Literature Review: Early-Age Sexual Activity as a Risk Factor for Cervical Cancer

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Abstract

Cervical cancer is one of the most common cancers in women and is largely caused by Human Papillomavirus (HPV) infection, particularly the oncogenic types 16 and 18. This literature review analyzes nine articles related to cervical cancer risk factors, with a focus on early-age sexual activity. Key data exploration was carried out using the PICO technique (Population, Intervention, Compare, Outcome). The analysis results show that first sexual intercourse before the age of 20 and early marriage are dominant risk factors. This literature affirms that preventing HPV infection through vaccination, sexual education, and increased awareness of hygiene are important strategies for reducing the risk of cervical cancer.

Introduction

Sexual lifestyle among young people continues to be a concerning phenomenon in Indonesia. Based on the 2022 IDHS, around 2% of women and 7% of men aged 15–24 reported having had sexual intercourse before marriage, reflecting the presence of risky sexual behavior among adolescents. Furthermore, the majority of them had their first sexual experience between the ages of 15–19 (61% of women and 73% of men). This situation is driven by several factors such as social changes, easy access to information, and increasingly permissive dating norms, making adolescents and young adults more vulnerable to engaging in sexual activities before achieving emotional and social maturity (Sono et al., 2024; Suryoadji et al., 2022).

This early-age sexual behavior often occurs without adequate education, without protection, and is accompanied by a higher risk of multiple sexual partners, thereby increasing vulnerability to sexually transmitted infections, including Human Papillomavirus (HPV), the primary cause of cervical cancer. The risks associated with sexual activity at a young age cannot be ignored. Factors contributing to this behavior include limited knowledge of reproductive health, peer influence, media exposure that normalizes early sexual behavior, weak self-control, and minimal family involvement in sexual education. Adolescents' physical and psychological immaturity in sexual activity makes them more susceptible to negative impacts, ranging from sexually transmitted infections and unintended pregnancies to an increased risk of cervical cancer later in life (Wantini & Indrayani, 2020).

Cervical cancer itself is one of the most deadly cancers for women and is largely caused by HPV infection transmitted through sexual activity. Globally, cervical cancer ranks as the fourth most common cancer among women, while in Indonesia the rate remains high and is the second leading cause of cancer-related deaths after breast cancer. Risk factors such as early-age sexual activity, multiple partners, high parity, smoking habits, long-term hormonal contraceptive use, and low screening participation further worsen the incidence of cervical cancer. Efforts for prevention have been carried out through VIA/Pap smear screening, reproductive health education, and HPV vaccination programs; however, suboptimal coverage has allowed cervical cancer cases to continue rising (Choi et al., 2023). In Indonesia, cervical cancer remains a major public health concern, with an estimated 36,000–37,000 new cases and

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more than 20,000 deaths reported annually, making it the second leading cause of cancer-related mortality among women after breast cancer. Risk factors such as early initiation of sexual activity, multiple sexual partners, high parity, smoking habits, long-term use of hormonal contraceptives, and low participation in screening programs further contribute to the high incidence of cervical cancer. Preventive efforts have been implemented through VIA and Pap smear screening, reproductive health education, and HPV vaccination programs; however, suboptimal coverage of these interventions has allowed cervical cancer cases to continue rising (Choi et al., 2023).

Considering the increasing prevalence of early-age sexual activity and its significant associated risks, particularly toward cervical cancer, the development of this literature review is highly important. This study is expected to provide scientific understanding of the relationship between early-age sexual activity and increased cervical cancer risk, strengthen the urgency of preventive education, and encourage more effective promotive and preventive efforts to protect women's reproductive health. Considering the increasing prevalence of early-age sexual activity over the past five years and its significant associated risks—particularly the heightened risk of cervical cancer—the development of this literature review is highly important. Recent surveys indicate that a substantial proportion of Indonesian adolescents report engaging in sexual activity during mid to late adolescence (with recent data showing around 60% of 16–17-year-olds and a majority of sexually active youth initiating sex between ages 15–19), which represents an observable rise compared with earlier reports that documented much lower rates of premarital sexual activity among young people in the previous decade. This upward trend in early sexual initiation highlights a growing public health concern. This study is expected to provide a scientific understanding of the relationship between early-age sexual activity and increased cervical cancer risk, strengthen the urgency of preventive education, and encourage more effective promotive and preventive efforts to protect women's reproductive health.

Methods

This literature review was compiled using a narrative review approach by examining ten relevant nine relevan research articles related to the association between early-age sexual behavior and cervical cancer risk. Journal identification was conducted in November 2025 through three major databases: PubMed, Google Scholar, and ScienceDirect, using the keywords "early sexual activity", "age of first intercourse", and "cervical cancer". Key data exploration was conducted using the PICO technique (Population, Intervention, Compare, Outcome).

Inclusion criteria included: (1) articles published between 2020–2025; (2) articles written in Indonesian or English; (3) studies with observational designs (cross-sectional, case-control, or cohort) that examined cervical cancer risk factors; and (4) articles that provided data on age at first sexual intercourse, excluding those using literature review methods. Exclusion criteria included articles that did not provide relevant quantitative data or were not fully accessible.

From the search and selection process, nine articles meeting the criteria were obtained, consisting of seven observational studies (Fajila et al., 2025; Has et al., 2020; Iswari et al., 2024; Santoso, 2021; Sulistyawati et al., 2020; Wahyuningtyas et al., 2025; Yuliani et al., 2021), one Mendelian randomization study (Zhou et al., 2024), one analytical study on the Japanese population (Yamaguchi et al., 2021), and Aini et al (2025).

Each article was analyzed using content analysis to identify variables related to sexual behavior and the incidence of cervical cancer confirmed through cytology examinations or medical records. The findings were then compared, classified based on risk themes, and synthesized to draw conclusions regarding the association between early-age sexual activity and increased cervical cancer risk.

Results and Discussion

Table 1. Result

Journal Specification	Research Method	Research Results
Sulistyawati D., Faizah Z., Kurniawati E. – Association Study of Cervical Cancer & Age of Coitarche (2020)	Observational case-control; 39 cases & 39 controls; interviews; Chi-square test.	There is an association between age of coitarche and cervical cancer (p=0.002; OR=6.76). Early coitarche increases risk.
Has E.M.M., Kusumaningrum T., Rahayu R.R.R., et al. – Sexual Activity and Satisfaction in Cervical Cancer Patients (2020)	Correlational study; 76 cervical cancer patients; purposive sampling; Chi-square test.	Most patients (90.8%) were sexually active, 76.32% were satisfied with their sexual life; no significant difference between sexual activity and sexual satisfaction (p=0.346).
Wahyuningtyas I.D., Atika, Amalia R.B. – Analysis of	Cross-sectional; consecutive sampling	Only first sexual intercourse <20 years was significant (p=0.009). Other factors were not significant.

Cervical Cancer Risk Factors (2025)	≥50 patients; Chi-Square & Fisher test.	
Aini, Z., Suseno, M. R., & Anggraeni, N. P. D. (2025). Determinan faktor risiko terjadinya kanker serviks (2025)	Analytical observational; case-control study; 156 respondents; Chi-square & logistic regression.	Significant factors: age at menarche (p=0.022), parity (p=0.000), hormonal contraception use (p=0.000), nutritional status (p=0.000), number of marriages (p=0.000), age at marriage (p=0.000). Dominant factor: age at marriage (Exp B=3).
Zhou Y., Chang M., et al. – Causal effect of AFSI & number of partners on cervical cancer (2024)	Mendelian Randomization (IVW, MR-Egger, Weighted Median, MR-PRESSO).	Lower age at first sexual intercourse → causal effect increasing cervical cancer risk. Number of partners not proven causal.
Santoso E.B. – Age at First Marriage & Cervical Cancer (2021)	Cross-sectional; 64 respondents; Chi-square test.	There is an association between age at first marriage and cervical cancer (p=0.026).
Yuliani D.E., Yuniarti, Jubaidi – Factors Influencing Cervical Cancer (2021)	Mixed-method; 34 cases, 68 controls; in-depth interviews (qualitative).	Significant factors: age, age at marriage, parity, hormonal contraception. Dominant factor: age (OR=8.312).
Fajila N., Rosida L., Listyaningrum T.H. – Relationship Between Age at Marriage & Parity with Cervical Cancer (2025)	Quantitative correlational; cross-sectional; 58 respondents; Chi-square test.	Age at marriage <20 years → 4x higher risk (p=0.025). Parity >3 also associated (p=0.045).
Iswari P.R.N., Surya I.G.N.H.W., et al. – Early Sexual Intercourse and Cervical Cancer (2024)	Retrospective cross-sectional; medical record data; minimum 43 samples; Chi-square test.	Sexual intercourse <20 years significantly increases cervical cancer (p=0.001).

Based on the literature review of the ten analyzed articles the nine analyzed articles, there is a consistent finding that sexual activity at a young age is significantly associated with an increased risk of cervical cancer. Early sexual activity, particularly first sexual intercourse (coitarche) before the age of 20, emerges as a major risk factor. Sulistyawati et al (2020) found that early coitarche significantly increases the risk of cervical cancer (p=0.002; OR=6.76), while Wahyuningtyas et al (2025) reported similar results in a cross-sectional study (p=0.009). A retrospective study by Iswari et al. (2024) also confirmed that sexual intercourse before the age of 20 is associated with an elevated risk of cervical cancer (p=0.001). These findings align with biological evidence that the adolescent cervix is more vulnerable to Human Papillomavirus (HPV) infection, particularly high-risk types such as HPV 16 and 18, because the immature cervical epithelium is more susceptible to viral DNA integration, which can trigger cellular transformation and carcinogenesis.

Causal analysis using the Mendelian Randomization method by Zhou et al (2024) strengthens observational evidence, showing a causal effect of younger age at first sexual intercourse on cervical cancer risk. Interestingly, the number of sexual partners did not show a causal effect, as also reported by Yamaguchi et al (2021) in Japan, who found that after adjusting for HPV genotype, the number of sexual partners was not significantly associated with CIN2+ risk. These findings emphasize that the main biological mechanism is cervical vulnerability to HPV infection at an early age, rather than simply the frequency or number of sexual partners.

In addition to early coitarche, other reproductive factors also significantly contribute to cervical cancer risk. Studies by Santoso (2021), Fajila et al (2025), Yuliani et al (2021) reported that early age at marriage (<20 years), high parity (>3 children), long-term hormonal contraceptive use, and age at menarche are significant factors. For example, Fajila et al. found that marrying before age 20 increases the risk fourfold (p=0.025), while parity greater than three is associated with increased risk (p=0.045). The biological explanations for these findings include prolonged exposure to estrogen and progesterone as well as mechanical trauma from repeated childbirth, both of which may increase cervical epithelial cell proliferation and facilitate HPV DNA integration.

From a social perspective, early sexual activity and early marriage are often associated with socioeconomic determinants, low educational levels, and limited access to sexual education and reproductive health services. These factors highlight the importance of public health interventions such as comprehensive sexual education, counseling on delaying sexual activity, and HPV vaccination as preventive strategies against cervical cancer.

Beyond biological and social factors, some studies highlight psychosocial aspects of cervical cancer patients. Has et al (2020) reported that most patients remained sexually active

(90.8%), and 76.32% were satisfied with their sexual life, but there was no significant association between levels of sexual activity or sexual satisfaction and cervical cancer risk (p=0.346). These findings indicate that adult sexual behavior or sexual satisfaction does not play a direct role in cervical cancer pathogenesis; rather, early factors such as early coitarche and reproductive-related variables are more influential.

By integrating these findings, it can be concluded that early sexual activity is a major determinant of cervical cancer. Early coitarche creates biological vulnerability through HPV exposure to an immature cervical epithelium, while age at marriage, parity, and hormonal contraceptive use compound the risk through hormonal and mechanical mechanisms. Social factors and health education also influence early sexual behavior; thus, preventive interventions must be multifactorial, including education, HPV immunization, and access to routine cervical screening.

Overall, the consistency of findings from various study designs—observational, retrospective, cross-sectional, case-control, and causal analysis—strengthens the evidence that early-age sexual activity is an important determinant of cervical cancer, and preventive interventions should focus on delaying early sexual activity and managing related reproductive factors.

Conclusion and Suggestion

Based on the literature review of the ten analyzed studies, early sexual activity—particularly first sexual intercourse before the age of 20 (early coitarche)—is a major determinant of increased cervical cancer risk. This finding is consistent across observational, retrospective, cross-sectional, and causal analyses using Mendelian Randomization. In addition, reproductive factors such as early marriage, high parity, long-term hormonal contraceptive use, and age at menarche also contribute to the risk, although early coitarche remains the most dominant factor. Social and health education factors, including reproductive health knowledge and access to screening or HPV vaccination services, also influence risk. Overall, the evidence underscores the importance of multifactorial preventive interventions, including delaying sexual activity, providing reproductive health education, implementing HPV vaccination, and ensuring routine cervical screening to reduce cervical cancer incidence in at-risk populations.

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