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Research Article

Characteristics of Breast Cancer Patients Undergoing Radiotherapy at the H. Adam Malik Central General Hospital Medan in 2020-2021

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ABSTRACT

Background: Breast cancer can affect both women and men, originating in the mammary glands, fatty tissue, or connective tissue of the breast. Radiation therapy is a key treatment option applicable at nearly all disease stages. **Objective:** To examine the characteristics of breast cancer patients receiving radiotherapy, focusing on body mass index (BMI), histopathological classification, breastfeeding history, previous treatments, clinical stage, and age. **Methods:** This descriptive observational study involved total sampling and secondary data from medical records. Univariate analysis was performed. Out of 120 reviewed records, 43 met the inclusion criteria. **Results:** Most patients had normal nutritional status (48.8%) and were diagnosed with Invasive Ductal Carcinoma (74.4%). The majority had a history of breastfeeding (95.3%), underwent chemotherapy beforehand (59.4%), were at clinical stage IIB (41.9%), and belonged to the early elderly age group (39.5%). **Conclusion:** The primary characteristics of breast cancer patients undergoing radiotherapy at Haji Adam Malik General Hospital, Medan (2020–2021), include normal BMI, Invasive Ductal Carcinoma, breastfeeding history, prior chemotherapy, stage IIB disease, and early elderly age. These findings underscore the importance of early detection, managing modifiable risk factors, and integrated treatment approaches for improved outcomes.

Keywords: breast cancer, characteristics, radiotherapy

1. Introduction

The most significant first incidence rate was 11.7%, with 2,261,419 new cases, and a mortality rate of 6.9%, with 684,996 cases globally. In Indonesia, breast cancer occupies the first position (16.6%) with 65,858 cases. Based on gender in women, breast cancer is in the first position (30.8%), with a mortality rate of 22,430 (9.6%), followed by cervical, uterine cancer, and ovarian cancer [1].

Breast cancer is the most aggressive type of cancer experienced by women in all countries in any hemisphere and is the second leading cause of death among cancer patients in women [2]. Breast cancer is a malignancy in breast tissue formed from the ductal epithelium or lobules, and its uncontrolled development allows it to spread between tissues or organs near the breast or to other parts of the body (Ministry of Health of the Republic of Indonesia, 2015). So far, breast cancer has always been a frightening scourge for women. This is because breast cancer is synonymous with malignant matters that can cause death [3].

Radiation therapy or radiotherapy is the treatment of cancer using ionizing radiation (X-rays). Related treatment aims to destroy tumor cells at the maximum dose in the target volume of radiation without damage to normal tissues [4]. Radiation therapy is a non-surgical therapy that is important for treating cancer [5].

Radiotherapy can be given with the aim of curative or palliative treatment. Radiotherapy can be used alone or in combination with other therapies, such as surgery, chemotherapy, and immunotherapy [6]. Therefore, radiotherapy can provide optimal clinical results. Radiotherapy should be essential to any national cancer control plan or program. Overall, radiotherapy clinical outcomes can be optimized when services go hand in hand with effective prevention and early detection programs and high-quality surgical procedures [7].

2. Methods

The research design used in this study is descriptive, accompanied by observation methods. The following research was carried out using secondary data, namely medical record data for breast cancer patients undergoing radiotherapy at the Haji Adam Malik Central General Hospital in Medan from 2020 to 2021. The sampling technique in the following study uses the total sampling technique with data analysis using univariate test methods. Also, Data processing in this study is carried out in several stages to ensure accurate research analysis, including editing, coding, entry, data cleaning, and saving using the SPSS application.

3. Results

Table 1. Frequency distribution characteristic of breast cancer patients undergoing radiotherapy

Variable	Frequency	Percentage (%)
BMI		
Underweight	1	2,3
Normal	21	48,8
Overweight	4	9,3
Obesity Grade 1	12	27,9
Obesity Grade 2	5	11,6
Histopathological Classification		
IDC	32	74,4
ILC	9	20,9
Mucinous Carcinoma	2	4,7
Breastfeeding History		
Exist	41	95,3
Not	2	4,7
Clinical Stage		
IIB	18	41,9
IIIA	4	9,3
IIIB	13	30,2
IIIC	6	14,0
IV	2	4,7
Age Category (Years)		
Early Adulthood (26-35 years)	4	9,3
Late Adult (36-45 years old)	8	18,6
Early Elderly (46-55 years old)	17	39,5
Late Seniors (56-65 years old)	13	30,2
Seniors (>65 years old)	1	2,3
Total	43	100

Based on the data presented in the table above, out of 43 patients who met the research criteria, the majority of breast cancer cases in this study exhibited dominant characteristics, including normal nutritional status, invasive ductal carcinoma histopathology, a history of breastfeeding, stage IIB, and age above 46 years.

Table 2. Frequency distribution of characteristics of breast cancer patients undergoing radiotherapy based on previous therapeutic history

Variable	Frequency	Percentage (%)
Previous Therapy History		
Surgery	33	38,8
Chemotherapy	42	59,4
Radiotherapy	10	11,8
Total Patient		43

The tabulated data reveal that among 43 breast cancer patients at Haji Adam Malik General Hospital, Medan, during the 2020-2021 period, previous treatment patterns were dominated by chemotherapy (42 cases), followed by surgical intervention (33 cases), and radiotherapy (10 cases).

4. Discussion

Based on Table 1, the present study revealed that the majority of breast cancer patients undergoing radiotherapy exhibited a normal nutritional status based on BMI (48.8%). This finding aligns with prior research by A'dilah Putri et al. [8], where 47.7% of breast cancer patients had a normal BMI. However, these results contrast with those of Fang et al. [9], who reported a higher prevalence of obesity (39.3%) among breast cancer patients. Such discrepancies may stem from variations in dietary patterns, lifestyle factors, and genetic susceptibility between Asian and Western populations, where the latter often demonstrate elevated obesity rates due to sedentary behaviors and high-calorie diets, established risk factors for oncogenesis.

From a pathophysiological perspective, the association between BMI and breast cancer risk is complex. Obesity contributes to increased peripheral aromatization of androgens into estrogens, elevating systemic estrogen levels, which may promote mammary epithelial proliferation and tumor development, particularly in postmenopausal women. Additionally, obesity is linked to chronic inflammation, insulin resistance, and elevated insulin-like growth factor (IGF) levels, all of which may foster carcinogenesis by enhancing cellular proliferation and suppressing apoptosis. Notably, Iyengar et al. [10] observed that even individuals with a normal BMI but high adiposity ("normal weight obesity") faced an elevated breast cancer risk, underscoring the need for body composition assessment beyond BMI alone.

Histopathologically, invasive ductal carcinoma (IDC) predominated (74.4%), consistent with global trends reported by Kemfang Ngowa et al. [11] in Cameroon (68.6%) and Harlayana (74.4%). This reinforces IDC as the most prevalent breast cancer subtype among radiotherapy recipients [12].

A history of breastfeeding was reported by 95.3% of patients, corroborating studies suggesting its protective role. Sipayung et al. [13] found that non-breastfeeding women had a significantly higher breast cancer risk (OR = 0.223), while Research by Unsamaria Mingke Risqina [14] noted that 73.2% of patients had breastfed. Mechanistically, breastfeeding reduces cumulative estrogen exposure and induces mammary gland differentiation, potentially mitigating carcinogenic risk.

Clinically, stage IIB was most frequent (41.9%), diverging from studies reporting advanced-stage predominance (Alfalah, 2022 [15]; Larasati et al., 2022 [16]). These disparities may reflect differences in screening accessibility, public awareness, or diagnostic delays, as highlighted by Dyanti et al. [17]. The early elderly (46–55 years) constituted the largest age group (39.5%), paralleling findings by Larasati et al. [16] and Rahmiwati et al. [18]. Age-related risk may arise from prolonged estrogen exposure, accumulated genetic mutations, and immunosenescence.

Based on the study results in Table 2, in the context of previous therapy, most patients (59.4%) received chemotherapy before undergoing radiotherapy. These results are consistent with the findings of Larasati et al. [16], which showed that chemotherapy was the most frequently administered therapy modality (60%) at Hasan Sadikin Hospital in Bandung, followed by radiotherapy and surgery. This finding underscores the crucial role of chemotherapy as an integral component of multimodal therapy approaches for breast cancer, particularly in patients requiring neoadjuvant therapy to reduce tumor size prior to radiotherapy, as well as adjuvant therapy to prevent recurrence following radiotherapy.

5. Conclusion

This study identified the predominant characteristics of breast cancer patients undergoing radiotherapy at Haji Adam Malik Central General Hospital, Medan (2020-2021): normal nutritional status, invasive ductal carcinoma, breastfeeding history, initial chemotherapy treatment, stage IIB disease, and early elderly age

group. These findings underscore the critical importance of a comprehensive approach encompassing early detection, metabolic risk factor management, and multimodal therapy for optimal treatment outcomes.

The research implications include developing standardized clinical protocols tailored to local patient profiles, enhancing community health education initiatives, and conducting prospective longitudinal studies. These results provide valuable evidence for optimizing evidence-based breast cancer management strategies in Indonesia, particularly for populations with comparable demographic and clinical characteristics.

6. Data Availability Statement

The datasets generated and analyzed during the current study are not publicly available due to privacy and ethical considerations, but are available from the corresponding author upon reasonable request. For the next researcher, it is hoped that this study can be used as a reference for basic data to carry out further research. The hospital is expected to be able to complete patient data collection on the medical record sheet because there is a number of incomplete medical record data. The community is expected to be able to continue to support and encourage family members suffering from cancer.

7. Ethical Statement

The research was carried out upon receiving ethical approval from the Health Research Ethics Committee of the Faculty of Medicine, Universitas Sumatera Utara. The study was granted ethical clearance with reference number 158/UN5.2.1.1.2.6/SPB/2022, indicating that all procedures involving human subjects were reviewed and deemed ethically appropriate in accordance with prevailing research ethics standards.

8. Author Contributions

All authors contributed to the design and implementation of the research, data analysis, and finalizing the manuscript.

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11. Conflict of Interest

The authors declare no conflict of interest.

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