, 51.5% of the participants are uneducated, while 29.7% of them have a primary education level, 10.9% have a secondary education level, and 7.9% have a university education level. 36.6% of the participants live in urban areas while 63.4% of them live in rural areas.

The results revealed that 58.4% of the participants had no income, while 31.7% had a limited income ranging between 500 and 1000 Dirhams, while 4% to 5.9% of the participants had an income ranging between 3000 Dirhams or more. Regarding the diagnosis of the disease, its duration ranged between less than 6 months for 30.7% of the participants, from 6 to 12 months for 13.9% of them, and more than a year for 55.4% of the participants. The results showed that 75.2% of the participants suffered from localized and non-spreading disease with breast cancer while 24.8% of the participants suffered from the spread of the disease to other areas of the body.

As for the type of treatment, it was found that 11.9% of the women participating in the study were newly diagnosed and had not yet undergone any treatment, 29.7% were undergoing chemotherapy, 19.8% were undergoing radiotherapy, 7.9% had recently undergone surgical treatment, and 30.7% were in the post-treatment follow-up phase **Tab. 1.**

Tab. 1. Patients' Socio-demographic variables.

Socio-demographic variables		N (%)
Age	<40 years	14 (13.9 %)
	41 years-59 years	58 (57.4 %)
	>60 years	29 (28.7 %)
Family status	Married	41 (40.6%)
	Single	18 (17.8 %)
	Divorced	24 (23.8%)
	Widow	18 (17.8 %)
Education level	Out of school	52 (51.5%)
	Primary school	30 (29.7%)
	Secondary school	11 (10.9%)
	University level	8 (7.9 %)
Residency	Rural	37 (36.6%)
	Urban	64 (63.4%)
Economic status	No income	59 (58.4%)
	Limited income	32 (31.7%)
	Moderate income	4 (4%)
	High income	6 (5.9%)
Diagnosis duration	<6 months	31 (30.7 %)
	6 months-12 months	14 (13.9 %)
	>12 months	56 (55.4 %)
Disease localization	Local	76 (75.2%)
	Diffused	25 (24.8 %)
Type of treatment	Treatment undecided	12 (11.9 %)
	Chemotherapy	30 (29.7 %)
	Radiation Therapy	20 (19.8 %)
	Surgery	8 (7.9 %)
	Post-Treatment	31 (30.7 %)

Tab. 2. shows that the mean of the PSQI was 8.32 with a standard deviation of 5.26, indicating that the study participants had a low level of sleep quality. The mean of the subjective sleep quality component was 1.30 with a standard deviation of 1.10, the mean of the sleep time component was 1.99 witha standard deviation of 1.11, the mean of the sleep duration component was 1.43 with a standard deviation of 1.25, and the mean of the usual sleep efficiency component was 1.57 with a standard deviation of 1.36. For the sleep disturbance component, the mean was 1.13 with a standard deviation of 0.87, while for the mean of the sleep medication use component it was 0.01 with a standard deviation of 0.10. The mean of daytime dysfunction was 0.88 with a standard deviation of 1.003. The results of the Templer Death Anxiety Scale (DAS) indicate that the mean death anxiety score was 8.00 with a standard deviation of 4.78, indicating that participants had a moderate level of death anxiety.

The results of **Tab. 3.** show that there were no statistically significant differences in the sleep quality index scores between different age groups, marital status, educational level, economic status, duration of diagnosis, type of treatment, location of the disease and place of residence, as the p-values for all variables were greater than 0.05. The results showed statistically significant differences in the level of death anxiety among the women participating in the study according to place of residence, as women residing in rural areas recorded higher scores in death anxiety than those residing in urban areas (P=0.030). The duration of diagnosis also affected death anxiety, as shorter periods of diagnosis (<6 months) were associated with higher levels of death anxiety than longer periods (P=0.007). In addition, the effect of treatment type on death anxiety appeared, as participants in the post-treatment phase recorded lower scores on the death anxiety scale than participants in the treatment phase (P=0.002).

Through the data in **Tab. 4.** which displays the results of the Pearson correlation coefficient between death anxiety scores (DAS) and sleep quality scores and components, the results of the statistical analysis indicate a strong statistically significant relationship between death anxiety Some components of sleep quality. Death anxiety was found to be significantly associated with subjective sleep quality (r=0.44, P=0.00), sleep time (r=0.28, P=0.004), sleep duration (r=0.35, P=0.00), and sleep efficiency (r=0.40, P=0.00). The results also showed a moderate relationship between death anxiety and sleep disturbances (r=0.23, P=0.01). However, no statistically significant relationship was found between death anxiety and the use of hypnotics (r=0.06, P=0.53). The effect of death anxiety on daytime dysfunction was close to the level of statistical significance but not significant (r=0.18, P=0.06).

Tab. 5. results revealed a significant correlation between death anxiety and overall sleep quality (r=0.41, P-value<0.01).

DISCUSSION

The average sleep quality score among women with breast cancer participants was 8.32 ± 5.26, reflecting a significant decrease in the level of sleep quality among them. These results were consistent with a recent Moroccan study that included 337 women with breast cancer, where the same scale, the Pittsburgh Sleep Quality Index (PSQI), was used, and showed that the average sleep quality score was 10.04±4.01. It also revealed that sleep disorders are common at 71.5% among women with breast cancer, highlighting that sleep problems are a phenomenon that is significantly widespread among this group [2].

The results of the study showed that women with breast cancer suffer from significant problems in sleep quality, as the participants rated their self- sleep negatively, reflecting a general feeling of low sleep quality. It was found that most of the participants had difficulty falling asleep, as the participants took a long time to fall asleep. The duration of sleep was also short, indicating that the participants were not getting enough sleep. The most prominent problems observed were difficulties falling asleep, as this problem was the most prevalent among the participants, followed by short sleep duration and poor sleep efficiency. Despite these challenges, the use of sleeping pills was very rare among the participants, reflecting the lack of resorting to medications as a primary solution to sleep problems.

The results of the study indicate a statistically significant correlation between death anxiety and some components of the sleep quality index and a significant correlation between the total score of the death anxiety scale and the total score of the sleep quality index. The current results are consistent with a group of previous studies that confirmed the existence of clear associations between psychological factors and sleep quality in this group. A recent Chinese study conducted by He, et al. [15], which included 293 breast cancer patients in three hospitals in Xi'an revealed an association between social anxiety and sleep quality. Despite the different concepts of death anxiety and social anxiety, both studies confirm the significant impact of psychological factors, especially anxiety disorders, on sleep quality in breast cancer patients.

Tab. 2. Descriptive data for sleep quality and death anxiety scores.

Variables	Mean	S.D.	Minimum	Maximum
Subjective sleep quality	1.30	1.10	0	3
Sleep latency	1.99	1.11	0	3
Sleep duration	1.43	1.25	0	3
Habitual sleep efficiency	1.57	1.36	0	3
Sleep disturbances	1.13	0.87	0	3
Use of sleeping medication	0.01	0.10	0	1
Daytime dysfunction	0.88	1.003	0	3
PSQI	8.32	5.26	0	18
DAS	8.00	4.78	0	15

Tab. 3. Participant's mean PSQI and DAS scores as a function of socio-demographic variables.

Variables		N	PSQI SCORES		DAS SCORES	
			Mean ± S. D	P-value	Mean ± S. D	P-value
Age	<40 years	14	8.50 ± 6.13	0.549	9.14 ± 4.737	0.529
	59 years-41 years	58	8.72 ± 5.28		8.03 ± 4.823	
	>60 years	29	7.41 ± 4.85		7.38 ± 4.777	
Family status [n (%)]	Married	41	8.95 ± 5.65	0.081	7.98 ± 4.486	0.966
	Single	18	6.22 ± 4.84		8.06 ± 5.252	
	Divorced	24	9.83 ± 4.99		8.33 ± 5.156	
	Widow	18	6.94 ± 4.43		7.56 ± 4.817	
Education level	Out of school	52	8.98 ± 5.609	0.602	8.62 ± 4.708	0.435
	Primary school	30	7.67 ± 4.922		7.00 ± 4.849	
	Secondary school	11	7.09 ± 5.204		7.18 ± 4.600	
	University level	8	8.13 ± 5.264		8.88 ± 5.33	
Residency	Rural	37	9.49 ± 5.490	0.090	9.35 ± 4.449	0.030
	Urban	64	7.64 ± 5.050		7.22 ± 4.825	
Economic status	No income	59	8.19 ± 5.463	0.270	7.95 ± 4.562	0.181
	Limited income	32	8.81 ± 5.177		8.78 ± 5.040	
	Moderate income	4	3.75 ± 0.957		3.25 ± 2.500	
	High income	6	10.00 ± 4.427		7.50 ± 5.683	
Diagnosis duration	<6 months	31	9.65 ± 5.583	0.150	9.65 ± 4.543	0.007
	6 months-12 months	14	6.50 ± 5.945		9.64 ± 5.183	
	>12 months	56	8.04 ± 4.808		6.68 ± 4.469	
Disease localization	Local	76	7.79 ± 5.468	0.079	7.63 ± 4.907	0.178
	Diffused	25	9.92 ± 4.300		9.12 ± 4.275	
Type of treatment	Treatment undecided	12	12.00 ± 3.954	0.055	9.67 ± 4.228	0.002
	Chemotherapy	30	8.67 ± 5.473		8.87 ± 4.592	
	Radiation Therapy	20	7.40 ± 5.861		8.55 ± 5.073	
	Surgery	8	9.25 ± 4 .803		11.13 ± 3.758	
	Post-Treatment	31	6.90 ± 5.265		5.35 ± 4.781	

Note: *P-value<0.05
Abbreviations: SD: Standard Deviation, DAS: Death Anxiety Scale, PSQI: Pittsburgh Sleep Quality Index, DAS: Death Anxiety Scale

Tab. 4. Correlation between the PSQI components and death anxiety scale total scores.

PSQI components	DAS total scores	
	R	P-value
Subjective sleep quality	0.44**	0.00
Sleep latency	0.28**	0.004
Sleep duration	0.35**	0.00
Habitual sleep efficiency	0.40**	0.00
Sleep disturbances	0.23	0.01
Use of sleeping medication	0.06	0.53
Daytime dysfunction	0.18	0.06

**Statistically significant at significance level 0.01
*Statistically significant at significance level 0.05

Tab. 5. Correlation between the PSQI total scores and DAS total scores.

Variables	R	P-value
PSQI/DAS	0.41**	0.00

Another study conducted by Kim, et al. [16] on 52 participants with breast cancer, who were evaluated during different time periods (during surgical treatment, the beginning and end of chemotherapy), showed that sleep quality is closely related to anxiety, depression, and quality of life, without recording clear differences between the time periods of treatment.

A study conducted by Cho & Hwang [11], conducted in South Korea on 266 breast cancer survivors, showed that participants with breast cancer, who were evaluated during different time periods (during surgical treatment, the beginning and end of chemotherapy), showed that sleep quality is closely related to anxiety, depression, and quality of life, without recording clear differences between the time periods of treatment.

A study conducted by Cho & Hwang [11], conducted in South Korea on 266 breast cancer survivors, showed that

sleep disorders play an important role in influencing levels of psychological anxiety among this group of patients. It was found that breast cancer survivors who suffer from sleep disorders are more susceptible to negative psychological effects such as anxiety and depression. The results also showed many survivors suffer from poor sleep quality, which is significantly associated with high levels of psychological anxiety.

In the same context, the results of the study by El Kherchi, et al. [2] showed a statistically significant relationship between the total score of the PSQI and levels of depression and anxiety according to the HADS scale and subjective sleep quality was the most closely related to levels of depression and anxiety, and it was noted that sleep duration was associated with higher levels of depression and anxiety. In contrast, no statistically significant association was found between the use of sleeping medications and the components of the HADS scale, indicating that taking medications had no direct effect on depression or anxiety.

As for the PSQI, the results showed no statistically significant differences between sleep quality scores attributable to study variables, with statistically significant differences in death anxiety levels attributable to place of residence, as women residing in rural areas recorded higher scores compared to their counterparts in urban areas. The study also showed a significant effect of the duration of diagnosis on death anxiety levels, with newly diagnosed women being more anxious than those diagnosed for a longer period. In addition, the type of treatment was a significant factor in death anxiety with women who had completed treatment or were in the post-treatment phase showing lower levels of death anxiety than those who had undergone chemotherapy, surgery, or radiotherapy.

When these results are discussed in the context of previous research, it becomes clear that death anxiety is one of the psychological challenges faced by cancer patients at different stages of treatment, and reflects feelings of fear and anxiety about the impact of their death on their families. Through the results of the current study, we can confirm that factors such as place of residence, duration of diagnosis, and type of treatment play a major role in determining death anxiety levels in women with breast cancer. The results of the study showed that women living in rural areas suffer from higher levels of death anxiety, which may reflect the challenges associated with difficulty in accessing specialized health care and medical services quickly, which may enhance feelings and emotions of anxiety and psychological stress about the future. In addition, women in the post-treatment phase were found to have lower levels of death anxiety than those still in treatment, reflecting a gradual development in acceptance of the idea of death as they progressed in or after treatment.

CONCLUSION

In conclusion, breast cancer patients are at high risk for sleep problems and death anxiety, which are common psychological challenges that significantly affect their quality of life. These problems have negative effects on mental and physical health, which increases feelings of anxiety, fatigue and exhaustion. Hence, integrating psychological care into oncology departments is an essential part of the comprehensive treatment plan, alongside medical treatments. It can effectively contribute to reducing death anxiety levels, improving sleep quality, enhancing patients' ability to cope with the disease and improving their psychological and social well-being.

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