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### Effect of Age and Stage on Quality of Life (Physical Health) in 3D-CRT Radiotherapy for Breast Cancer at the Hasanuddin University Hospital Radiotherapy Installation

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#### ABSTRACT

Breast cancer is the highest malignancy in women among other types of cancer and includes a very diverse disease. Radiation therapy aims to deliver the minimum possible dose to healthy tissue and to the maximum possible dose of cancer cells. Measuring quality of life in breast cancer patients is very important to assess treatment outcomes which are closely related to age and stage. The 3D-CRT technique causes toxic side effects on the skin and in another study the results of breast cancer treatment using the 3D-CRT technique resulted in a worse patient's quality of life than the IMRT technique. However, breast cancer radiation therapy at the Hasanuddin University Hospital Radiotherapy Installation in Makassar still uses the 3D-CRT technique. This study uses a quantitative descriptive research with a cross sectional study approach. 80% of breast cancer patients who have undergone radiation therapy have a poor quality of life (physical health) and 20% have a good quality of life (physical health). There is a significant relationship between age and quality of life (physical health) because the value of Sig. (2-tailed) of 0.004 and there is a significant relationship between stage and quality of life (physical health) with Sig. (2-tailed) of 0.022.

**Keywords:** Radiotherapy, 3D-CRT, Breast Cancer, Quality of Life

#### INTRODUCTION

Breast cancer is the highest malignancy in women among other types of cancer and includes a very diverse disease, it has several indicators related to tissue characteristics, therapeutic evaluation and reaction to therapy. Types of breast cancer malignancies include ductal carcinoma in situ (DCIS), lobular carcinoma in situ (LCIS), invasive ductal carcinoma (IDC), invasive lobular carcinoma (ILC), inflammatory breast cancer (IBC), and breast angiosarcoma. increases with age (1). Based on WHO (World Health Organization) data, there were 2.1 million cases of breast cancer from all over the world throughout 2018. In western countries, about 50% of women over the age of 65 have breast cancer. Meanwhile, in Southeast Asia, from 100,000 women, the incidence was 38.1% and mortality was 14.1% in the same year. In Indonesia alone the incidence rate reaches 347,792 (1.4% of the total population) (2). Efforts in the treatment of breast cancer include surgery,

chemotherapy, and radiotherapy (3). Radiotherapy is a human medical discipline that utilizes ionizing radiation for the generation, conservation, and dissemination of knowledge about the causes, prevention, and treatment of cancer and other diseases involving specialized expertise in therapeutic applications. Radiation therapy aims to deliver the minimum possible dose to healthy tissue and to the maximum possible dose of cancer cells (4). Radiotherapy is also known as radiation therapy with a treatment modality based on the use of high-energy rays or radioactive substances using a linear accelerator (5).

Linear Accelerator (LINAC) is a radiotherapy modality that uses high-frequency electromagnetic waves to accelerate charged particles such as electrons to produce energy that is directed at a linear tube. The high energy electrons generated can be used directly for near-surface tumor therapy or directed at a target to generate Megavolt X-rays which are used for

tumor therapy at high depths. In radiotherapy there are several techniques that are commonly used today (6).

Radiotherapy techniques are generally 2D (2 Dimensional Radiation Therapy), 3D-CRT (3 Dimensional Conformal Radiation Therapy) techniques, and IMRT (Intensity Modulated Radiation Therapy) techniques. In the conventional 2D technique, the minimum number of radiation fields is carried out in two fields, namely the Laterolateral Parallel Plan technique and the supraclavicular field, the 3D-CRT technique forms a beam and a more conformal dose distribution and there is an increase in the dose distribution in the tumor, and the IMRT technique the radiation beam is given modulated. to deliver high doses to irregular or even concave tumors (7)

According to the World Health Organization Quality of Life (WHOQOL), states that the quality of life parameters are based on 6 aspects, namely aspects of physical health, psychological, level of independence, social relationships, environment, and spirituality/religion/personal beliefs. However, from these 6 aspects, it was renewed again into 4 aspects of quality of life consisting of psychological aspects, social relationships, environment and physical health (8).

Physical health or physical health is a somatic sensation, disease symptoms, and side effects of treatment. Physical health is the well-being of the body and the functioning of individual organisms, for example, such as physical function, pain intensity, pain disorders, fatigue, and sleep disturbances which are normal conditions for individuals, both physically and mentally, who do not suffer from any disease and the ability to carry out daily activities. day and live comfortably (9).

Measuring quality of life in breast cancer patients is very important to assess treatment outcomes. The potential for psychological and physical dysfunction caused by diagnosis and treatment can adversely affect a woman's quality of life in relation to stage (10). Older women with breast cancer experience a significantly lower quality of life than younger women (11).

In a study conducted by Tobias Forster, et al in 2021, it was found that breast cancer treatment with the IMRT technique had a better quality of life for patients than with the 3D-CRT technique. Furthermore, the study of E J Bantema-Joppe, et al in 2017 found the fact that breast cancer patients who received radiotherapy after surgery or surgery had a worse quality of

life. Another study conducted by Kai J. Borm, et al in 2018 found the fact that radiation therapy for breast cancer with the tangential 3D-CRT technique causes side effects of toxicity to the skin.

Based on the results of the research described above, radiation therapy for breast cancer with the 3D-CRT technique causes side effects toxicity to the skin and the results of other studies, treatment of breast cancer using the 3D-CRT technique resulted in a worse quality of life for patients than the IMRT technique. However, breast cancer radiation therapy at the Hasanuddin University Hospital Radiotherapy Installation in Makassar still uses the 3D-CRT technique.

## METHOD

### Type and Design of Research

This study uses a quantitative descriptive research method with a cross sectional study time approach to describe problems and circumstances or events in accordance with reality and reveal in-depth facts.

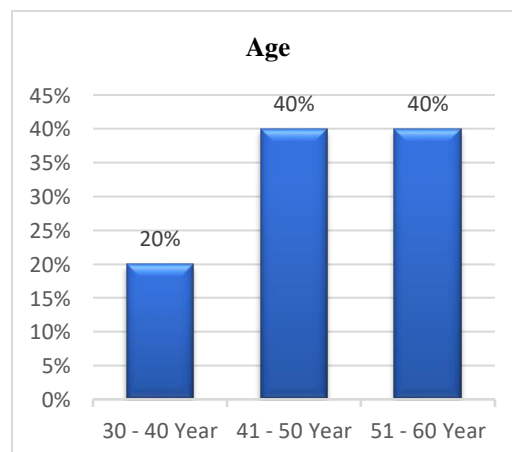
### Data Analysis

In this study, non-parametric statistical analysis was carried out using the SPSS (Statistical Product and Service Solutions) version 25 application to analyze the quantitative data that had been collected using the frequency descriptive statistical test and the Spearmen correlation test to determine the relationship between age and stage of quality of life (physical health). ) breast cancer patients.

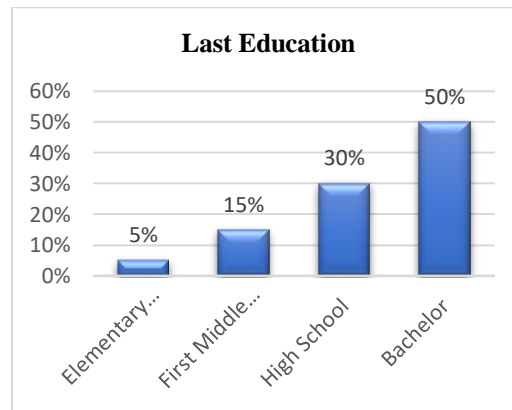
## RESULT

### Description of Respondents Characteristics

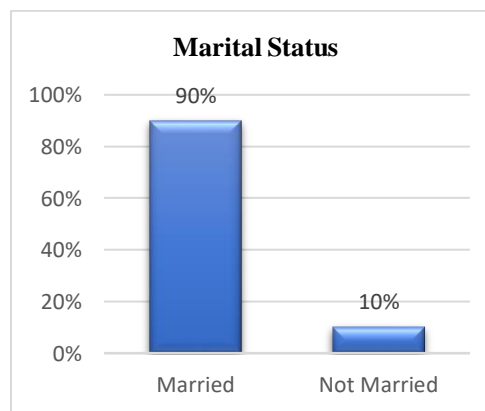
In this study, data was collected using the EORTC QLQ-30 questionnaire to respondents, namely breast cancer patients, carried out in the period June-July 2022 and located at the Radiotherapy Installation of Hasanuddin University Hospital Makassar. The number of samples obtained is as many as 20 respondents. From the results of the questionnaire, the characteristics of respondents based on age, last education, stage, marital status, radiation dose, surgery history, and chemotherapy history were as follows:



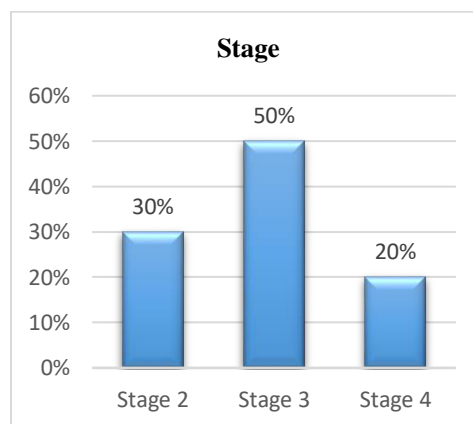
Based on graph 1, the distribution of the characteristics of various respondents is presented, where the majority of respondents are aged 30-40 years with a percentage of 20%, those aged 41-50 years have a percentage of 40%, while those aged 51-60 years are 40%.



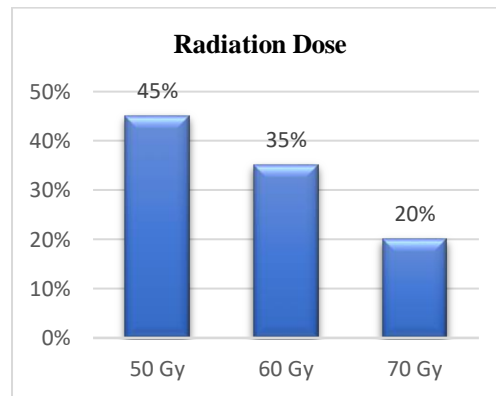
Based on graph 2, the distribution of respondents' latest education is presented with varying results, where the elementary education level has a percentage of 5%, while at the junior high school level the percentage is 15%, the high school education level is 30%, and 50% is at the undergraduate level.



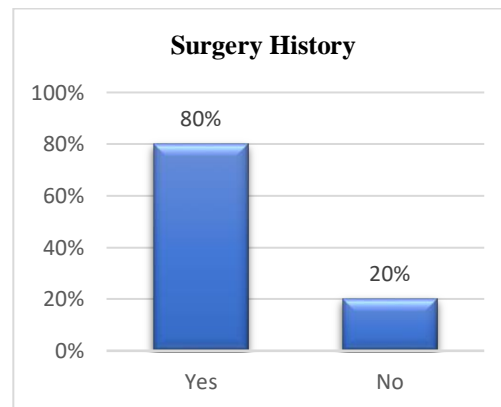
Based on graph 3, the distribution of respondents' marital status data with various results, the majority of marital status is married with a percentage of 90% and unmarried status of 10%.



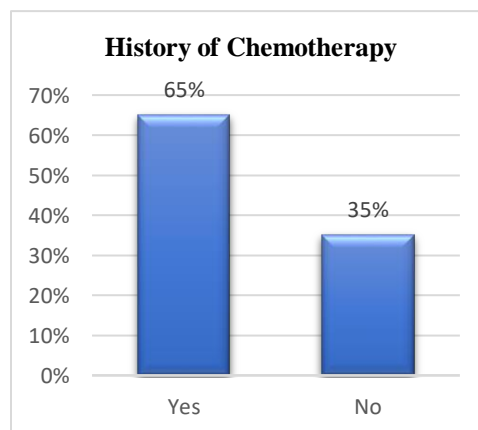
Based on graph 4, it is described that respondents' stages have varying results, 30% suffer from stage 2, respondents who suffer from stage 3 have a presentation of 50%, and 20% suffer from stage 4.



Based on graph 5, the distribution of radiation dose data is described with various results, the 50 Gy dose has a presentation of 45%, while the 60 Gy dose has a 35% presentation, and the 70 Gy dose has a 20% presentation.



Based on table 6, respondents with a history of surgery have a presentation of 80% and those who do not have a history of surgery are 20%.



Based on graph 7, data on respondents who have a history of chemotherapy are presented with a presentation of 65% and 35% of respondents who do not have a history of chemotherapy.

### **EORTC QLQ-30 Questionnaire Results for Respondents**

In this study, respondents answered the EORCT QLQ-30 Questionnaire, for filling out this questionnaire consisted of 30 questions with the reduction of several questions because this

study only focused on quality of life (physical health). The results of this questionnaire are in the form of numbers for which the criteria for grouping the items will be made, which will then be analyzed descriptively. The grouping of the results of these items is a grouping of the quality of life (physical health) of the respondents.

**Table 1: Characteristics of the QLQ-30 EORTC questionnaire items**

	Item	Rerata	SD
<b>Functional Scale</b>	Physical Function	65.35	17.55
	Role Function	70.20	23.41
	Emotional Function	64.35	17.44
	Cognitive Function	51.95	22.25
<b>Symptom</b>	Fatigue	70.30	19.90
	Nausea Vomiting	37.80	21.53
	Pain	74.50	19.08
	Shortness of Breath	70.30	23.70
	Difficulty Sleeping	50.50	16.92
	Loss of Appetite	50.40	25.31
	Constipation	35.50	20.23
	Diarrhea	30.80	19.75
<b>Global Health Status</b>	Health Condition	32.80	18.94

Table 1 shows a description of the quality of life (physical health) of breast cancer patients in terms of physical function, role function, emotional function, cognitive function, fatigue, nausea and vomiting, pain, shortness of breath, difficulty sleeping, loss of appetite, constipation, diarrhea and status

global health. Based on the table, it was found that pain symptoms were the highest average of 74.50 and the lowest average of symptoms of diarrhea was 30.80. While on the functional scale, the highest average was obtained, namely the role function of 70.20.

**Table 2: Frequency of Respondents Quality of Life (Physical Health)**

Physical Health	Frequency	Presentation (%)
Less	16	80.0
Enough	4	20.0
Good	0	0.0
Total	20	100.0

Table 2 presents the components of quality of life (physical health) based on the EORTC QLQ-30 questionnaire. From the table above shows that most of the respondents have a quality of life (physical health) answered less/poor (80%), and sufficient/good (20%).

### Relationship Between Age and Quality of Life (Physical Health) of Respondents

**Table 3: Spearman Correlation Test between Age and Quality of Life (Physical Health) of Respondents**

Age	Quality of Life (Physical Health)
Sig. (2-tailed)	0,004

In table 3 the results of the analysis test using the Spearman correlation show that there is a significant relationship between age and quality of life (physical health) of respondents because of the results of significance or Sig. (2-

tailed) of 0.004. Furthermore, the correlation coefficient is 0.610, so there is a strong level of strength (relationship) between the quality of life variable and the age of the respondent.

### The Relationship Between Stage and Quality of Life (Physical Health) of Respondents

**Table 4: Spearman Correlation Test between Stage and Respondents' Quality of Life (Physical Health)**

Stage	Quality of Life (Physical Health)
Sig. (2-tailed)	0,022

In table 4 the results of the analysis test using the Spearman correlation, it is found that there is a significant relationship between the stage and the quality of life (physical health) of the respondents because of the results of significance or Sig.

(2-tailed) of 0.022. Furthermore, the correlation coefficient is 0.509, so there is a strong level of strength (relationship) between the quality of life variable and stage.

## DISCUSSION

### Analysis of Quality of Life (Physical Health) of Breast Cancer Patients

Radiotherapy is one of the treatments for breast cancer. However, radiotherapy treatment itself has an impact on the patient's physical and psychological, including quality of life (physical health) and the effects of radiation. Good quality of life (physical health) is very important for healing the disease for breast cancer patients. There are various factors that affect the quality of life (health of life) of breast cancer patients such as pain from surgery, burning sensation due to radiotherapy, and taste. In this study, researchers assessed the quality of life (physical health) in breast cancer patients who had undergone radiotherapy using a questionnaire. EORTC QLQ-30. In addition to assessing the quality of life (physical health) of breast cancer patients, researchers also present whether or not there is a relationship between age and quality of life (physical health) and whether or not there is a relationship between stage and quality of life (physical health) of patients.

In this study, researchers assessed the quality of life (physical health) in breast cancer patients who had undergone radiotherapy using the EORTC QLQ-30 questionnaire. In addition to assessing the quality of life (physical health) of breast cancer patients, researchers also present whether or not there is a relationship between age and quality of life (physical health) and whether or not there is a relationship between stage and quality of life (physical health) of patients.

In the research that has been done, the researchers obtained a sample of patients who underwent radiotherapy with breast cancer cases as many as 20 samples at the Radiotherapy Installation of Hasanuddin University Hospital Makassar. Then it was found that respondents (80%) had poor quality of life (physical health) and good quality of life (physical health) (20%). In the results of the descriptive analysis of each item of quality of life (physical health) the domains of physical function are 65.35 (enough), role function is 70.20 (enough), emotional function is 64.35 (enough), cognitive function is 51.95 (less), fatigue 70.30 (enough), nausea and vomiting 37.80 (less), pain 74.50 (enough), shortness of breath 70.30 (enough), difficulty sleeping 50.50 (less), loss of appetite 50.40 (less), constipation 35.50 (less), diarrhea 30.80 (less), and health conditions 32.80 (less).

According to research by Ahmed RL, breast cancer patients often experience a decrease in quality of life (physical health). This is caused by several things including concerns about survival, fatigue, pain, disease recurrence, and the treatment process being undertaken. The psychological mental state of breast cancer sufferers may experience a dramatic decline, resulting in patients experiencing depression, impaired physical function and social activities. According to Justyna Chalubinska, et al (2015) the quality of life (QoL) of breast cancer patients does not depend only on the presence of the disease, because there are so many social and clinical factors. Other forms of oncology treatment such as surgery and chemotherapy before radiotherapy have an impact on global health status or on all areas of quality of life. Radiotherapy alone has a minor

effect on the quality of life (physical health) of breast cancer patients, although organ-specific complications can significantly impair physical function (12).

### Relationship Between Age and Quality of Life (Physical Health) of Patients

In a study that has been carried out there is a significant effect on quality of life (physical health) in older women compared to young women. However, in this study, the aim was to determine the relationship between age and quality of life (physical health) and based on the results obtained, it was found that there was a significant relationship between age and quality of life (physical health), due to or Sig. (2-tailed) of 0.004 or less than the value of 0.05. Then based on the results of the correlation coefficient there is a strong relationship between age and quality of life (physical health) of 0.610. In addition to the relationship between age and quality of life (physical health) of patients, at a younger age range, namely 50 years, the quality of life of patients is better than patients with an age range of 50 years because patients with age over 50 years have a significantly worse prognosis.

According to Hai Long Chen, et al (2016) age is an important risk factor for breast cancer. Young women have a better quality of life than older women (13). The quality of life of breast cancer survivors determines the effect on the patient's physical health which is closely related to age and shows that older women experience a significantly lower quality of life (14). The patient's age is closely related to the perceived impact of quality of life (physical health). In addition, age is significantly associated with psychological well-being of breast cancer patients (15).

### The Relationship Between Stage and Quality of Life (Physical Health) of Patients

This study examines the relationship between stage and quality of life (physical health) of breast cancer patients. Based on the results of the Spearman correlation statistical test, it was found that there was a significant relationship between stage and quality of life (physical health), due to the results of significance or Sig. (2-tailed) of 0.022. This indicates that there is a strong relationship between stage and quality of life (physical health) because the correlation coefficient value is 0.509. In addition there is a significant relationship between stage and quality of life (physical health), there is a range of stages in breast cancer patients. In the early stages (stages 1 and 2), the quality of life (physical health) of patients is better when compared to patients with advanced stages (stages 3 and 4) because in patients with advanced breast cancer the survival rate is lower so that the percentage of life expectancy decreases.

According to Andree Kurniawan, et al (2014) measuring the quality of life in breast cancer patients is very important to assess treatment outcomes. The potential for psychological and physical dysfunction caused by diagnosis and treatment can adversely affect a woman's quality of life in relation to stage. Advanced stage breast cancer patients have a decreased quality of life. Tumor stage is significantly related to the quality of life (physical health) of breast cancer patients (10).



## CONCLUSION

Based on the results of the research that has been explained, that in this study the average quality of life (physical health) of breast cancer patients had a poor quality of life (physical health) (80%) and a good quality of life (20%) and there was

a significant relationship between age and quality of life (physical health), namely the results of Sig. (2-tailed) = 0.004 and there is a significant relationship between stage and quality of life (physical health), namely the results of Sig. (2-tailed) = 0.022. It is hoped that further research will be carried out using 3 other quality of life domains namely psychology, social relations and the environment with a larger sample and using stronger methods.

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