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RISK FACTORS FOR BREAST CANCER INCIDENCE IN THE MALANG CITY HOSPITAL AREA

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ABSTRAK

Abstract:
The world is facing a health problem where there is an epidemiological shift, namely the emergence of infectious diseases into non-infectious diseases. One of the non-infectious diseases that is a global health burden is cancer. The exact cause of breast cancer is still unknown. However, many factors are thought to influence the high incidence of breast cancer. The purpose of this study was to determine the risk factors for breast cancer in Hospitals in the Malang City Area. Quantitative descriptive research with a secondary data analysis strategy was conducted on all patients diagnosed with breast cancer in 4 major hospitals in Malang City in January - December 2023, with a total of 1464 data using the total sampling technique. The data was processed using descriptive statistical methods. The results showed that the majority of women diagnosed with breast cancer were over 50 years old (58.1%), and married (86.95%). A total of 67.96% of respondents were multiparous mothers, 31.69% used 3-month hormonal contraceptive injections, and some had a medical history of hypertension (7.31%). This study shows the importance of early detection of breast cancer at all ages and equitable access to health facilities that provide cancer care services.

***Abstrak*:**
Dunia tengah menghadapi masalah kesehatan dimana terjadi pergeseran epidemiologi yaitu munculnya penyakit infeksi menjadi penyakit non infeksi. Salah satu penyakit non infeksi yang menjadi beban kesehatan global adalah kanker. Penyebab pasti dari kanker payudara hingga kini belum diketahui. Namun, banyak faktor yang diduga mempengaruhi tingginya kejadian kanker payudara. Tujuan dari penelitian ini adalah untuk mengetahui faktor risiko terjadinya kanker payudara di Rumah Sakit di Wilayah Kota Malang. Penelitian deskriptif kuantitatif dengan strategi analisis data sekunder dilakukan terhadap seluruh pasien yang terdiagnosis kanker payudara di 4 rumah sakit besar di Kota Malang pada bulan Januari – Desember 2023 dengan jumlah data sebanyak 1464 dengan menggunakan teknik total sampling. Data diolah dengan menggunakan metode statistik deskriptif. Hasil penelitian menunjukkan bahwa mayoritas wanita yang terdiagnosis kanker payudara berusia lebih dari 50 tahun (58,1%), dan berstatus menikah (86,95%). Sebanyak 67,96% responden merupakan ibu multipara, 31,69% menggunakan suntik KB hormonal 3 bulan, dan sebagian memiliki riwayat kesehatan hipertensi (7,31%). Studi ini menunjukkan pentingnya deteksi dini kanker payudara pada semua usia dan akses yang adil ke fasilitas kesehatan yang menyediakan layanan perawatan kanker.

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INTRODUCTION

Currently, the world is faced with health problems where there is a shift in epidemiology, namely the emergence of infectious diseases caused by viruses, fungi, bacteria, and other microorganisms into non-communicable diseases. This causes a double burden for all countries globally. The country will face the problem of infectious diseases that have not been fully controlled, but currently the death rate due to non-communicable diseases tends to increase. One of the non-communicable diseases that is a burden on health globally is cancer. This disease is characterized by the presence of abnormal cells that can grow uncontrollably and have the ability to attack and move between cells and body tissues [1].

According to the WHO, breast cancer was the most common cancer in women in 157 of 185 countries in 2022. Still according to WHO, there are 2.3 million women diagnosed with breast cancer and 670,000 deaths worldwide [2]. Breast cancer is also the leading cause of cancer death in women (15.0%), followed by lung cancer (13.8%), colorectal cancer (9.5%), and cervical cancer (6.6%). Breast cancer is the most common cancer diagnosed in women (24.2%), i.e. about one in 4 of all new cancer cases diagnosed in women worldwide is breast cancer [3].

The incidence of breast cancer can occur due to several risk factors. Any risk of breast cancer in women can have a higher or lower probability, depending on several factors. The cause of breast cancer is unknown, but it is likely multifactorial. According to research results, the specific cause of breast cancer is still unknown. But many factors are thought to influence the high incidence of breast cancer, such factors include: obesity (obesity), heavy smoking, alcoholism, unhealthy diet or diet, lack of exercise, genetics, age, hormones, breastfeeding history, pregnancy history (parity) and menstrual history (menarche). Meanwhile, according to Mulyani, the factors that affect the incidence of breast cancer are: age factors, genetic factors, the use of estrogen hormones, the use of birth control pills, menarche age and a history of breast cancer [4].

Prevention of risk factors is a very useful preventive effort in reducing the incidence of breast cancer. Because with the prevention of risk factors, it can help find early cases of breast cancer through risk factor screening. The purpose of this study is to determine the risk factors for breast cancer incidence in hospitals in Malang City. This research supports the government's efforts in transformation in the health sector, especially the transformation of primary services. The success of health transformation requires the support of various parties, including health workers, stakeholders, the community and health education institutions.

RESEARCH METHOD

A quantitative descriptive study using a secondary data analysis strategy was conducted on all patients diagnosed with breast cancer in 4 major hospitals in the Malang City Region that have breast cancer treatment facilities. The collection of medical record data in this study has received approval from all hospitals used for research.

This study utilizes secondary data to determine the risk factors for breast cancer incidence in the Malang City Area. Data was taken through medical records of 4 hospitals, namely Saiful Anwar Hospital, Lavalette Hospital, Panti Nirmala Hospital, and Aisyiyah Hospital in January – December 2023 with a total of 1464 data using total sampling techniques. The total sampling technique was used to describe the risk factors for breast cancer in the overall population. To maintain the relevance and specificity of the study to the target group, this study includes patients who have been diagnosed with breast cancer and have complete medical record data.

The data collection tool in this study is a master sheet for raw data. The data taken in this study were data on respondent characteristics (age, domicile, education level, occupation, and medical history) and data on breast cancer risk factors (age, marital status, parity, history of use of hormonal contraception and health history). Furthermore, the data obtained were processed using descriptive statistical methods, including frequency and percentage to answer research questions.

Regarding ethical considerations, the researchers submitted a detailed research protocol to the Ethics Review Committee and have been ratified by the Health Research Ethics Committee of the Malang Ministry of Health, through letter Number DP.04.03/F.XXI.31/01073/2024. The proposed protocol includes details about the informed consent process, explaining how participants will be informed about the research, their rights, and how their data will be handled. Therefore, the ethical clearance achieved for research ensures that the research adheres to strict ethical standards, pays attention to the welfare of respondents, and maintains research integrity throughout the entire research process.

RESULT AND ANALYSIS

Table 1.
Characteristics of the respondents (N=1464)

Characteristics	Frequency	Percentage
Age (years old)		
<30	23	1.57%
30-40	134	9.15%
41-50	446	30.46%
>50	861	58.81%
Domicile		
Rural	1242	84.84%
Urban	222	15.16%
Level of education		
No schooling	78	5.33%
Primary school	299	20.42%
Junior high school	288	19.67%
Senior high school	647	44.19%
Diploma	17	1.16%
Bachelor	125	8.54%
Master	10	0.68%
Occupation		
Housewife	665	45.42%
Civil servant	47	3.21%
Private employee	171	11.68%
Trader	301	20.56%
Laborer	131	8.95%
Teacher	29	1.98%
Retirement	29	1.98%
Others	91	6.22%
History of therapy		
Chemotherapy	551	37.64%
Radiotherapy	277	18.92%
Mastectomy	469	32.04%
No treatment recorded	217	17.40%

After reviewing secondary data from medical records of breast cancer patients examined at four hospitals in the Malang City area—dr. Saiful Anwar Regional General Hospital, Lavalette Hospital, Aisiyah Hospital, and Panti Nirmala Hospital—throughout 2023, it was determined that 1,464 records met the criteria. Table 1 illustrates the general attributes of the respondents. The findings indicate that the majority of women diagnosed with breast cancer are above the age of 50 (58.1%) and lived in rural area (84.84%). 44.19% have attained schooling up to Senior high school, while 45.42% are employed as housewives. The majority of respondents are receiving treatment for their breast cancer. Chemotherapy is the most frequently selected treatment (37.64%), followed by mastectomy (32.04%) and then radiotherapy (18.92%).

Table 2.
Risk Factors for Breast Cancer (N=1464)

Risk Factors	Frequency	Percentage
Age (years old)		
<30	23	1.57%
30-40	134	9.15%
41-50	446	30.46%
>50	861	58.81%
Marital status		
Never married	77	5.26%
Married	1273	86.95%
Widow	114	7.79%
Parity		
Nulliparous (0)	255	17.42%
Primiparous (1)	205	14.00%
Multiparous (2-4)	995	67.96%
Grandemultiparous (≥5)	9	0.61%

History of hormonal contraceptive use		
Never	497	33.95%
Contraceptive implant	132	9.02%
1-month injectable contraceptive	216	14.75%
3-month injectable contraceptive	464	31.69%
Contraceptive pill	155	10.59%
Medical History		
No history	1016	69.40%
Hypertension	107	7.31%
Diabetes mellitus	50	3.42%
Pneumonia	46	3.14%
Anemia	44	3.01%
Cardiomegaly	34	2.32%
Pleural effusion	34	2.32%
Breast cáncer	15	1.02%
Others	118	8.06%

Table 2 presents the univariate analysis of risk factors for breast cancer reported by respondents, specifically age, marital status, parity, history of hormonal contraception usage, and history of other diseases currently encountered or previously endured. The study's results indicated that the majority of women diagnosed with breast cancer were over 50 years of age (58.1%). A majority of respondents were married, with 86.95% still having husbands at the time of data collection. About 67.96% of respondents were multiparous, having given birth two to four times. The majority of respondents were users of hormonal contraceptives employing different methods. The most commonly utilized hormonal contraception among respondents was the 3-month injectable, accounting for 31.69%. The majority of respondents had not experienced any additional disorders (69.40%); however, among those with a medical history, the most prevalent conditions were hypertension (7.31%) and diabetes mellitus (3.42%).

Carcinogenesis in breast carcinoma is influenced by a range of risk factors, including chemical, biological, physical, and lifestyle-related elements [5]. Research by Łukasiewicz et al. (2021) and Zou et al. (2023) identifies several characteristics that may elevate the risk of breast cancer among the population in Southeast China. These include age, education level, age at menarche, age at first birth, parity, history of abortion, use of exogenous hormones, pregnancy and breastfeeding, menstrual period and menopause, family history of breast and ovarian cancer, history of breast surgery and prior radiation therapy. This study analyzed five risk factors: age, marital status, parity, history of hormonal contraceptive use, and medical history.

A notable conclusion from this study is that, based on general data, the majority of respondents live in rural areas (84.84%). This finding compelled the researchers to examine the correlation between residential location and the prevalence of breast cancer. Research by Councell et al. (2024) indicates that women residing in socially vulnerable groups have a greater likelihood of developing breast cancer, whereas a study by LeBlanc et al. (2022) revealed that women in rural locations exhibit more advanced breast cancers and endure poorer survival results. This arises from variables including elevated false positive rates in diagnostic mammography for women in rural regions, delays in biopsy procedures, reduced availability to core needle biopsy, and constrained access to treatments [10]. This finding aligns with the circumstances at the research site, situated in the southern region of East Java, where extensive cancer treatment facilities are predominantly concentrated in the city of Malang. Consequently, a significant number of breast cancer patients seeking medical attention and therapy originate from rural regions.

1. Age

The results of the study showed that most women with breast cancer were over 50 years old (58.1%). This is in accordance with the results of research by Benz (2008) and Sun et al. (2017), which stated that most cases of breast cancer are diagnosed in women over 50 years old. As we age, the mass of the mammary glands slowly decreases and is replaced by fat tissue and collagen. So, changes in breast tissue due to

aging will occur along with natural changes that occur in the breasts from puberty to menopause, which are influenced by menstrual history and the number of children [11]. After menopause, the ovaries stop producing estrogen because they ovaries also experience a decline in organ function [13]. However, in women who have gone through menopause, there is an increase in the production of the aromatase enzyme in the breast, which functions to convert androgen hormones (such as testosterone) into estrogen [14]. Estrogen produced locally in the breast can accelerate the development of cancer [15].

Estrogen receptor expression in the breast increases progressively with age, reaching its peak in the 50s [11]. Estrogen, both from the ovaries and locally produced in the breast, binds to these receptors, signaling cancer cells to grow and divide. Estrogen is involved in cancer cell proliferation and affects tumorigenesis, the conversion of normal cells into cancerous cells [16]. Estrogen can induce DNA damage in breast cells, accelerate cell proliferation, and modify the microenvironment in breast tissue, potentially increasing the risk of genetic mutations and cancer development.

Breast cancer in women under 40 years of age is seldom, yet it does occur. The findings of this study indicate that a minority of respondents diagnosed with breast cancer were aged 30-40 years (9.15%), with an even smaller percentage under 30 years (1.57%). Breast cancer diagnosed in younger individuals is typically more aggressive and frequently detected at a more advanced stage [17]. Factors including family history, genetic mutations (e.g., BRCA1 or BRCA2), and prior radiation exposure may elevate the risk of breast cancer in younger women [17].

This study's results support the promotion of clinical breast examination programs and health education initiatives aimed at encouraging women to conduct monthly self-examinations for the early detection and treatment of breast cancer, as all age groups are at risk. Moreover, it is essential to encourage women aged 50 and above to participate in mammography screenings, as the prevalence of breast cancer is elevated in this demographic.

2. Marriage Status

Prior research indicates that unmarried women exhibit a greater risk of breast cancer development relative to their married counterparts; however, the independence of marital status as a factor linked to breast cancer remains unverified [18]. Other studies indicate that marital status significantly influences the early detection of breast cancer, with married women being diagnosed more frequently than their unmarried or widowed counterparts [19]. The findings of this study indicate that a majority of respondents were married, with 86.95% still having husbands at the time of data collection.

Marriage can positively influence breast cancer management, as partners can detect early symptoms and motivate their spouses to pursue medical attention promptly upon symptom onset [20]. Research indicates that married women exhibit a higher likelihood of participating in mammography screening than their unmarried counterparts [21], [22]. Unmarried female cancer patients exhibit a 28% increased risk of advanced stage diagnosis and a 20% elevated risk of mortality [23]–[25]. Moreover, marriage may mitigate risky behaviors and establish social control over actions, including diet and exercise, which influence overall physical health [26]. Married cancer patients often receive increased social support, as family members can share the emotional burden. Consequently, these patients exhibit reduced levels of depression, fatigue, and anxiety [19].

Marital status does not directly influence the incidence of breast cancer in women. Marital status significantly influences the early detection and treatment

of breast cancer. Married women receive support from their partners during examination and treatment, resulting in more favorable outcomes compared to unmarried women. Consequently, increased social support is essential, particularly for unmarried or widowed women, to enable them to attain outcomes comparable to those of married women.

3. Parity

Research indicates that nulliparous women exhibit a higher risk of breast cancer relative to their parous counterparts [27]. The breasts experience proliferation and differentiation during pregnancy to prepare for lactation. Terminal differentiation of the terminal lobular duct unit takes place during the final trimester; this process is believed to be a significant factor connecting full-term pregnancy to a decreased risk of long-term breast cancer, thereby safeguarding breast tissue from carcinogenic transformation [28]. Nevertheless, the findings of this study indicated that approximately two-thirds of respondents were multiparous, having given birth two to four times (67.96%). The observed difference may arise because parity and pregnancy are not solely individual factors affecting breast cancer incidence; they are also influenced by the mechanisms associated with breastfeeding.

Breastfeeding induces hormonal changes that may decrease long-term estrogen exposure, subsequently lowering the risk of cellular alterations associated with cancer [28]. Consequently, it is essential to examine not only the number of children but also the prevalence and duration of breastfeeding. However, in this study, information regarding breastfeeding history, including its duration, was unavailable, as the data were obtained from secondary sources (medical records) that did not consistently document lactation history. This limitation highlights the need for further research using primary data collection to explore the interplay between parity, breastfeeding, and breast cancer risk. Studies indicate that women who breastfeed for an extended duration (exceeding 6 months) exhibit a reduced risk of breast cancer in comparison to those who do not breastfeed or breastfeed for a brief period [29]. Increased breastfeeding duration correlates with prolonged exposure to its protective effects, potentially lowering breast cancer risk [30]. Exclusive breastfeeding for infants is strongly advocated due to its numerous advantages for the mother as well.

4. History of Hormonal Contraceptive Use

Estrogen and progestin are in hormonal contraceptives. These hormones regulate the menstrual cycle and prevent ovulation, but long-term exposure can cause breast cancer. The length of hormonal contraception use affects breast cancer risk. Long-term hormonal contraception use increases exposure to breast-cell-damaging hormones. Long-term use of hormonal contraceptives increases breast cancer risk in women [26], [31]–[33]. This survey found that 67.05% of respondents utilized hormonal contraception in various ways. These findings suggest that IUDs, tubectomy, and vasectomy should be socialized to prevent the long-term consequences of estrogen in hormonal contraception.

5. Medical History

Breast cancer associated with estrogen exposure is indeed linked to a history of specific diseases, particularly those that result in metabolic disorders. Metabolic diseases, including obesity, diabetes, hypertension, and metabolic syndrome, exhibit a significant association with breast cancer through various interconnected mechanisms [34], [35]. This study indicates that a majority of respondents (69.40%) have not experienced any other diseases. Among those with a disease history, the most prevalent conditions are hypertension (7.31%) and diabetes mellitus (3.42%). However, the

analysis of respondents' Body Mass Index is constrained by insufficient data from medical records.

Increased adipose tissue in women can lead to elevated estrogen production [36]. It has the potential to promote the proliferation of breast cancer cells, particularly in estrogen-receptor positive (ER+) breast cancer [37], [38]. Obesity induces prolonged low-grade inflammation, characterized as chronic inflammation, within the body [39]. Inflammation results in the production of inflammatory cytokines, which may cause tissue damage and promote the growth and dissemination of cancer cells [40], [41].

Type 2 diabetes is associated with a heightened risk of breast cancer. Type 2 diabetes results in elevated insulin levels in the bloodstream due to the body's insulin resistance. Insulin resistance activates compensatory mechanisms that elevate androgen production while decreasing estrogen production [42]. Insulin resistance and reduced estrogen production lead to intricate metabolic disorders that facilitate cancer development in estrogen-dependent organs, such as the breast, endometrium, and ovaries [43]. Insulin can enhance the quantity of insulin receptors present on the surface of breast cancer cells. Excessive insulin receptor expression can lead to the malignant transformation of breast cells, increasing the likelihood of cancer development [43]. Chronic inflammation linked to obesity, characterized by the release of inflammatory cytokines and the formation of reactive oxygen species (ROS), contributes to cellular damage, cancer proliferation, and increased invasiveness [44], [45].

Research by Lega et al. (2018) indicates that women with diabetes mellitus and cardiovascular disease face a twofold increased risk of mortality from breast cancer relative to women without cardiovascular disease. Hypertension represents a prevalent cardiovascular condition. Breast cancer and hypertension may share a common mechanism, as both conditions are influenced by adipose tissue in the body. Adipose tissue can induce chronic inflammation, thereby elevating the risk of breast cancer and hypertension. Hypertension may elevate the risk of breast cancer by interfering with the apoptosis process, thereby influencing cellular turnover and enhancing the probability of cancer cell development. Furthermore, studies indicate that the association between hypertension and breast cancer may be affected by additional factors, including body mass index (BMI) and diabetes [47], [48]. Women with a history of breast cancer, particularly those carrying specific genetic mutations like BRCA1 or BRCA2, exhibit increased susceptibility to breast and ovarian cancer. This risk is present in both previously healthy breasts and those already diagnosed with cancer [49]

CONCLUSION

This study revealed that breast cancer patients treated in four hospitals in Malang City predominantly consisted of women over 50 years of age, married, multiparous, residing in rural areas, with a history of hormonal contraceptive use, and comorbidities such as hypertension and diabetes mellitus. These characteristics suggest that demographic, reproductive, and health-related factors are associated with the incidence of breast cancer in this population.

The findings emphasize the need for strengthening early detection programs, particularly mammography screening for women aged ≥50 years, enhancing health promotion on breastfeeding and non-hormonal contraception, and improving the management of metabolic diseases to reduce breast cancer risk. Counseling regarding breast self-examination is the most effective effort to improve women's skills in carrying out early detection of breast cancer [50]. Moreover, improving access to cancer care services, especially in rural areas, is essential to address

disparities in diagnosis and treatment outcomes.

This study effectively delineated the characteristics of women with breast cancer in relation to their risk factors, utilizing a substantial sample size. Additional risk factors warrant further investigation, including age of menarche, age at first marriage, family history of cancer, duration of hormonal contraception use, age of menopause, number of children breastfed, duration of breastfeeding, Body Mass Index, and lifestyle choices. Consequently, the findings of this descriptive analysis warrant careful generalization.

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