Anxiety Influenced Sleep Quality Among Cancer Patients at the First Time of Chemotherapy

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Abstract. Chemotherapy is one of the main treatments for cancer patients. The impact of chemotherapy is sleeping disturbance. However, there has not been much research regarding the factors that cause sleep disorders in patients undergoing chemotherapy. The aim of this study was to determine the relationship between anxiety levels and sleep quality in breast cancer patients who will undergo chemotherapy. This research is a correlation study with a cross sectional approach. The number of respondents was 103 people using a consecutive sampling technique, who were patients who were undergoing chemotherapy for the first time, and had no history of insomnia, used the gamma statistical test. Based on the results of the analysis, it was found that of the 103 research respondents, the majority had the characteristics of being 50 years old, with the educational level characteristics of most of them having a high school education, namely 50.5%, with the job characteristics of most of them as housewives, namely 70.9%, with the characteristics of the stage of breast cancer, most of them still stage I, namely 63.1%. The research results also showed that 9.7% of respondents experienced mild levels of anxiety, 66% experienced moderate levels of anxiety and 24.3% experienced severe levels of anxiety. As many as 31.1% of respondents experienced good sleep quality and 68.9% experienced poor sleep quality. The results of the study show that there is a relationship between anxiety levels and sleep quality in breast cancer patients who will undergo chemotherapy with ρ value < 0.05. Efforts are needed to reduce the anxiety level of patients undergoing chemotherapy for the first time.

Keywords: Anxiety Level, Breast Cancer, Chemotherapy, Sleep Quality.

1. Introduction

Breast cancer is the growth of glandular cells that grow in the breast, glandular ducts and supporting tissue that turn into malignancy which can cause a person to feel discomfort in the breast area. Generally, breast cancer can occur in women between the ages of 30-50 years, however there is a possibility that young women can develop breast cancer. Breast cancer is a disease that is often feared by every woman, although men can also get breast cancer with a probability ratio of less than 1 in 1000. Several causal factors from various

studies can cause breast cancer in a woman, one of which is age, lifestyle factors and family history factors [1].

According to the World Health Organization (WHO), in 2020, 18.1 million women were diagnosed with breast cancer and 9.6 million deaths occurred worldwide. Based on the World Health Organization (WHO), breast cancer is common in 2021, with a ratio of new cases reaching 12% per year. According to evidence obtained from the Global Burden of Cancer (Globocan), the International Agency for Research on Cancer (IARC) according to 2020, the quantity of new problems for patients with breast cancer was 68,858 problems reaching (16.6%) of the total number of 396,914 new problems. Cases increased by 22 thousand due to deaths of late-stage breast cancer patients [2]. Based on evidence from Riskesdas, the incidence of cancer in Indonesia has increased from 1.4 per 1000 population in 2013 to an increase of 1.79 per 1000 population in 2018. Based on data from the Disease Prevention and Eradication Division of the Semarang City Health Service, there are recorded sufferers. Breast cancer reached 3,590 cases, with details of 16 cases in men and 3,574 cases in women. Breast cancer cases have increased since last year from 2,498 cases [3]. Breast cancer occurs at the highest rate in the age group 55-64 years (4.62%), age 45-54 (4.03%), and age 75 years and over (3.84%). Of the prevalence of cancer, surgical treatment was (61.8%), radiation (17.3%), and chemotherapy was (24.9%). This shows that the majority of breast cancer sufferers are treated with chemotherapy [3].

Chemotherapy is one of the treatments available for cancer sufferers which is useful for removing and killing tumor cells [4]. The impact and side effects of breast cancer treatment from a physical perspective that can be felt by patients are nausea, vomiting, fatigue, changes in hair (hair loss), weakness and changes in body structure [5]. The impact of treatment on breast cancer patients from a psychological perspective in breast cancer sufferers is anxiety, depression, hopelessness and low self-esteem [6]. Anxiety can also be interpreted as a feeling of being rushed and not relaxed which is caused by discomfort that comes from the word fear which is then reacted by the body. The impact of anxiety on breast cancer patients can cause decreased ability to sleep, increase nausea and vomiting after chemotherapy, and can disrupt the quality of oneself. Patients with breast cancer also suffer from anxiety when they are undergoing chemotherapy resulting in disturbed sleep quality and anxiety must be controlled both physically and psychologically [7][8].

Sleep quality is a condition that every person undergoes to get freshness and fitness when they wake up from sleep. The influence of stressors that trigger psychological responses, as well as feelings of anxiety, shock, low self-esteem and depression. With the presence of stressors that appear there will be factors that cause sleep quality disturbances, namely anxiety [9]. the character of nurses in providing nursing care to breast cancer patients on chemotherapy is very important, namely what breast cancer patients feel about chemotherapy is excessive anxiety about their disease and this will affect the quality of sleep which is ineffective [6]. One of the considerations for health workers that needs to be taken into account in breast cancer sufferers who will undergo chemotherapy, one of which

is that these sufferers will suffer from anxiety and disturbed sleep quality since this condition exists. Nurses have a role as care providers (nursing care providers) to overcome the anxiety felt by breast cancer patients, namely by carrying out relaxation distractions and regulating sleep quality by regulating the quality of sleep hours and sleep duration [10].

Based on medical record reports from the Sultan Agung Islamic Hospital, Semarang, in February-April there were 1,484 patients with breast cancer. The results of a preliminary study conducted at RSI Sultan Agung Semarang obtained data on 5 breast cancer sufferers from stages I-IV. 3 patients with stages I and III in chemotherapy cycle 1 felt anxious, afraid of their own thoughts, always woke up at night, and had difficulty sleeping when undergoing chemotherapy. Sufferers also said they were afraid that their disease would not be cured and that they would have to undergo continuous chemotherapy treatment. 2 patients with stages II and IV in chemotherapy cycle 1, the patient experienced difficulty sleeping, was restless, could not sleep soundly, and felt hot at night when undergoing chemotherapy treatment. Based on this background description, researchers are interested in conducting research on the relationship between anxiety and sleep quality in breast cancer patients who will undergo chemotherapy at RSI Sultan Agung Semarang.

2.   Method

This research is a quantitative correlation study using a cross sectional approach. The instrument used is a valid and reliable questionnaire. This aims to analyse the close relationship between anxiety levels and sleep quality in breast cancer patients including the characteristics of the respondents (age, gender, education, occupation and stage of cancer). The anxiety level questionnaire uses the state trait anxiety inventory (STAI) questionnaire. The sleep quality questionnaire uses The Pittsburgh Sleep Quality Index (PSQI) questionnaire. The research was conducted at the Sultan Agung Islamic Hospital, Semarang. The population in this study was 103 patients who were going to undergo chemotherapy. Sampling was carried out by consecutive sampling. Data analysis was carried out univariate and bivariate using the gamma formula. The research has received ethical approval from the Health Research Ethics Commission, Sultan Agung Islamic Hospital, based on ethical certificate No.130/KEPK-RSISA/VI/2023.

3.   Result

Table 1 presents an overview of respondent characteristics, revealing that the average age of patients is 50 years old, with the highest age recorded at 69 years old. Moreover, the table provides insight into the demographic distribution, indicating that all 103 individuals (100.0%) are female. In terms of education, 52 respondents (50.5%) have completed high school, and a predominant occupation among the participants is homemaking, with 73 individuals (70.9%) engaged in this role. The majority of respondents are at stage I of breast

cancer, totaling 65 individuals (63.1%). Furthermore, table 3 delineates the anxiety levels among breast cancer patients anticipating chemotherapy. Notably, a substantial proportion of respondents, specifically 68 individuals (66.0%), exhibit a mild level of anxiety. Meanwhile, Table 4 delves into the sleep quality of these patients, revealing that a significant majority, amounting to 71 individuals (68.9%), experience poor sleep quality. Table 5 contributes further insights by establishing a correlation between anxiety levels and sleep quality in breast cancer patients undergoing chemotherapy, revealing a statistically significant relationship with a p-value of 0.0001 (<0.05). This finding underscores the interconnectedness of anxiety and sleep quality in this cohort, emphasizing the importance of addressing both aspects concurrently in the management and care of breast cancer patients undergoing chemotherapy.

Table 1. Frequency distribution of respondents (n=103)

Variable	f	%	Mean	Min-Max
Age (years)			49.69	27-69
Gender				
Man	0	0		
Woman	103	100		
Education				
elementary school	33	32.0		
Junior High School	16	15.5		
Senior High School	52	50.5		
College	2	1.9		
Work				
Housewife	73	70.9		
Retired	2	1.9		
Farmer	9	8.7		
Self-employed	15	14.6		
Civil servants	4	3.9		
Stadium Level				
I	65	63.1		
II	23	22.3		
III	15	14.6		
IV	0	0		

Table 2 Frequency distribution based on anxiety level in breast cancer patients (n=103)

Anxiety Level	f	%
Low	10	9.7
Moderate	68	66.0
High	25	24.3

Table 3 Frequency distribution based on sleep quality in breast cancer patients who will undergo chemotherapy (n=103)

Sleep Quality	f	%
Good	32	31.1
Bad	71	68.9

4.   Discussion

This research revealed that the average respondent was 50 years old. The youngest respondent's age was 27 years and the oldest was 69 years. Breast cancer occurs due to abnormal growth of cells in the breast. This disease is classified as a non-communicable disease whose cases continue to increase. This abnormal growth is thought to be caused by genetically inherited gene mutations[11]. Aging is one of the most important risk factors for breast cancer, because the incidence of breast cancer is closely related to increasing age. Women over 50 years old have a significant risk of developing breast cancer. Less than 25% of breast cancers occur before menopause, so it can be estimated that the onset of tumors will result in clinical changes in the breast. Menopause that occurs after the age of 55 years increases the risk of developing breast cancer. It is estimated that the onset of tumors occurs long before clinical changes occur[12].

the average age of breast cancer sufferers undergoing chemotherapy is 50 years [13]. The causes of breast cancer are multifactorial, the main cause of which is not yet clearly known. There are several factors that are thought to have an influence on breast cancer, including the age of menarche which is too early in women, namely less than 12 years, causing exposure to the hormone estrogen in the body faster [14]. The hormone estrogen can trigger abnormal cell growth in certain parts of the body. The mechanism of breast cancer caused by exposure to estrogen is still not known with certainty, because it is caused by estrogen stimulation of epithelial cell division or because it is caused by estrogen and its metabolites which directly act as mutagens [15]. High exposure to estrogen can be caused by several conditions, namely never giving birth or giving birth for the first time at the age of more than 35 years, menopause at the age of >50 years, use of hormonal contraceptives for a long period of time, and menarche at the age of <12 years. According to researchers, it can be concluded that age is influenced by the age of menarche at <12 years of age and menopause at >50 years of age, there is an increase in exposure to the hormone estrogen in the body. Exposure to the hormone estrogen can trigger abnormal growth of cells in breast cancer so that it can trigger cancer. This hormone can stimulate the growth of tissue in the breast glands.

The research results show that all breast cancer patients who will undergo chemotherapy are female. Women have a higher risk of developing breast cancer compared to men,

because women have estrogen, progesterone and testosterone, which are hormones that both women and men have. However, for estrogen and progesterone, women have higher levels of these hormones than men [16]. If women have higher than normal levels of the hormone's estrogen and progesterone, the risk of breast cancer will increase. Please note that hormones in the body are closely related to the cells around the breasts. That is why when there is a hormonal imbalance, the cells around the breast can develop abnormally and can trigger cancer. This is related to prolonged estrogen exposure that is not counteracted or balanced by the influence of progesterone [17]. A woman is a risk factor that influences of breast cancer. This is due to longer exposure to the hormones estrogen and progesterone which influence the process of breast tissue proliferation.

In this study, the largest respondent's education was in the high school education category with a total of 52 respondents (50.5%). Respondents who have higher education have a broader understanding, are also able to supervise themselves in dealing with problems they encounter, are easy to accept what is recommended by health workers, and can increase confidence to support the individual in making decisions [18].

Table 4. Relationship between anxiety levels and sleep quality in breast cancer patients who will undergo chemotherapy.

Anxiety Level	Sleep Quality						r	ρ
	Good		Bad		Total			
	f	%	f	%	f	%		
Low	9	9.0	1	1.0	10	10.0		
Moderate	22	22.0	46	46.0	68	68.0	**0.888**	**0.0001**
High	1	1.0	24	24.0	25	25.0		

In line with the research conducted that the highest level of education was high school, amounting to 36.7% of respondents [19]. The higher a person's education level, the higher their awareness of dealing with disease, so that it can influence individual behavior in seeking treatment, therapy, such as therapy or medication given to inhibit growth. cancer cells with chemotherapy treatment. As well as treatment to overcome disease, and complying with actions recommended by health workers, such as maintaining health patterns such as eating healthy food and regular physical activity. So, it can be concluded that the level of education has an influence on changes in behavior and can produce many changes in knowledge, especially in the health sector. A higher level of formal education makes it easier to absorb information such as about health so that a person's awareness of healthy living behavior increases and their knowledge about breast cancer increases.

In this study, the majority of respondents' occupation was working as a housewife, 73 respondents (70.9%). In line with research [20] the majority of breast cancer patients were

IRT, 18 people (79%). The proportion of respondents who most often do BSE and receive information about breast cancer are respondents who work, namely 58.3% as employees, compared to the group who do not work or are housewives. namely as much as 55%. The majority of respondents are housewives who are classified as not working. Lack of knowledge of sufferers about breast cancer is dominant causes of it. The researcher's assumption in this study is that most women who do not work have sufficient knowledge. It is possible that respondents who do not work have time to get information about breast cancer and BSE through print media, electronic media, and health workers who provide education. In line with research conducted [21] housewives have insufficient knowledge. This may be because sufferers lack information about breast cancer.

In this study, the patient with the largest stage was in the stage I category. From the results of the study, it can be seen that the patient's awareness should be checked as early as possible. So that patients get treatment earlier and can anticipate cancer that can be discovered earlier[22]. Stages I and II are early stages while stage III is an advanced stage. This is good for patients because the sooner they are diagnosed, the quicker they will be treated and they have greater potential for recovery. In line with research conducted [23] which stated that the majority of respondents were stage I breast cancer patients (53.3%). Stage I is the earliest stage of breast cancer that has the potential to spread (invasive). In the initial stage of breast cancer, the tumor is small (less than 2 cm) and hasn't spread to lymph nodes, but cancer cells have extended beyond the original location into surrounding healthy breast tissue. Despite its difficulty to detect at this point, early diagnosis through measures like breast self-examination and routine screening is crucial. Breast cancer at stage I is highly curable, typically treated with Breast Conserving Therapy (BCT), involving lumpectomy, sentinel lymph node removal, and subsequent radiotherapy. Chemotherapy or hormone therapy can also be [24]. So it can be concluded that the stage of breast cancer is generally still in stage I, because at this stage there are already signs of symptoms including pain in the breast area and a lump in the breast. With these signs and symptoms, sufferers can feel discomfort and can carry out examinations as early as possible to detect the disease they are suffering from.

Anxiety is a common emotional response to unpleasant stimuli, experienced universally by all living beings [25]. In cancer patients, it manifests as excessive emotional reactions and a sensitive response to the context of their condition, often leading to feelings of pressure. Resolving these anxieties for a sense of safety may require external support, as not all challenges can be effectively addressed individually, causing restlessness and fear but not all problems can be solved well by individuals [26]. This feeling of anxiety gives rise to restlessness and fear [18].

Anxiety in breast cancer patients has various detrimental effects, including increased pain, sleep disturbances, heightened nausea and vomiting post-chemotherapy, and a negative impact on overall quality of life [14]. Research indicates that a significant portion of respondents experiences moderate state anxiety (66.0%). The dominating factor causing

anxiety in breast cancer patients undergoing chemotherapy is the self-system threat, which can affect the patient's self-role, emphasizing the importance of addressing multiple influencing factors to alleviate anxiety. Additionally, anxiety can have repercussions on the quality of sleep-in breast cancer patients. The results showed that (77%) the quality of sleep was poor in the hospital with several factors causing sleep disorders during hospital treatment, namely physiological factors, nurses' routine actions, environmental, psychological and psychosocial factors. Where psychosocial factors show that 24% of clients experience anxiety and 43% are depressed [27].

The level of anxiety felt when undergoing chemotherapy treatment will affect the quality of sleep, and before treatment is carried out, the patient will be given the information they need for treatment [27]. The correlation strength value obtained is 0.888, which means the correlation strength value is in the very strong category. The strong relationship between anxiety levels and sleep quality in breast cancer patients undergoing chemotherapy may be influenced by research results which show that anxiety levels will influence sleep quality. Breast cancer patients undergoing chemotherapy often face moderate anxiety and poor sleep quality, primarily due to concerns about the treatment's effects [28]. Age plays a role in anxiety levels, as anxiety disorders can occur at any age, with higher prevalence in adulthood. Additionally, women, in general, exhibit higher levels of anxiety and depression compared to men, possibly influenced by both reporting patterns and a greater inclination among women to use emotional approaches in problem-solving [29]. The emotional impact of chemotherapy on breast cancer patients underscores the need for holistic support and interventions to address mental well-being during treatment. Recognizing the diverse factors contributing to anxiety is crucial for developing targeted strategies to alleviate distress in this patient.

Impaired sleep quality can also be caused by the environment and medical diagnoses. Sleep quality disorders are common in patients with medical conditions, such as those undergoing surgical diagnoses, with the incidence varying among conditions. Hospital nurses play a vital role in creating a comfortable environment to minimize disruptions to patients' sleep. Furthermore, providing education about chemotherapy and its effects is essential for reducing anxiety in patients undergoing such treatments.

So it can be concluded that a moderate level of anxiety can influence poor sleep quality, there are several factors including psychological factors and environmental factors, as well as psychological factors felt by sufferers including feelings related to the treatment being carried out and the disease they are suffering from. Environmental factors are influenced by beds that are not used to many people and there are different places to rest. This can lead to poor sleep quality in patients during chemotherapy treatment. Thus, the more the sufferer feels severe anxiety, the worse the quality of sleep will be because there is a negative perception that exists in the feelings of a person suffering from breast cancer when undergoing treatment for the first time. Anxiety level is one of the factors that influences sleep quality in breast cancer patients who will undergo chemotherapy.

5.   Conclusion

Anxiety level is one of the factors that influences sleep quality in breast cancer patients who will undergo chemotherapy. The limitations of this research include that it still uses one location and examines the relationship between variables. Further research is related to actions to reduce anxiety before chemotherapy.

Authors' Contributions

SS Conceptualization, Data Curation, Formal Analysis, Methodology, Validation, Visualization, Writing – Original Draft, Review & Editing; AIA Conceptualization, Investigation, Methodology, Validation, and Writing – Original Draft, Review & Editing; MAN Conceptualization, Methodology, Formal Analysis, Validation, and Writing – Original Draft, Review & Editing.

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