International Journal of Health Science & Medical Research

Vol 5. No. 2 (2026) : August

AGE, BREASTFEEDING HISTORY, AND HORMONAL CONTRACEPTIVE USE AS PREDICTORS OF BREAST CANCER INCIDENCE AT NTB PROVINCIAL HOSPITAL

Ni Made Srileona Mileniasari[1], Made Agus Suanjaya[2], Kadek Dwi Pramana[3], Rizki Mulianti[4]
Medical Study Program, Faculty of Medicine, Universitas Islam Al-Azhar Mataram, Indonesia
email: leonamilenia@gmail.com

Abstract

Breast cancer is a major health problem in women whose incidence continues to increase, including in Nusa Tenggara Barat (NTB) Province, so that scientific evidence-based prevention efforts are needed. The novelty of this study lies in the simultaneous analysis of age, breastfeeding history, and hormonal contraceptive use as independent risk factors for breast cancer in the local NTB population using a multivariate approach. This study aims to analyze the relationship between age, breastfeeding history, and hormonal contraceptive use with breast cancer incidence at the NTB Provincial Hospital. The research used an observational analytical design with a retrospective case-control approach, involving 110 respondents (55 cases and 55 controls) and medical record data from 2024, with univariate analysis, a bivariate Chi-Square test, and multivariate logistic regression. The results showed that age >40 years and hormonal contraceptive use were associated with an increased risk of breast cancer, while breastfeeding history was protective, and all three variables remained significant in the multivariate analysis, with hormonal contraceptive use as the most dominant factor. The conclusion of this study states that age, breastfeeding history, and hormonal contraceptive use are independent risk factors for breast cancer. Therefore, strengthening health education, early detection in at-risk groups, and appropriate contraceptive counseling are needed as a breast cancer prevention effort in NTB Province.

Keywords: Age; Breast cancer; Breastfeeding history; Hormonal contraception.

INTRODUCTION

Breast cancer (Carcinoma Mammae) is one of the most common types of malignant tumors in women and the second most common cause of cancer death worldwide. Breast cancer tends to have a poor prognosis, usually only being detected at an advanced stage. This occurs due to a lack of public awareness of the importance of early detection and routine breast examinations (1).

According to 2020 Global Cancer Observatory (GLOBOCAN) data published by the International Agency for research on Cancer (IARC), breast cancer accounts for approximately 11.7% of all new cancer cases globally, with more than 2.3 million new cases recorded in 2022. This cancer also causes approximately 685,000 deaths worldwide. Meanwhile, in Indonesia, 68,858 new cases of breast cancer are recorded annually, with a death toll reaching 22,430 cases. This high incidence indicates that breast cancer remains a significant public health burden (2).

In NTB Province, the prevalence of cancer reaches 0.85%. Breast lump detection is recorded at 2.45%, and breast tumors rank

Received: January 11th, 2026; 1st Revised February 17th, 2026;
Accepted for Publication : March 17th, 2026

second highest at 15.6%, after ovarian and cervical tumors. According to the 2017 NTB Health Profile, 126 positive cases of lumps were recorded at district and city health centers. Meanwhile, data from the NTB Provincial Hospital shows an increase in the number of breast cancer patients each year, namely 104 in 2015, 106 in 2016, 246 in 2017, and a jump to 796 in 2018 (3).

The NTB Provincial General Hospital is the primary referral hospital in the NTB region. This hospital provides various services for cancer patients, such as outpatient clinics, oncology surgery, chemotherapy, and palliative care for patients with advanced cancer. Based on data from the NTB Provincial General Hospital's Medical Records Unit, the number of breast cancer inpatients continues to increase annually. In 2020, there were 513 patients; in 2021, 551; in 2022, 764; in 2023, 930; and in 2024, 31,445 (3,545 inpatients and 27,900 outpatients). This increase in the number of cases indicates that breast cancer at the NTB Provincial General Hospital has continued to increase over the past five years.

Breast cancer is a multifactorial disease that develops due to the interaction of modifiable risk factors such as obesity, alcohol consumption, smoking, low physical activity, long-term use of hormone therapy, history of hormonal contraceptive use, and history of breastfeeding. Non-modifiable risk factors include age, gender, a positive family history of breast cancer, genetic mutations, a personal history of breast cancer, early menarche, and never having given birth. These factors play a significant role in the development of breast cancer, so early detection and regular checkups are essential (4).

Previous research has shown mixed results regarding the relationship between age, breastfeeding history, and hormonal contraceptive use and breast cancer incidence in women. Some studies have found a significant association (5,6).

The urgency of this research is based on the increasing incidence of breast cancer in West Nusa Tenggara Province, particularly at the NTB Provincial General Hospital (RSUD NTB), the primary referral hospital. This increase in cases places a significant burden on healthcare services and impacts patients' quality of life. Breast cancer is influenced by risk factors relevant to women in NTB, such

as age, history of breastfeeding, and the widespread use of hormonal contraception. Therefore, this research is crucial for providing scientific evidence that can serve as the basis for prevention efforts, early detection, and health education tailored to the needs of the NTB community.

Only three risk factors were selected because they represent key biological and hormonal pathways that are strongly associated with breast cancer development. Age reflects cumulative cellular mutation and hormonal exposure over time, while breastfeeding history and hormonal contraceptive use represent reproductive and hormonal factors that directly influence lifetime estrogen and progesterone exposure. Although breast cancer is multifactorial, these variables were prioritized because they are well-documented, clinically relevant, and consistently available in medical records, thereby enabling more reliable analysis of retrospective data.

RESEARCH METHOD

This study uses an observational, analytical, quantitative approach with a retrospective case-control design, using medical record data from female patients at the NTB Provincial Hospital in 2024, with a population of 31,445 patients. A retrospective case-control design based on medical records was used because it is appropriate for analyzing associations between multiple risk factors and breast cancer using existing clinical data. Medical records provide clinically confirmed diagnoses and documented exposure histories, supporting data validity. The sample in this study amounted to 110 respondents, consisting of 55 case groups and 55 control groups, selected through purposive sampling, to analyze the relationship between age, breastfeeding history, and use of hormonal contraception with the incidence of breast cancer through univariate analysis, bivariate Chi-Square test, and multivariate logistic regression at a significance level of *P-value* <0.05. This study was already permitted by the Ethical Committee of the Faculty of Medicine, Universitas Islam Al-Azhar, Nomor: 138/EC-01/FK-06/UNIZAR/IX/2025.

RESULTS AND DISCUSSION

Results

Table 1. Univariate Analysis Results

Characteristics	Frequency	
	n	%
Age		
High Risk (> 40 years old)	54	50,9%
Low Risk (≤ 40 years old)	56	49,1%
Total	**110**	**100%**
Breastfeeding History		
Yes	69	62,7%
No	41	37,3%
Total	**110**	**100%**
Hormonal Contraception		
Yes	64	58,2%
No	46	41,8%
Total	**110**	**100%**

Sources: Primary Data, 2025

Based on the table above, of the total 110 patients, 54 (50.9%) were over 40 years old, while 56 (49.1%) were under 40 years old. 69 (62.7%) had a history of breastfeeding, while 41 (37.3%) did not breastfeed. 64 (58.2%) used contraception, while 46 (41.2%) did not.

Table 2. Results of Bivariate Analysis of Perception

Variable	Breast Cancer		Non-breast Cancer		Total	P-value	r	95% CI
	n	%	n	%				
Age								
> 40 years old	36	66,7	18	33,3%	54	0,001	0,327	1,765 – 8,593
≤ 40 years old	19	33,9	37	66,1%	56			
Total	**55**	**100**	**55**	**100**	**110**			
Breastfeeding History								
Yes	27	39,1	42	60,9	69	0,003	-0,282	0,132 – 0,675
No	28	68,3	13	31,7	41			
Total	**55**	**100**	**55**	**100**	**110**			
Hormonal Contraception								
Yes	41	64,1	23	35,9	64	0,001	0,332	1,814 – 9,154
No	14	30,4	32	69,6	46			
Total	**55**	**100**	**55**	**100**	**110**			

Sources: Primary Data, 2025

Based on the bivariate analysis table, respondents aged >40 years who experienced breast cancer numbered 36 people (66,7%), while 18 people (33,3%) in this age group did not experience breast cancer. In comparison, in the age group ≤40 years, there were 19 people (33,9%) who experienced breast cancer and 37 people (66,1%) who did not experience breast cancer. In the breastfeeding history variable, respondents who had a history of breastfeeding and experienced breast cancer were 27 people (39,1%). In comparison, 42 people (60,9%) did not experience breast cancer, while in the group without a history of breastfeeding, 28 people (68,3%) experienced breast cancer, and 13 people (31,7%) did not experience breast cancer. Meanwhile, in the variable of hormonal contraceptive use, respondents who used hormonal contraceptives and experienced breast cancer were 41 people (64,1%). In comparison, 23 people (35,9%) did not experience breast cancer. In comparison, in the group who did not use hormonal contraceptives, there were 14 people (30,4%) who experienced breast cancer and 32 people (69,6%) who did not experience breast cancer.

The results of statistical tests showed that there was a significant relationship between age and the incidence of breast cancer (*P-value*=0,001; r=0,327; 95%CI=1,765–8,593), between breastfeeding history and the incidence of breast cancer (*P-value*=0,003; r=-0,282; 95%CI=0,132–0,675), and between the use of hormonal contraception and the incidence of breast cancer (*P-value*=0,001; r=0,332; 95%CI=1,814–9,154). A p-value smaller than 0,05 and a confidence interval range that does not include the number 1 indicate that these three variables have a statistically significant relationship with the incidence of breast cancer, where age >40 years and the use of hormonal contraception increase the chance of breast cancer. At the same time, a history of breastfeeding is protective against the incidence of breast cancer.

Table 3. Multivariate Analysis

Variable	B	P-value	OR	95%CI
Age	1,380	0,003	3,976	1,618-9,774
Breastfeeding history	-1,705	0,001	0,182	0,064-0,514
Hormonal Contraception	1,849	0,000	6,353	2,358-17,118
Constant	**-2,414**	**0,025**	**0,089**	

Sources: Primary Data, 2025

Based on the results of the logistic regression test in the multivariate analysis table, three variables have a significant effect on the incidence of breast cancer, namely age, history of breastfeeding, and use of hormonal contraception. The age variable shows a significant relationship with a *P-value* = 0,003 and OR = 3,976 (95%CI = 1,618-9,774), which means that women with risky ages have almost four times greater chance of developing breast cancer compared to younger age groups. The breastfeeding history variable also shows a statistically significant effect, with a *P-value* = 0,001 and an OR = 0,182 (95% CI = 0,064-0,514). An OR value < 1 indicates that a history of breastfeeding is protective, meaning women with a history of breastfeeding have a lower risk than women without one. Meanwhile, the use of hormonal contraception shows a significant relationship with the incidence of breast cancer, indicated by a *P-value* = 0,000 and OR = 6,353 (95%CI = 2,358-17,118).

This indicates that women who use hormonal contraception have a more than sixfold higher risk of developing breast cancer compared to women who do not use hormonal contraception. The analysis also shows that the constant term is statistically significant (*P-value* = 0,025) and has an OR of 0,089, indicating that the regression model has significant predictive power. Based on the OR and p-values in the multivariate analysis, the use of hormonal contraception is the most dominant factor influencing the incidence of breast cancer, followed by age, while breastfeeding history acts as a protective factor.

Discussion

The Relationship Between Age and Breast Cancer Incidence at the NTB Provincial Hospital

The study found that age had a significant relationship with breast cancer incidence at the NTB Provincial Hospital, with a p-value of 0,001 (<0,05), an OR of 0,327, and a 95% CI of 1,765-8,593. These results indicate that age is a risk factor contributing to the increased incidence of breast cancer.

As a woman ages, her risk of developing breast cancer increases. This is due to accumulated exposure to the hormones estrogen and progestin throughout life, as well as the increased

likelihood of genetic mutations with age. Most breast cancer cases occur in women over 40, especially after menopause, when the body's DNA repair mechanisms begin to weaken, and abnormal cells are more likely to grow unchecked (7).

The increased risk of breast cancer with age is due to several mechanisms. First, the mutation accumulation theory explains that as a person ages, the chance of DNA damage increases due to lifetime exposure to radiation, environmental factors, chemicals, and errors in cell replication. With age, DNA repair mechanisms become less effective, making it easier for abnormal cells to survive and develop into cancer. The aging process leads to an increased accumulation of somatic mutations, which play a key role in carcinogenesis, including breast cancer (8).

Second, cumulative estrogen exposure throughout the reproductive years also influences breast cancer risk. Estrogen stimulates breast epithelial cell division, so the longer the exposure to estrogen, the greater the chance of mutations resulting from replication errors. Older women have higher lifetime estrogen exposure, especially those who experience early menopause or late menopause. Third, the aging process of the immune system also influences cancer risk. With aging, the immune system has a decreased ability to detect and destroy abnormal cells that could become cancerous. Decreased immune function is a key factor that increases susceptibility to various types of cancer, including breast cancer (8).

The Relationship Between Breastfeeding History and Breast Cancer Incidence at the NTB Provincial Hospital

The study found that breastfeeding history was significantly associated with breast cancer incidence at the NTB Provincial Hospital, with a p-value of 0.003 (<0,05), an OR of -0,282, and a 95% CI of 0,132-0,675. These results indicate that breastfeeding history is a factor associated with breast cancer incidence.

Breastfeeding may provide a protective effect against breast cancer because estrogen levels naturally decrease during lactation. This decrease in estrogen reduces breast tissue stimulation, thereby reducing the risk of abnormal cell proliferation that can develop into cancer.

Furthermore, breastfeeding also helps remove breast cells that may have DNA damage, thus reducing the potential for malignant transformation (9).

Besides hormonal factors, the duration of breastfeeding also plays a significant role. The longer a woman breastfeeds, the greater the protective effect against breast cancer. Research shows that breastfeeding for 12 months or more can significantly reduce the risk of breast cancer. This benefit applies to both women with one child and those with multiple children, and may be greater in women with high-risk factors (10).

This is in line with the results of research conducted by Paratiwi (2021) with a *P-value* of 0,005, which found a significant association between breastfeeding history and breast cancer incidence. Breastfeeding provides protection against breast cancer through hormonal and biological mechanisms. During breastfeeding, estrogen levels, known to stimulate breast cancer cell growth, decrease, while prolactin levels become more dominant. This hormonal balance helps suppress the risk of abnormal cell proliferation in breast tissue. Furthermore, breastfeeding promotes more complete maturation of breast cells, making breast tissue more stable and resistant to potentially malignant changes.

The Relationship Between Hormonal Contraceptive Use and Breast Cancer Incidence at the NTB Provincial Hospital

The study found that hormonal contraceptive use was significantly associated with breast cancer incidence at the NTB Provincial Hospital, with a *P-value* of 0,001 (<0,05), OR (0,332), and 95% CI (1,814-9,154). These results indicate that hormonal contraceptive use is a risk factor contributing to the increased incidence of breast cancer.

The use of hormonal contraceptives can trigger breast cancer through mechanisms related to the effects of estrogen and progestin on breast cells. These hormones play a role in cell proliferation, which is the process of cell division and growth. Estrogen, in particular, can stimulate the growth of epithelial cells in breast tissue. When exposure to estrogen and progestin is continuous or long-term, it can lead to uncontrolled cell division,

increasing the likelihood of genetic mutations. These mutations can trigger the transformation of normal cells into cancer cells. In addition, these hormones can also affect the expression of certain genes related to the cell cycle and apoptosis (programmed cell death), thereby disrupting the balance between cell growth and death (12).

Several studies have also shown that the progestin in hormonal contraceptives may contribute to carcinogenesis through inflammatory pathways and angiogenesis (new blood vessel formation), which support tumor growth. This risk tends to be higher in women who use hormonal contraceptives long-term, start using them at a young age, or have other risk factors such as a family history of breast cancer. However, the increased risk is relatively small and decreases gradually after contraceptive use is discontinued. Therefore, every woman needs to consider her overall health and consult a doctor before choosing an appropriate contraceptive method (13).

This is also in line with the results of research conducted by Wulan *et al.* (2021) with a *P-value* of 0,002 indicates that hormonal contraceptive use has been shown to significantly influence breast cancer incidence, especially in women who use them long-term. Continuous exposure to the synthetic estrogen and progestin hormones contained in hormonal contraceptives can increase cell proliferation in breast tissue. When this hormonal stimulation continues for a long time, the risk of abnormal or malignant cell changes increases. This occurs because estrogen plays a crucial role in stimulating breast cell growth, so excessive exposure can trigger cancer cell formation. Other studies have also supported this finding, showing that long-term use of estrogen-containing contraceptives increases the risk of cancer compared to short-term use or contraceptives without estrogen. Thus, the duration of hormonal contraceptive use is an important factor influencing breast cancer risk through the mechanism of prolonged estrogen exposure and continuous breast cell stimulation.

Factors Influencing Cancer Incidence at NTB Provincial Hospital

Multivariate analysis results showed that age, breastfeeding history, and hormonal

contraceptive use remained significantly associated with breast cancer incidence after simultaneously controlling for all variables in the model. This indicates that these three variables act as independent factors associated with breast cancer incidence. Among these three, hormonal contraceptive use was the most dominant variable, as indicated by the largest odds ratio.

These results align with those of Iqmy et al. (2021), who stated that hormonal contraceptive use is the most dominant factor in breast cancer incidence. Estrogen supports cell growth, particularly in reproductive tissues. Estrogen's tendency to stimulate cell growth makes its excess a trigger for cancer (15).

The results of this study may be generalizable to other hospitals, particularly referral or tertiary care facilities, because similar patterns of breast cancer risk factors have been reported across multiple hospitals. Consistency of findings across different hospital settings suggests that the observed associations are not unique to a single institution but may reflect broader clinical and biological patterns of breast cancer risk.

This is further supported by established breast cancer pathophysiological theories, including cumulative hormonal exposure with increasing age, protective hormonal effects of breastfeeding, and proliferative effects of exogenous hormones from contraceptive use, which strengthen the plausibility of applying these findings beyond the study setting. However, multicenter or population-based studies are still recommended to strengthen external validity further.

CONCLUSION AND RECOMMENDATION

The incidence of breast cancer at the NTB Provincial Hospital was significantly associated with age, breastfeeding history, and hormonal contraceptive use, both in bivariate and multivariate analyses, where women aged >40 years and users of hormonal contraceptives had a greater chance of developing breast cancer. In contrast, a history of breastfeeding was shown to have a protective effect, with hormonal contraceptive use being the most dominant factor. Based on these findings, health workers and policy makers are expected to

strengthen promotive and preventive efforts by increasing education on breast cancer risk factors, strengthening early detection programs in at-risk age groups, and providing appropriate counseling regarding the use of hormonal contraceptives, accompanied by encouragement of optimal breastfeeding practices as a breast cancer prevention strategy in NTB Province.

ACKNOWLEDGEMENT

The authors would like to thank all parties at the NTB Provincial Hospital for providing permission, support, and facilities, enabling this research to be successfully conducted. Special thanks go to the respondents who willingly participated in this study until its completion.

REFERENCES

1. Zakia SD, Oktaviyanti IK, Budiwinata W, Rahman EY, Rosida L, Studi P, et al. Hubungan Riwayat Keluarga dengan Kejadian Kanker Payudara Usia Muda di RSUD Ulin Banjarmasin. Homeost J Mhs Pendidik Dr. 2024;7(3):649–56.
2. Sung H, Ferlay J, Siegel RL, Laversanne M, Soerjomataram I, Jemal A, et al. Global Cancer Statistics 2020: GLOBOCAN Estimates of Incidence and Mortality Worldwide for 36 Cancers in 185 Countries. Vol. 71, CA: A Cancer Journal for Clinicians. 2021. p. 209–49.
3. Ramadonika F, Amrah N. Efektifitas Pendidikan Kesehatan Terhadap Tingkat Pengetahuan Remaja Putri tentang SADARI di Pondok Pesantren Nurul Haramain Narmada Lombok Barat. J Mutiara Kesehat Masy. 2021;6(2).
4. Muthmainnah PR, Syahril K, Rahmawati, Nulanda M, Dewi AS. Analisis Faktor Risiko Kanker Payudara. J Mhs Kedokt. 2024;04(5):359–67.
5. Yunus EM, Permatasari N, Yanti ES. Pengaruh penggunaan alat kontrasepsi hormonal terhadap kejadian kanker payudara di fasillitas pelayanan kesehatan. J Kesehat Poltekkes Kemenkes RI Pangkalpinang. 2021;9(2):117–23.
6. Salman S, Prasetyo B, Romadhoni R. Hubungan Usia dan Penggunaan Alat Kontrasepsi Hormonal dengan Kejadian Kanker Payudara di RSUD

KMRT Wongsonegoro: Studi Cross Sectional. J Ilmu Kedokt dan Kesehat. 2024;10(10):2940–7.

7. Aisy LR, Mujaddidah Mochtar N, Irawati DN, Finansah YW. Hubungan faktor genetik dan faktor usia terhadap kejadian kanker payudara pada wanita di RSUD Dr.Soedomo Trenggalek periode 2020-2021. Proceeding Ser Univ Muhammadiyah Surabaya. 2022;1(2):107–22.
8. Lue JC, Radisky DC. From Embryogenesis to Senescence: The Role of Mammary Gland Physiology in Breast Cancer Risk. Cancers (Basel). 2025;17(5):1–21.
9. Ye DM, Bai X, Xu S, Qu N, Zhao N, Zheng Y, et al. Association between breastfeeding, mammographic density, and breast cancer risk: a review. Int Breastfeed J . 2024;19(1).
10. Hameiri-Bowen D, Pedersen DC, Jensen BW, Aarestrup J, Rasmussen KM, Baker JL, et al. The association between being breastfed in infancy and risks of cancer in adulthood—a UK Biobank study. BJC Reports. 2024;2(1):1–8.
11. Paratiwi A. Faktor Risiko yang Berhubungan dengan Kejadian Kanker Payudara Wanita di RSUD Dr. Achmad Mochtar Bukittinggi. J Kesehat Masy Mulawarman. 2021;3(2):93.
12. Islamiyah S, Inayah Z. Usia dan Penggunaan Alat Kontrasepsi Hormonal dengan Kejadian Kanker Payudara di RSUD K.M.R.T Wongsonegoro: Studi Cross Sectional. Jurnalmalahayati. 2023;10(3):1672–80.
13. Nawangsari H, Tripuspitasari M, Fatmawati N. Hubungan antara Pemakaian KB Hormonal dengan Kejadian kanker Payudara pada Wanita Usia Subur di Puskesmas Temayang Kabupaten Bojonegoro. 2023;21(2):167–77.
14. Wulan D, Siregar D, Effendi H, Hasibuan H, Sulistiawati C. Relationship Between The Use Of Hormonal Contraception With Carcinoma Mammae In Female Age Women In Hospital Ptpn Ii Tg . Morawa. J Kedokt STM (Sains dan Teknol Med. 2021;IV(I):33–8.

15. Iqmy LO, Setiawati S, Yanti DE. Faktor Resiko yang Berhubungan dengan Kanker Payudara. J Kebidanan. 2021;7(1):32–6.