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THE RELATIONSHIP OF ANXIETY LEVEL AND SLEEP QUALITY IN CANCER PATIENTS UNDERGOING CHEMOTHERAPY

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ABSTRACT

This study aims to determine the relationship between anxiety levels and sleep quality in cancer patients undergoing chemotherapy. The background of this study is the significant influence of cancer and chemotherapy on patient sleep patterns, with anxiety often being the main cause of sleep disturbances. The research method used was a correlational design with a sample size of 82 cancer patients undergoing chemotherapy at KRMT Wonsonegoro Hospital, Semarang. Data collection was carried out through the Pittsburgh Sleep Quality Index (PSQI) questionnaire to analyze the respondents' sleep quality and the Zung Self-Rating Anxiety Scale (ZSAS) to assess anxiety levels. Data analysis used the Spearman rank correlation test. The results showed a significant correlation between anxiety levels and sleep quality ($r = 0.663$, $p < 0.001$). Patients with high anxiety tend to experience worse sleep quality. The PSQI subscales, especially sleep duration and efficiency, showed a strong positive correlation with anxiety levels. These findings are consistent with the literature showing that anxiety can interfere with various aspects of sleep. The results of the study indicate that psychological interventions to overcome anxiety may be important in improving the sleep quality of cancer patients undergoing chemotherapy. In conclusion, there is a significant positive relationship between anxiety and sleep quality in cancer patients undergoing chemotherapy. This study emphasizes the importance of considering interventions to reduce anxiety as part of comprehensive care, to improve sleep quality and life in cancer patients.
Keywords : *Cancer; Anxiety; Sleep Quality; Chemotherapy*

BACKGROUND

Cancer is a type of malignant tumor that manifests as abnormal somatic cells that grow uncontrollably and without identifying the underlying target, thus damaging or destroying normal tissue (Opasic et al. 2020). In Indonesia itself, many people suffer from several types of cancer, including five types of cancer, namely rectal cancer, skin cancer, uterine cancer, lymph node cancer, breast cancer . In Indonesia itself, cancer is currently the third leading cause of death, and will continue to increase because cancer is difficult to treat (Purwati, Ma'rifah, and Maryati 2020). The identification results show that patients with breast cancer experience several symptoms including: Delirium, irregular sleep, angry emotions, fatigue, aggression, irritability, despair, and find it difficult or even impossible to accept their illness and consider themselves a burden to others, their families because their hopes for a complete recovery cannot be fulfilled (Fadillah and Sanghati 2023). One aspect that is often disturbed due to anxiety is sleep habits, because poor sleep habits can worsen the condition (Savard, J., Ivers, H., & Villa 2020).

In 2012, there were 971,279 cases of skin cancer, including 4,444 deaths (Swanson 2020). According to the 2018 Basic Health Research (Riskesdas), the incidence of cancer in Indonesia continues to increase. Data shows that there are 18.1 million new cases and 9.6 million deaths due to cancer. Specifically, cancer causes death in 20% of men and around 16.7% of women in Indonesia. In a global context, cancer is also a serious threat, with a mortality rate reaching 12.5% in men and around 9.1% in women (Moewardi 2023). Chemotherapy is a treatment method that uses drugs that spread throughout the body and are able to penetrate cancer cells that have spread. Although it is the main therapy for cancer patients, chemotherapy is not always given to every patient. The administration of chemotherapy must be adjusted to the condition of each patient, because based on research, not all chemotherapy has the same positive effect on every cancer patient (Hotijah, Dewi, and Kurniyawan 2021).

The physical impacts felt by cancer patients include pain, loss of appetite, fatigue, changes in body image,

decreased sexual function, and sleep disturbances due to the disease and its treatment, while the psychological impacts include denial, fear, anxiety, sadness, and drunkenness (Krakstad 2019) . Physical problems experienced by cancer patients can cause sleep disturbances in patients (Anggraini, Marfuah, and Puspasari 2020). Emotional and social difficulties are also experienced by cancer patients, such as difficulty talking about their illness, lack of self-confidence, and difficulty maintaining positive relationships with loved ones (Azwaldi, Muliyadi, and Aisyah 2022). People with cancer undergo treatment, which can increase anxiety because they feel their physical and mental well-being is threatened. The more cancer patients know about chemotherapy, the greater the impact on their anxiety levels (Setyani, P, and Milliani 2020) . Cancer patients often receive chemotherapy. Some effects of chemotherapy that occur in patients cause various side effects such as nausea, vomiting, and alopecia (Johnson, A., Smith, B., & Wong 2020). This causes fear in patients, prolonged fear in cancer patients can have serious consequences. Possible negative impacts include the emergence of symptoms of depression and a significant decrease in the quality of life of sufferers. The disturbed mental condition due to this constant fear has the potential to worsen the patient's overall well-being (Setyani, P, and Milliani 2020).

The aim of this study was to examine the relationship between anxiety levels and sleep quality in cancer patients undergoing chemotherapy. Cancer patients often face a variety of psychological and physiological issues that can affect their sleep quality, including high levels of anxiety caused by their cancer diagnosis and treatment. It is hoped that this study will provide deeper insight into how anxiety affects sleep quality and identify components that can improve patient well-being during chemotherapy.

METHOD

This study used a correlational approach to examine the relationship between anxiety and sleep quality. The subjects of the study were 82 cancer patients undergoing chemotherapy at KRMT Wongsonegoro Hospital, Semarang. The inclusion criteria included patients who had received chemotherapy treatment and were able to communicate verbally, and the exclusion criteria were patients who had special needs, or who had disabilities such as hearing and speech disorders, or were blind, had impaired consciousness, and were unable to communicate well, and were unwilling to be respondents. For data collection, researchers used two main instruments, namely the Zung Self-rating Anxiety Scale (ZSAS) questionnaire to measure anxiety levels, and the Pittsburgh Sleep Quality Index (PSQI) to evaluate patient sleep quality. In analyzing the data obtained, the research team applied the Spearman rank correlation test method. This approach was chosen to identify and measure the strength of the relationship between anxiety variables and sleep quality in the group of cancer patients who were the focus of this study. This study has obtained ethical permission from the Ethics Committee of RSD KRMT Wongsonegoro, Semarang City with the number 068/ Kom.EtikRSWN /VI/2024.

RESULTS AND DISCUSSION

A. RESULTS

1. Respondent Characteristics

It can be explained that the highest proportion of gender in this study was female, which was 67 respondents (85.4%). The highest proportion of age level was pre-elderly (46-55 years) with the number of respondents as many as 32 respondents (39.0%). The highest proportion of education level was high school, which was 31 respondents (37.8%). The highest proportion of chemotherapy cycles was 30 respondents (36.6%) who had undergone chemotherapy more than 6 times. And the highest proportion of duration of illness in respondents was 1-3 years, which was 44 respondents (53.7%) which is presented in table 1.

Table 1. Characteristics

Characteristics	Amount	%
1. Gender		
Man	15	18.3
Woman	67	81.7
Total	82	100.0

2.	**Age**		
	17 – 25 years	1	1.2
	26 – 35 years	1	1.2
	36 – 45 years	23	28.0
	46 – 55 years	32	39.0
	56 – 65 years	25	30.5
	Total	82	100.0
3.	**last education**		
	elementary school	24	29.3
	JUNIOR HIGH SCHOOL	16	19.5
	SENIOR HIGH SCHOOL	31	37.8
	English D3	9	11.0
	D4	number 0	0.0
	S1	2	2.4
	Total	82	100.0
4.	**Chemotherapy Cycle**		
	1 – 2 times	7	8.5
	3 – 4 times	17	20.7
	5 – 6 times	28	34.1
	>6 times	30	36.6
	Total	82	100.0
5.	**Long term pain**		
	< 1 year	34	41.5
	13 years old	44	53.7
	>3 years	4	4.9
	Total	82	100.0

2. Anxiety Level

Of the total 82 respondents, 29 respondents (35.4%) showed normal anxiety levels, 37 respondents (45.1%) experienced mild anxiety, and 12 respondents (14.6%) experienced moderate anxiety. Meanwhile, there were 4 respondents (4.9%) who experienced severe anxiety. The details are presented in table 2.

Table 2
Level of Anxiety in Respondents

	Frequency	Percentage (%)
Normal	29	35.4
Light	37	45.1
At the moment	12	14.6
Heavy	4	4.9
Total	**82**	**Rp. 100,000**

3. Sleep Quality

The study involving 82 participants showed varying patterns of sleep quality. The majority of respondents, namely 48 people or 58.5% of the total sample, reported experiencing unsatisfactory sleep quality. On the other hand, 34 respondents or equivalent to 41.5% of all participants showed good sleep quality. These findings indicate a higher prevalence of sleep quality problems among the studied groups, the explanation of which is presented in table 3.

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Table 3
Sleep Quality in Respondents

	Frequency	Percentage (%)
Good	34	41.5
Bad	48	58.5
Total	**82**	**100.0**

4. The relationship between anxiety levels and sleep quality

The cross-tabulation results showed a correlation between the level of anxiety and the quality of sleep of the respondents. Among those with normal levels of anxiety, the majority (89.7% or 26 people) enjoyed good quality sleep, while only a small number (10.3% or 3 people) experienced poor quality sleep. However, this pattern changed drastically in the group with mild anxiety, where the majority (83.8% or 31 people) reported poor quality sleep, and only a small number (16.2% or 6 people) had good quality sleep. A similar trend was seen in respondents with moderate anxiety, with 83.3% (10 people) experiencing poor quality sleep and only 16.7% (2 people) enjoying good quality sleep. The situation became more extreme at the severe anxiety level, where all respondents (100% or 4 people) reported poor quality sleep, with none experiencing good quality sleep. These data indicate that there is a relationship between decreased sleep quality and anxiety levels among respondents. This can be seen in table 4

Table 4
The Relationship between Anxiety Levels and Sleep Quality

Anxiety Level	Sleep Quality				Total		*rho*	*P Value*
	Good		Bad					
	F	%	F	%	F	%		
Normal	26	89.7	3	10.3	29	100.0	0.663	0.000
Light	6	16.2	31	83.8	37	100.0		
At the moment	2	16.7	10	83.3	12	100.0		
Heavy	number 0	0.0	4	100.0	4	100.0		
Total	34	41.5	48	58.5	82	100.0		

B. Discussion

1. Respondent characteristics

a. Gender

From the study, 82 research subjects were obtained, including 67 female respondents (85.6%) and 15 male respondents (14.6%). In line with research (Andinata, Marni, and Erianti 2020), the definition of gender refers to variations in roles and obligations imposed on men and women, which are formed by social structures both in the family and in the wider community context. These differences are not innate conditions, but rather the result of social formation and expectations. In the context of this study, it was found that in female respondents undergoing chemotherapy, the dominant anxiety factor tended to be related to aspects of self-esteem. This shows a relationship between gender identity, medical experience, and self-perception in female patients undergoing cancer therapy. Chemotherapy changes their appearance, making them feel inferior and useless (Arfina et al. 2022).

b. Age

The age distribution of respondents in this study showed interesting variations. The most dominant age group was 46-55 years, which was 39.0% of the total sample with 32 respondents. Not much different,

the 56-65 age group was in second place with 30.5% or 25 respondents. The 36-45 age group also had quite significant representation, which was 28.0% or 23 respondents. Meanwhile, the younger age group had minimal participation, which was only one respondent (1.2%) each for the 17-25 and 26-35 age ranges. The data shows that the majority of respondents are in the middle-aged to pre-elderly age group, with very limited representation from the younger age group. In line with research conducted by (Nunung Warnasih, Sinaga, and Shinta Parulian 2023). Based on the results of searches in several journals, internal factors are the main cause of respondent anxiety. This is proven by the results of the relationship analysis which identified that respondents who were afraid of chemotherapy were mostly breast cancer patients aged 40 to 65 years. People at this age are experiencing a transition phase towards early adulthood which involves changes in behavioral patterns as well as physical and mental changes. Of course they are afraid of chemotherapy because they believe they can develop independently and optimally. The majority of people at this age are very worried that the side effects of chemotherapy will damage their attractiveness. This condition causes fear and is often accompanied by resistance to chemotherapy. (Marsaid and friends, 2022).

c. Education

In this study, the results of the characteristics based on the highest level of education were 24 respondents (29.3%), elementary school 16 respondents (19.5%), high school 31 respondents (37.8%), D3 9 respondents (11.9%) and S1 2 respondents (2.4%). In line with the research conducted by (Andinata, Marni, and Erianti 2020) Higher levels of education are generally associated with better ability to understand and process information, as well as to communicate. However, in the context of this study, education was identified as one of the factors contributing to the emergence of anxiety among respondents (Perline 2023). Interestingly, the majority of participants in this study had a secondary education background. This raises questions about the complex relationship between education level, understanding of medical conditions, and the level of anxiety experienced by respondents in dealing with their health situation. What is cancer, and because we do not know, how it is treated and whether we receive chemotherapy, the impact it will have they are afraid of the treatment they receive (Gajda and Kowalska 2020).

d. Chemotherapy cycle

In this study, based on the results of the chemotherapy cycle, 7 respondents (8.5%) had undergone chemotherapy 1-2 times, 17 respondents (20.7%) 3-4 times, 28 respondents (34.1%) 5-6 times), and more than 6 times as many as 30 respondents (36.6%). According to (Elina 2023) the chemotherapy cycle is an action that is carried out in stages, where the distance between chemotherapy cycles is generally 21 days, but you still have to wait for information from the doctor. Chemotherapy must be carried out in cycles, meaning that after undergoing the 1st cycle, the 2nd cycle will be continued and so on until it is completely finished, with the administration of chemotherapy drugs that have been determined by the doctor according to the patient's cycle. So that cancer cells will really die if chemotherapy cycles are carried out regularly. The results of research from (Setyani, P, and Milliani 2020) explain that most patients with mild anxiety have undergone four or more cycles of chemotherapy. Patients who undergo chemotherapy for four or more cycles can feel the side effects of treatment and have a better direct experience in managing these side effects.

e. Long-standing illness

The results of this study indicate that the duration of illness experienced by respondents varies, namely 34 respondents (41.5%) experienced illness for less than 1 year, 44 respondents (53.7%) experienced illness for 1-3 years, and 4 respondents (4.9%) experienced illness for less than 1 year %) more than 3 years. These results are in line with research (Rizqiyah and Abdurrachim 2021) The results of the observation showed that the number of patients who had been fighting cancer for more than four years was less than those who were diagnosed within one to four years. This prognosis is very dependent on various events and developments that occur during the course of the disease. This pattern highlights the importance of early detection and better understanding the course of breast cancer.

2. Anxiety level

Data analysis from 82 participants in this study revealed a spectrum of varying levels of anxiety. Most respondents, namely 37 people or 45.1%, were identified as experiencing mild anxiety. Meanwhile, 29 people or 35.4% showed normal levels of anxiety. Moderate anxiety was experienced by 12 respondents (14.6%), and only a small portion, namely 4 people (4.9%), experienced severe anxiety . The dominance of mild anxiety in these findings is consistent with previous research conducted by (Subekti 2020) who found that out of 30 breast cancer patients undergoing chemotherapy, a significant majority, namely 22 people (73.3%) also experienced mild anxiety . This anxiety arises because of the fear that their lives will change due to the disease, or because of concerns about the side effects of chemotherapy. Cancer patients are often afraid of medical procedures such as chemotherapy, radiation, surgery, and hormone therapy. In particular, the chemotherapy process that patients must undergo can be very frightening, not only because it is carried out in a short time, but also because it must be carried out periodically over a long period of time. This fear needs attention from health workers, especially nurses, because it can worsen the patient's condition.

3. Sleep quality

The results of the study involving 82 participants revealed varying sleep quality patterns. The majority of respondents, namely 48 people or 58.5% reported experiencing unsatisfactory sleep quality. Meanwhile, as many as 34 respondents or equivalent to 41.5% stated that their sleep quality was good. In line with the study (Firdausi 2024) which took place in the Seruni Room of the Integrated Cancer Installation and the Dahlia and Gardenia Surgical Inpatient Installation, Arifin Achmad Hospital, Pekanbaru, involving 68 respondents. The results of the study revealed that the majority of participants, namely 47 people or 69.1% also reported poor sleep quality. Cancer patients often think about their illness at night, making it difficult to fall asleep. This can also cause anxiety and poor sleep quality. In addition, cancer patients may not accept their illness and undergo surgery or chemotherapy, which can increase anxiety during treatment and affect sleep quality.

4. The relationship between anxiety levels and sleep quality

The results of the cross-tabulation analysis showed that there was a clear pattern between the level of anxiety and the sleep quality of the respondents. In the group with a normal level of anxiety, most (89.7%) had good sleep quality. Conversely, in the group with a higher level of anxiety, the proportion of respondents with poor sleep quality increased significantly. Specifically, among respondents with mild anxiety, 83.8% experienced poor sleep quality. A similar pattern was seen in the moderate anxiety group, where 83.3% of respondents also reported poor sleep quality. Most strikingly, all respondents (100%) with severe levels of anxiety experienced poor sleep quality. Statistical analysis using the Spearman rank test produced a P value of 0.000, which was smaller than the significance level of 0.05. These results lead to the rejection of the null hypothesis (Ho) and the acceptance of the alternative hypothesis (Ha). The interpretation of these findings is that there is a significant relationship between the level of anxiety and sleep quality in cancer patients undergoing chemotherapy. The results of this study are in line with research (Zulaekha et al. 2024) at Al-Ihsan Hospital, West Java Province using *a non-probability method* with *a purposive sampling technique* through correlation analysis using *a cross-sectional design* . With a sample size of 59 people and the instruments used were an anxiety questionnaire using HARS, and a sleep quality questionnaire using PSQI. Explaining that colorectal cancer respondents who experienced severe anxiety as many as 24 people (54.2%) had good sleep quality. While respondents who experienced very severe anxiety as many as 35 people (100%) had poor sleep quality. With an r value = 0.642. Based on the p value obtained of 0.000 and compared with α = 0.05, it can be concluded that there is a correlation between anxiety levels and sleep quality in colorectal cancer patients at Al-Ihsan Hospital, West Java Province. Sleep duration and sleep disturbances are known to affect anxiety, and sleep latency and subjective sleep quality and sleep quality are known to affect depression. From the explanation above, it can be concluded that the level of anxiety and sleep quality of cancer patients have a relationship, have a positive correlation, where the higher the level of anxiety, the worse the sleep quality.

From the research that the researcher has done, a p-value of 0.000 <0.05 was obtained, so it can be said that there is a relationship between anxiety and sleep quality in colorectal cancer patients. The level of anxiety in colorectal cancer patients is very severe which has an impact on poor sleep quality.

CONCLUSION AND RECOMMENDATIONS

From the results of the study, it can be concluded that in cancer patients undergoing chemotherapy, there is a significant relationship between their anxiety levels and their sleep quality. The results showed that patients with higher levels of anxiety experienced problems related to their sleep quality, including difficulty falling asleep and frequent waking up at night. These findings show how the psychological conditions of patients suffering from cancer and chemotherapy treatment affect their sleep quality. The benefits of developing this research are to gain a better understanding of how anxiety can affect the sleep quality of cancer patients and how broader interventions, which not only focus on physical treatment but also on the patient's mental health. Further research can investigate other sources that can affect the relationship between anxiety and sleep, such as social support, coping strategies, and the long-term effects of chemotherapy. Further research can also investigate psychological and therapeutic interventions that can reduce anxiety and improve sleep quality, with the hope of improving the quality of life of cancer patients both during and after treatment.

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