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SEXUAL BEHAVIOR AND RISK OF CERVICAL CANCER AMONG WOMEN UNDER-40: A CROSS-SECTIONAL STUDY IN MEDAN, INDONESIA

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ABSTRACT

Background: Cervical cancer remains a major health problem in Indonesia, ranking as the third leading cause of cancer-related deaths. While typically affecting older women, a considerable number of cases occur in women under 40 years of age, raising concern about early-onset disease and its contributing factors.

Methods: This cross-sectional study aims to identify sexual behavior–related risk factors associated with cervical cancer in women under 40 years old. The sample of this study was cervical cancer patients diagnosed at RSUP H. Adam Malik Medan in 2024. Purposive sampling was applied based on inclusion criteria, and data were extracted from medical records. Chi-square tests and logistic regression were used to assess associations.

Results: A significant association was found between early initiation of sexual activity or marriage (χ^2=12.86; p=0.001; aOR=6.6) and having multiple sexual partners (χ^2=5.45; p=0.009; aOR=4.0) with cervical cancer in women under 40. No significant relationship was observed with parity, oral contraceptive use, smoking, history of sexually transmitted infections, or immune disorders.

Conclusion: Early initiation of sexual activity and multiple sexual partners are key risk factors for cervical cancer in women under 40 years among cervical cancer patients diagnosed at RSUP H. Adam Malik Medan included in this study, with early sexual debut emerging as the strongest predictor. These findings highlight the importance of sexual health education and early preventive strategies to reduce the burden of cervical cancer among young women.

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INTRODUCTION

Cervical cancer remains a major global health concern, ranking as the fourth most common cancer among women worldwide, with an estimated 604,000 new cases and 342,000 deaths reported in 2020 [1]. Persistent infection with high-risk types of human papillomavirus (HPV), transmitted primarily through sexual contact, is the established cause of the disease [2]. Despite being largely preventable through HPV vaccination and screening, cervical cancer continues to disproportionately affect women in low- and middle-income countries (LMICs), where access to preventive and diagnostic services is often limited [3,4].

In Indonesia, cervical cancer ranks as the third leading cause of cancer-related deaths among women, with an estimated 36,000 new cases and more than 20,000 deaths annually [5]. Delayed diagnosis remains a major challenge, as the disease frequently progresses without symptoms in its early stages [6]. In North Sumatra Province, 283 cases were reported in 2018 [7], while hospital-based data from RSUP H. Adam Malik Medan recorded 594 cases in 2022 and 508 cases in 2023. Notably, a substantial proportion occurred in women under 40 years of age—84 cases in 2022 and 83 in 2023—indicating a shift toward earlier onset compared to the typical age distribution of cervical cancer [hospital data].

Several reproductive and behavioral factors have been associated with the development of cervical cancer, including early age at sexual debut, multiple sexual partners, multiparity, smoking, and long-term use of hormonal contraceptives [8–11]. While these risk factors are well documented globally, evidence specific to younger women in Indonesia remains limited [12]. Identifying which factors are most influential in this age group is crucial for guiding prevention strategies and tailoring public health interventions.

In response to the global burden, the World Health Organization (WHO) introduced the 90-70-90 strategy, which aims by 2030 to achieve 90% HPV vaccination coverage among girls, 70% screening coverage for women, and 90% access to appropriate treatment for cervical disease [13]. However, the persistence of cervical cancer cases among younger women highlights the need for further research into modifiable risk factors. This study therefore aims to analyze sexual behavior–related risk factors associated with cervical cancer in women under 40 years of age at RSUP H. Adam Malik Medan.

METHOD

Study Design and Setting

This study used a quantitative cross-sectional design and was conducted at RSUP H. Adam Malik Medan, North Sumatra, between July 2024 and February 2025.

Study Population and Sampling

The study population included all cervical cancer patients aged ≤40 years who received inpatient or outpatient care at RSUP H. Adam Malik in 2024. Records that were incomplete, damaged, or illegible were excluded. A total of 85 patients met the inclusion criteria and were included in the analysis.

Data Collection

Data were obtained from secondary sources through patient medical records. Information on sociodemographic characteristics and sexual behavior–related risk factors was extracted for analysis.

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Data Analysis

Descriptive statistics were used to summarize patient characteristics and study variables. Bivariate analysis was performed using chi-square tests to examine associations between independent variables and cervical cancer. Variables with significant associations were then analyzed using logistic regression to identify the most influential risk factors. All analyses were conducted using SPSS software.

Ethical Considerations

This study was approved by the Ethics Committee of the University of North Sumatra (No. 1315/KEPK/USU/2024).

RESULTS

Table 1 shows the characteristics of 85 cervical cancer patients. About half of the cases were diagnosed at ≤40 years (50.6%), and the remainder at >40 years (49.4%). Most patients had middle-level education (50.6%), while 37.6% had low education, and 11.8% high education. The majority were unemployed (74.1%).

At diagnosis, most cases were found at an advanced stage, particularly stage III (44.7%), followed by stage I (25.9%), stage IV (15.3%), and stage II (14.1%). Nearly half of the patients (48.2%) began sexual activity at ≤20 years of age, and 41.2% reported having more than one sexual partner.

In terms of reproductive history, 55.3% had three or more births. Oral contraceptive use for ≥5 years was found in 51.8% of cases. Regarding behavioral and medical risk factors, 20% were smokers, 18.8% had a history of sexually transmitted infections (STIs), and 2.4% had immune disorders such as HIV.

Table 1. Characteristics of Cervical Cancer Patients (n = 85)

Characteristic	n	%
Age at diagnosis		
≤ 40 years	43	50.6
> 40 years	42	49.4
Education		
Low	32	37.6
Middle	43	50.6
High	10	11.8
Employment		
Unemployed	63	74.1
Employed	22	25.9
Cancer stage		
I	22	25.9
II	12	14.1
III	38	44.7
IV	13	15.3
Age at first sexual activity		
≤ 20 years	41	48.2
> 20 years	44	51.8
Number of partners		
> 1	35	41.2
1	50	58.8
Parity		
≥ 3 births	47	55.3

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< 3 births	38	44.7
Oral contraceptive use		
≥ 5 years	44	51.8
< 5 years	41	48.2
Smoking		
Yes	17	20.0
No	68	80.0
History of STIs		
Yes	16	18.8
No	69	81.2
HIV status		
Positive	2	2.4
Negative	83	97.6

Next, the further analysis (Table 2) revealed significant associations between sexual behavior–related factors and the incidence of cervical cancer in women under 40 years of age. Women who had their first sexual activity at ≤20 years were more likely to be diagnosed before the age of 40 compared to those whose first sexual activity occurred after 20 years (67.4% vs. 28.6%, χ^2=12.86, p<0.01). Similarly, having more than one sexual partner was significantly associated with a higher proportion of cases in women under 40 (53.5% vs. 28.6%, χ^2=5.45, p=0.02).

In contrast, no statistically significant associations were observed for parity (χ^2=1.47, p=0.23), long-term oral contraceptive use (χ^2=2.00, p=0.16), smoking behavior (χ^2=1.69, p=0.19), history of sexually transmitted infections (χ^2=1.12, p=0.29), or HIV status (χ^2=2.00, p=0.16).

Overall, the findings suggest that early initiation of sexual activity and having multiple sexual partners are key risk factors associated with cervical cancer in women under 40 years, whereas other reproductive and lifestyle factors were not significantly related in this study population.

Table 2. Association of Risk Factors with Age at Diagnosis of Cervical Cancer

Variable	Total n (%)	≤40 years n (%)	>40 years n (%)	χ^2	p-value
Age at first sexual activity					
≤ 20 years	41 (48.2)	29 (67.4)	12 (28.6)	12.86	<0.01
> 20 years	44 (51.8)	14 (32.6)	30 (71.4)		
Number of sexual partners					
> 1	35 (41.2)	23 (53.5)	12 (28.6)	5.45	0.02
1	50 (58.8)	20 (46.5)	30 (71.4)		
Parity					
≥ 3 births	47 (55.3)	21 (48.8)	26 (61.9)	1.47	0.23
< 3 births	38 (44.7)	22 (51.2)	16 (38.1)		
Oral contraceptive use					
≥ 5 years	44 (51.8)	19 (44.2)	25 (59.5)	2.00	0.16
< 5 years	41 (48.2)	24 (55.8)	17 (40.5)		
History of STIs					
Yes	16 (18.8)	10 (23.3)	6 (14.3)	1.12	0.29
No	69 (81.2)	33 (76.7)	36 (85.7)		
Smoking					
Yes	17 (20.0)	11 (25.6)	6 (14.3)	1.69	0.19
No	68 (80.0)	32 (74.4)	36 (85.7)		
HIV status					
Positive	2 (2.4)	2 (4.7)	0 (0)	2.00	0.16
Negative	83 (97.6)	41 (95.3)	42 (100)		

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Furthermore, a multivariate logistic regression analysis (Table 3) identified two independent risk factors for cervical cancer diagnosis at ≤40 years of age. Women whose first sexual activity occurred at ≤20 years had a significantly higher risk of early-onset cervical cancer compared to those with a later sexual debut (aOR = 6.6; 95% CI: 2.38–18.22; p = 0.001). Likewise, having more than one sexual partner was associated with increased odds of early diagnosis (aOR = 4.0; 95% CI: 1.41–11.24; p = 0.009). Among these, early age at first sexual activity was the strongest predictor of cervical cancer diagnosis before the age of 40.

Table 3. Multivariate Logistic Regression of Risk Factors for Cervical Cancer Diagnosis at ≤40 Years

	aOR	95% CI	p-value
Age at first sexual activity ≤20 years	6.6	2.38 – 18.22	0.001
>1 sexual partner	4.0	1.41 – 11.24	0.009

DISCUSSION

This study examined sexual behavior–related risk factors for cervical cancer among women diagnosed at or before the age of 40 in Medan, Indonesia. Our findings highlight two key determinants: early initiation of sexual activity (≤20 years) and having multiple sexual partners, both of which were significantly associated with a higher likelihood of early-onset cervical cancer. These associations remained robust in multivariate analysis, with early sexual debut emerging as the strongest independent predictor.

The role of early sexual debut in cervical carcinogenesis has been consistently demonstrated in previous studies [14,15]. Early exposure to sexual activity increases the likelihood of human papillomavirus (HPV) infection at a younger age, when cervical epithelial cells, particularly in the transformation zone, are more susceptible to oncogenic changes [14,16]. Similar findings have been reported by previous studies [16,17,18] conducted in other countries, where initiation of sexual activity at or before 20 years substantially increased cervical cancer risk. Our results reinforce this evidence, suggesting that delayed sexual debut could be a key protective factor, particularly in populations with high HPV prevalence and limited screening coverage.

Having multiple sexual partners also showed a significant association with cervical cancer diagnosed before age 40. This aligns with global evidence linking partner multiplicity to persistent HPV infection and higher exposure to high-risk HPV types [19]. Interestingly, in our study, the strength of association for multiple partners (aOR 4.0) was somewhat lower than that for early sexual debut (aOR 6.6), suggesting that while both are important, early initiation of sexual activity may play a more dominant role in driving early-onset cases.

Other reproductive and behavioral factors, such as multiparity [20,21], long-term oral contraceptive use [22], smoking [23], STI history including HIV infection [24], did not show significant associations in this study. These null findings may be explained by several factors. First, the relatively small sample size could have limited the statistical power to detect associations for less prevalent exposures, such as HIV infection (2.4%) or STIs (18.8%). Second, it is possible that the contribution of these factors is more relevant in the progression and severity of cervical cancer rather than the timing of diagnosis. For instance, multiparity and long-term hormonal contraceptive use have been consistently associated with cervical cancer risk in general populations, but their effect on age of onset may be less direct.

The high proportion of women diagnosed at advanced stages (particularly stage III) is a notable finding, reflecting delayed detection and limited access to effective screening in our setting. This pattern is consistent with reports from other low- and middle-income countries (LMICs) [25,26], where Pap smear and HPV DNA testing coverage remains suboptimal. Early identification of high-risk women, especially

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those with early sexual debut and multiple sexual partners, could inform targeted prevention strategies, including HPV vaccination, health education, and improved access to screening services.

This study contributes to the growing body of evidence that sexual behavior plays a crucial role in determining the risk of cervical cancer at a younger age [27]. Importantly, the findings underscore the need for strengthening primary prevention strategies in Indonesia, including comprehensive sexual and reproductive health education, HPV vaccination for adolescents, and interventions to delay sexual debut. Moreover, awareness campaigns highlighting the risks of multiple sexual partners may help reduce exposure to oncogenic HPV strains.

LIMITATIONS

Several limitations should be acknowledged. The cross-sectional design precludes causal inference, and self-reported data on sexual behavior may be subject to recall or social desirability bias. The single-center setting and modest sample size also limit generalizability to other populations. Despite these limitations, the study provides important insights into modifiable behavioral risk factors associated with early-onset cervical cancer in Indonesian women.

CONCLUSION

In conclusion, early initiation of sexual activity and having multiple sexual partners were the main risk factors associated with cervical cancer diagnosis before age 40 in this study. These findings emphasize the importance of preventive interventions focusing on sexual and reproductive health behaviors, alongside efforts to expand HPV vaccination and screening programs, to reduce the burden of cervical cancer among young women in Indonesia.

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