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The Relationship Between Chemotherapy Management and Quality of Life in Breast Cancer Patients in Yogyakarta

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KEYWORDS
Breast Cancer, Chemotherapy, Quality of Life

ABSTRACT
Breast cancer, one of the most prevalent cancers in women, has a high mortality rate. Chemotherapy is commonly used to stop cancer growth, but it significantly affects patients' quality of life. While several studies have reported on the impact of adjuvant chemotherapy on the quality of life in breast cancer patients aged 20-80 with grades 1-4, limited research focuses on grade 2-3 patients aged 40-50, as measured by the QLQ C-30. Using random consecutive sampling, this study investigates the relationship between chemotherapy and quality of life in grade 2-3 breast cancer patients aged 40-50 in Yogyakarta. Quality of life is assessed through the QLQ C-30 questionnaire, with data analyzed by the unpaired t-test method at a 95% confidence level ($p < 0.05$). Results show a significant decrease in the overall quality of life ($p = 0.000$) but no significant differences in function ($p = 0.152$) and symptom scales ($p = 0.15$). Respondents not undergoing chemotherapy reported a better general quality of life than those receiving treatment.

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INTRODUCTION

Breast cancer is a disease in which cells in the breast grow out of control. This group of diseases is greatly feared by the general public as a disease that has a high mortality rate and has difficult treatment procedures (Yang et al., 2020). Therefore, breast cancer itself has resulted in a significant decrease in the quality of life in patients. Treatment procedures include some regimens, such as surgery to remove the breast organ affected by cancer, radiation therapy, chemotherapy, and endocrine (hormone) therapy. Chemotherapy can be used as an additional therapy (adjuvant) so that tumor cells do not grow back (Pérez-Herrero & Fernández-Medarde, 2015). However, chemotherapy can cause many side effects, such as decreased appetite, nausea, vomiting, feeling weak, and many more.

Breast cancer is one of the most common types of cancer in women, affecting 2.1 million women per year, and also causes the largest number of cancer-related deaths among women. The American Cancer Society (ACS) estimates that the number of breast cancer cases for men and women in 2019 will reach 271,270 new cases, with an estimated death toll of 42,260 cases. On January 31st, 2019, the Indonesian Ministry of Health published an article providing data on cancer cases in Indonesia. It states that the highest average number of cancer cases for women is breast cancer, which is 42.1 per 100,000 population with an average mortality rate of 17 per 100,000 population.

A basic root of the concept of quality of life, according to WHO in 1947, defines the quality of life as "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity." Quality of life is a broad multidimensional concept that usually includes subjective evaluations of the positive and negative aspects of life (Skevington & Böhnke, 2018). Quality of life scores can represent the functional effects of a disease and its treatment as perceived by the patient and

are subjective evaluations of the overall character of a good and satisfying life. One way to measure the quality of life of a population is through a validated questionnaire to assess an individual's quality of life (Verdugo et al., 2014). The EORTC (European Organisation for Research and Treatment of Cancer), has developed several questionnaires. One of them, the EORTC quality of life questionnaire (QLQ) is an integrated system for assessing health-related quality of life (QoL) in cancer patients participating in international clinical trials (Tan et al., 2014). The core questionnaire, the QLQ-C30, is the product of more than a decade of collaborative research. Since its general release in 1993, the QLQ-C30 has been used in a variety of cancer clinical trials by a large number of research groups; in addition, it has been used in various other non-experimental studies. Moreover, the QLQ C-30 questionnaire has been translated and validated for use in Indonesia.

According to research data conducted by Sook Yeon Hwang et al. (2015), patients who underwent chemotherapy after surgery experienced significantly worse quality of life than patients who did not undergo chemotherapy, but its effect on patient quality of life varied according to the duration of post-surgery. The results of another study conducted by Semiha Akin et al (2017), who conducted a study on breast cancer patients in Turkey aged under 40 years, between 40-50 years, and over 50 years who underwent chemotherapy for 18 weeks, showed a significant decrease in quality of life, which was assessed using the Functional Assessment of Cancer Therapy (FACT) questionnaire.

In a study conducted by Neelam (Sharma & Purkayastha, 2017), several factors that can affect the quality of life value in breast cancer patients include differences in age groups and cancer stages. Cancer stages that have metastasized have a much worse quality of life value compared to other stages, while early stages tend to have a better quality of life (Shrestha et al., 2019). To avoid these confounding factors, this chemotherapy study will have a cancer stage 2-3 limit and an age group of 40-50.

Although there have been many reports on the effect of adjuvant chemotherapy on the quality of life in breast cancer patients grade 1-4 in the age range of 20-80 years, there has not been much discussion about the relationship between chemotherapy and quality of life assessed by the QLQ C-30 questionnaire in breast cancer patients stage 2-3 at the age of 40-50. The purpose of this study was to determine the relationship between chemotherapy management of breast cancer patients and the quality of life of patients in Yogyakarta (Putri et al., 2024).

Specifically, the psychological and physical side effects of chemotherapy, such as fatigue, nausea, and decreased social functioning, are reported to impact patients' well-being significantly. The gap in research on the quality of life among Indonesian breast cancer patients, especially those in the 40-50 age range and at cancer stages 2-3, highlights the need to investigate these effects in a more localized context. This research is urgent due to the increasing incidence of breast cancer and the ongoing debate on how best to manage its treatment without drastically affecting the patient's quality of life (Hamood et al., 2018). This study introduces new insights by focusing specifically on the relationship between chemotherapy and the quality of life of Indonesian breast cancer patients in Yogyakarta.

The purpose of this research is to determine the relationship between chemotherapy management and the quality of life of breast cancer patients, specifically for those in the 40-50 age group with stages 2-3 breast cancer, using the QLQ C-30 questionnaire. The findings from this study are expected to offer critical data to healthcare providers and policymakers to improve the support systems for breast cancer patients undergoing chemotherapy (Trapani et al., 2022). By focusing on a specific population, this research can help tailor interventions aimed at mitigating chemotherapy's side effects on the quality of life.

METHOD

This was a study with an unpaired numerical comparative analytical study design with a cross-sectional method. This study was conducted in Yogyakarta via the Internet from March to July 2020. The target population was patients diagnosed with grade 2-3 breast cancer. The sample was breast cancer patients in Yogyakarta who were Lovepink members and were given an online questionnaire. Sampling was carried out using a random consecutive sampling technique. Research data will be analyzed using the SPSS 23.0 program. The statistical test for this research uses the Unpaired T Test method with the alternative research statistics Mann-U Whitney Test, with a significance level of 95% ($p < 0.05$).

RESULT AND DISCUSSION

The target patients of this research are women. The target age for inclusion criteria was 40-50 years, and were breast cancer patients with cancer grade 2-3. This study involved subjects who were undergoing Brexel chemotherapy and those who had not undergone chemotherapy.

Table 1.
The effect of chemotherapy treatment on the quality of life of breast cancer patients

		Not yet Undergo Chemotherapy		Currently, Undergo Chemotherapy	
QLQ C30 (Quality s Life)	Subcategory	Mean	Standard Deviation	Mean	Standard Deviation
	Health General (Quality Life)	73.86	9.02	60.61	7.79
	Function Scale	66.77	20.75	59.90	6.67
	Symptom Scale	34.62	21.83	41.96	8.01

Table 1 shows that the average general Quality of Life scale and function scale in the group of respondents who had not undergone chemotherapy were higher than those who underwent chemotherapy, but the symptom scale was lower for the group who had not undergone chemotherapy.

Table 2.
Descriptive results of data on the effect of chemotherapy treatment on the quality of life of breast cancer patients

	Quality Life General		Function scale		Symptom Scale	
	Chemotherapy (Brexit)	No chemotherapy	Chemotherapy (Brexit)	No chemotherapy	Chemotherapy (Brexit)	No chemotherapy
Max	75	91.67	77.78	97.78	56.41	64.10
Min	50	58.33	51.11	35.56	30.77	0
Mean	60.61	73.86	59.90	66.77	41.96	34.62
SD	7.79	9.02	6.67	20.75	8.01	21.83
Variant	60.73	81.32	44.43	430.6	64.21	476.35

Table 2 describes the overall data description that has been obtained. In this table, the highest, lowest, average, standard deviation, and variant values of each group and each scale are listed.

Table 3.
Normality test of chemotherapy treatment on the quality of life of breast cancer patients

Type chemotherapy used		Kolmogorov-Smirnov [a]			Shapiro Wilk		
		Statistics	df	Sig.	Statistics	df	Sig.
General Life Quality Scale (linear transformation	Not yet /No chemotherapy	0.223	22	0.006	0.914	22	0.057
	Brexel	0.297	22	0,000	0.852	22	0.004

value)							
Function scale (linear transformation value)	Not yet / No chemotherapy	0.130	22	.200 *	0.926	22	0.100
	Brexel	0.156	22	0.177	0.915	22	0.060
Symptom Scale (linear transformation value)	Not yet /No chemotherapy	0.156	22	0.176	0.911	22	0.051
	Brexel	0.123	22	.200 *	0.942	22	0.222

*. *This is a lower bound of the true significance.*

a. *Lilliefors Significance Correction*

The number of samples obtained was 44, so the table used was the Kolmogorov-Smirnov. According to the official guidelines for assessing the QLQ C30 questionnaire by EORTC, reporting the questionnaire results must explain 3 subscales in their respective categories, and because each question is only included in 1 subscale, a normality test must be performed for each subscale. The data were not normally distributed for the general quality of life scale, but they were normally distributed for the function and symptom scales.

Table 4.
The results of the Mann-U Whitney test of the use of Brexel chemotherapy on the general quality of life scale scores of breast cancer patients.

	Quality Life General (linear transformation value)
Mann Whitney U	68,500
Z	-4,197
Asymp. Sig. (2-tailed)	0,000

In Table 4, it is known that the significance value (Asym. Sig. 2-tailed) is 0.000. The significance value <0.05 means that there is a significant difference in the difference in general quality of life values between the group who were using Brexel chemotherapy and those who were not using chemotherapy.

Table 5.
Results of the independent t-test of the use of Brexel chemotherapy on the function scale values of breast cancer patients

Function Scale			
Chemotherapy	**Average**	**P value**	**Difference Average (I.C.) 95%)**
No Chemotherapy (n=22)	66.77 (20.75)	0.152	6.87 ((-2.7)-16.4)
Brexel (n=22)	59.9 (6.67)		
Symptom scale			
Chemotherapy	**Average**	**P value**	**Difference Average (I.C.) 95%)**
No Chemotherapy (n=22)	34.62 (21.83)	0.15	-7.34 ((-17.5)-2.8)
Brexel (n=22)	41.96 (8.01)		

In Table 5, an independent t-test was conducted because the normality test for the function scale and symptom scale was normal. The analysis showed that there was no statistical or clinical relationship between the function scale and the symptom scale.

This study was conducted on 44 respondents of breast cancer patients in Yogyakarta, both patients who were using Brexel chemotherapy and those who had not used chemotherapy (Coleman et

al., 2022). The sample was all female gender within the age group of 40-50 years. The total sample was 44 according to the inclusion and exclusion criteria. Respondents who had not used chemotherapy were 22 (50%), and respondents who used Brexel chemotherapy were 22 (50%). In contrast to the study by Semiha Akin et al. (2017), which incorporated respondents from a wide age category, using the categories of <40, 40-50, and >50, this study only included respondents with an earlier age range to reduce confounding factors. The study by Semiha Akin et al. (2017) also included patients with various types of chemotherapy such as FAC, FEC, Docetaxel, Paclitaxel, AC, EC, and Navelbin regimens, while this study only used data from respondents who used Brexel chemotherapy. In addition, The study by Semiha Akin et al (2017) also used data from all stages of breast cancer, while this study only included data from respondents with cancer stages 2 and 3 to reduce confounding factors. Another difference that can be seen is the questionnaire used. The study by Semiha Akin et al. (2017) used the FACT-B and FACT-G questionnaires, while this study used the QLQ C30 questionnaire by EORTC, which contains 3 subscales of quality of life, which were the general quality of life scale, function scale, and symptom scale. According to the QLQ C30 questionnaire assessment procedure manual by EORTC, higher general health scores and function scale scores indicate a healthy and better quality of life and level of function, but higher symptom scale scores indicate higher symptoms/problems. The reported scores are in the form of numeric values, which have a score range from 0 to 100.

The statistical data of the study were processed using the Mann-U Whitney test for the general health scale and unpaired t-test for the function scale and symptom scale (Murphy et al., 2016). The values used for calculating the statistical test are in the form of a linear transformation, according to the official QLQ C3011 questionnaire assessment manual. The statistical data showed that the average value for respondents who had not undergone chemotherapy was higher, namely 73.86, compared to the average value of the general quality of life scale of respondents who were undergoing Brexel chemotherapy at 60.61, which means that the group of respondents who did not undergo chemotherapy had better general health/general quality of life compared to the group undergoing Brexel chemotherapy. In this study, it was found that the significance value (Asym. Sig. 2-tailed) was 0.000. The significance value <0.05 means that there is a significant difference in the value of the general quality of life scale in breast cancer patients who use Brexel chemotherapy and those who have not used chemotherapy.

These results are in accordance with research conducted by Semiha Akin et al (2017) which stated that there was a significant decrease in quality of life in patients using chemotherapy. The difference lies in the function scale and symptom scale in this study, where no significant differences were found either statistically or clinically on the two scales.

For the function scale and symptom scale, an independent t-test was conducted because the normality test for the function scale and symptom scale was normal (S.-M. Lee et al., 2015). The significance number of the function scale is 0.152 with a mean difference of 6.87, and the 95% internal consistency value (95% CI) is between -2.7 and 16.4. The significance number of the symptom scale is 0.15 with a mean difference of -7.34, and the 95% CI value is between -17.5 and 2.8. Because the p value>0.05 and the confidence interval passed the number, it can be concluded that statistically, there is no significant difference in the mean value of the function scale and symptom scale between the groups that do not use chemotherapy and those that use chemotherapy. Because the difference in the value of the function scale and the symptom scale is <10, it can be concluded that clinically, there is no significant difference in the mean value of the function scale and the symptom scale between the groups that do not use chemotherapy and those that use chemotherapy. Thus, there is no significant difference in the value of the function scale and the symptom scale between groups, either statistically or clinically (A. C. Lee et al., 2017).

The interpretation for the 95% internal consistency value is that it can be trusted by 95% that if the measurement is carried out on the population, then the difference in the function scale value of the group that does not use chemotherapy with the group which uses chemotherapy is between -2.7 (the group that does not use chemotherapy can have a lower mean of 2.7 than the chemotherapy group) to 16.4 (the group that does not use chemotherapy can have a higher mean of 16.4 than the chemotherapy group) and the difference in the symptom scale value is between -17.5 to 2.8.

The general health/quality of life scale describes an individual's quality of life in a broad and overall manner, the function scale measures an individual's ability to function in carrying out daily activities, and the symptom scale measures whether there are additional symptoms that the respondent may feel.

Brexel is a chemotherapy that has a docetaxel composition. This drug is included in the G classification in the drug classification regulations in Indonesia, where the drug is a prescription drug that can be available to the public through a doctor's prescription (Anggriani et al., 2020). Brexel has a docetaxel composition, which is a taxoid antineoplastic agent. The drug promotes the assembly of microtubules from tubulin dimers and stabilizes microtubules by preventing depolymerization. Docetaxel binds to the β-subunit of tubulin. By excessively stabilizing their structure, the ability of cells to use microtubules flexibly is eliminated, which has a negative impact on cells because the function of microtubules to lengthen and shorten (called dynamic instability) is essential for the transport function of these cells. Several studies have also indicated that docetaxel promotes apoptosis in cancer cells by binding to B-cell leukemia 2 (Bcl-2), a protein to stop apoptosis, and stopping this function so that cancer cells can apoptosis. Chemotherapy drugs cannot distinguish between healthy cells and cancer cells, so the work of docetaxel, namely stopping the cell replication cycle, will also occur in some healthy cells (Anand et al., 2023). Healthy normal cells will replicate and grow again, but during drug administration, side effects such as weakness due to anemia caused by decreased red blood cell replication cycles can occur. A study found that although docetaxel causes some side effects, it is quite well tolerated (Assi et al., 2020). Side effects such as anemia can occur during therapy, which can explain the decline in general quality of life. However, because healthy cells will begin to replicate themselves again after chemotherapy, the patient's body functions and symptoms can improve, which explains the insignificant results on the function scale and symptom scale.

In a study conducted by Dessy Angraini et al. (2018), other factors such as age, occupation, education level, body mass index, and stage did not affect the quality of life of breast cancer respondents (Socha & Sobiech, 2021).

CONCLUSION

Based on the results and discussion, it can be concluded that there is a significant decrease in the quality of life value on the general quality of life scale of breast cancer patients who do not use Brexel chemotherapy compared to those who use Brexel chemotherapy.

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