

# Relationship between anxiety and sleep quality in cancer patients undergoing chemotherapy at Dr. M. Djamil Central Public Hospital

## Relación entre la ansiedad y la calidad del sueño en pacientes con cáncer en quimioterapia del Hospital Público Central Dr. M. Djamil

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### SUMMARY

**Introduction:** Cancer is a disease caused by abnormal division and growth of body tissue cells, so these cells turn into cancer cells which are harmful to the body. One of the treatments for cancer patients is chemotherapy. The impact of chemotherapy in cancer patients on the psychological aspects of experiencing anxiety and disrupting sleep quality. This study aimed to determine the relationship between anxiety and sleep quality in cancer patients undergoing chemotherapy at Dr. M. Djamil Central Public Hospital.

**Methods:** The type of research used is an analytic survey using a cross-sectional study design. The sample

was 90 respondents with the sampling technique is accidental sampling. The stress instrument uses the DASS (Depression on Anxiety Stress Scale) 42 which consists of 14 questions about anxiety while the sleep quality instrument uses the Pittsburgh Sleep Quality Index (PSQI) questionnaire. The results of this study were processed using the Chi-Square test.

**Results:** The results of this study for anxiety showed that 12.2% of respondents experienced mild anxiety, 45.6% of respondents experienced moderate anxiety, 36.7% of respondents experienced severe anxiety, and 5.5% of respondents experienced very severe anxiety. As for sleep quality, the results showed that 93.3% of respondents experienced poor sleep quality and 6.7% of respondents experienced good sleep quality. It can be concluded that there is a relationship between anxiety and sleep quality in cancer patients undergoing chemotherapy ( $p = 0.0001$ ).

**Conclusion:** The results of this study show a relationship between anxiety and sleep quality in cancer patients undergoing chemotherapy at Dr. M. Djamil Central Public Hospital. With this research, it can help nurses identify the anxiety of cancer patients undergoing chemotherapy.

**Keywords:** Anxiety, Cancer, Chemotherapy, Sleep Quality

DOI: <https://doi.org/10.47307/GMC.2023.131.s4.19>

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Recibido: 23 de julio 2023

Aceptado: 5 de agosto 2023

### RESUMEN

**Introducción:** El cáncer es una enfermedad causada por la división y crecimiento anormal de las células de los tejidos del cuerpo, de modo que estas células se convierten en células cancerosas que son dañinas para el cuerpo. Uno de los tratamientos para los

*pacientes con cáncer es la quimioterapia. El impacto de la quimioterapia en pacientes con cáncer en los aspectos psicológicos de experimentar ansiedad y alterar la calidad del sueño. El objetivo de este estudio fue determinar la relación entre la ansiedad y la calidad del sueño en pacientes con cáncer sometidos a quimioterapia en el Hospital Público Central Dr. M. Djamil.*

**Métodos:** *El tipo de investigación utilizado es una encuesta analítica utilizando un diseño de estudio transversal. La muestra es de 90 encuestados con la técnica de muestreo que es el muestreo accidental. El instrumento de estrés utiliza el DASS (Depression on Anxiety Stress Scale) 42 que consta de 14 preguntas sobre ansiedad mientras que el instrumento de calidad del sueño utiliza el cuestionario Pittsburgh Sleep Quality Index (PSQI). Los resultados de este estudio se procesaron mediante la prueba Chi-Cuadrado.*

**Resultados:** *Los resultados de este estudio para la ansiedad mostraron que el 12,2 % de los encuestados experimentaron ansiedad leve, el 45,6 % de los encuestados experimentaron ansiedad moderada, el 36,7 % de los encuestados experimentaron ansiedad severa y el 5,5 % de los encuestados experimentaron ansiedad muy severa. En cuanto a la calidad del sueño, los resultados mostraron que el 93,3 % de los encuestados experimentó una mala calidad del sueño y el 6,7 % experimentó una buena calidad del sueño. Se puede concluir que existe una relación entre la ansiedad y la calidad del sueño en pacientes oncológicos en quimioterapia ( $p = 0,0001$ ).*

**Conclusión:** *Los resultados de este estudio muestran una relación entre la ansiedad y la calidad del sueño en pacientes con cáncer que reciben quimioterapia en el Hospital Público Central Dr. M. Djamil. Con esta investigación, puede ayudar a las enfermeras a identificar la ansiedad de los pacientes con cáncer que se someten a quimioterapia.*

**Palabras clave:** *Ansiedad, cáncer, quimioterapia, calidad del sueño.*

## INTRODUCTION

Cancer is a disease caused by abnormal growth of body tissue cells a result of which these cells turn into cancer cells which are harmful to the body. Cancer is still a major health problem in the world and one of the highest causes of death in the world (1). According to the World Health Organization (WHO), the number of cancer data in the world in 2020 was 19 292 789 cases with the death rate due to cancer in the world in 2020 as many as 9 958 133 (10.65 %). In Southeast

Asia, the number of cancer cases in 2020 was 1 100 037 cases with a death rate due to cancer in 2020 of 689 093 (10.08 %). Based on basic health research data (2018), the prevalence of cancer in Indonesia shows an increase from 1.4 per 1 000 population in 2013 to 1.79 per 1 000 population in 2018. Data on the incidence of cancer in Indonesia in 2020 reached 946 088 cases (2). According to data from GLOBOCAN, the number of new cancer cases in Indonesia in 2020 was 396 914. According to data from the Ministry of Health (Ministry of Health, 2019) in West Sumatra, cancer patients in 2019 were 2.4779 per 1 000 population with a death rate due to cancer in Indonesia in 2020 of 234 511 (3).

Chemotherapy is a treatment using drugs or hormones to reduce cancer cells. Chemotherapy is the process of administering anticancer drugs or cytokines whose function is to kill cancer cells through a chemotactic mechanism, by interfering with their function and reproduction to heal, regulate, or relieve symptoms (4). The proportion of cancer treatment with chemotherapy based on the 2018 Riskesdas results illustrates that most of the population in Indonesia is undergoing cancer treatment with chemotherapy of 24.9 %. The incidence of cancer patients undergoing chemotherapy at Dr. M. Djamil Central Public Hospital in 2017 there were 423 patients. This figure has increased in 2018 to as many as 540 patients (5). Hospital medical record data from Dr. M. Djamil Central Public Hospital in 2020 shows that visits to receive chemotherapy services for cancer from January - June were 2 045 visits (6). Chemotherapy's side effects can arise both physically and psychologically. Physical side effects of chemotherapy include nausea, vomiting, hair loss, dry mouth, mouth sores, sore throat, diarrhea, pancytopenia, allergies, hypersensitivity effects on sexual organs, affecting nerves and muscles, skin problems, fatigue, and constipation. The psychological side effects are anxiety, depression, shame, helplessness, and anger (7).

According to a study by Khairani et al. (2019), 100 % of patients undergoing chemotherapy have a side effect, namely fatigue (8). The fatigue felt by cancer patients is caused by pain, sleep disturbances, emotional disturbances, and the effects of the treatment being carried out (9). Another study showed that around 30 % to 80 %

of women with cancer will experience sleep disturbances. This sleep disorder can result in a decrease in the patient's sleep quality (10).

Sleep quality is a state of sleep experienced by an individual that results in freshness and well-being when awake. From several studies in Indonesia, poor sleep quality is a problem that occurs in many cancer patients undergoing chemotherapy. Amelia et al. (2021) demonstrated that most cancer patients undergoing chemotherapy at Dr. M. Djamil Central Public Hospital experienced poor sleep quality at 93.3 % (11). Krisdhiyanti in 2016 evaluated the sleep quality in cancer patients undergoing chemotherapy at Dr. Hasan Sadikin Bandung and showed that 69 patients experienced poor sleep quality out of 83 patients undergoing chemotherapy (12). This proves that the sleep quality of patients undergoing chemotherapy is poor.

One of the factors that affect the quality of sleep is anxiety. Anxiety is a psychological state caused by constant worry. Anxiety is a negative emotional reaction to a real or imagined threat that is accompanied by changes in the autonomic nervous system and subjective tension, fear, and anxiety sensations. The impact of anxiety that arises in cancer patients is in the form of fear that their age will be short (related to inner conflict). In addition, anxiety can also increase the effects of chemotherapy (13). Anxiety in cancer patients is a psychological disorder caused by patients facing uncertainty, worrying about the effects of cancer treatment, and fear of cancer development which results in death, in some situations they feel angry, scared, sad, and depressed and often experience mood swings (14). According to Afifah and Padoli's (2018) in their study on breast cancer patients, the anxiety level of breast cancer patients undergoing chemotherapy in the Working Area of the Pucang Sewu Health Center, Surabaya, most (55 %) experienced mild anxiety, a small proportion (15 %) experienced moderate anxiety, and almost half experiencing severe anxiety (30 %) (15). A study conducted by Retnaningsih (2020) also stated that 73.3 % of breast cancer patients undergoing chemotherapy at Urip Sumoharjo Hospital Bandar Lampung in the chemotherapy room or 22 people experienced anxiety (16). Furthermore, Purwati and Maryati (2016), at Prof. Hospital. Dr. Margono Soekarjo

Purwokerto revealed that there is a relationship between anxiety and the sleep quality of patients with breast cancer (17). On the contrary, Linawati (2014) revealed that in their research there was no relationship between anxiety and the sleep quality of breast cancer patients at Dharmais Hospital, Jakarta (18). Thus, the evidence about the relationship between anxiety and sleep quality is still a matter of debate. The present study aimed to assess the possible relationship between anxiety and sleep quality in cancer patients undergoing chemotherapy at Dr. M. Djamil Central Public Hospital.

## METHODS

The type of research conducted was an analytic survey with a cross-sectional research design. The sampling technique used the consecutive sampling method. The sample was cancer patient respondents undergoing chemotherapy in the chemotherapy room of RSUP Dr. M. Djamil Central Public Hospital which is suitable as a source of data according to the inclusion and exclusion criteria. Inclusion criteria for samples that were eligible to be included or worthy of research were: willing to be respondents, able to communicate well (cooperative), and cancer patients undergoing chemotherapy were present at the time of the study. While the exclusion criteria in the study were respondents experiencing physical impairment (disability), respondents experiencing hearing loss, and respondents taking sleeping pills. The total sample in this study was 90 cancer patients undergoing chemotherapy at Dr. M. Djamil Central Public Hospital.

The research instruments used in this study were the Pittsburgh Sleep Quality Index (PSQI) which was used to measure sleep quality in adults and the DASS (Depression Anxiety Stress Scale) which was used to measure anxiety. This research was carried out through an ethical test at Dr. M Djamil Central Public Hospital.

## RESULTS

### Characteristics of Respondents Undergoing Chemotherapy

As shown in Table 1, based on gender most of the cancer patient respondents were (90 %) women. Half of cancer patients based (58.9 %) were  $\geq 47$  years old. More than half were with breast cancer (53.3 %), with a frequency of chemotherapy mostly (87.8 %)  $<5$  times.

Table 1

Characteristics of Respondents in Cancer Patients Undergoing Chemotherapy at the Dr. M. Djamil Central Public Hospital (n= 90)

Characteristic of respondents	f	%
Age		
<47	37	41.1
$\geq 47$	53	58.9
Total	90	100.0
Gender		
Man	9	10
Woman	81	90
Total	90	100
Type of cancer		
Acute myeloid leukemia	1	1.1
Breast cancer	48	53.3
Carsinoma cervix	11	12.2
Colorectal cancer	4	4.4
Endometrial Cancer	1	1.1
Tongue cancer	1	1.1
Ovary cancer	12	13.3
Lung cancer	1	1.1
Rectal cancer	3	3.3
Nasopharyngeal cancer	3	3.3
Hodgkin's lymphoma	2	2.2
Multiple myeloma	1	1.1
Uterine sarcoma	1	1.1
Squamous cell carcinoma	1	1.1
Total	90	100.0
Chemotherapy to		
$<5$	79	87.8
$\geq 5$	11	12.2
Total	90	100.0

**The Anxiety of Cancer Patients Undergoing Chemotherapy**

Most respondents who experienced cancer and underwent chemotherapy were found to have a moderate anxiety level of 45.6 %, while 33 % had heavy anxiety (Table 2).

Table 2

Distribution of anxiety frequency of cancer patients undergoing chemotherapy at Dr. M. Djamil Central Public Hospital (n=90)

ANXIETY	f	%
Mild anxiety	11	12.2
Moderate anxiety	41	45.6
Heavy anxiety	33	36.7
Very serious anxiety	5	5.5
Total	90	100.0

**Sleep Quality of Cancer Patients Undergoing Chemotherapy**

Most of the respondents, as much as 93.3 % of the 90 respondents who underwent chemotherapy, stated that their sleep quality was bad (Table 3).

Table 3

Frequency distribution of sleep quality in cancer patients undergoing chemotherapy at Dr. M. Djamil Central Public Hospital (n=90)

Sleep Quality	f	%
Good	6	6.7
Bad	84	93.3
Total	90	100.0

**The Relationship between Anxiety and Sleep Quality in Cancer Patients Undergoing Chemotherapy**

As shown in Table 4, respondents with moderate anxiety had poor sleep quality as much as 45.6 % of 90 respondents. Meanwhile, respondents with mild anxiety had good sleep quality as much as 6.7 % of 90 respondents (p-value = 0.0001,  $p \leq 0.05$ ).

## RELATIONSHIP BETWEEN ANXIETY AND SLEEP QUALITY IN CANCER PATIENTS

Table 4

Distribution of anxiety frequency of cancer patients undergoing chemotherapy at Dr. M. Djamil Central Public Hospital (n=90)

Anxiety	Good		Sleep Quality		Bad		Total	P values
	f	%	f	%	f	%		
Mild	6	6.7	5	5.5	11	12.2		0.0001
Moderate	0	0.0	41	45.6	42	45.6		
Heavy	0	0.0	33	36.7	33	36.7		
Very serious	0	0.0	5	5.5	5	5.5		
Total	6	6.7	90	93.3		100.0		

### DISCUSSION

Chemotherapy is the process of administering anti-cancer drugs in the form of liquid pills or capsules or through infusions with the purpose to destroy cancer cells and prevent tumor growth (4,7). Patients with chemotherapy often experience anxiety which causes sleep pattern disturbances, usually, anxiety often occurs in breast cancer patients undergoing chemotherapy in the first, second, and third stages, the management that can be done by a nurse is to provide education about emotional support, assess needs patients, fears, and patient coping mechanisms (14).

#### Characteristics of Respondents Undergoing Chemotherapy

Our present results show that 91 % of cancer patients were women. According to Handayani and Udani (2016), judging from the gender factor, the risk of cancer in women and men is the same, but with the many incidences of cervical cancer and breast cancer in women, it seems that the incidence of cancer in women is higher (19). However, when analyzing the age factor, the incidence of cancer in women and men is not the same. In children under 15 years, the incidence of cancer in men is higher, at the age of 15-55 years the incidence of cancer is higher in women, especially in the age range of 35-50

years. After the age of 60 years, the incidence of cancer is higher in men. Our present study indicates that cancer patients based on age, more than half (58.9 %) were  $\geq 47$  years old, showing similarities with the theory which states that the incidence of cancer increases with age. According to the American Cancer Society, about 76 % of cancer incidence occurs over the age of 55. This makes age a risk factor for cancer (20). Based on the theory, the frequency of cancer has increased with increasing age, due to the accumulation of somatic mutations that cause the development of malignant neoplasms, and with increasing age, the higher the risk of developing breast cancer (21).

The most common type of disease was breast cancer (53.3 %). According to the 2018 Basic Health Research (Riskesdas), the highest incidence rate in Indonesia for men is lung cancer, which is 19.4 per 100 000 population, followed by liver cancer, which is 12.4 per 100 000 population. Meanwhile, the highest incidence rate for women was breast cancer, which was 42.1 per 100 000 population, followed by cervical cancer, which was 23.4 per 100 000 population (22).

Regarding the frequency of chemotherapy, our data show that most (87.8 %) were  $< 5$  times. In effect, Afifah and Sarwoko (2020) observed in their study that of the 32 respondents, the highest frequency of chemotherapy was second chemotherapy (23). Patients who undergo chemotherapy every cycle have a treatment process with chemotherapy interspersed with recovery periods.

### **Anxiety of Cancer Patients Undergoing Chemotherapy**

Cancer patients undergoing chemotherapy have different levels of anxiety with various factors causing anxiety such as age and education, anxiety disorders can occur at all ages, more often in adulthood. As an adult, a person usually has a heavier mind load, lasts a long time, and is accompanied by many physiological components such as sleep disturbances, restlessness, imagining, fear, and anxiety. Indeed, the respondents who experienced cancer and underwent chemotherapy were found to have a moderate anxiety level of 45.6 %. The results of this study are supported by previous research conducted by Primal et al. (2020) concerning the level of anxiety and sleep patterns of breast cancer patients who are undergoing chemotherapy. Their results showed that 55 breast cancer respondents who underwent chemotherapy (60.0 %) experienced moderate anxiety (24).

An overview of the factors that affect the level of anxiety based on the age of women aged 45-50 years because of the knowledge factor and influence anxiety. Changes in hormone levels, life changes, and sleep disturbances during menopause can cause anxiety. In addition to generalized anxiety, people may also experience sudden, intense panic attacks. People can often manage these symptoms with lifestyle changes, medications, and psychotherapy (25). Arsittasari (2017) stated that the frequency of chemotherapy experienced by patients who are undergoing treatment for the first time is a valuable experience for subsequent treatment (26). Chemotherapy treatment which consists of several cycles is a long-term treatment, if the first experience of undergoing chemotherapy is not subject to the side effects of chemotherapy, it will affect the level of anxiety in the next chemotherapy treatment (27). Simanullang and Manullang (2020) found that most respondents who were going to undergo second chemotherapy experienced moderate anxiety because the respondent had undergone chemotherapy more than once so the respondent already had experience dealing with and experiencing the side effects (28).

The emergence of anxiety experienced by respondents while undergoing chemotherapy is caused by many things including changes in

the physique that begin to experience a decline in health and can affect the quality of life which has an impact on many things, one of which is emotional. The anxiety felt by the respondent also had an impact on the patient's recovery because if the patient always experienced anxiety, it was possible that the respondent could stop the chemotherapy, the symptoms felt by the patient who was experiencing anxiety were anxiety, difficulty sleeping, and difficulty concentrating.

### **Sleep Quality of Cancer Patients Undergoing Chemotherapy**

Sleep disorders are said to be the most common and annoying symptoms of cancer patients who have recently undergone treatment. In the present study most of the respondents, as much as 93.3 % of the 90 respondents who underwent chemotherapy, stated that their sleep quality was poor. The results are in line with the study of Amelia et al. (2021) concerning the relationship between stress and sleep quality in breast cancer patients undergoing chemotherapy during the COVID-19 pandemic at Dr. M. Djamil Central Public Hospital involving 45 respondents. The results of their study showed that 93.3 % of breast cancer respondents who underwent chemotherapy at Dr. M. Djamil Padang have poor sleep quality, and 6.7 % of respondents have good sleep quality (12).

Age is also a factor that affects the quality of sleep. Age is one of the determining factors for the length of sleep a person needs. The older a person is, the less sleep they need. Individuals who have become adults sleep about 8-10 h a day. Meanwhile, individuals who have become old adults sleep about 6-8 h a day (29).

Apart from the age factor, the frequency of chemotherapy also affects the sleep quality of breast cancer patients. In patients undergoing chemotherapy for the first time or afterward, they still experience sleep disturbances due to frequent awakenings in the middle of the night to go to the bathroom, restlessness, or being unable to get to sleep before or after waking up in the middle of the night (30).

Good quality sleep is needed by the patient's body, a sick body will have difficulty starting and maintaining sleep, if the body experiences sleep

deprivation, the body will experience decreased endurance, decreased daily activities, feel tired, and can have an impact on psychological health and have an impact on the recovery of the respondent's illness. The results of the study used the PSQI (Pittsburgh Sleep Quality Index) questionnaire involving 90 cancer respondents undergoing chemotherapy and it was found that almost all respondents experienced poor sleep quality, namely (93.3 %) with complaints of frequently using the bathroom, feeling hot, often waking up in the middle of the night or early in the morning and other complaints such as nightmares and feelings of anxiety. Quality sleep is needed by cancer patients who are undergoing chemotherapy to regenerate and repair body cells.

#### **The Relationship between Anxiety and Sleep Quality in Cancer Patients Undergoing Chemotherapy**

Anxiety in breast cancer patients can increase pain, interfere with sleep ability, increase nausea and vomiting after chemotherapy, as well as disrupt their quality of life (27). Our results support this concept since respondents with moderate anxiety had poor sleep quality as much as 45.6 % of 90 respondents. Meanwhile, respondents with mild anxiety had good sleep quality as much as 6.7 % of 90 respondents (p-value = 0.0001 ( $p \leq 0.05$ ), suggesting a relationship between anxiety and sleep quality in cancer patients undergoing chemotherapy. Similar results were reported by Afifah and Padoli (2018) regarding the relationship between anxiety and sleep quality in breast cancer patients in the working area of the Pucang Sewu Public Health Center, Surabaya (15), showing that nearly half of breast cancer patients experienced light (30 %) and poor (30 %) sleep quality and a small proportion experienced good sleep quality (25 %) and moderate sleep quality (15 %). Most (55 %) experienced mild anxiety, a small number experienced moderate anxiety (15 %), and almost half experienced severe anxiety (30 %). Severe anxiety with poor sleep quality at the second chemotherapy frequency was observed due to unpleasant side effects of chemotherapy to continue the next chemotherapy.

Anxiety is an unpleasant emotional reaction to real or imagined danger which is accompanied by changes in the autonomic nervous system and

subjective experiences such as pressure, fear, and anxiety (28). The negative impact of anxiety can occur in cancer patients (27).

Cancer patients undergoing chemotherapy have different levels of anxiety with various factors that cause anxiety such as age. Anxiety disorders can occur at any age, more often in adulthood. The more mature a person usually the heavier burden of the mind, lasts a long time, and is accompanied by many physiological components such as sleep disturbances, anxiety, fear, and anxiety. In addition, anxiety also occurs in new patients undergoing chemotherapy for the first time.

Cancer patients who do chemotherapy have moderate levels of anxiety and poor sleep quality disturbances, and so do respondents who experience very severe anxiety have poor sleep quality. This is because many cancer patients undergoing chemotherapy are worried about the effects of the chemotherapy and anxiety that occurs in respondents was also influenced by age being  $\geq 47$  years old. A person's sleep quality is said to be good because he does not show signs of sleep deprivation and does not experience sleep problems. The lower the anxiety experienced, the better the quality of sleep, and the higher the level of anxiety, the worse the quality of sleep.

#### **CONCLUSIONS**

It was found that there is a relationship between anxiety and sleep quality in cancer patients undergoing chemotherapy at Dr. M. Djamil Central Public Hospital.

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