

Cancer risk factors associated with historical contraceptive use and breastfeeding duration

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Abstract

Cancer is the second leading cause of death worldwide. Two prominent factors in this regard are a woman's history of contraceptive use and the duration of breastfeeding. This study aimed to delve into these risk factors and their impact on cancer incidence. The research employed a cross-sectional design involving 125 cancer patients undergoing chemotherapy at Abdul Wahab Sjahranie Hospital in Samarinda, East Kalimantan. This study used a total sampling approach to include all available patients. Data on contraceptive use, breastfeeding duration, and cancer status were collected through a questionnaire and subsequently analyzed using the chi-square test. The study revealed that breast cancer was the most prevalent type, affecting 41.6% of patients. Additionally, more than half of the respondents breastfed for less than two years (52%), while only 48% breastfed for two years or more. Notably, a significant majority (66.4%) had a history of using hormonal contraception. Statistical analysis demonstrated a compelling association between contraceptive history, breastfeeding duration, and cancer incidence ($p < 0.001$). In summary, the findings highlight a substantial relationship between a woman's history of contraceptive use, the duration of breastfeeding, and the incidence of breast cancer. These results underscore the importance of further research and the development of targeted interventions to better understand and mitigate breast cancer risk factors among women.

Introduction

Cancer is a general term for a large group of diseases characterized by the overgrowth of abnormal cells that invade adjacent parts of the body and spread to other organs. Other common terms for this condition are malignancy and neoplasm. Cancer can affect almost any part of the body.¹ However, cancer rates vary from country to country, with the fastest-growing rates observed in Latin America, Africa, and developing countries in Asia. The death rate from cancer increased from 8.2 million in 2012 to 9.6 million in 2018. The most common causes of death from cancer worldwide include lung cancer (1.76 million deaths), colon cancer (862,000 deaths), stomach cancer (783,000 deaths), liver cancer (782,000 deaths), and breast cancer (627,000 deaths).¹

Nationally, cancer rates in Indonesia remain high, showing an increasing prevalence of cancer and tumors. According to the Global Burden of Cancer (GLOBOCAN) data released on September 12, 2018, cancer is the leading cause of incidence in Indonesia, with 58,256 reported cases. This is followed by cervical cancer with 32,469 cases and lung cancer with 30,023 cases, among others.^{2,3} East Kalimantan has a high incidence of cancer, with a prevalence rate of 1.7%, affecting 6,745 people. The most common types of cancer in East Kalimantan include breast cancer

(1,879 cases), colon/rectal cancer (1,923 cases), cervical cancer (752 cases), lung cancer (875 cases), and leukemia (653 cases).⁴ Medical records from Abdul Wahab Sjahranie Hospital in Samarinda for the year 2017 show that cancer cases were the most common disease in Samarinda, with 1,421 reported cases. Most of these cancer patients underwent chemotherapy at Abdul Wahab Sjahranie Hospital.⁴ The factors contributing to the increased incidence of cancer are not fully understood, but many studies have linked this increase to lifestyle changes, including reproductive factors, physical activity, and diet. Reproductive factors associated with an increased cancer risk include early menarche, late menopause, first birth over age 30, never breastfeeding, the use of oral hormonal contraceptives, and hormone replacement therapy.⁵ An often overlooked risk factor for cancer in women is their history of contraceptive use. The use of birth control pills can increase estrogen exposure in the body, potentially leading to abnormal cell growth and an increased risk of cancer, depending on age and duration of use.⁶ The most commonly used hormonal contraceptives are injections and pills, which often combine estrogen and progesterone. The estrogen and progesterone content of these contraceptives can excessively stimulate glandular growth. Consequently, long-term use of oral contraceptives is associated with an increased risk of cancer.⁷

According to Nasution *et al.* (2018), a sedentary lifestyle and unhealthy habits increase the risk of cancer, particularly among individuals with a family history of the disease. Furthermore, prolonged use of hormonal contraceptives can disrupt the body's hormonal balance, leading to normal cell changes becoming abnormal.⁸ Breastfeeding is a modifiable reproductive factor associated with a reduced risk of cancer.³ Apart from its potential in reducing the risk of breast cancer in mothers, breastfeeding provides multiple benefits for both mother and baby. However, despite these advantages, breastfeeding rates remain low among women.⁹ The relationship between extended breastfeeding and cancer incidence remains a subject of debate. While Bernier *et al.*¹⁰ reported conflicting results regarding breastfeeding as a risk factor for cancer, Lanfranchi's study¹¹ demonstrated that breastfeeding women had a lower risk of developing cancer compared to non-breastfeeding women. In contrast, Thomas's study¹² found that continuous breastfeeding did not significantly affect cancer risk.

In a preliminary survey conducted among ten cancer patients, including four breast cancer patients, three colon cancer patients, two cervical cancer patients, and one lung cancer patient, eight of the ten respondents with cancer had a history of hormonal contraception use. Two respondents had a long history of using non-hormonal contraception. This study aimed to analyze the risk factors associated with the history of contraceptive use and the duration of breastfeeding in relation to breast cancer, colon/rectal cancer, cervical cancer, and lung cancer.

Materials and Methods

Research design

Explanatory research was employed to identify risk factors associated with the history of contraceptive use and duration of breastfeeding in relation to cancer, utilizing a cross-sectional approach. This research aimed to elucidate the characteristics of respondents, contraceptive history, breastfeeding duration, and types of cancer.

Study participants

The study population comprised 183 cancer patients receiving chemotherapy at Abdul Wahab Syahrani Hospital in Samarinda. Purposive sampling, a non-random technique, was used to select 125 respondents based on predetermined criteria. Inclusion criteria encompassed patients diagnosed with breast cancer, colon/rectal cancer, cervical cancer, and lung cancer, who were conscious, female, married, with a history of breastfeeding and contraceptive use. Exclusion criteria included patients with poor communication abilities and severe debilitation.

Variable, instrument, and data collection

The independent variables encompass demographic factors such as age, education, and occupation, along with the history of contraceptive use (non-hormonal, hormonal), and duration of breastfeeding (less than two years and more than two years). The dependent variable is the type of cancer (breast cancer, colon/rectal cancer, cervical cancer, and lung cancer). A questionnaire was employed as the research instrument, previously tested for validity and reliability. This seven-question instrument employs a 2-point Guttman scale: "Yes" = 2 and "No" = 1.

Data analysis

Data analysis was conducted using SPSS with the chi-square test. The chi-square test is particularly useful for assessing the relationship or influence between two nominal variables, each representing a different nominal variable (c = coefficient of contingency).

Table 1. Characteristics of respondents (n=125).

Characteristics	Frequency	%
Age (years)		
17-25	3	2.4
26-35	18	14.4
36-45	31	24.8
46-55	47	37.6
56-65	18	14.4
>65	8	6.4
Education		
Not attending school	25	20.0
Elementary school	41	32.8
Junior high school	38	30.4
Senior high school	18	14.4
College	3	2.4
Occupation		
Not working/housewife	110	88.0
Laborer/Farmer	2	1.6
Private	5	4.0
Entrepreneur	6	4.8
Civil servant	2	1.6
History of Contraceptive Use		
Non-Hormonal	42	33.6
Hormonal	83	66.4
Duration of breastfeeding		
<2 Years	65	52.0
≥2 Years	60	48.0
Type of Cancer		
Breast Cancer	52	41.6
Colon/Rectum Cancer	29	23.2
Cervical Cancer	29	23.2
Lung Cancer	15	12.0
Total	125	100

Results

Table 1 reveals that among the 125 respondents, the largest age group consisted of individuals aged 46-55, totaling 47 people (37.6%). In terms of the respondents' highest level of education, the majority were elementary school graduates, accounting for 41 respondents (32.8%). Regarding employment, the majority of respondents were unemployed/homemakers (IRT), comprising 110 individuals (88.0%). In addition, it is clear that a majority of respondents, specifically 66.4% or 83 individuals, reported a history of using hormonal contraception. Furthermore, 52% of the respondents breastfed for less than two years. In terms of the types of cancer observed, breast cancer was the most prevalent, affecting 41.6% or 52 people.

In Table 2, the chi-square results show that out of the 125 respondents, 42 used non-hormonal contraception, while 83 opted for hormonal contraception. Among those using non-hormonal contraception, 15 (35.7%) were diagnosed with breast cancer. For the 83 respondents who chose hormonal contraception, 37 (44.6%) were diagnosed with breast cancer. The statistical test indicates a significant relationship between the history of contraceptive use and the type of cancer. Among the 65 respondents who breastfed for less than 2 years, 38 (58.5%) were diagnosed with breast cancer. In contrast, out of the 60 respondents who breastfed for two years, 18 (30%) were diagnosed with cervical cancer. The statistical chi-square test produced significant results.

Discussion

The results of this research provide valuable insights into the factors influencing the occurrence of various cancer types among the participants. The study primarily focuses on key variables, including the history of contraceptive use and the duration of breastfeeding.

Historical contraceptive use and types of cancer

Our study findings reveal a significant association between historical contraceptive use and the prevalence of specific cancers

among participants. Notably, individuals who used hormonal contraception, especially for extended periods, showed a higher incidence of breast and cervical cancers. The most common forms of hormonal contraception are pills and injections due to their ease of use, which might explain the higher rates of breast and cervical cancers among those with a history of hormonal contraceptive use. These findings align with a 2015 study conducted by Charlton *et al.*, which indicated an increased risk of colon/rectal cancer, particularly with long-term hormonal contraceptive use exceeding eight years.¹³ According to Fitri (2018), both short-term and long-term use of hormonal contraception can affect various body systems, such as ovulation, implantation, gamete transport, luteal function, cervical mucus, and estrogen and progesterone. Excessive exposure to hormones in the body can trigger the rapid growth of cancer cells.¹⁴ These observations are consistent with a 2021 study by Iversen *et al.*, which reported an elevated risk in current or recent users of combined hormonal contraception but not with progestin-only contraception alone.¹⁵ This corroborates the findings of Abdullah *et al.* (2013), which revealed a significant association between hormonal contraception and cervical cancer. Mothers using hormonal contraceptives were found to be 0.18 times more likely to develop cervical cancer than those using non-hormonal contraceptives.¹⁶

Based on our study's results, it can be reasonably concluded that there is a general association between the use of hormonal contraception and cancer, with breast and cervical cancers having the highest incidence rates. According to our hypothesis, the risk of cancer and its impact on hormones is greater in cases where hormonal contraception is used for over ten years. Extended use of contraception appears to challenge the body's hormone regulation. A surplus of hormones in the body may expedite the emergence of cancer cells. Hence, if contraceptive use surpasses a decade, it is advisable for respondents to undergo regular check-ups and examinations at least every six months to detect potential adverse effects and implement preventive measures for long-term contraceptive use. During direct interviews with 18 respondents, other factors potentially contributing to cancer were identified, including unhealthy lifestyles characterized by the consumption of carcinogenic foods (burnt foods), lack of physical activity, stress, family history, menarche, menopause, radiation exposure, alcohol con-

Table 2. Relationship between history of contraceptive use, duration of breastfeeding and type of cancer.

Type of cancer	History of contraceptive use				p
	Non-Hormonal		Hormonal		
	f	%	f	%	
Breast cancer	15	35.7	37	44.6	<0.001
Colon/rectum cancer	11	26.2	18	21.7	
Cervical cancer	3	7.1	26	31.3	
Lung cancer	13	31.0	2	2.4	
Total	42	100	83	100	
Type of cancer	Duration of breastfeeding				p
	< 2 years		≥ 2 years		
	f	%	f	%	
Breast cancer	38	58.5	14	23.3	<0.001
Colon/rectum cancer	15	23.1	14	23.3	
Cervical cancer	11	16.9	18	30.0	
Lung Cancer	1	1.5	14	23.3	
Total	65	100	60	100	

sumption, and smoking. However, another noteworthy factor linked to cervical cancer was the use of hormonal contraception for over ten years and frequent changes in contraception methods. Among the 60 respondents, the average number of children per respondent was four to six, suggesting a possible connection between the number of children and the incidence of cancer.⁴⁻⁶

Breastfeeding duration and type of cancer

Breastfeeding duration significantly impacts breast cancer risk, with 58.5% of the 65 respondents who breastfed for less than two years being diagnosed with breast cancer. Interviews with these participants unveiled complex factors influencing breastfeeding practices, including work demands and beliefs about introducing solid foods early. A comprehensive approach, as suggested by Anstey *et al.* in 2017, may be effective in supporting mothers to achieve their breastfeeding goals and reduce disparities in breastfeeding rates, ultimately lowering breast cancer incidence.¹⁷ Research by Listyawati in 2016 indicates that women who breastfeed for less than two years face a higher breast cancer risk,¹⁸ while Ardhany *et al.*'s 2018 study shows a 5.06 times higher risk for non-breastfeeding mothers.⁹ Furthermore, Gonzales-Jiménez's 2018 findings underscore the protective effects of breastfeeding for over six months, especially for mothers with multiple children, and breastfeeding for over two years due to prolonged hormonal influences.¹⁹ Lastly, Fortner *et al.*'s 2019 research highlights the potential of breastfeeding in reducing hormone receptor-negative breast cancers, making it a cost-effective risk-reduction strategy.²⁰

These findings underscore the importance of interventions aimed at educating women about the protective benefits of breastfeeding in reducing their risk of breast cancer and associated mortality.²¹ Sari *et al.*'s theory in 2012 posits that breastfeeding offers various advantages, including a reduced risk of breast, uterine, and ovarian cancers. This is attributed to the influence of estrogen in the body, and the decrease in estrogen levels during breastfeeding can lower the risk of cancer. A reduction in estrogen levels decreases the stimulation of the uterine and breast tissue linings, ultimately reducing the risk of cancer. The theory further suggests that breastfeeding for more than six months can lower cancer risk by 25-30%.²²

The research primarily focuses on the relationship between contraceptive use, breastfeeding duration, and cancer incidence, and does not consider other potential confounding variables that could influence cancer risk. These limitations highlight the need for larger, more comprehensive studies in diverse populations to provide a more complete understanding of the complex factors contributing to cancer risk.

Conclusions

This research has successfully identified a significant association between extended hormonal contraceptive use and an elevated risk of breast and cervical cancer. Prolonged use of hormonal contraception could potentially disrupt hormone regulation, leading to an acceleration in the growth of cancer cells. Additionally, the study highlights the protective advantages of breastfeeding, particularly in reducing the risk of breast cancer through the mechanism of decreasing estrogen levels during the breastfeeding period. The practical implications of these findings point toward the importance of public health campaigns aimed at increasing awareness and promoting informed decision-making regarding contraceptive methods and breastfeeding practices. However, it's essential to

acknowledge that further, more comprehensive research is necessary to consider other potential influencing factors on cancer risk.

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