

THE ASSOCIATION BETWEEN KNOWLEDGE LEVEL AND ATTITUDES OF WOMEN OF REPRODUCTIVE AGE WITH CERVICAL CANCER PREVENTION IN KUTA SELATAN DISTRICT

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ABSTRACT

Background: Cervical cancer remains a major, yet largely preventable, public health problem among women. Prevention strategies including HPV vaccination are available, but implementation of cervical cancer preventive measures in the community remains suboptimal.

Objective: This study aimed to examine the association between levels of knowledge and attitudes and the adoption of cervical cancer preventive practices among women of reproductive age in Kuta Selatan Subdistrict.

Methods: An analytic observational study with a cross-sectional design was conducted. Seventy-three respondents were enrolled using a nonprobability (non-random) sampling technique. Data were collected via a structured questionnaire previously utilized in earlier studies. Data analysis comprised univariate and bivariate assessments, with bivariate associations tested using Pearson's chi-square at a 95% confidence level ($\alpha = 0.05$).

Results: Descriptive analysis indicated that respondents exhibited varying categories of knowledge and attitudes; however, the majority had not undertaken cervical cancer preventive measures optimally. Bivariate analysis revealed no significant association between knowledge level and preventive actions ($p = 0.680$). Similarly, no significant relationship was observed between attitude and preventive practices ($p = 0.859$).

Conclusion: Neither knowledge nor attitude showed a significant association with cervical cancer preventive practices among women of reproductive age in Kuta Selatan Subdistrict. These findings suggest the need for more comprehensive promotive and preventive interventions that address additional determinants to improve preventive behaviour.

Keywords: cervical cancer, knowledge, attitude, prevention practices, women of reproductive age

INTRODUCTION

Cervical cancer, also known as cancer of the uterine cervix, is a malignancy that affects the cervical region and has remained a significant health threat for women, particularly those at risk of developing the disease. This condition was reflected in its high incidence and mortality rates. According to data from the Global Cancer Observatory, in 2020 there were at least 36,633 new cases of cervical cancer worldwide.¹ Based on GLOBOCAN 2020 data, Indonesia reported 396,914 new cancer cases with 234,511 cancer-related deaths, and this number was likely to continue increasing in the absence of effective preventive measures. Among women, breast cancer was the most common malignancy (65,858 cases), followed by cervical cancer (36,633 cases).² In the same year, the World Health Organization (WHO) officially reported 342,000 deaths and 604,000 new cases of cervical cancer globally, most of which were associated with sexual transmission.³

Indonesia, with a population of approximately 273 million, reported 36,633 new cases of cervical cancer, accounting for 17.2% of the total cases.³ Cervical cancer occurred more

frequently in low- and middle-income countries, while high-income countries had consistently implemented comprehensive prevention strategies encompassing primary, secondary, and tertiary levels. Primary prevention focused on Human Papillomavirus (HPV) vaccination, secondary prevention included screening approaches such as Visual Inspection with Acetic Acid (VIA) and Pap smear examinations, and tertiary prevention was directed toward reducing disease-related complications and mortality.⁴

According to the Indonesian Ministry of Health in 2021, the main strategies to reduce the risk factors for cervical cancer included avoiding high-risk sexual behavior associated with HPV infection by maintaining a single sexual partner, delaying sexual activity until after the age of 20 years, avoiding exposure to secondhand smoke, undergoing regular VIA and Pap smear examinations, and receiving HPV vaccination.⁵ On November 17, 2020, the World Health Organization (WHO) urged global commitment to eliminate cervical cancer as a public health concern by adopting a three-pillar strategy to be achieved by 2030. The initiative set specific targets, including the vaccination of 90% of girls with two doses of the HPV vaccine before the age

of 15 years, the screening of 70% of women using high-quality screening methods at the ages of 35 and 45 years, and the provision of appropriate treatment and care for 90% of women diagnosed with cervical lesions.⁶

HPV vaccination had been available since 2006. Three types of prophylactic HPV vaccines could be administered to both females and males starting at the age of nine years to prevent precancerous lesions and cervical cancer. These vaccines included the bivalent vaccine targeting HPV types 16 and 18, the quadrivalent vaccine targeting HPV types 6 and 11, and the nonavalent vaccine targeting HPV types 31, 33, 45, 52, and 58.⁶ The two newer vaccines also focused on preventing anogenital warts caused by HPV types 6 and 11. Although cervical cancer had various etiologies, it was generally caused by Human Papillomavirus infection as the primary risk factor.

The VIA examination technique represented a simple early detection method using a speculum to visualize the cervix after application of 3–5% acetic acid, which was observed with the naked eye. After approximately 10 seconds, changes in cervical coloration were assessed. VIA results were categorized as VIA-negative when the cervix appeared normal, VIA-inflammatory when inflammation (cervicitis) or other benign abnormalities such as cervical polyps were present, and VIA-positive when white patches (acetowhite epithelium) were observed.⁷ Meanwhile, conventional pap smear examination required proper techniques of cell collection, smear preparation on glass slides, and immediate fixation of cervical cells.⁸

The World Health Organization (WHO) had identified twelve HPV genotypes associated with cervical cancer, including types 16, 18, 31, 33, 35, 39, 45, 51, 52, 56, 58, and 59. It was widely recognized that oncogenic HPV types, particularly HPV 16 and 18, accounted for approximately 99.7% of cervical cancer cases.⁹ In developed countries, women at risk of cervical cancer were generally aged 50 years and older; however, younger women also remained at risk.

Symptoms such as abnormal vaginal discharge that appeared whitish, foul-smelling, or mixed with blood; pain and bleeding during sexual intercourse (including intermenstrual bleeding, postmenopausal bleeding, or postcoital bleeding); pelvic pain involving the lower abdomen, waist, and legs; difficulty urinating; loss of appetite; and weight loss were clinical manifestations that could be experienced by patients with cervical cancer.¹⁰

Educational activities in the form of public outreach were essential, as knowledge represented a critical domain in shaping individual behavior. Furthermore, behaviors based on adequate knowledge tended to be more sustainable and deeply rooted compared to behaviors not supported by scientific understanding.¹¹ When individuals were aware of the importance of routine examinations such as Pap smear or HPV testing, recognized the warning signs and symptoms of cervical cancer, understood the importance of a healthy lifestyle, and possessed sufficient knowledge, information dissemination became more effective, thereby increasing public awareness and participation in regular screening.

OBJECTIVE

This study examined the relationship between knowledge level and attitudes toward cervical cancer

prevention among women of reproductive age in South Kuta.

METHODS

A cross-sectional analytic observational study was carried out, with data collected through in-person, face-to-face interviews among women residing in Kuta Selatan District, Badung Regency, Bali, Indonesia.

The target population included women of reproductive age (15–49 years) who had resided in Kuta Selatan for at least six months and possessed basic literacy skills (ability to read and write). All eligible participants provided written informed consent before enrollment. Women with a prior diagnosis of cervical cancer and participants with incomplete questionnaire data were excluded. Predefined protocols were implemented to address nonresponse, dropout, and participant attrition.

Participants were selected using a non-random, area-based sampling method that allocated respondents by village/kelurahan to ensure geographic distribution across the subdistrict. The final sample comprised 73 respondents obtained during the fieldwork period.

The required sample size was estimated using a two-proportion formula, adopting proportions from prior literature (higher-knowledge group = 0.435; lower/medium-knowledge group = 0.114), with a 95% confidence level ($Z_{\alpha/2} = 1.96$) and 80% statistical power ($Z_{\beta} = 0.84$). The initial calculation indicated 29 participants per group, which was rounded to 30, resulting in a minimum of 60 participants. A nonresponse adjustment was applied according to the predefined protocol. Ultimately, 73 fully completed questionnaires were obtained at recruitment.

Outcome (dependent) variable: cervical cancer prevention practice (dichotomous: performed vs not performed), operationalised primarily by history of HPV vaccination and related preventive actions. Exposures (independent) variables: knowledge level and attitude toward cervical cancer prevention. Knowledge was measured by a 16-item instrument (score range 0–16) and categorised as low (0–8), moderate (9–12), and high (13–16). Attitude was assessed using a four-point Likert scale; mean scores were classified as low (<3.0) or high (≥ 3.0). Covariates: age, education level, occupation, socioeconomic status, access to health information, and prior screening history (e.g., IVA or Pap smear).

A structured questionnaire, adapted from the 2016 study by Winata Sastra et al. and previously subjected to pre-testing with established evidence of validity and reliability, was used for data collection. The instrument included multiple sections that evaluated knowledge, attitudes (or perceptions), and cervical cancer-related preventive behaviors. The 10-item HPV knowledge scale demonstrated good internal consistency (Cronbach's $\alpha = 0.744$). The 6-item HPV vaccine knowledge scale showed acceptable reliability (Cronbach's $\alpha = 0.676$). The perceived risk scales for HPV infection and for other sexually transmitted infections exhibited strong reliability (Cronbach's $\alpha = 0.768$ and 0.789 , respectively). Moreover, the scale measuring perceived need for safe sexual-behavior

maintenance indicated very good reliability (Cronbach's $\alpha = 0.796$).¹²

Based on these reliability values, the questionnaire as a whole met the criteria for adequate internal consistency for use as a research instrument. The content and structure of the questionnaire did not undergo significant changes, except for minor wording adjustments to suit the regional context; therefore, revalidation and reliability testing were deemed unnecessary. This instrument was deemed suitable and sufficiently accurate for assessing knowledge, attitudes, and cervical cancer-related preventive behaviors among women of reproductive age in South Kuta District.

Data were collected using a structured, paper-based questionnaire that included domains on participant characteristics, knowledge assessment, attitudes, and prevention practices. Knowledge items employed closed-ended questions and were scored dichotomously (1 = correct; 0 = incorrect or "do not know"). Attitude statements were rated on a four-point Likert scale, with reverse scoring applied for negatively worded items. Prevention practices were also coded dichotomously (1 = yes; 0 = no).

Field data collection was performed by the research team through direct visits to selected kelurahan. For each participant, the researchers explained the study purpose, obtained written informed consent, and then administered the questionnaire; respondents either self-completed the questionnaire or answered via structured interview if assistance was required. Completed questionnaires were checked in the field for completeness and consistency; incomplete or inconsistent questionnaires were excluded in accordance with the dropout criteria. Data collection took approximately 2–3 weeks depending on participant accessibility.

The study protocol received ethics approval from the Faculty of Medicine institutional ethics committee (FK

UNUD/RSUP Sanglah). Participants' confidentiality was assured; personal identifiers were recorded only for coding and were not presented in study outputs. Participation was voluntary and participants could withdraw at any time without penalty. A copy of the signed informed consent form was provided to each participant.

Completed paper questionnaires were stored securely and later entered into an electronic database (Microsoft Excel) for cleaning. Data entry procedures included double-checking and validation to detect entry errors, removal of outliers where justified, and application of predefined coding schemes (e.g., 1 = yes, 0 = no for dichotomous items). Only questionnaires that passed the completeness and consistency checks were included in the final analysis.

Data were analyzed using both descriptive and inferential statistical methods. Univariate analysis was performed to summarize respondent characteristics and to describe the distribution of knowledge, attitudes, and prevention practices. Bivariate analysis was used to examine associations between exposures (knowledge level and attitude) and the outcome (prevention practice); the chi-square test was applied for categorical comparisons. A significance threshold of $\alpha = 0.05$ was used. The analysis plan and software (SPSS v.26 and/or Excel) are noted in the appendices. Where some contingency table cells had small expected counts, the chi-square assumptions were checked and the test was used when minimum expected counts exceeded the acceptable threshold stated in the protocol.

RESULTS

Based on the results of the univariate analysis of 73 respondents, respondent characteristics were described according to age distribution, educational level, and occupation.

Tabel 1. Respondent Characteristics Data Based on Age, Level of Education, and Occupation

Characteristics	Number (n = 73)	Percentage (%)
Age		
Young early adulthood (18–25 years)	10	14%
Early adulthood (26–35 years)	30	41%
Middle adulthood (36–45 years)	17	23%
Late middle adulthood / pre-elderly (46–55 years)	16	22%
Educational Level		
No formal education / did not complete elementary school	1	1%
Completed elementary school	4	5%
Completed junior high school	10	14%
Completed senior high school / vocational high school	23	32%
Higher education	35	48%
Occupation		
Unemployed	15	21%
Self-employed	33	45%
Teacher / civil servant	25	34%
Farmer	0	0%

Characteristics	Number (n = 73)	Percentage (%)
Healthcare worker	0	0%
Laborer	0	0%

Based on age distribution, the majority of respondents were in the 26–35-year age group, totaling 30 individuals (41%). This was followed by respondents aged 36–45 years, with 17 individuals (23%), and those aged 46–55 years, with 16 individuals (22%). Meanwhile, respondents aged 18–25 years constituted the smallest group, with 10 individuals (14%). These findings indicated that most respondents were within the productive age range and belonged to the group of women of reproductive age, who were optimal targets for cervical cancer prevention programs.

In terms of educational level, most respondents had attained higher education, with 35 individuals (48%). Respondents who had completed senior high school or vocational high school accounted for 23 individuals (32%), followed by those who had completed junior high school, totaling 10 individuals (14%). Meanwhile, respondents who had completed elementary school numbered 4 individuals

(5%), and those with no formal education or who had not completed elementary school constituted the smallest group, with only 1 individual (1%). This distribution indicated that the majority of respondents had a moderate to high level of education, which could potentially influence their level of knowledge and attitudes toward cervical cancer prevention.

With regard to occupation, most respondents were self-employed, totaling 33 individuals (45%). This was followed by respondents who worked as teachers or civil servants, numbering 25 individuals (34%), and those who were unemployed, totaling 15 individuals (21%). No respondents were employed as farmers, healthcare workers, or laborers in this study. These findings suggested that the majority of respondents had formal occupational backgrounds, which could influence access to information and health-related behaviors.

Distribution of Respondents Based on Level of Knowledge

Table 2. Distribution of Respondents Based on Level of Knowledge in South Kuta District, Badung Regency, Bali, 2025

Level of Knowledge	Frequency (n = 73)	Percentage (%)
Low	20	27%
Moderate	37	51%
High	16	22%

The distribution of respondents indicated that most participants had a moderate level of knowledge, accounting for 37 of the 73 respondents (51%). Meanwhile, 20 respondents (27%) were classified as having a low level of knowledge, and 16 respondents (22%) were categorized as having a high level of knowledge.

Overall, these findings indicated that most respondents had not yet reached the high knowledge category and remained at a moderate level of knowledge. This suggested that respondents generally possessed an

adequate basic understanding; however, gaps in information or inaccuracies in understanding were still present in certain aspects of the knowledge assessed. The proportion of respondents with a high level of knowledge, which accounted for only approximately one-fifth of the total sample, underscored the need for strengthened educational efforts to enable more respondents to achieve an optimal level of understanding.

Distribution of Respondents Based on Attitude Level

Table 3. Distribution of Respondents Based on Attitude Level in South Kuta District, Badung Regency, Bali, 2025

Attitude Level	Frequency (n = 73)	Percentage (%)
Negative	45	62%
Positive	28	38%

The attitude variable was categorized based on the mean Likert scale score, with scores ranging from 1.0 to 2.9 classified as a negative attitude and scores from 3.0 to 4.0 classified as a positive attitude. Based on the results of the univariate analysis, the majority of respondents demonstrated a negative attitude, accounting for 45 out of 73 respondents (62%), while respondents with a positive attitude totaled 28 individuals (38%). These findings indicated that more than half of the respondents exhibited

attitudes that were less supportive of cervical cancer prevention measures, particularly HPV vaccination.

The relatively high proportion of negative attitudes suggested that respondents had not fully accepted or demonstrated behaviors consistent with recommended preventive measures. Negative attitudes may reflect hesitation, disagreement, or lack of concern among respondents, which could potentially hinder the adoption of desired preventive behaviors. This condition was important to consider, as attitudes often served as a determining factor

in whether existing knowledge was translated into practical preventive actions in daily life.

Distribution of Respondents Based on Preventive Behavior

Table 4. Distribution of Respondents Based on Preventive Behavior in South Kuta District, Badung Regency, Bali, 2025

Level of Preventive Behavior	Frequency (n = 73)	Percentage (%)
Did not perform preventive behavior	53	73%
Performed preventive behavior	20	27%

The preventive behavior variable was categorized into two groups, namely respondents who did not perform preventive behaviors and those who performed preventive behaviors. The data distribution showed that the majority of respondents had not engaged in preventive behaviors, accounting for 53 out of 73 respondents (73%), while only 20 respondents (27%) had performed preventive actions. These findings indicated that most respondents had not implemented recommended preventive measures, although a smaller proportion had already adopted preventive practices

The low proportion of respondents who practiced preventive behaviors indicated limited adherence to and awareness of cervical cancer prevention measures. This condition may have been influenced by several factors, such as the information received, personal experiences, environmental support, as well as existing governmental policies or programs.

Association Between Level of Knowledge and Cervical Cancer Preventive Behavior

Table 5. Cross-tabulation of Respondents Based on Level of Knowledge and Cervical Cancer Preventive Behavior in South Kuta District, Badung Regency, Bali, 2025

Level of Knowledge	Did Not Perform n (%)	Performed n (%)	Total n (%)	p-value
Low	16 (80.0)	4 (20.0)	20 (100)	0.680
Moderate	26 (70.3)	11 (29.7)	37 (100)	
High	11 (68.8)	5 (31.3)	16 (100)	
Total	53 (72.6)	20 (27.4)	73 (100)	

Cross-tabulation analysis revealed that 16 of 20 respondents with low knowledge levels (80.0%) did not undertake cervical cancer preventive actions. Among respondents with high knowledge levels, 5 individuals (31.3%) reported engaging in preventive behaviors.

Statistical analysis demonstrated no significant association between knowledge level and cervical cancer preventive behavior ($p = 0.680$). Although respondents with higher knowledge levels showed a marginally greater

proportion of preventive behavior than those with moderate or low knowledge, the difference was not statistically significant. The chi-square test was applied despite the presence of several cells with expected frequencies below five, as the minimum expected value exceeded three and the overall sample size was considered adequate for statistical analysis.

Association Between Attitude and Cervical Cancer Preventive Behavior

Table 6. Cross-tabulation of Respondents Based on Attitude and Cervical Cancer Preventive Behavior in South Kuta District, Badung Regency, Bali, 2025

Attitude	Did Not Perform n (%)	Performed n (%)	Total n (%)	p-value
Negative	33 (73.3)	12 (26.7)	45 (100)	0.859
Positive	20 (71.4)	8 (28.6)	28 (100)	
Total	53 (72.6)	20 (27.4)	73 (100)	

The cross-tabulation analysis between attitude and cervical cancer preventive behavior showed that respondents with negative attitudes accounted for 33 individuals (73.3%) and those with positive attitudes accounted for 20 individuals (71.4%), both of whom tended not to engage in cervical cancer preventive behaviors. It was also observed that only a small proportion of respondents chose to perform preventive actions,

namely 12 respondents (26.7%) among those with negative attitudes and 8 respondents (28.6%) among those with positive attitudes. The chi-square test yielded a p value of 0.859, indicating no statistically significant association between respondents' attitudes and cervical cancer preventive behavior. Although participants with positive attitudes exhibited a marginally higher rate of preventive behaviour than those with negative attitudes, this difference was not statistically significant.

DISCUSSION

This study aimed to assess the levels of knowledge, attitudes, and preventive behaviors among the community in South Kuta District, Badung Regency, Bali, in 2025. The findings indicated that no significant association was observed between knowledge level and cervical cancer preventive behavior, nor between attitudes and preventive behavior. Descriptive analysis showed that most respondents had not undertaken preventive measures, the majority possessed a moderate level of knowledge, and most exhibited attitudes classified as negative.

Association Between Level of Knowledge and Preventive Behavior

Bivariate analysis using the chi-square test found no statistically significant association between knowledge level and cervical cancer preventive behavior ($p = 0.680$). This finding was consistent with a study in Manado in 2024 that reported no significant relationship between parental knowledge or support with HPV vaccination participation, but differed from a 2019 study in Palangka Raya that found a significant association between knowledge level and interest among university students.^{13,14}

This study was also inconsistent with research conducted at SMK PGRI 3 Denpasar, which examined the association between knowledge and attitudes of female adolescents toward cervical cancer prevention through HPV vaccination from December 2016 to January 2017. That study reported a correlation coefficient of $r = 0.859$, indicating a very strong relationship. The study concluded that better knowledge among female adolescents was associated with more positive attitudes toward cervical cancer prevention.^{15,22}

The non-significant association observed in this study may have been influenced by several factors, including lack of interest among women in receiving the vaccine, hesitation due to perceived lack of necessity, insufficient information regarding cervical cancer or the HPV vaccine, or concerns regarding vaccine safety.¹⁶ In addition, external factors may have contributed, such as parental support, access to available information services, and the limited availability of HPV vaccines in Indonesia, which were considered exclusive, costly, and possibly accessible only to middle- to upper-income populations. This is consistent with a 2021 study reporting that only 30 of 246 respondents (12.2%) had received the HPV vaccine prior to the study.^{14,17}

Association Between Attitude and Preventive Behavior

The bivariate analysis between attitude (positive/negative) and preventive behavior (performed/not performed) among 73 respondents showed no significant association (Pearson chi-square, $p = 0.859$). Descriptively, the proportion of respondents who performed preventive actions was nearly similar between the negative attitude group (26.7% performed preventive actions) and the positive attitude group (28.6% performed preventive

actions), indicating no meaningful practical difference between the groups. These findings were inconsistent with a study entitled “*Self-efficacy, intention, and attitude toward human papillomavirus vaccination among urban females in Indonesia: a cross-sectional study*,” which reported a significant association between self-efficacy and attitudes and intentions toward HPV vaccination. Respondents with higher self-efficacy demonstrated more positive attitudes and greater intention to receive the HPV vaccine compared to those with lower self-efficacy ($p < 0.001$). A 2022 study of urban Indonesians’ knowledge, attitudes, and practices regarding HPV infection, cervical cancer, and HPV vaccination found that, despite moderate-to-good levels of knowledge and attitudes toward cervical cancer prevention, engagement in preventive practices remained comparatively low. That study found significant associations between knowledge and attitude, knowledge and preventive behavior, as well as attitude and preventive behavior.^{18,19}

Several studies had shown that vaccine acceptance within the Indonesian population was influenced by a range of factors. These determinants were grouped into four levels: the individual level, which included personal characteristics, knowledge level, access to information, perceptions of vaccination importance, and risk perception; the social level, encompassing social influence and media exposure; the policy level, referring to public health policies; and the religious level, which involved religious beliefs and moral values.

In addition, maternal knowledge was found to have a strong influence on children’s knowledge regarding preventive behaviors. These factors collectively formed a complex dynamic within society, resulting in tangible barriers to prevention. Several potential solutions have been proposed, including the implementation of free national vaccination programs as a governmental responsibility, the development of appropriate official policies, and the provision of vaccines at affordable prices, as economic status represented a significant barrier within the community.^{19,20}

CONCLUSIONS AND RECOMMENDATIONS

This study, which explored the relationship between knowledge and attitudes among women of reproductive age and their cervical cancer preventive behaviors in South Kuta District, found that most respondents had not adopted preventive measures. Consequently, cervical cancer prevention practices remained low despite generally adequate levels of knowledge and attitudes. Statistical analysis showed p -values >0.05 for both chi-square tests examining the relationships between knowledge and preventive behavior, as well as between attitude and preventive behavior, indicating no significant associations. This finding suggests that knowledge and attitudes alone are insufficient to directly translate into concrete cervical cancer preventive

actions, and that other factors beyond knowledge and attitudes likely influence decision-making related to prevention.

Consequently, healthcare providers should move beyond merely improving knowledge and attitudes and offer practical, actionable education that clearly specifies service locations, procedures, costs, and appointment schedules for cervical cancer prevention. Women of reproductive age should be encouraged to seek reliable information actively and to utilize available health services. Future research should recruit broader populations and examine additional variables such as family support, healthcare access, socioeconomic factors, and the role of healthcare personnel to enable a more comprehensive analysis.

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