

RESEARCH ARTICLE

The Relationship Between Age, Smoking Habits, and Family History with Breast Cancer Incidence at Vina Estetica General Hospital in 2023

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Abstract

Background: Breast cancer is one of the cancers that ranks first in Indonesia with 68,858 cases and is still a problem in the world of health. Increasing age, having a smoking habit and a history of breast cancer in the family are risk factors for breast cancer. However, there are several studies that say that age, smoking habits and family history do not increase the risk of breast cancer.

Purpose: The purpose of this study was to determine the relationship between age, smoking habits and family history with the incidence of breast cancer at Vina Estetica General Hospital in 2023.

Research Methods: This study used the Chi Square test and the Binomial Logistic Regression statistical test with a cross-sectional approach to see the relationship between age, smoking habits and family history with the incidence of breast cancer at Vina Estetica General Hospital in 2023 with a sample size of 65 respondents.

Results: In this study, the most respondents were found based on age > 35 years as many as 43 respondents (66.2%), based on smoking habits as many as 42 respondents (64.6%) and based on family history as many as 41 respondents (63.1%). relationship between age \geq 35 years with the incidence of breast cancer with p-value Chi Square table 0.05 (dk 1) 3.841; RP 3.18; 95% CI 1.5779 - 6.3086. There is a relationship between smoking habits and the incidence of breast cancer with p-value Chi Square table 0.05 (dk 1) 3.841; RP 3.38; 95% CI 1.6823 - 6.7790. There is a relationship between family history and the incidence of breast cancer with p-value Chi Square table 0.05 (dk 1) 3.841; RP 3; 95% CI 1.5972 - 5.6742 and in the multivariate results obtained the dominant factors are age p-value 0.003, smoking habits p-value 0.012 and family history p-value 0.018.

Conclusion: The results of the study found a relationship between age, smoking habits and family history with the incidence of breast cancer. With the dominant factor being age.

Keywords: Breast Cancer, Age, Smoking Habits, Family History.

1. Introduction

Cancer is a non-communicable disease, but its development and

growth are so rapid that they disrupt the body's metabolic processes and can also spread between cells and tissues. Breast cancer is a type of cancer that begins in the epithelial ducts and lobules and spreads to breast tissue. (1,2)

The World Health Organization reports that, worldwide, up to 2.3 million women were diagnosed with breast cancer in 2020, resulting in 685,000 deaths. By the end of 2020, up to 7.8 million women had been diagnosed in the previous five years, making breast cancer the most common cancer worldwide (3). The Global Cancer Observatory announced that in 2020, there were 68,858 (16.6%) new cases of breast cancer, ranking first out of a total of 396,914 new cancer cases in Indonesia, with 22,000 deaths (4). The Indonesian Cancer Foundation (YKI) of North Sumatra detected 824 cases of breast cancer in Medan, making it the most common type of cancer in 2021 (5).

Increasing age and being a woman increase the risk of breast cancer. Breast cancer rates in women under 50 are as high as 44 per 100,000, while in women over 50, the rate is as high as 345 per 100,000, according to data from the Surveillance, Epidemiology, and End Results (SEER) database. The age at which breast cancer occurs is bimodal, with the first peak occurring around age 50 and the second peak occurring around age 70. This allows for a comprehensive and detailed calculation of breast cancer cases depending on age. (6)

One risk factor for breast cancer is smoking. Tobacco smoke contains

carcinogens, polycyclic aromatic hydrocarbons, aromatic amines, and N-nitromazines, which can potentially cause breast cancer. Carcinogens cross the alveolar membrane and enter the bloodstream, where they are transported to mammary tissue via plasma lipoproteins. Carcinogens cause DNA damage and the formation of adducts in mammary epithelial cells. (7)

Breast cancer risk factors include a family history of the disease. According to a study by Brewer HR and Jones ME, women with two or more relatives with a history of breast cancer are 2.5 times more likely to develop breast cancer, which serves as a benchmark for screening and prevention. (8)

Based on the introduction above, researchers are interested in examining the relationship between age, education, and occupation with breast cancer incidence at Vina Estetica General Hospital in 2023.

2. Research Method

This study examines the relationship between age, smoking status, and family history with breast cancer incidence at Vina Estetica General Hospital in 2023 using quantitative research methods, a cross-sectional analytical observational approach, and secondary data. Using total sampling, 65 patients suspected of having breast cancer were obtained. Breast cancer is the dependent variable, while age, smoking habits, and family history are the independent factors. Chi-square statistical tests and binomial logistic regression will be used to assess the collected data.

3. Research Results

Univariate Analysis

Table 1 Distribution of Research Variables

Variables	f	%
Age		
≥ 35 Age	43	66,2 %
< 35 Age	22	33,8 %
Smoking Habit		
Smoking	42	64,6 %
No Smoking	23	35,4 %
Family History		
Family History	41	63,1 %
No Family History	24	36,9 %
Breast Cancer		
Breast Cancer	43	66,2 %
No Breast Cancer	22	33,8 %
Total	100	100

In Table 1, the age variable is obtained, 43 people (66.2%) are ≥ 35 years and 22 people (33.8%) are < 35 years, the smoking habit variable, 42 people (64.6%) smoke and 23 people (35.4%) do not smoke, the family history variable, there is a family history of 41 people (63.1%) and there is no family history of 24 people (36.9%) and the breast cancer variable, 43 people (66.2%) have breast cancer and 22 people (33.8%) do not have breast cancer.

Bivariate Analysis

Table 2 Relationship between Age and Breast Cancer Incidence

Age	Breast Cancer		p – value	95% Confidence Interval
	Yes	No		
≥ 35 age	37	6	0.000	3.1550 (1.5779)
< 35 age	6	16	–	6.3086)
Total	43	22		

In table 2, the results of data analysis show a significant relationship between age and the incidence of breast cancer (Chi-Square count 22.453 > Chi-Square table 0.05 (1) 3.841; p-value <0.05; Prevalence Ratio 3.18; 95% Confidence Interval 1.5779 – 6.3086), 43 people with breast cancer, 37 people aged ≥ 35 years and

6 people aged < 35 years. Of the 22 people who did not have breast cancer, 6 people were aged ≥ 35 years and 16 people were aged < 35 years.

Table 3 The Relationship Between Smoking Habits and Breast Cancer Incidence

Smoking Habit	Breast Cancer		p – value	95% Confidence Interval
	Yes	No		
Smoking	37	5	0.000	3.3770
No Smoking	6	17	0	(1.6823 – 6.7790)
Total	43	22		

In Table 3, the results of data analysis show a significant relationship between smoking habits and the incidence of breast cancer (Chi-Square count 25,521 > Chi-Square table 0.05 (1) 3.841; p-value <0.05; Prevalence Ratio 3.38; 95% Confidence Interval 1.6823 – 6.7790), as many as 43 people with breast cancer, 37 of whom smoked and 6 of whom did not smoke. Of the 22 people who did not have breast cancer, 5 people smoked and 17 people did not smoke.

Table 4 The Relationship Between Family History and Breast Cancer Incidence

Family History	Breast Cancer		p – value	95% Confidence Interval
	Yes	No		
Family History	36	5	0.000	3.0105 (1.5972)
No Family History	7	17	–	5.6742)
Total	43	22		

In table 4, the results of data analysis show a significant relationship between family history and the incidence of breast cancer (Chi-Square count 23,248 > Chi-Square table 0.05 (1) 3.841; p-value <0.05; Prevalence Ratio 3; 95% Confidence Interval 1.5972 – 5.6742), as many as 43 people with breast cancer, 36 with a history of breast cancer and as many as 7 people with no family history. Of the 22 people without breast cancer, 5

people with a history of breast cancer and 17 people with no history of breast cancer.

Multivariate Results

Table 5 The Relationship Between Age, Smoking Habits and Family History with Breast Cancer Incidence

Variable	Signification
Age	0.003
Smoking Habit	0.012
Family History	0.018

Table 5 shows a multivariate analysis of the relationship between age, smoking habits, and family history with breast cancer incidence. The independent variables of age, smoking habits, and family history significantly influence breast cancer incidence. The most dominant variable is age with a p-value of 0.003, followed by smoking habits with a p-value of 0.012, and then family history with a p-value of 0.018.

4. Discussion

The Relationship Between Age and Breast Cancer Incidence

Based on table 2 shows a relationship of p value of 0.000 (<0.05) between the incidence of breast cancer and family history. This study is similar to Rahayu and Arania, 2017 with a sample of 58 people, as many as 56 people aged > 30 years suffered from breast cancer and 2 people aged < 30 years and 9 people with symptoms resembling breast cancer 6 people aged > 30 years and 3 people aged < 30 years where the results of the study showed a p - value of 0.002 and OR = 14.00 (9). This study is also in line with Isniani and Elpiana, 2017 with a sample of 312 people, as many as 62 people aged > 35 years suffered from breast cancer and 46 people aged <35 years suffered from breast cancer and 204 people who did not suffer from breast cancer with 61 people aged > 35

years and 143 people aged < 35 years with a p - value of 0.000. (10)

Estrogen production increases with age, increasing the risk of breast cancer. Aging also results in decreased production of the aromatase enzyme by breast fat cells; high levels of this enzyme can increase estrogen levels and lead to breast cancer. (11)

As we age, cells in the body experience damage caused by reactive oxygen species (ROS), which results in oxidative stress, leading to genomic instability and DNA damage, such as single- and double-strand breaks in the double helix, point mutations, translocations, and large-scale chromosomal rearrangements. If damage occurs, the DNA Damage Response (DDR) activates, repairing the damaged DNA and preventing carcinogenesis. However, if mutations occur in the DDR, the ability to repair DNA is impaired, leading to cancer and genomic instability, which can lead to tumor growth and metastasis. (12)

The Relationship Between Smoking Habits and Breast Cancer Incidence

Based on table 3, there is a relationship between smoking habits and the incidence of breast cancer with a p-value of 0.000 (<0.05). This study is similar to Arini Paratiwi, 2021 with a sample of 100 people, 50 people suffering from breast cancer, 32 smokers and 18 non-smokers, and 50 people who do not suffer from breast cancer, 16 smokers and 34 non-smokers with a p-value of 0.003 and an OR value of 3.778 where people who smoke are 3.778 times more likely to

suffer from breast cancer compared to people who do not smoke (13). This study is also similar to that conducted by Wahida and Gusriani, 2022 with a sample of 46 people, 30 people suffering from breast cancer, 22 smokers and 8 non-smokers, and 16 people who do not suffer from breast cancer, 6 non-smokers and 10 smokers with a p-value of 0.027. (14)

Polycyclic Aromatic Hydrocarbons (PAHs) are chemicals found in cigarettes that, when ingested by the body, change from a chemical to a more reactive substance. These compounds then react with other macromolecules in cells to form covalent bonds, disrupting the regular biochemical processes of cells and resulting in genetic changes (mutations). Furthermore, PAHs cause mutations in the p53 gene, and mutations in the p53 gene alter cell regulation, which can lead to cancer. Other substances that can contribute to cancer growth include nicotine and 4-(methylnitrosoamino)-1-(3-pyridyl)-1-butanone (NKK) (15). These compounds can also cause PAHs. Furthermore, smoking can cause metabolic problems involving blood levels of progesterone and estrogen. Excessive smoking can disrupt liver function and estrogen metabolism, increasing estrogen levels and increasing the risk of breast cancer. (16)

The Relationship Between Family History and Breast Cancer Incidence

Table 4 shows a p-value of 0.000 (<0.05) between breast cancer incidence and family history. With 100

participants, this study is comparable to Rini Astuti's 2022 study, which involved 50 individuals with a family history of breast cancer, 41 individuals with a family history of breast cancer, 9 individuals without a family history of breast cancer, and 50 individuals without a family history of breast cancer. The results showed a p-value of 0.018 and an OR of 3.135, meaning that those with a family history of breast cancer were 3.135 times more likely to develop breast cancer than those without (17). This study is comparable to another study conducted by Azmi and Kurniawan in 2020, which used a sample size of 77 individuals, consisting of 55 individuals with breast cancer, 42 individuals with a history of breast cancer and 13 individuals without, and 22 individuals without breast cancer, 5 individuals with a history of breast cancer and 17 individuals without, with a p-value of 0.000 and an OR of 10.9. (18)

A woman's risk doubles if her mother, sister, or other family member has a first-generation family history of breast cancer (19). If there is a history of breast cancer in two consecutive generations, the risk triples. Li-Fraumeni syndrome (LFS), another name for breast cancer, is a hereditary condition that runs in families. If a family member carries the BRCA1 gene, there is an increased chance of developing cancer due to an anomaly in the p53 gene. (20)

5. Conclusions and Suggestions

Conclusions

- a. The frequency distribution of patient age was highest among

- patients aged 35 years and above, with a frequency of 43 (66.2%).
- b. The frequency distribution of smoking habits was highest among patients with a smoking habit, with a frequency of 42 (64.6%).
 - c. The frequency distribution of family history was highest among patients with a family history of cancer, with a frequency of 41 (63.1%).
 - d. The frequency distribution of breast cancer patients was 43 (66.2%).
 - e. There was a correlation between age and breast cancer incidence.
 - f. There was a correlation between smoking habits and breast cancer incidence.
 - g. There was a correlation between family history and breast cancer incidence.
 - h. Based on multivariate analysis, the most dominant variable was age, with a p-value of 0.003.

Suggestions

- a. It is hoped that further research will be conducted using different methods and different variables or factors related to breast cancer.
- b. It is hoped that health workers will provide more information on how age, smoking habits, and family history can influence the incidence of breast cancer.

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