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Correlations between Parity and Marriage Age with Incidence of Cervical Cancer at Gunung Jati Hospital, Cirebon, Indonesia

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ABSTRACT

Background: Cervical cancer is one of the leading causes of death among women in Indonesia, and factors such as parity and age at marriage are believed to play a significant role in increasing the risk of developing this disease.

Aims: Examine the relationship among parity and age at marriage with the incidence of cancer of cervix by describing the age distribution, parity, age at marriage, and histopathological features of cancer of cervix patients at Gunung Jati Hospital in Cirebon, Indonesia.

Methods: This study utilized an analytical observational approach with a cross-sectional design. It analyzed secondary data, specifically the medical records of cancer of cervix patients at Gunung Jati Hospital in Cirebon from 2022 to 2023. A total of 47 patients were selected through total sampling. The Spearman correlation test was employed for statistical analysis to determine the correlation between the variables.

Results: The majority of cervical cancer patients were multiparous (70.2%), had a marriage age of < 20 years, and exhibited histological findings of Squamous Cell Carcinoma Keratinizing (48.9%). No correlation was found among parity and the occurrence of cancer of cervix ($p = 0.450$; $p > 0.05$). However, a significant association was observed among age at marriage and cancer of the cervix occurrence ($p = 0.010$; $p < 0.05$).

Conclusion: The results of the study are expected to provide insight into the importance of reproductive factors in the prevention of cervical cancer, as well as recommendations for more effective reproductive health policies.

Keywords: Cervical cancer, Parity, Marriage age.

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1. Introduction

Cervical cancer is a malignant disease affecting the cervix, a female reproductive organ positioned between the uterus and the vaginal canal (Setianingsih *et al.*, 2022). Cancer of cervix is one of the most frequent cancers in women worldwide, particularly in developing nations such as Indonesia (Zeta *et al.*, 2023).

According to data from The Global Cancer Observatory (GLOBOCAN) in 2020, there were 604,127 new cases of cervical cancer worldwide, accounting for 3.1% of the 19.29 million new cancer cases. This led to 341,831 deaths, representing 3.4% of the total 9.95 million cancer-related fatalities (Khairunnisa *et al.*, 2022). GLOBOCAN data also indicates that in 2020, the number of new cervical cancer cases in Indonesia reached 36,633, or 9.2% of the total 396,914 new cancer cases, causing 21,003 deaths, or 9.0% of the total 234,511 cancer-related deaths (Putri & Sulistyowati, 2023). According to data from the Ministry of Health of the Republic of Indonesia (Kemenkes RI), in 2019, cervical cancer cases in West Java reached 15,635 cases (0.7%) (Nisa *et al.*, 2022). Meanwhile, in 2022, the number of cervical cancer cases with positive IVA test results in Cirebon City reached 134 cases (0.34%) (Dewi *et al.*, 2022).

Cervical cancer is caused by the oncogenic subtype of the HPV (Human Papilloma Virus). There are more than 100 types of the HPV virus, and 13 of those are known to carry a high risk of cancer. The most commonly detected high-risk HPVs are types 16 and 18 (Purba, 2021). HPV can be transferred by skin-to-skin contact during sexual intercourse, as well as through hand contact with the genital organs and oral sex (Raihan *et al.*, 2022).

The incidence of cancer of the cervix is influenced by a variety of factors, including parity. During pregnancy, eversion of the columnar cervical epithelium creates a new dynamic of immature metaplastic epithelium, increasing the chance of cell transformation, particularly in the cervix, leading in chronic HPV infection. Marriage at a young age may also increase the risk of cancer of cervix. According to BKKBN, a young marriage is carried out before the age of twenty. The process of cancer lesion development at the first sexual intercourse age of <20 years is closely related to the metaplasia process in the endocervical layer, transforming into squamous epithelium in the transformation zone (Sholichah & Sukmawati, 2020). In addition, age, education, the use of hormonal contraception, smoking, and sexual behavior also contribute to an increased risk of cervical cancer (Lismaniar *et al.*, 2021).

According to research conducted at the NTB Provincial Hospital in 2022, there is a link between the number of parity and the occurrence of cancer of the cervix. The majority of cervical cancer patients have multiparity, which is caused by repetitive cervical trauma (Paramitha *et al.*, 2022). Furthermore, a 2020 study, found a link between marriage age and cervical cancer incidence, with women marrying at a younger age of less than 20 years having a higher risk of developing cervical cancer. This is because women under the age of 20 do not have fully formed reproductive organs.

This study studied the relationships between parity and marriage age and the incidence of cancer of the cervix patients at Gunung Jati Hospital in 2022 to 2023, specifically investigating reproductive factors such as parity and marriage age in relation to cervical cancer, which had not been extensively studied in Indonesia, particularly in Cirebon. Furthermore, this study contributed to the understanding of the influence of marriage age on the incidence of cervical cancer, which could provide new insights for reproductive health education programs and more effective cervical cancer prevention policies.

2. Methods

Study design/ Research procedures

This study employed analytical observational research with a cross-sectional design to collect data from cervical cancer patients' medical records in a single location. The population consisted of cervical cancer patients who were histopathologically identified at Gunung Jati Hospital Cirebon between 2022 and 2023. This study was carried out during May and June 2024 at the Gunung Jati Hospital in Cirebon. This study's inclusion criteria were patients diagnosed with cervical cancer who had comprehensive medical records. Patients with a history of

hormonal contraceptive use for more than four years and a second cancer diagnosis were excluded from the trial. The sample size for this study is 49, drawn from all patient data diagnosed with cervical cancer in medical records that match the inclusion criteria at Gunung Jati Hospital Cirebon City in 2022 to 2023. Following data collection, two samples were removed because they had previously used hormonal contraception for more than four years. As a result, samples were collected from 47 patients in total.

Measurements

The independent variable in this study was parity and marital age, while the dependent variable was the incidence of cervical cancer. Parity has four measurement results: nulliparity, primiparity, multiparity, and great multiparity, which are all measured using an ordinal scale. Marriage age was determined using an ordinal scale, with outcomes ranging from <20 to ≥ 20 years. Cervical cancer is quantified using an ordinal scale, with four types: squamous cell carcinoma keratinizing, squamous cell carcinoma non-keratinizing, adenocarcinoma, and adenosquamous carcinoma. The data was obtained through a total sampling method, utilizing secondary data from the medical records of cancer of the cervix patients at Gunung Jati Hospital Cirebon during 2022 to 2023 who met the inclusion criteria.

Statistical techniques

The research findings are presented in the form of a text table. To demonstrate the association between two variables recorded on an ordinal scale, statistical analysis used univariate and bivariate analysis, as well as the Spearman correlation test. All measurements were automated with IBM SPSS.

Ethical Clearance: This research has ethical approval from the Research Ethics Committee of Gunung Jati Hospital with registration number 023/LAIKETIK/KEPPKRSJ/V/2024.

3. Results

The entire sample approach yielded 47 patients who met the inclusion and exclusion criteria. The patients' features in this study were reported in terms of age the cervical cancer patient, parity, marriage age, and histological type. The data using in this present study was collected from the medical records of cancer of the cervix patients at Gunung Jati Hospital Cirebon during 2022 to 2023.

Table 1. Frequency Distribution of Respondent Characteristics

Variables	Frequency (n)	Percentage (%)
Age		
26 – 35 years old	1	2.1
36 – 45 years old	13	27.7
46 – 55 years old	22	46.8
56 – 65 years old	9	19.1
> 65 years old	2	4.3
Parity		
Nulliparity	1	2.1
Primiparity	6	12.8
Multiparity	33	70.2
Grand multiparity	7	14.9
Marriage Age		
< 20 years	33	70.2
≥ 20 years	14	29.8
Histological Type of Cervical Cancer		
<i>Squamous Cell Carcinoma Keratinizing</i>	23	48.9
<i>Squamous Cell Carcinoma Non-Keratinizing</i>	16	34.1
<i>Adenocarcinoma</i>	7	14.9
<i>Adenosquamous carcinoma</i>	1	2.1
Total	47	100.0

Table 1 showed that out of the 47 cancer of the cervix patients at Gunung Jati Hospital in Cirebon from 2022 to 2023, 1 patient (2.1%) was aged 26-35 years, 13 patients (27.7%) were aged 36-45 years, 22 patients (46.8%) were aged 46-55 years, 9 patients (14.9%) were aged 56-65 years, and 2 patients (4.3%) were aged over 65 years. Among 47 cervical cancer patients, 1 patient (2.1%) had nulliparity, 6 patients (12.8%) had primiparity, 33 patients (70.2%) had multiparity, and 7 patients (14.9%) had grand multiparity. Regarding the age of marriage, 33 patients (70.2%) were married at an age younger than 20 years, while 14 patients (29.8%) were married at 20 years or older. The following features of cervical cancer patients identified with histological types: There were 23 patients (48.9%) with squamous cell carcinoma keratinizing, 16 (34.0%) with squamous cell carcinoma non-keratinizing, 7 (14.9%) with adenocarcinoma, and 1 (2.1%) with adenosquamous carcinoma.

Table 2. Cross-tabulation Between Parity and Marriage age with Cervical Cancer

	Histological Type of Cervical Cancer				Total	p-value	
	Keratinizing SCC	Non-Keratinizing SCC	Adeno-carcinoma	Adeno squamous Carcinoma			
Parity							
Nulliparity	N	1	0	0	1	0.450	
	%	2.1	0.0	0.0	2.1		
Primiparity	N	3	0	2	6		
	%	6.4	0.0	4.3	12.8		
Multiparity	N	15	13	5	33		
	%	31.9	27.7	10.6	70.2		
Grand multiparity	N	4	3	0	7		
	%	8.5	6.4	0.0	14.9		
Marriage Age							
< 20 years	N	19	12	2	33		0.010
	%	40.4	25.6	4.3	70.3		
≥ 20 years	N	4	4	5	14		
	%	8.5	8.5	10.6	29.7		
Total	N	23	16	7	47		
	%	48.9	34.1	14.9	100.0		

Based on Table 2, the bivariate Spearman correlation test indicated that there was no relationship among parity and the incidence of cancer of the cervix p -value 0.450 ($p > 0.05$) and there is correlation between marriage age and the incidence of cancer of the cervix p -value 0.010 ($p < 0.05$).

4. Discussion

Based on the findings, the majority of the 47 patients with cervical cancer at Gunung Jati Hospital in Cirebon City were multiparous, accounting for 33 (70.2%) of the total, which indicated that most of the cervical cancer patients, 22 patients (46.8%), were aged 46-55 years. Additionally, 23 patients (48.9%) were diagnosed with *squamous cell carcinoma keratinizing*, and 16 patients (34.0%) were diagnosed with *squamous cell carcinoma non-keratinizing*. Parity refers to the number of births a woman has experienced, which can influence the risk of cervical cancer, as more deliveries may increase the cervix's exposure to hormonal changes and infections associated with cancer risk. In several studies, parity is connected with the incidence of cancer of the cervix. The basic mechanisms that connect include trauma to the cervix during labor, hormonal changes due to pregnancy, and a suspected decrease in immunity during pregnancy (Musfirah, 2018). However, parity is not the leading cause of cervical cancer. Another factor that can cause cancer of the cervix is the occurrence of HPV (Human Papilloma Virus) infection transferred during sexual intercourse, infection by the HPV virus causes abnormal changes in cervical cells, a condition called CIN (Cervical Intraepithelial Neoplasia), which can develop into

cervical cancer (Wasiah, 2019). In this study, cervical cancer also occurred in women with low parity, and this can be caused by other risk factors such as sexual behavior, family history of cancer, use of hormonal contraception, and smoking.

In this study confirmed no correlation among parity and the incidence of cancer of the cervix p -value 0.450 ($p>0.05$). This is because other risk factors may influence the occurrence of cancer of the cervix, such as the use of contraception, which can effectively regulate the spacing between births, thus the number of parities is not related to the incidence of cancer of the cervix (Wasiah, 2019). The use of hormonal contraceptives can also be one of the risks of cervical cancer because the hormones progestin and estrogen contained in hormonal contraceptives can increase the occurrence of cancer of the cervix. In addition, these hormones can directly affect cervical cells, help integration and stimulate transcription of HPV DNA to the host genome so that cell proliferation will increase (Amelia et al., 2022). This finding further emphasized the need for continued research into the specific roles of hormonal contraceptives and HPV in cervical cancer development.

The findings of this study are supported by the results of studies from Manopo et al. in 2016, which found no link between parity and cervical cancer. The lack of this relationship in this study is most likely attributable to other risk factors such as a family history of cervical cancer, smoking habits, and immunosuppression (Manoppo, 2016). The risk of cervical cancer increases two to three times more in patients who have family members who have had cervical cancer, and this is due to the inability of the immune system to fight genetically inherited HPV infection. Furthermore, smoking increases the risk of cancer of the cervix because it exposes smokers and those around them to various cancer-causing substances that damage organs other than the lungs. Cigarette smoke contains carcinogens that can damage the DNA of cervical cells, contributing to the development of cancer of the cervix. Smoking can also weaken the immune system, making the body less efficient at fighting HPV infection (Lismaniar et al., 2021).

Based on the findings, it is understood that among the 47 patients who had suffered cervical cancer at Gunung Jati Hospital, Cirebon City, most of the 33 (70.2%) patients were married at a young age < 20 years old. According to BKKBN, a young marriage is carried out under the age of 20. Moreover, the ideal age of marriage for women is 20-35 years (Sekarayu & Nurwati, 2021). Generally, the reproductive organs are mature and ready to be fertilized at 20 years and above. Cervical cancer risk increases in young marriages or for the first time at the age of 15-20 years (Dewi et al., 2023). At a young age, the cells of the female cervical mucosa are immature, making them more vulnerable and sensitive to carcinogenic stimuli. The rapidly growing cells are due to the process of squamous cell metaplasia in the transformation zone during the young adult period, which is very high and is exacerbated by the entry of foreign substances such as sperm so that the risk of atypical squamous transformation increases, which eventually becomes cervical intraepithelial neoplasia (CIN) (Amelia et al., 2022). This risk factor is also linked to carcinogens in the transition zone, which is still in the process of development and will become dangerous when exposed to HPV within 5 to 10 years after menarche (Lismaniar et al., 2021).

The findings of this study confirmed a correlation among marriage age and the incidence of cancer of the cervix p -value 0.010 ($p<0.05$). Cervical cancer is due to the process of squamous cell metaplasia in the transformation zone during adolescence or young adulthood is very high so that the risk of atypical squamous transformation increases until CIN (cervical intraepithelial neoplasia) occurs as a precursor lesion of invasive cervical cancer (Amelia et al., 2022). In Firdayanti's research in 2023, which showed an association between age at marriage and the incidence of carcinoma cervix, because immature cervical mucus in young women so that it will be more sensitive to external stimuli, including chemicals carried by sperm during sexual intercourse (Purnami et al., 2022).

Women who marry at the age of < 20 years will be at four times the risk compared to women aged \geq 20 years. An immature cervix will be more easily infected than a mature cervix. Trauma to the cervix can occur more often because the cervix is still vulnerable to stimulation, exposure to sperm, or substances carried by sperm. Immature mucosal cells will also easily change their nature to become cancerous (Zeta et al., 2023). Cell abnormalities that lead to cancer of the cervix do not occur in just a short time but take 10 to 20 years. As a result, it is recommended that adolescents postpone marriage and/or sexual activity until the optimal age of 20 years and receive HPV vaccine to lower the risk of cancer of the cervix. Early identification of cancer of the cervix is crucial in women who have been sexually active since a young age (Lismaniar et al., 2021).

This result underscores the critical need for public health interventions aimed at delaying early marriages and promoting reproductive health education, particularly in regions where early marriages are common. The implications of this finding are significant, as early marriages not only increase the risk of cancer of the cervix but also contribute to a range of social and health issues, including maternal and child health complications, gender inequality, and limited access to education and economic opportunities. The importance of education and awareness campaigns targeted at adolescent girls cannot be overstated in reducing the incidence of cervical cancer and improving overall public health outcomes.

Moreover, the study's results have the potential to influence future research directions. Further studies should explore the interaction between various risk factors, including hormonal contraceptive use, HPV infection, and family history of cancer, to better understand their combined impact on cervical cancer incidence. Additionally, longitudinal studies that follow individuals over time would provide more detailed insights into the long-term effects of early marriage, parity, and contraceptive use on cervical cancer development.

Limitation

Several limitations should be considered when evaluating the findings of this study. To begin, there were constraints to the completeness of the medical records throughout data collection, resulting in just 49 samples matching the inclusion criteria. Second, this study was only conducted in Gunung Jati General Hospital in Cirebon City from 2022 to 2023, with a total of 47 samples, therefore the findings are insufficient to reflect the complete population of cervical cancer patients in West Java. Finally, the variables covered in this study are limited. Therefore, more research is needed to explore the variables that have not previously been studied.

This study could also serve as a foundation for further in-depth research to explore other risk factors that may not have been identified in this study, such as HPV infection, sexual behavior, use of hormonal contraception, family history, and smoking, which may have played a more significant role and how the interaction between these factors could have contributed to the incidence of cancer of the cervix.

5. Conclusion

Based on the previous data and discussion, it is possible to conclude that the majority of patients having cancer of the cervix patients are multiparous and marry at a young age, particularly before the age of 20. The study also found that there is no relationship among parity and the risk of cancer of the cervix. However, there was meaningful link among marital age and cancer of the cervix occurrence among patients at Gunung Jati Hospital in Cirebon City. Based on these findings, it is critical to develop health education initiatives for the prevention of cervical cancer. Future study can be conducted again using new methodology or a larger sample size in order to acquire generalizable research results.

Conflict of Interest

The authors declare no conflicts of interest for the results.

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