


Original Research Paper

The relationship between cancer stage and quality of life in cancer patients: a cross-sectional study

Vita Setyaningsih, Hamudi Prasestiyo* , Wantonoro Wantonoro

Program Studi Keperawatan, Fakultas Ilmu Kesehatan, Universitas Aisyiyah Yogyakarta, Yogyakarta, Indonesia
 hamudiprasestiyo@unisayogya.ac.id

Submitted: March 24, 2026

Revised: April 18, 2026

Accepted: May 7, 2026

Abstract

Cancer is a chronic disease that affects not only physical health but also psychological, social, and spiritual well-being, leading to decreased quality of life (QoL). This study aimed to analyze the relationship between cancer stage and quality of life in cancer patients. This study used an observational analytic design with a cross-sectional approach conducted at PKU Muhammadiyah Gamping Hospital. A total of 75 respondents were selected using purposive sampling based on Slovin's formula. Data on cancer stage were obtained from medical records, while quality of life was measured using the EORTC QLQ-C30 questionnaire. The results showed that most patients were in advanced stages (stage III = 48%) and had poor quality of life (65.3%). Spearman Rank analysis indicated a significant negative correlation between cancer stage and quality of life ($p = 0.001$; $r = -0.54$), meaning that higher cancer stages were associated with lower quality of life. In conclusion, cancer stage is an important determinant of quality of life. Early detection, routine QoL assessment, and strengthening palliative nursing care are essential to improve patient outcomes.

Keywords: cancer patients; EORTC QLQ-C30; palliative nursing; quality of life; stage of cancer

1. Introduction

Cancer is a disease characterized by an uncontrolled proliferation of abnormal cells as well as the potential for metastasis to other organs, which have systemic impacts beyond physical boundaries to include psychological, social, and spiritual dimensions. The complexity of this multidimensional burden places quality of life as a crucial parameter in evaluating the effectiveness of cancer patient care management.

According to [GLOBOCAN \(2022\)](#), there were 19.97 million cases of cancer in 2022 and there were 9.74 million cases of cancer deaths in 2022. According to [GLOBOCAN \(2022\)](#), Asia is ranked as the highest number of cancer patients, reaching 49.2% or around 9.82 million cases of cancer in 2022 and contributing 56.1% or around 5.46 million cases of cancer deaths in 2022. Based on [GLOBOCAN \(2022\)](#), the prevalence of cancer patients in Indonesia in 2022 reached 408 thousand cases of cancer and there were 242 thousand cases of death due to cancer. Indonesia is the country that ranks 8th in the incidence of cancer in Southeast Asia, with the prevalence of cancer patients in the province of Yogyakarta reaching 3.6 per 1,000 population ([Yonatan, 2024](#)). According to the ([Kementrian Kesehatan Republik Indonesia, 2023](#)) in the Indonesian health survey (SKI), in 2023 there were 11,757 cases of cancer patients in the Special Region of Yogyakarta. From Indonesian health survey data, it was found that the Special Region of Yogyakarta became the province with the highest number of cancer patients in Indonesia, reaching 3.6%. Based on the results of a preliminary study with license number 2031/FIKES-UNISA/Ad/VII/2025 which has been granted permission from PKU Muhammadiyah Gamping Hospital with number 2176/PI.24.1/XI/2025, conducted on October 2, 2025, the number of cancer patients at PKU Muhammadiyah Gamping Hospital consisted of 305 outpatients



and 124 inpatients consisting of various stages of cancer. Based on this data, it was found that the most types of cancer were found, the first was breast cancer (Ca Mammae), which was 40 people and the second was colon cancer (Ca Colon), as many as 38 people.

Recent literature confirms that the quality of life of cancer patients is a multidimensional entity influenced by various determinants, including clinical characteristics, therapeutic modalities, and psychosocial support. Among these factors, the stage of cancer plays a crucial role because it reflects the degree of disease progression which has direct implications on the burden of symptoms, the complexity of treatment, and the patient's prognosis. The consensus of recent empirical studies, as reported by [Rumsilah et al. \(2024\)](#) and [Fadhil et al. \(2024\)](#), Affirms that patients in advanced stages face a significant risk of a significant decrease in quality of life due to the escalation of physical symptoms and side effects of therapy. These findings are reinforced by [Awaliyah & Mulyati \(2023\)](#) which shows a real negative correlation, where diagnosis at an early stage is closely related to the achievement of a more optimal quality of life compared to the advanced stage.

Although the link between cancer stage and quality of life has been extensively researched, most previous studies have focused on specific types of cancer or survivor groups, as well as being conducted in different healthcare contexts. In addition, there are still limited studies that examine this relationship in the general cancer patient population using cancer-specific quality of life instruments and conducted in referral hospitals in Indonesia. This condition shows that there is a research gap, both in terms of population coverage and the context of health services, so research that provides a more contextual empirical picture is needed.

Responding to this urgency, this study was designed to specifically analyze the relationship between disease stages and quality of life in the cancer patient population at PKU Muhammadiyah Gamping Hospital, by measuring using the EORTC QLQ-C30 instrument to determine the relationship between cancer stage and quality of life in cancer patients at PKU Muhammadiyah Gamping Hospital. The novelty of this study lies in an in-depth contextual assessment of the clinical service setting. Practically, the results of this study are expected to enrich the treasures of nursing science, especially in the optimization of palliative care, as well as provide a frame of reference for medical personnel in developing holistic intervention plans for cancer patients.

2. Research Methods

This analytical observational study used a cross-sectional approach to evaluate the correlation between cancer stage and quality of life at PKU Muhammadiyah Gamping Hospital. Involving the population of outpatient cancer patients, the research sample was set as many as 75 respondents based on the calculation of the Slovin formula ($e = 10\%$). Purposive sampling techniques are applied to ensure that respondents meet the inclusion criteria that have been set. The inclusion criteria in this study were cancer patients undergoing treatment at PKU Muhammadiyah Gamping Hospital, aged ≥ 18 years, able to communicate effectively, and willing to participate by signing informed consent. Meanwhile, the exclusion criteria included patients who were in critical condition, had cognitive impairment, or refused to participate in the study. Acquisition of clinical data (cancer stage) is carried out through triangulation of interview data and medical records. Quality of life variables were measured using the European Organisation for Research and Treatment of Cancer Quality of Life (EORTC QLQ-C30) standardized questionnaire, which consists of 30 items on the domains of global function, symptoms, and health. The research process complies with the principles of the Helsinki declaration, as evidenced by the operational permit (No. 0017/PI.24.2/I/2026) and the approval of the ethics committee (No. 312/KEP-PKU/XII/2025). The principles of autonomy and confidentiality are strictly maintained through the signing of informed consent sheets. The data is analyzed using statistical software. The characteristics of the respondents are presented in frequency distribution (univariate). Furthermore, the Spearman Rank

test was used for bivariate analysis to test the hypothesis of the relationship between cancer stage and quality of life, with a statistically significant level of significance set at $p < 0.05$.

3. Results and Discussion

3.1. Results

3.1.1. Characteristics of Cancer Patients

Table 1. Distribution of frequency characteristics of respondents at PKU Muhammadiyah Gamping Hospital in January 2026

Features Age	Frequency (f)	Percentage (%)
<17	1	1.3
17-25	1	6.7
26-35	5	10.7
36-45	8	28
46-55	21	32
56-65	24	20
>65	15	1.3
Gender		
Women	56	74.7
Male	19	25.3
Education		
No School	4	5.3
Elementary School	23	30.7
Junior high school	12	16.0
High School/Vocational School	23	30.7
D3	5	6.7
S1	8	10.7
Employment Status		
Not Working	32	42.7
Work	43	57.3

Table 1 shows that the majority of 75 respondents were 56-65 years old with a total of 24 people (32%). It shows that of the 75 respondents, the average patient score is 54.15 years, of the 75 people the youngest age is at the age of 13 years and for the highest age is at the age of 82 years. Showing that of the 75 respondents, the majority were female respondents, namely 56 people (74.7%). Showing that out of 75 respondents, the majority of respondents were educated in elementary and high school/vocational schools, namely 23 people (30.7%). showing that out of 75 respondents, as many as 43 respondents (57.3%).

3.1.2. Cancer Stage

Table 1. Frequency Distribution of Cancer Stage Data at PKU Muhammadiyah Gamping Hospital in January 2026

Cancer Stage	Frequency (f)	Presentase (%)
Stage 1	1	1.3
Stage 2	26	34.7
Stage 3	36	48.0
Stage 4	12	16.0

Table 2 shows that out of 75 respondents, the majority of respondents with stage 3 were 35 people (48%).

3.1.3. Quality of Life

Table 2. Frequency Distribution of Quality of Life Data in Cancer Patients at PKU Muhammadiyah Gamping Hospital in January 2026

	Frequency (f)	Presentase (%)
Quality of Life		
Bad	49	65.3
Medium	26	34.7

Table 3 shows that out of 75 respondents, the majority of respondents' quality of life was poor, namely 49 people (65.3%) with poor quality of life. There are no respondents with a good quality of life.

3.1.4. Results of Analysis of the Relationship between Cancer Stage and Quality of Life

Table 4. Results of Analysis of the Relationship between Cancer Stage and Quality of Life in Cancer Patients at PKU Muhammadiyah Gamping Hospital in 2026 (n=75)

Cancer Stage	Quality of Life						Total	P value	r	
	Bad		Medium		Good					
	f	%	f	%	f	%				
Stage 1	0	0	1	100	0	0	1	100	<0.001	-0,54
Stage 2	8	30,8	18	69,2	0	0	26	100		
Stage 3	30	83,3	6	16,7	0	0	36	100		
Stage 4	11	91,7	1	8,3	0	0	12	100		
Total	40	53,3	35	46,7	0	0	75	100		

As presented in Table 4, the analysis of the Spearman Rank correlation of 75 respondents resulted in a correlation coefficient (r) of -0.54 with a p-value = 0.001 ($p < 0.05$). These statistical results indicate a significant negative relationship between the two variables. The negative coefficient value confirms the inverse relationship pattern, in which an increase in cancer stage (disease progressivity) is linearly correlated with a decrease in the patient's quality of life. Thus, it can be concluded that there is a statistically significant relationship between the stage of cancer and the quality of life of patients at PKU Muhammadiyah Gamping Hospital.

3.2. Discussion

3.2.1. Characteristics of Cancer Patients

Based on the data presented in Table 1, the age profile of the respondents was dominated by the age group of 56-65 years, with the average age of the study population of 54.15 years (range: 13-82 years). The dominance of the elderly group in the patient population at the Hemato-Oncology Polyclinic confirms the relevance of age as a determinant factor of carcinogenesis. This is closely related to the biological aging process, in which susceptibility to cellular mutations and failure of tumor suppression mechanisms tends to increase progressively with age. The stage of cancer tends to be higher in individuals with late adulthood which impacts the level of perceived symptoms and the patient's quality of life (Chung et al., 2024).

These findings are consistent with studies Rahmah et al. (2023) which identifies that the majority of cancer patients, particularly cervical cancer, are in the menopausal and advanced phases. In the clinical context, old age is not only a risk factor, but is also associated with the manifestation of the disease at a higher stage, which in turn demands the complexity of therapeutic management as well as increases the risk of complications. This is reinforced by research Fadhil et al. (2024) at Dr. M. Djamil Padang Hospital, which confirms the existence of a linear correlation between old age, cancer stage,

and decreased quality of life. Geriatric patients with advanced cancer experience a *double burden* due to the physiological degradation of aging and the systemic impact of cancer progression, which significantly deteriorates their quality of life compared to early-stage patients.

Judging from gender characteristics (Table 1), the dominance of female respondents was recorded to be very significant, reaching 74.7% (56 people). The high proportion of female patients at the Hemato-Oncology Polyclinic of PKU Muhammadiyah Gamping Hospital reflects national epidemiological trends. As reported by (GLOBOCAN, 2022), Breast cancer is the most prevalent malignancie in Indonesia. This data is also validated by the hospital's internal preliminary study, which confirms that breast cancer tops the list of oncology cases in this institution.

The theory of cancer epidemiology states that hormones and female reproductive factors play a role in the incidence of certain cancers, such as breast cancer and cervical cancer (Ode et al., 2022). According to Chung et al. (2024) It also shows differences in disease burden symptoms based on the type of cancer, which is also influenced by gender. Gender can lead to differences in cancer symptom burden, these differences can have an impact on the patient's quality of life experience (Osborne et al., 2025).

This research is in line with research Wahyuni et al. (2021) Showing that female cancer patients are more dominant in oncology services in referral hospitals, especially those related to breast cancer, this study shows gender differences in health services, where women are more active in seeking health services than men. This study states that women have a relatively higher level of health awareness. But on the other hand, men tend to delay health check-ups and do not maintain their lifestyle until the symptoms felt are severe enough.

This research is in line with Marwin et al. (2021) discussing female patients dominates and states that women have a higher level of awareness. Women tend to be more sensitive to changes in body conditions, especially in the reproductive organs and breasts, so they are quicker to recognize abnormalities or abnormal symptoms. The level of awareness encourages women to be more active in improving health.

Based on Table 1, it is known that the majority of respondents have an elementary and high school/vocational education level, namely 23 people (30.7%) each. This right shows that most of the cancer patients who undergo outpatient treatment have a lower secondary level of education. Education level is one of the factors that affect a person's understanding of his or her health condition. Education also plays a role in a person's ability to receive health information.

Education affects a patient's understanding of health information and ability to make decisions related to his health, thus affecting the delay in diagnosis and the patient's quality of life (Chung et al., 2024). Patients with higher education levels tend to have better health knowledge, i.e. the ability to search, understand, and use health information effectively. Good health knowledge allows patients to recognize the early symptoms of the disease, understand the importance of health check-ups and be able to make informed decisions in seeking health services.

This research is in line with research Rahmah et al. (2023) which shows a relationship between education and understanding the early symptoms of cervical cancer, where low levels of education contribute to delayed diagnosis. The study explains that patients with low levels of education are less likely to recognize early symptoms of cervical cancer such as abnormal bleeding or unusual vaginal discharge, so they consider perceived complaints as a mild health problem and do not require follow-up examination. As a result, patients come to health facilities when the disease is already at an advanced stage.

This is in line with research Wahyuni et al. (2021) reinforcing that respondents with low education are likely to have greater challenges in understanding the cancer treatment process. The study explained that patients with low levels of education more often have difficulty understanding medical information

related to diagnosis, therapy goals, treatment procedures, as well as side effects that may arise during treatment. Limitations in understanding can lead to confusion, anxiety, and non-adherence to established treatment regimens.

The educational characteristics of the respondents not only provide a demographic picture but also determine the need for health education in accordance with the understanding of cancer patients in Indonesia. The importance of tailored educational interventions to improve patient knowledge and involvement in their care (Rahmah et al., 2023)

Based on Table 1, it is known that the majority of respondents have working status, namely 43 people (57.3%). These results show that most of the cancer patients who undergo outpatient treatment at the hemato oncology polyclinic at PKU Muhammadiyah Gamping Hospital still have work activities. This condition illustrates that bringing cancer patients to the hemato oncology polyclinic at PKU Muhammadiyah Gamping Hospital is not entirely in a condition of dependence.

Employment status is related to the functional ability of the quality of life of cancer patients. Working patients tend to have better physical function and are motivated to maintain their social roles. However, the demands of work can also cause physical fatigue and psychological stress, especially in patients who are undergoing cancer therapy (Reynaldi et al., 2020).

This research is in line with Tamminga et al. (2020) showed that cancer patients who were still working in the period after diagnosis had higher quality of life scores than those who did not work. Work with cancer patients can maintain the physical function and social role of cancer patients, as well as provide an important sense of empowerment in the process of adaptation to chronic diseases. This finding is in general line with current research which shows that the majority of patients at PKU Muhammadiyah Hospital Jogja are still working.

In addition, this research is in line with Rizka et al. (2024) Discussing that factors that affect the quality of life in cancer patients are one of the factors that affect the quality of life in cancer patients. The results of the study showed that cancer patients who stayed on work tended to have a better perception of quality of life compared to those who did not work. In line with the condition of the respondents at PKU Muhammadiyah Gamping Hospital which shows that the majority of patients work, it shows that work can contribute to the dynamics of quality of life in cancer patients.

3.2.2. Cancer Stage

Based on Table 2, it is known that the majority of respondents are in stage III cancer, which is 36 people (48%). These results show that most cancer patients come to health facilities in advanced conditions. The stage of cancer itself illustrates how severe and spread the disease is. The higher the stage of cancer, the wider the spread of the cancer cells.

A higher stage of cancer indicates the spread of the cancer to other surrounding tissues or organs. The spread of cancer to this increases physical symptoms such as pain, fatigue and decreased organ function. Advanced stages are often associated with poor prognosis and the need for palliative care (Fadhil et al., 2024).

This research is in line with research Fadhil et al. (2024) shows that most cancer patients are advanced and have a decreased quality of life. This study used the EORTC QLQ-C30 instrument and found that the stage of cancer has a significant relationship with the patient's quality of life. The results showed that patients with higher stages of cancer were likely to have low quality of life scores.

The results of this study are in line with the research Marwin et al. (2021) It shows that patients with advanced cancer have a lower quality of life in both the physical and emotional domains. In advanced stages, patients experience a decline in physical ability due to progressive disease and side effects of therapy, such as chemotherapy and radiotherapy. Disorders in the form of anxiety and changes in body image also worsen the quality of life in cancer patients.

3.2.3. Quality of Life

Based on [Table 3](#), it is known that the majority of respondents have a poor quality of life, namely 49 people (65.3%). In this study, there were no respondents with good quality of life. These results show that most cancer patients experience a decrease in quality of life. Quality of life is an important indicator in evaluating the success of cancer treatment.

This research is in line with the results of the research [Marwin et al. \(2021\)](#) who assessed the quality of life of cancer patients at Dr. Kariadi Hospital, the majority of respondents reported decreased physical function and symptoms that reflected their suboptimal quality of life. The study used the EORTC questionnaire QLQ-C30, the results of which showed that physical aspects and symptoms of the disease affected the overall perception of the overall quality of life of breast cancer patients.

This research is also in line with the research [Larasati et al. \(2022\)](#) which indicates that the symptoms and complaints of breast cancer patients in the domain of physical function and symptoms are in the poor category, which is part of the overall quality of life dimension. This study explains that breast cancer patients often experience physical functions, such as decreased ability to perform daily activities, prolonged fatigue, and pain. This condition directly affects cancer patients' perception of their quality of life.

3.2.4. Results of Analysis of the Relationship between Cancer Stage and Quality of Life

Based on [Table 4](#) the results of the Spearman Rank test showed a significant relationship between cancer stage and quality of life ($p = 0.001$; $r = -0.54$). The negative correlation indicates that higher cancer stages are associated with lower quality of life. This finding confirms that cancer stage is an important determinant of patients' overall well-being.

Patients in advanced stages tend to experience more severe symptoms, such as pain, fatigue, and decreased functional ability, which directly contribute to reduced quality of life. In addition, therapy-related side effects also increase in advanced stages, including nausea, vomiting, fatigue, immune suppression, and hair loss. The increasing burden of both disease symptoms and treatment side effects leads to decreased physical function, emotional instability, and social limitations. Patients in advanced stages tend to have lower physical, role, and social functioning due to activity limitations and increased dependence on others. As symptom severity increases, patients experience a significant decline in their overall quality of life.

The results of this study are in line with the research conducted by [Rumsilah et al. \(2024\)](#) which states that there is a significant relationship between cancer stage and quality of life of breast cancer patients with a p value = 0.000. The study showed that patients with advanced stages of cancer tended to have a lower quality of life than patients with early stages. The similarity of these results shows that cancer stages are consistently a determinant of quality of life, despite differences in the study location, number of respondents, quality of life instruments, and sampling and data analysis techniques used.

In addition, the results of this study are also in line with the research [Awaliyah & Mulyati \(2023\)](#) who found a significant relationship between cancer stage and quality of life of breast cancer survivors with a $p = 0.004$ value. The study showed that the majority of respondents diagnosed at an early stage had a better quality of life compared to respondents at an advanced stage. These findings support the results of current studies that show that the progression of cancer stages is inversely proportional to the quality of life of patients, even though the study was conducted in a survivor community and used different instruments.

This research is also in line with the research [Fadhil et al. \(2024\)](#) which states that there is a significant relationship between cancer stage and quality of life in bully-buli cancer patients with a p value = 0.01. The study used the same EORTC QLQ-C30 instrument as this study, thus strengthening the consistency of the findings that cancer stages affect the quality of life of cancer patients.

4. Conclusion

This study concludes that most cancer patients are in advanced stages and have a low quality of life. There is a significant negative relationship between cancer stage and quality of life ($p = 0.001$; $r = -0.54$), indicating that higher cancer stages are associated with poorer quality of life. These findings highlight the importance of early cancer detection, routine quality of life assessment, and strengthening palliative nursing care to improve patient outcomes. However, this study has limitations, including the use of a cross-sectional design and a relatively small sample size, which may limit causal interpretation and generalization of the findings. Therefore, future research is recommended to involve larger sample sizes, apply longitudinal designs, and include additional variables such as social support and coping strategies. In addition, healthcare providers are encouraged to focus on early cancer screening, patient education, routine quality of life monitoring, and strengthening the role of oncology nurses in delivering comprehensive and holistic care to cancer patients.

Acknowledgements

The researcher would like to thank PKU Muhammadiyah Gamping Hospital for providing permission and support in the implementation of this research. Thank you are also expressed to all respondents who have been willing to participate in this research, as well as to the Nursing Study Program, Faculty of Health Sciences, University of 'Aisyiyah Yogyakarta for the academic support provided during the research process.

References

- Awaliyah, S. N., & Mulyati, R. (2023). Factors Related to the Quality of Life of Breast Cancer Survivors in the Bandung Cancer Society Community. *Proceeding Seminar Nasional Keperawatan*, 9(1), 1–10.
- Chung, K. C., Muthutantri, A., Goldsmith, G. G., Watts, M. R., Brown, A. E., & Patrick, D. L. (2024). Symptom impact and health-related quality of life (HRQoL) assessment by cancer stage: a narrative literature review. *BMC Cancer*, 24(1), 1–23. <https://doi.org/10.1186/s12885-024-12612-z>
- Fadhil, F., Alvarino, A., & Akhyar, G. (2024). Hubungan Stadium Kanker dan Jenis Terapi yang diberikan Dengan Tingkat Kualitas Hidup Penderita Kanker Buli-Buli di RSUP Dr. M. Djamil Padang Tahun 2018–2021. *Detector Jurnal Inovasi Riset Ilmu Kesehatan*, 2(3), 33–47. <https://doi.org/10.55606/detector.v2i3.4012>
- GLOBOCAN. (2022). *Absolute Number, Incidence, Both sexes, in 2022 All cancers*. https://gco.iarc.who.int/today/en/dataviz/pie?mode=population&group_populations=0
- Kemntrian Kesehatan Republik Indonesia. (2023). Indonesian Health Survey (SKI). *Indonesian Health Survey*, 1–68.
- Larasati, M. S. P., Setiawan, I. G. B., Wetan, N. G. a. a. M. Y., & Manuaba, I. B. T. W. (2022). Factors that Affect Quality Of Life of Post Mastektomic Breast Cancer Patients at Sanglah Hospital. *E-Jurnal Medika Udayana*, 11(10), 107. <https://doi.org/10.24843/mu.2022.v11.i10.p18>
- Marwin, M., Perwitasari, D. A., Candradewi, S. F., Septiantoro, B. P., & Purba, F. D. (2021). Kualitas Hidup Pasien Kanker Payudara Di RSUP DR. Kariadi Semarang Menggunakan Kuisisioner EORTC QLQ-C30. *JIFFK Jurnal Ilmu Farmasi Dan Farmasi Klinik*, 18(01), 16. <https://doi.org/10.31942/jiffk.v18i01.4895>
- Ode, L., Taufiq, M., & Hermawan, D. (2022). *Epidemiology of non-communicable diseases*.
- Osborne, A., Estiningtyas, Q., Adnani, S., & Ahinkorah, B. O. (2025). Breast cancer incidence in Indonesia : a sex- disaggregated analysis using WHO health equity assessment toolkit data. *BMC*

- Cancer*, 25(1), 986. <https://doi.org/10.1186/s12885-025-14332-4>
- Rahmah, A. H., Rahmawati, V. E., Alfiani, L., Kaharani, W., Putri, W. K., Kusparlina, E. P., Fatimah, N., Setiawan, A., & Prastyo, A. (2023). Kualitas hidup penderita kanker serviks di Kota Kediri tahun 2023. *Jurnal Kesehatan Tambusai*, 4(4), 6735–6742. <https://doi.org/10.31004/jkt.v4i4.22290>
- Reynaldi, A., W, Y. T., & Adiningsih, D. (2020). Gambaran Kualitas Hidup Pasien Kanker Paru Stadium Lanjut di RS Paru Dr. H. A. ROTINSULU Bandung. *Majalah Keperawatan Unpad/Journal of Nursing Care*, 3(2). <https://doi.org/10.24198/jnc.v3i2.20999>
- Rizka, Y., Deli, H., Dewi, W. N., & Putriana, N. (2024). Predictive Factors Associated Towards Quality Of Life In Patients With Cancer : A Cross-Sectional Study. *Nurse and Health: Jurnal Keperawatan*, 13(2), 248–258. <https://doi.org/10.36720/nhjk.v13i2.676>
- Rumsilah, R., Suparman, R., Febriani, E., & Mamlukah, M. (2024). Analisis faktor-faktor yang mempengaruhi kualitas hidup pasien kanker payudara. *Journal of Public Health Innovation*, 5(1), 9–18. <https://doi.org/10.34305/jphi.v5i01.1422>
- Tamminga, S. J., Jansen, L. P., Frings-dresen, M. H. W., & Boer, A. G. E. M. De. (2020). Long-term employment status and quality of life after cancer : A longitudinal prospective cohort study from diagnosis up to and including 5 years post diagnosis. *Work*, 66, 901–907. <https://doi.org/10.3233/WOR-203234>
- Yonatan, A. Z. (2024). 7 provinces with the highest cancer prevalence 2023. GoodStats. <https://data.goodstats.id/statistic/7-provinsi-dengan-prevalensi-kanker-tertinggi-2023-CNt4Y>
- Wahyuni, F. A., Supadmi, W., & Yuniarti, E. (2021). Hubungan Karakteristik Pasien dan Rejimen Kemoterapi Terhadap Kualitas Hidup Pasien Kanker di RS PKU Muhammadiyah Yogyakarta. *Jurnal Sains Dan Kesehatan*, 3(2), 310–316. <https://doi.org/10.25026/jsk.v3i2.488>