Research Article

Risk Factor Analysis in Young Adult Patients with Cervical Cancer

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Abstract

Objective: To identify risk factors associated with cervical cancer and determine the strongest predictors among young adults at Prof. Dr. R.D. Kandou General Hospital.

Methods: This study employed an analytical case–control design. Sampling was performed using a total sampling method, including all cervical cancer patients aged <45 years treated at Prof. Dr. R.D. Kandou General Hospital from January 2022 to June 2023. The independent variables included educational level, occupation, nutritional status, age at first sexual intercourse, multiple sexual partners, type of contraception, and parity. Associations between variables were analyzed statistically.

Results: A total of 210 participants were included, comprising 105 cases and 105 controls. The most common age group was 30–39 years (51%). The predominant histopathological type was squamous cell carcinoma (82%), and most cases were diagnosed at stage IIB–IIIC1r (73%). Educational level (p=0.318) and occupation (p=0.972) were not significantly associated with cervical cancer in young adults. In contrast, normal nutritional status (p<0.001), age at first sexual intercourse ≤18 years (p<0.001), multiple sexual partners (p<0.001), use of hormonal contraception (p<0.001), and multiparity (p<0.001) were significantly associated with cervical cancer in young adults.

Conclusions: Early age at first sexual intercourse (≤18 years), multiple sexual partners, use of hormonal contraception, and multiparity are significant risk factors for cervical cancer in young adults.

Keywords: cervical cancer, risk factor, young adult.

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INTRODUCTION

Cervical cancer remains a major global health problem and is one of the leading causes of cancer-related morbidity and mortality among women, particularly in developing countries[1]. Despite advances in screening and vaccination programs, the burden of cervical cancer remains high due to limited access to early detection and preventive services.[2,3] Persistent infection with high-risk Human Papillomavirus (HPV) is recognized as the primary cause of cervical cancer; however, several behavioral, reproductive, and socioeconomic factors also contribute to disease development.[4,5]

In recent years, an increasing number of cervical cancer cases have been reported among younger women.[6] This trend raises concern, as cervical cancer in young adults may present with more aggressive characteristics and affect fertility and long-term quality of life. Several risk factors have been identified, including early age at first sexual intercourse[7-10], multiple sexual partners[4,5,11], high parity[12,13], and prolonged use of hormonal contraception[14,15]. Additionally, socioeconomic factors such as education and occupation, as well as nutritional status, may influence both the risk of cervical cancer and access to preventive healthcare services.[16-18]

However, findings across studies remain inconsistent, and limited data specifically address young adult populations, particularly in Indonesia[19]. Therefore, this study aimed to identify risk factors associated with cervical

cancer in young adult women and determine the strongest predictors at Prof. Dr. R.D. Kandou General Hospital.

METHODS

This study employed an analytical case–control design conducted at Prof. Dr. R.D. Kandou General Hospital, Manado. Data were collected from medical records of patients between January 2022 and June 2023. Total sampling was applied, including all young adult women diagnosed with cervical cancer, along with an equal number of controls without cervical cancer. Independent variables included educational level, occupation, age at first sexual intercourse, multiple sexual partners, parity, contraceptive method, and nutritional status. The dependent variable was cervical cancer. Data were analyzed using the chi-square test, followed by binary logistic regression to determine the strongest predictors. A p-value <0.05 was considered statistically significant.

RESULTS

The study included 210 participants, consisting of 105 cases and 105 controls. Most cervical cancer patients were aged 30–39 years (51%). The predominant histopathological type was squamous cell carcinoma (82%), and the majority of patients were diagnosed at advanced stages (IIB–IIIC1R, 73%).

Table 1. Characteristics of Cervical Cancer Patients Based on Age Distribution, Histopathological Type, and Stage (n=105)

Variable	n	(%)
Age (years)		
20-29	9	8
30-39	53	51
40-44	43	41
Histopathological Type		
Squamous Cell	86	(82)
Adenokarsinoma	19	(18)
Stadium		
IA1 to IIA2	11	(11)
II B to IIIC1R	77	(73)
IVA to IV B	17	(16)

Table 1 shows that cervical cancer cases were most frequently observed in women aged 30–39 years (51%), followed by those aged 40–44 years (41%) and 20–29 years (8%). Squamous cell carcinoma was the most common histopathological type (82%), while adenocarcinoma accounted for 18% of cases. Most patients were diagnosed at stages IIB–IIIC1R (73%), followed by stages IVA–IVB (16%), and stages IA1–IIA2 (11%). Bivariate analysis was performed using the chi-square test to evaluate factors associated with cervical cancer. A p-value of <0.05 was considered statistically significant.

Table 2. Relationship between Variables and the Occurrence of Cervical Cancer in Young Adults

Variable	Case		Control		*P-value*
	n	%	n	%	
Education					
Not completed elementary school	1	100	0	0	0.318
Elementary School	11	73.3	4	26.7	
Junior High School	14	45.2	17	54.8	
Senior High School	56	48.3	60	51.7	
Bachelor's degree	23	48.9	24	51.1	
Occupation					
Housewife	77	50.3	76	49.7	0.972
Civil servant	15	48.4	16	51.6	
Employee	10	52.6	9	47.4	
Others	3	42.9	4	57.1	
Body Mass Index					
Underweight	7	53.8	6	46.2	<0.001*
Normal	66	62.3	40	37.7	
Overweight	29	48.3	31	51.7	
Obesity	3	9.7	28	90.3	
Ages at first sexual intercourse					
≤ 18	42	72.4	16	27.6	<0.001*
> 18	63	41.4	89	58.6	

Having Multiple Sexual Partners					
Yes	52	75.4	17	24.6	<0.001*
No	53	37.6	88	62.4	
Contraception					
Hormonal	79	60.8	51	39.2	<0.001*
Non-Hormonal	7	36.8	12	63.2	
No Contraception	19	31.1	42	68.9	
Number of parity					
0	3	9.7	28	90.3	<0.001*
1 to 4	97	56.7	74	43.3	
≥5	5	62.5	3	37.5	

As shown in Table 2, education level (p=0.318) and occupation (p=0.972) were not significantly associated with cervical cancer in young adults. This indicates that the risk of cervical cancer is relatively similar regardless of educational attainment or occupation.

In contrast, body mass index (BMI) was significantly associated with cervical cancer (p<0.001). Women with normal and underweight BMI had a higher proportion of cervical cancer compared to those who were overweight or obese.

Age at first sexual intercourse was also significantly associated with cervical cancer (p<0.001). Women who had their first sexual intercourse at ≤18 years had a higher proportion of cervical cancer cases compared to those with first intercourse at >18 years. Similarly, having multiple sexual partners was significantly associated with cervical cancer (p<0.001). Women with multiple sexual partners had a higher proportion of cervical cancer compared to those with a single partner.

Contraceptive use was also significantly associated with cervical cancer (p<0.001). Women using hormonal contraception showed a higher proportion of cervical cancer compared to those using non-hormonal methods or no contraception. Parity was another significant factor (p<0.001). Women with parity ≥1 had a higher proportion of cervical cancer compared to nulliparous women.

Table 3. Association of the Relation between Research Variables

Variable	Case	Control	*P-value*	OR (95% CI)
Body Mass Index			<0.001*	
Underweight	7	6		
Normal	66	40	0.558	1.41 (0,44-4.51)
Overweight	29	31	0.719	0.81 (0.24 -2.67)
Obesity	3	28	0.004*	0.09 (0.02-0.46)
Ages at first sexual intercourse			<0.001*	
≤ 18	42	16	<0.001*	3.71 (1.92-7.18)
> 18	63	89		
Having Multiple Sexual Partners			<0.001*	
Yes	52	17	<0.001*	5.08 (2.67-9.68)
No	53	88		
Contraception			<0.001*	
Hormonal	79	51	0.000	3.42 (1.79-6.53)
Non-Hormonal	7	12	0.644	1.29 (0.44-3.79)
Number of Parity			<0.001*	
0	3	28		
1 to 4	97	74	<0.001*	12.23 (3.58-41.79)
≥5	5	3	0.004*	15.56 (2.42-100.11)

Multivariate analysis using binary logistic regression demonstrated that body mass index, age at first sexual intercourse, multiple sexual partners, contraceptive method, and parity were significantly associated with cervical cancer (all $p<0.05$).

Women who had their first sexual intercourse at ≤18 years had a 3.71-fold higher risk of cervical cancer (OR=3.71; 95% CI: 1.92–7.18). Those with multiple sexual partners had a 5.08-fold increased risk (OR=5.08; 95% CI: 2.67–9.68). Hormonal contraceptive use was associated with a 3.42-fold higher risk (OR=3.42; 95% CI: 1.79–6.53).

Parity showed the strongest association, with women having parity 1–4 and ≥5 demonstrating a 12.23-fold (OR=12.23; 95% CI: 3.58–41.79) and 15.56-fold (OR=15.56; 95% CI: 2.42–100.11) increased risk, respectively, compared to nulliparous women.

DISCUSSION

In this research finding, squamous cell histopathology was the most common type found in the samples. These results are consistent, where the most frequently encountered histopathology in young cervical cancer was squamous cell, followed by adenocarcinoma. However, adenocarcinoma is more commonly found in the young age group compared to other age groups.[1]

In this study, a significant portion of cervical cancer patients were diagnosed at an advanced stage. These findings are relatively consistent with a previous study conducted in Pontianak, which reported that 45.36% of cervical cancer patients presented to the hospital at stage IIIB. This data indicates that the screening program has not been implemented effectively, as most cervical cancer patients are being detected at an advanced stage. These results are similar to the characteristics found in other developing countries. A study in Ethiopia showed that only a small proportion of patients were diagnosed at an early stage, while over half of the sample was diagnosed at stages II through IV.[3] Based on the increasing incidence of cervical cancer being found at a young age, early and routine screening and vaccination against Human Papilloma virus (HPV) will be very important keys in preventing cervical cancer.

In this study, squamous cell carcinoma was the most common histopathological type observed. This finding is consistent with previous studies reporting that squamous cell carcinoma predominates in young cervical cancer patients, followed by adenocarcinoma, although adenocarcinoma tends to be relatively more frequent in younger age groups.[1]

A large proportion of patients in this study were diagnosed at an advanced stage. This is in line with findings from a study in Pontianak, where 45.36% of cervical cancer patients presented at stage IIIB, indicating suboptimal implementation of screening programs. Similar patterns are observed in other developing countries; for instance, a study in Ethiopia reported that more than half of patients were diagnosed at stages II–IV.[3] These findings highlight the importance of early detection through routine screening and HPV vaccination, especially among young women.

Education and Occupation

This study found no significant association between education level or occupation and cervical cancer incidence in young adults. Although higher education is generally associated with better health awareness, other factors such as socioeconomic status, cultural beliefs, stigma, and access to healthcare services may play a more substantial role in influencing screening behavior.[4,5]

Most patients in this study were homemakers, which may reflect limited financial independence and reduced access to healthcare. Previous studies suggest that women with stable income are more likely to utilize preventive services such as screening and HPV vaccination.[6,7] However, occupation itself was not a significant determinant, indicating that broader social factors may be more influential.

Nutritional Status

This study demonstrated a significant association between BMI and cervical cancer; however, the pattern observed differs from some previous studies. Most patients had normal or underweight BMI. Existing literature shows inconsistent findings regarding the relationship between BMI and cervical cancer risk.[8] One possible explanation is that BMI measured at the time of diagnosis may not reflect pre-disease nutritional status, as weight loss commonly occurs in advanced cancer. Therefore, caution is needed when interpreting BMI as a risk factor, and longitudinal assessment

of nutritional status may provide more accurate insights.

Age at First Sexual Intercourse

Age at first sexual intercourse was significantly associated with cervical cancer in this study. Women who initiated sexual activity at ≤18 years had a substantially higher risk of developing cervical cancer. This may be explained by the biological vulnerability of the cervix during adolescence, when the transformation zone contains immature epithelial cells that are more susceptible to HPV infection.[10-12] Additionally, early sexual debut is often associated with prolonged exposure to HPV and other co-factors. Sociocultural practices such as early marriage may further contribute to this risk.[13,14] These findings reinforce the importance of sexual health education and delaying the onset of sexual activity as preventive strategies.

Multiple Sexual Partners

Having multiple sexual partners was found to be a significant risk factor for cervical cancer. This is consistent with findings from the International Agency for Research on Cancer, which demonstrated a strong association between multiple sexual partners and increased risk of HPV infection and cervical neoplasia.[15] Multiple sexual partners may increase exposure to HPV and disrupt normal vaginal microbiota, thereby impairing viral clearance and promoting carcinogenesis.[16,17] This highlights the importance of behavioral interventions and public health education in reducing HPV transmission.

Contraceptive Use

Hormonal contraceptive use was significantly associated with cervical cancer in this study. Long-term exposure to steroid hormones is believed to influence cervical carcinogenesis through increased expression of oncogenes such as E6 and E7, leading to disruption of tumor suppressor pathways.[18] Previous studies have also shown that prolonged use of hormonal contraception (particularly >5 years) is associated with increased cervical cancer risk.[19] In contrast, non-hormonal contraceptive methods did not show a significant association, suggesting that hormonal exposure may play a key role.

Parity

Parity was identified as the strongest risk factor in this study, with the highest odds ratio observed among all variables. Women with higher parity had a significantly increased risk of cervical cancer. This association may be explained by repeated cervical trauma during childbirth, hormonal changes during pregnancy, and increased susceptibility to HPV persistence.[20,21] Additionally, physiological changes in the transformation zone during pregnancy may contribute to malignant transformation. These findings are consistent with previous studies demonstrating a positive correlation between high parity and cervical cancer risk.

CONCLUSION

Based on the findings of this study, early age at first sexual intercourse (≤18 years), multiple sexual partners, use of hormonal contraception, and multiparity are significant risk factors for cervical cancer in young adults. Among these, multiparity was identified as the most fluential factor.

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