SKJP 2025
Jurnal SMART Keperawatan, 2025, 12 (1), 89-95 pISSN 2301-6221; eISSN 2502-5236
http://www.stikesyahoedsmg.ac.id/ojs/index.php/sjkp
Received 18 January; Revised 5 February; Accepted 8 February 2025

RELATIONSHIP BETWEEN FATIGUE AND SLEEP QUALITY OF ADVANCED BREAST CANCER PATIENTS UNDERGOING CHEMOTHERAPY

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ABSTRACT

Introduction: Breast cancer is the most common type of cancer that occurs in women due to the growth of abnormal cells in the breast tissue. One of the most widely used treatments is chemotherapy with the most common side effect being fatigue. Continuous fatigue can affect the patient's sleep quality, especially in advanced stages. **Objective:** This study aims to determine the relationship between fatigue and sleep quality of advanced breast cancer patients undergoing chemotherapy. **Method:** This study used a descriptive correlation design with a cross-sectional approach. This study amounted to 43 respondents who were taken based on the inclusion criteria using the total sampling technique. The instruments used the study were Brief Fatigue Inventoy (BFI) and Pittsburgh Sleep Quality Index (PSQI). The analysis used was Chi Square test. **Results:** As many as 21 respondents had fatigue in the mild category (48,8%) and 22 respondents had fatigue in the severe category (51,2%) while in the sleep quality of 43 respondents, 8 respondents had good sleep quality (18,6%) and 35 respondents had poor sleep quality (81,4%). There is no significant relationship between fatigue and sleep quality in advanced breast cancer patients undergoing chemotherapy with p value (0,689) > alpha (0,05). **Conclusion**: Fatigue has no significant relationship with sleep quality in advanced breast cancer patients undergoing chemotherapy. Can further develop the results of this study regarding other factors such as physical, psychological, religious and social factors that can affect the sleep quality of advanced breast cancer patients undergoing chemotherapy.

Keywords: Advanced stage; Breast cancer; Chemotherapy; Fatigue; Sleep quality

INTRODUCTION

Cancer is the second cause of death worldwide that has increased every year. Based on Global Burden Cancer (GLOBOCAN) 2020 data, the number of new cancer cases worldwide reached 19,292,789 patients with a death rate of 9,958,133 per year. In Indonesia, new cases of cancer occur around 396,314 cases with cancer deaths reaching 234,511 people. The biggest causes of cancer deaths are lung cancer, breast cancer, cervical cancer, liver cancer, and colorectal cancer (WHO, 2020). One of the most dangerous types of cancer is breast cancer. Breast cancer is the most common cancer in women (Brunner & Suddarth, 2018).

According to the World Health Organization (WHO) in 2020 there are about 2,261,419 (11.7%) new cases of breast cancer with a mortality rate of 684,996 (6.9%). In Indonesia, the first new case of cancer is breast cancer which reached 65,858 (16.6%) cases and a death rate of 22,430 (9.6%) after lung cancer. The increase in new cancer cases also occurred in Riau where about 26,085 (1.67%) patients were found (Riskesdas, 2018). Arifin Achmad Regional General Hospital (RSUD) of Riau Province is a referral center for 12 regencies and cities in the Riau region, reaching approximately 1,200 patients per day with breast cancer patients dominating (Media Center Riau, 2022). Based on data obtained from the medical records of Arifin Achmad Hospital, there were 12,803 breast cancer patients in 2023. This number has decreased from 2022 which amounted to 16,982 cases (Medical Record Data of RSUD Arifin Achmad, 2023).

Current breast cancer treatment therapy consists of surgery, radiotherapy, chemotherapy and hormone therapy (Kemenkes RI, 2023). Chemotherapy is a cancer treatment therapy using anticancer or cytotoxic drugs that function to destroy cancer cells in the body). Cancer patients who undergo treatment therapy with chemotherapy

generally experience several side effects such as nausea and vomiting, anemia, sleep problems and fatigue (Dahlia, Karim, & Damanik, 2019). Fatigue is a subjective feeling of tiredness or fatigue that can spread and interfere with daily activities. Fatigue is a common problem in cancer patients, with an estimated prevalence of 60-90% of cases (Dennett & Elkins, 2020).

Patients who experience fatigue have significantly longer sleep duration and tend to be awake more at night than breast cancer patients who do not experience fatigue, which can result in disruption of the patient's sleep quality (Imanian et al., 2019). Several components that can affect sleep quality include subjective sleep quality, sleep latency, sleep duration, sleep efficiency, sleep disturbances, sleep medication, and daytime sleep dysfunction (Anggraini, Marfuah, & Puspasari, 2020). Decreased sleep quality in breast cancer patients is caused by several factors including anxiety, depression and environmental factors such as noise, lighting, room temperature, and bed hygiene (Aisy et al., 2020). Cancer stage levels can also affect a person's sleep quality, the higher the stage level in cancer patients, the worse the patient's sleep quality (Andini et al., 2022).

Sleep disorders are often or rarely diagnosed, which can worsen a person's condition. Patients who experience disturbances in sleep quality are prone to decreased endurance, decreased daily activities, easily weakened and slow recovery and cause psychological problems (Ahsan, 2022). Psychological problems that occur include feelings of pressure, anxiety, depression and stress (Sari et al., 2022). According to Tristianingsih and Handayani (2021), the decline in quality of life and health function is also an impact that is often experienced by patients, where patients with advanced stages really need care to improve their quality of life. Poor sleep quality can affect the body's wake-sleep cycle, which can lead to disruption of the brain's work system (Hutagalung, Marni, & Erianti, 2021). Another health problem that can be caused is a decrease in sympathetic nerves and parasympathetic nerves which have a relationship with sleep disorders experienced by patients, this can be the main cause of decreased Heart Rate Variability (HRV) and increased patient heart rate (Rozy & Risdiana, 2019).

Based on the phenomenon that has been described, it appears that fatigue can cause decreased sleep quality in breast cancer patients, but in patients with advanced stages it is not specifically known. Therefore, the authors are interested in conducting research on the relationship between fatigue and sleep quality of advanced breast cancer patients undergoing chemotherapy at RSUD Arifin Achmad.

METHOD

The research design used in this study is quantitative in the form of descriptive correlation with a cross-sectional approach. The population determined in this study were advanced breast cancer patients who underwent chemotherapy from July 2023 to December 2023 at RSUD Arifin Achmad Riau Province, totaling 43 people. The sample technique used in this study was total sampling. The instruments used in this study were Brief Fatigue Inventoy (BFI) and Pittsburgh Sleep Quality Index (PSQI). Data analysis used is univariate and bivariate analysis with Chi Square test.

RESULTS

Table 1 Frequency Distribution Based on Breast Cancer Patients Characteristics

Characteristics	Frequency (n)	Percentage (%)
Age		
26-35	2	4,7
36-45	13	30,2
46-55	18	41,9
56-65	10	23,3
Last Education		
SD	14	32,6
SMP	7	16,3
SMA	18	41,9
College	4	9,3
Occupation		
Household Management	36	83,7
PNS/ASN	1	2,3
Entrepreneurship/Self-Employment	2	4,7
Other	4	9,3
Marital Status		
Having a Partner	37	86,0
Don’t Have a Partner	6	14,0

Jurnal SMART Keperawatan, 2025, 12 (1), 89-95
http://www.stikesyahoedsmg.ac.id/ojs/index.php/sjkp
Received xx ; Revised xxx; Accepted xxxx

Stage		
III	38	88,4
IV	5	11,6
Chemoterapy Time Range		
≤6 months	35	81,4
>6 months	8	18,6
Total	43	100

Based on table 1 regarding the characteristics of breast cancer patients, it can be concluded that advanced breast cancer patients who underwent chemotherapy were 43 breast cancer patients (100%) with the highest age range of 46 to 55 years, namely 18 breast cancer patients (41.9%). Furthermore, the last education of the most breast cancer patients was Senior High School (SMA) as many as 18 breast cancer patients (41.9%) with the majority of breast cancer patients having a job household management, namely 36 breast cancer patients (83.7%). Almost all breast cancer patients had a partner as many as 37 breast cancer patients (86.0%). The majority of breast cancer patients were at stage III as many as 38 breast cancer patients (88.4%) and as many as 35 breast cancer patients (81.4%) underwent chemotherapy ≤6 months.

Table 2 General Overview of Breast Cancer Patients Fatigue

Characteristics	Frequency (n)	Percentage (%)
Mild	21	48,8
Severe	22	51,2
Total	43	100

Based on table 2 regarding the fatigue picture of breast cancer patients in general, it shows that some breast cancer patients have a mild level of fatigue, namely 21 breast cancer patients (48.8%) and 22 breast cancer patients (51.2%) have a severe level of fatigue.

Table 3 General Overview of Breast Cancer Patients Sleep Quality

Characteristics	Frequency (n)	Percentage (%)
Good	8	18,6
Poor	35	81,4
Total	43	100

Based on table 3 regarding the description of the breast cancer patient sleep quality in general, it is known that most of the respondents, namely 35 breast cancer patients (81.4%) have poor sleep quality while 8 breast cancer patients (18.6%) have good sleep quality.

Table 4 Overview of Breast Cancer Patients Sleep Quality Based on Each Component

Subjective Sleep Quality	**Very Good**		**Fairly Good**		**Fairly Bad**		**Very Bad**	
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**
	1	2,3	20	46,5	21	48,8	1	2,3
Sleep Latency	0		1-2		3-4		5-6	
	n	%	n	%	n	%	n	%
	10	23,3	18	41,9	13	30,2	2	4,7
Sleep Duration	>7 hours		6-7 hours		5-6 hours		<5 hours	
	n	%	n	%	n	%	n	%
	2	4,7	11	25,6	20	46,5	10	23,3
Sleep Efficiency	>85%		75%-84%		65%-74%		<65%	
	n	%	n	%	n	%	n	%
	32	74,4	10	23,3	1	2,3	0	0
Sleep Disturbances	0		1-9		10-18		19-27	
	n	%	n	%	n	%	n	%
	0	0	21	48,8	22	51,2	0	0
Use of Sleeping Medication	Never		<1x a week		1-2x a week		≥3x a week	
	n	%	n	%	n	%	n	%
	42	97,7	0	0	1	2,3	0	0
Daytime Disfunction	0		1-2		3-4		5-6	
	n	%	n	%	n	%	n	%
	2	4,7	6	14,0	29	67,4	6	14,0

Based on table 4 which is a description of the breast cancer patients sleep quality based on each component, it is known that 21 breast cancer patients (48.8%) have subjectively quite poor sleep quality. Furthermore, in the sleep latency component, 18 breast cancer patients (41.9%) had a score range of 1-2. The breast cancer patients sleep duration component was mostly in the 5-6 hour duration, as many as 20 breast cancer patients

(46.5%). As for the sleep efficiency component or the comparison between sleep duration and long duration in bed, 32 breast cancer patients (74.4%) had a percentage of >85%. Furthermore, in the sleep disturbance component, some breast cancer patients, namely 22 breast cancer patients (51.2%) had a score range of 10-18. It was found that in the component of the use of sleeping pills, almost all breast cancer patients, namely 42 breast cancer patients (97.7%) did not consume drugs to help sleep, and in the daytime dysfunction component, 29 breast cancer patients (67.4%) had a score of 3-4.

Table 5 Relationsheep Between Fatigue and Sleep Quality

Fatigue	Sleep Quality				Total		P value
	Good		Poor				
	n	%	n	%	n	%	
Mild	3	14,3	18	85,7	21	100	0,689
Severe	5	22,7	17	77,3	22	100	
Total	8	14,0	35	81,4	43		

The results of the analysis of table 5 regarding the relationship between fatigue and sleep quality found that 3 breast cancer patients (14, 3%) had good sleep quality, then there were 18 breast cancer patients (85.7%) who had mild fatigue had poor sleep quality. Then in breast cancer patients who have a severe level of fatigue there are 5 breast cancer patients (22.7%) who have good sleep quality and 17 respondents (77.3%) who have poor sleep quality. The statistical test results show a p value = 0.689, which means that the p value > α 0.05 so that Ho is declared failed to be rejected, it can be concluded that there is no relationship between fatigue and sleep quality of advanced breast cancer patients undergoing chemotherapy at Arifin Acmad Hospital.

DISCUSSION

Fatigue

The results of the research conducted showed that of the 43 breast cancer patients who underwent chemotherapy, it was found that almost half of the breast cancer patients experienced severe fatigue, namely 22 breast cancer patients (51.2%). Theoretically, fatigue is the most common symptom complained of in almost all breast cancer patients undergoing chemotherapy (Oh & Cho, 2020). Fatigue is characterized by several symptoms, namely lack of energy and symptoms that are persistent or do not decrease with rest and increase when the patient is undergoing chemotherapy (Maqbali et al., 2021), There are several causes of fatigue in patients with breast cancer, including decreased red blood cells (anemia), impaired adenosine triphosphate (ATP) formation, stimulated production of pro-inflammatory cytokines, interleukins (IL), and tumor necrosis factor (TNF), and HPA axis dysfunction resulting in dysregulation of metabolism and the endocrine system (Wolvers et al., 2018).

According to Setiadi (2020), a high level of fatigue can worsen the condition of advanced breast cancer patients undergoing chemotherapy both physically and psychologically. Conversely, breast cancer patients who receive holistic treatment can help in the management of fatigue and improve the patient's physical and psychological condition, especially the experience of better sleep quality.

Sleep Quality

The results of the research conducted showed that of the 43 respondents who underwent chemotherapy, almost all breast cancer patients had poor sleep quality, namely 35 breast cancer patients (81.4%). There are seven components that contribute to the measurement of breast cancer patient sleep quality. Based on the research conducted, the subjective sleep quality component or the respondent's assessment of their sleep, 21 breast cancer patients (48.8%) stated that their sleep quality was quite poor. Furthermore, in the sleep latency component, 18 breast cancer patients (41.9%) were found to have a score range of 1-2, which means that the time it takes for breast cancer patients to start falling asleep is 16-30 minutes and falls into the good enough category. The breast cancer patients sleep duration component was mostly in the 5-6 hours duration and categorized as quite bad, namely as many as 20 breast cancer patients (46.5%). As for the results of the research on the sleep efficiency component or the comparison between the duration of sleep and the length of time in bed, 32 breast cancer patients

(74.4%) had a percentage of >85%, which means that the time the breast cancer patients spends in bed is the same as the time to fall asleep, so this result is categorized as very good. Furthermore, in the sleep disturbance component, some breast cancer patients, namely 22 respondents (51.2%) had a score range of 10-18, which means that sleep disturbances that occur affect sleep quality and are categorized as quite bad. It was found that in the component of the use of sleeping pills, almost all breast cancer patients, namely 42 breast cancer patients (97.7%) did not take drugs to help fall asleep and were categorized as very good, and in the component of daytime dysfunction or daytime activity disorders, 29 breast cancer patients (67.4%) had a score of 3-4, which means that activity disorders that occur indicate that sleep quality is in a fairly poor category. In general, of the seven components of sleep quality, there are several components that contribute to the assessment of the poor quality of sleep of breast cancer patients. These components are sleep duration, sleep efficiency, and daytime dysfunction (Alifiyanti et al., 2017).

The most important part of the brain in regulating sleep duration is the hypothalamus. Neurons of the hypothalamic group produce neurotransmitters that are important for regulating sleep-wake, namely histamine which is a neurotransmitter involved in the waking state and GABA (Gamma Aminobutyric Acid) which affects falling asleep. The body produces more histamine and not enough GABA when a person experiences insomnia, but during the day the body produces too much GABA and not enough histamine, causing excessive sleepiness during the day (Siegel, 2022).

Various sleep disorders are often experienced by breast cancer patients, one of the causes is chemotherapy undergone by patients. According to Hafiroh (2022) breast cancer patients who undergo chemotherapy will feel tired, nausea and vomiting, pain, fatigue, and hair loss. These various side effects are associated with sleep disturbances experienced by patients such as frequent waking at night, so this causes poor sleep quality.

Relationship between Fatigue and Sleep Quality

The results of this study indicate that there is no relationship between fatigue and sleep quality of advanced breast cancer patients undergoing chemotherapy at RSUD Arifin Achmad with p value = 0.689 which means p value > 0.05. According to Handayani (2020), fatigue is the symptom most often encountered in cancer patients, where fatigue is a sensation of physical, emotional, and cognitive fatigue that occurs due to cancer disease or treatment, and cannot be fully overcome with regular rest, while sleep quality is an aspect to see the good or bad condition of a person's sleep which is indicated by peaceful, deep, and restorative sleep (Do, 2022).

One of the factors that affect the quality of sleep of breast cancer patients is the fatigue factor (Hafiroh, 2022), but in this study the quality of sleep that respondents have is not only influenced by fatigue factors, but also influenced by many other factors which in this study found that the quality of sleep experienced by respondents showed varying sleep quality. As many as 18 breast cancer patients (85.7%) with mild fatigue had poor sleep quality, then breast cancer patients who had severe fatigue had poor sleep quality as many as 17 breast cancer patients (77.3%). This shows that the level of fatigue does not show any relationship to the sleep quality of advanced breast cancer patients undergoing chemotherapy at Arifin Achmad Hospital.

Advanced breast cancer patients undergoing chemotherapy are often considered to experience fatigue as one of the most common side effects. However, according to research by Andini et al (2021) explained that even though patients feel very tired physically, patients can still have a fairly good quality of sleep, this is due to the body's physiological adaptation factor to chronic fatigue because the patient's body reaches a compensation point, where the severe fatigue experienced by the patient actually makes the patient fall asleep quickly even though sleep is not long enough (Andini et al., 2021). Another factor that can cause fatigue not to affect the patient's sleep quality is effective chemotherapy symptom management. Patients who undergo supportive therapy, such as medication to reduce pain or breathing exercise therapy and meditation as well as the ability to

manage good emotional balance can also maintain patient sleep quality even though physical fatigue is still felt by patients (Ardiani, 2023). In addition, several studies confirm that there are other factors that are significant enough to cause a decrease in the quality of sleep of advanced breast cancer patients undergoing chemotherapy.

Breast cancer patients with metastases also experience high levels of pain and sleep problems in the form of nighttime awakenings. Pain that occurs in advanced breast cancer patients can inhibit raphe nuclei nerve fibers in secreting serotonin. Serotonin is a neurotransmitter that causes sleep, inhibition of its work will result in wakefulness and become a factor in sleep disorders (Aisy, 2020). There are several factors that cause this including cancer treatments, medications, physical symptoms such as pain and hot flashes, emotional reactions such as depression and anxiety and environmental influences such as noise, light and hospital stay (Alifiyanti, 2017).

The fatigue is not the only cause of poor sleep quality of advanced breast cancer patients undergoing chemotherapy, so that in addition to fatigue factors, breast cancer patients can optimize other factors that can improve the sleep quality of advanced breast cancer patients undergoing chemotherapy. The limitation in this study is that some breast cancer patients are difficult to meet because many are resting and waiting for the installation of chemotherapy drugs, which results in longer research time. In addition, breast cancer patients in the study were also less open when filling out the questionnaire, making it difficult for researchers to develop research. Researchers cannot control the honesty of respondents in filling out questionnaires because the control tool is only a questionnaire sheet that must be filled in by the breast cancer patients themselves.

CONCLUSION

There is no significant relationship between fatigue and sleep quality of advanced breast cancer patients undergoing chemotherapy. Who are interested in similar issues to further develop the results of this study regarding other factors such as physical, psychological, religious and social factors that can affect the sleep quality of advanced breast cancer patients undergoing chemotherapy.

REFERENCES

Ahsan, Z. (2022). Hubungan antara kualitas tidur dengan kecemasan. *Jurnal Sosial Dan Sains*, *2*(3), 426–432.

Aisy, R., Sawutri, E., & Rotinsulu, D. J. (2020). Insomnia Pada Penderita Kanker yang Menjalani Kemoterapi. *Jurnal Medika: Karya Ilmiah Kesehatan, 5*(1)

Alifiyanti, D., Hermayanti, Y., & Setyorini, D. (2017). Kualitas tidur pasien kanker payudara berdasarkan terapi yang diberikan di RSUP dr. Hasan Sadikin Bandung. *Jurnal Pendidikan Keperawatan Indonesia*, *3*(2), 115-125.

Anggraini, D., Marfuah, D., & Puspasari, S. (2020). Kualitas Tidur Pasien Kanker Payudara Yang Menjalani Kemoterapi. *Jurnal Ilmiah Kesehatan Keperawatan*, *16*(2), 91. https://doi.org/10.26753/jikk.v16i2.494

Ardiani, A. I. (2023). Hubungan Tingkat Kecemasan dengan Kualitas Tidur pada Pasien Kanker Payudara yang Akan Menjalani Kemoterapi. *Repository Unissula*. https://repository.unissula.ac.id/34205/2/30902000050_fullpdf.pdf.

Brunner, & Suddarth. (2018). *Keperawatan Medikal Bedah Edisi 12*. Jakarta: Buku Kedokteran EGC

Dahlia, D., Karim, D., & Damanik, S. R. H. (2019). Gambaran Fatigue Pada Pasien Kanker Post Kemoterapi. *Jurnal Ners Indonesia*, *9*(2), 80. https://doi.org/10.31258/jni.10.1.80-93

Dennett, A. M., & Elkins, M. R. (2020). Cancer rehabilitation. In *Journal of Physiotherapy* (Vol. 66, Issue 2). https://doi.org/10.1016/j.jphys.2020.03.004

Hafiroh, F. N. (2022). *Hubungan Fatigue (Kelelahan) Dengan Kualitas Tidur Pada Pasien Penderita Kanker Payudara Yang Menjalani Kemoterapi Di Rs Baladhika Husada Jember* (Doctoral dissertation, Universitas dr. SOEBANDI).

Hamzah, B. D., Akbar, H., Rafsanjani, T. M., Sinaga, A. H., Hidayani, W. R., Panma, Y., & Bela, S. R. (2021). *Teori Epidemiologi Penyakit Tidak Menular*. Yayasan Penerbit Muhammad Zaini.

Handayani, S., Wulandari, R., & Susanti, I. (2020). Fatigue pada Pasien Kanker di RSUD Abdul Wahab Sjahranie, Samarinda. *Jurnal Keperawatan Dirgahayu*, 2(1). Diakses dari Jurnal Keperawatan Dirgahayu

Handiyani, H., Hariyati, T.S., Yetti, K., & Indracahyani, A. (2018). *Healthy Nurse Napping: Sehat Bagi Perawat dan Tenaga Kesehatan*. Jakarta: UI Publishing.

Hidayah, N., Nurjanah, S., & Agustina, R. (2023). Pengaruh Hidroterapi dan Musik Alam terhadap Kualitas Tidur pada Pasien Kanker Payudara yang Menjalani Kemoterapi. Tahta Media. https://tahtamedia.co.id/index.php/mjn/article/download/874/886.

Hutagalung, N., Marni, E., & Erianti, S. (2022). Faktor-faktor yang Mempengaruhi Kualitas Tidur Pada Mahasiswa Tingkat Satu Program Studi Keperawatan STIKes Hang Tuah Pekanbaru. *Jurnal Keperawatan Hang Tuah*

(Hang Tuah Nursing Journal), 2(1),77-89

Imanian, M., Imanian, M., & Karimyar, M. (2019). Sleep quality and fatigue among breast cancer patients undergoing chemotherapy. *International Journal of Hematology-Oncology and Stem Cell Research*, *13*(4), 196–200. https://doi.org/10.18502/ijhoscr.v13i4.1894

James, P. (2012). *Anaesthesia , Sleep And Dyssomnias - Part 1 Anaesthesia Tutorial Of The Week 268 ! Dr . Paul James , Specialty Trainee Anaesthetics Nottingham and East Midlands School of Anaesthesia Correspondence to paul_t_james@yahoo.co.uk*. 1–7

Marelli, S., Castelnuovo, A., Somma, A., Castronovo, V., Mombelli, S., Bottoni, D., ... & Ferini-Strambi, L. (2021). Impact of COVID-19 lockdown on sleep quality in university students and administration staff. *Journal of neurology*, *268*, 8-15.

Maqbali, M. (2021). Cancer-related fatigue: an overview. *British Journal of Nursing*, *30*(4), S36-S43.

Rahayuwati, D., et al. (2023). Pilihan Pengobatan Pasien Kanker Payudara Masa Kemoterapi. *Journal of Cancer Therapy*, Vol. 9, No. 2, pp. 118-123.

Riskesdas. (2018). Laporan Nasional Riskesdas. *Kementrian Kesehatan RI*, *1*(1), 1. https://www.kemkes.go.id/article/view/19093000001/penyakit-jantung-penyebab-kematian-terbanyak-ke-2-di-indonesia.html

Sari, L., Putra, I. G. K., & Nuraini, S. (2019). Faktor Pekerjaan dan Pendidikan terhadap Stadium Kanker Payudara. *Jurnal Onkologi Indonesia*, 9(1), 45-52.

Setiadi, O. H. (2020). *Gambaran Tingkat Kelelahan Pada Pasien Kanker Payudara Yang Menjalani Kemoterapi: Systematic Literature Review*. STIKep PPNI Jawa Barat. Diakses dari repository.stikep-ppnijabar.ac.id.

Tenggara, J.B. (2024). Data Tinggi Kasus Kanker Payudara di Indonesia. Republika Online. Diakses dari Republika.

WHO. (2020). *Global Cancer Obsevatory of Breast Cancer*. International Agency for Research on Cancer. https://gco.iarc.fr/today/data/factsheets/cancers/20-Breast-fact-sheet.pdf

Wolvers, M. D. J., Bussmann, J. B. J., Bruggeman-Everts, F. Z., Boerema, S. T., van de Schoot, R., & Vollenbroek-Hutten, M. M. R. (2018). Physical behavior profiles in chronic cancer-related fatigue. *International journal of behavioral medicine*, *25*, 30-37.

Zaiyati, N., Ridwan, A., & Maulina, M. (2023). Kualitas Tidur Pada Mahasiswa Dengan Tugas Akhir. *Jurnal Ilmiah Mahasiswa Fakultas Keperawatan*, *7*(3).