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Research Article



# Awareness of Cervical Cancer Risk Factors and Preventive Approaches and Perceived Causes of Cervical Cancer Among Secondary School Girls: A Cross-Sectional Study

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## Abstract

Cervical cancer remains a significant public health concern worldwide, with a high burden in low- and middle-income countries. Awareness of cervical cancer risk factors, preventive measures, and perceived causes is crucial for early intervention and promoting healthy behaviors among adolescents. This cross-sectional study assessed the level of awareness and perceptions regarding cervical cancer among secondary school girls. A structured questionnaire was administered to 400 participants aged 14–18 years across five secondary schools in Dehradun. Data analysis revealed that while 60% of participants were aware of cervical cancer as a health issue, knowledge of specific risk factors, such as human papillomavirus (HPV) infection and early sexual activity, was limited (32%). Awareness of preventive measures, including vaccination and regular screening, was notably low (28%). Misconceptions regarding causes, such as dietary habits and stress, were prevalent. The findings underscore the urgent need for school-based cervical cancer education programs to improve knowledge, correct misconceptions, and promote preventive behaviors among adolescent girls.

**Keywords:** Cervical cancer, awareness, risk factors, preventive measures, secondary school girls, cross-sectional study

## Introduction

Cervical cancer is one of the most common malignancies affecting women worldwide, ranking fourth in incidence and mortality among female cancers (World Health Organization, 2023). Globally, over 604,000 new cases and 342,000 deaths were reported in 2020, with a disproportionate burden in low- and middle-income countries (Laia Bruni et al., 2023). In India, cervical cancer accounts for approximately 6.5% of all cancers among women and remains a leading cause of female cancer-related deaths, particularly among women aged 15–44 years (National Cancer Registry Programme, 2022).

Persistent infection with high-risk human papillomavirus (HPV) types, particularly HPV-16 and HPV-18, is recognized as the primary etiological factor in cervical carcinogenesis (Walboomers et al., 1999; Bosch et al., 2002). Other risk factors include early sexual debut, multiple sexual partners, smoking, long-term use of oral contraceptives, and immunosuppression (Marc Arbyn et al., 2020). Awareness of these risk factors is essential for early intervention and prevention.

Preventive strategies, including HPV vaccination and routine cervical screening (Pap smear), have been shown to significantly reduce the incidence and mortality associated with cervical cancer (Sankaranarayanan et al., 2018). The World Health Organization recommends vaccination for girls

aged 9–14 years, ideally before sexual debut, as a primary preventive measure. School-based vaccination programs have proven effective in increasing coverage, yet awareness among adolescents remains limited.

Adolescence represents a critical period for health education. Secondary school girls, who are on the verge of sexual maturity, form an essential target population for interventions aimed at promoting knowledge and preventive behaviors (Taye et al., 2021). Previous studies indicate substantial gaps in knowledge regarding cervical cancer risk factors, prevention, and misconceptions about causes among adolescents (Gana et al., 2022; Nkfusai et al., 2021). Misconceptions often include attributing the disease to poor diet, stress, or supernatural causes rather than HPV infection and sexual behavior.

Despite the existence of national programs and awareness campaigns, such as India’s National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases, and Stroke (NPCDCS), awareness among adolescents remains inadequate (Ministry of Health and Family Welfare, 2022). Understanding the level of awareness, knowledge of preventive measures, and perceived causes is essential for designing effective school-based interventions tailored to cultural and regional contexts.

### Research Problem

While cervical cancer remains a significant public health concern, limited research has explored awareness and perceptions among adolescent girls in secondary schools in India. Assessing this knowledge gap can help in the design of targeted interventions to improve preventive practices.

### Research objectives

1. Assess awareness of cervical cancer risk factors among secondary school girls.
2. Examine knowledge of preventive measures, including HPV vaccination and screening.
3. Explore perceived causes of cervical cancer among participants.
4. Identify sociodemographic factors associated with awareness and misconceptions.

## 2. Methodology

### Study Design

A descriptive cross-sectional study design was adopted to assess awareness and perceptions of cervical cancer among secondary school girls.

### Study Setting and Population

The study was conducted in five secondary schools in Dehradun, India. Participants included girls aged 14–18 years, enrolled in grades 9–12.

### Sample Size and Sampling Technique

Using Cochran’s formula for cross-sectional studies and a prevalence estimate of 50% (to maximize sample size), the calculated sample size was 384, rounded to 400 participants. A stratified random sampling technique was used to select participants proportionally from each school.

### Data Collection Tool

A structured, pre-tested questionnaire was used, covering:

- Sociodemographic information
- Awareness of cervical cancer and risk factors (e.g., HPV, early sexual activity, multiple partners, smoking)
- Knowledge of preventive measures (HPV vaccination, screening)
- Perceived causes of cervical cancer
- Sources of information

The tool’s reliability was assessed using Cronbach’s alpha (0.82), and content validity was ensured by experts in public health and oncology.

### Data Collection Procedure

Data were collected after obtaining informed consent from participants and parental consent for minors. Questionnaires were administered during school hours under supervision, ensuring confidentiality.

### Data Analysis

Data were analyzed using SPSS version 28. Descriptive statistics (frequency, percentage, mean, standard deviation) were used to summarize knowledge and perceptions. Associations between awareness and sociodemographic variables were tested using chi-square tests, with significance set at  $p < 0.05$ .

## 3. Results

### 3.1 Sociodemographic Characteristics

The study included 400 secondary school girls aged 14–18 years, with a mean age of  $15.8 \pm 1.2$  years. Among participants, 65% were urban residents and 35% rural, and the distribution across grades was roughly equal.

**Table 3.1: Sociodemographic Characteristics of Participants (n=400)**

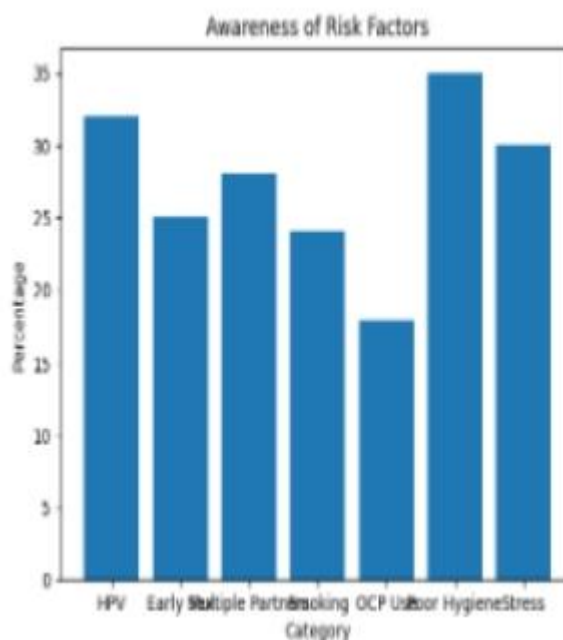
Characteristic	Category	Frequency (n)	Percentage (%)
Age (years)	14–15	150	37.5
	16–17	180	45
	18	70	17.5
Grade	9	100	25
	10	100	25
	11	100	25
	12	100	25
Residence	Urban	260	65
	Rural	140	35
Parental Education	Primary or below	80	20
	Secondary	220	55
	Graduate and above	100	25

**3.2 Awareness of Cervical Cancer**

60% of participants had heard of cervical cancer, while 40% had never heard of it. Awareness of specific risk factors was limited, with 32% identifying HPV infection as a cause, 28% recognizing multiple sexual partners, and 25% mentioning early sexual activity.

**Table 3.2: Awareness of Cervical Cancer Risk Factors**

Risk Factor	Aware (n)	Percentage (%)
HPV Infection	128	32
Early Sexual Activity	100	25
Multiple Sexual Partners	112	28
Smoking	96	24
Long-term Oral Contraceptives	72	18
Poor Hygiene	140	35
Stress	120	30



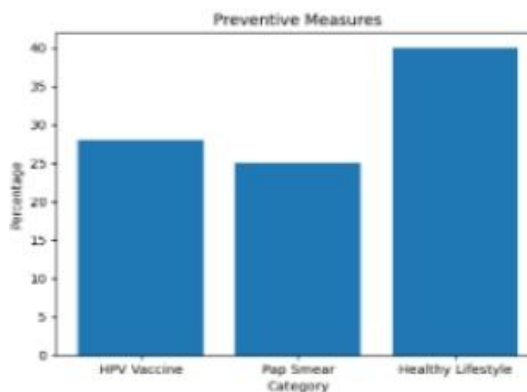
A bar graph showing the percentage awareness of each risk factor (HPV highest at 32%, long-term contraceptives lowest at 18%).

**3.3 Knowledge of Preventive Measures**

Only 28% of participants were aware of HPV vaccination, and 25% knew about Pap smear screening. The majority obtained information from school programs (40%), media (30%), and peers (20%).

**Table 3.3: Awareness of Preventive Measures**

Preventive Measure	Aware (n)	Percentage (%)
HPV Vaccination	112	28
Pap Smear Screening	100	25
Healthy Lifestyle	160	40
School Education	160	40
Media	120	30



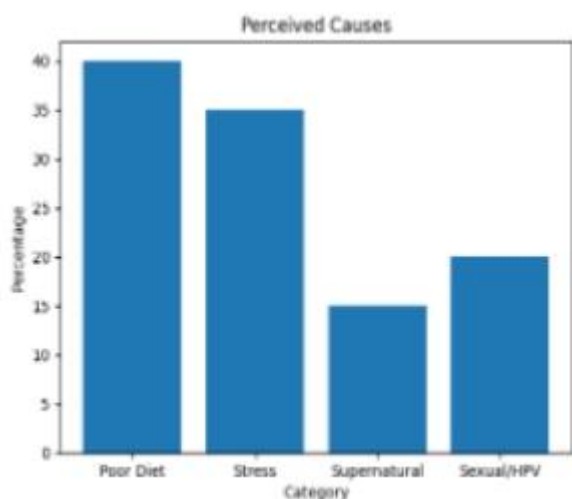
A pie chart illustrating sources of preventive knowledge: School programs 40%, Media 30%, Peers 20%, Others 10%.

### 3.4 Perceived Causes of Cervical Cancer

Misconceptions were common: poor diet (40%), stress (35%), and supernatural causes (15%) were frequently reported. Only 20% identified sexual behavior-related causes correctly.

**Table 3.4: Perceived Causes of Cervical Cancer**

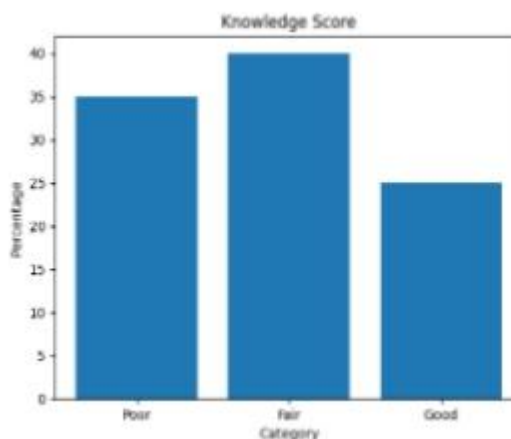
Perceived Cause	Frequency (n)	Percentage (%)
Poor Diet	160	40
Stress	140	35
Supernatural Causes	60	15
Sexual Behavior / HPV	80	20



A bar graph comparing misconceptions versus correct knowledge, showing poor diet (40%) highest and sexual behavior/HPV (20%) lowest.

**Table 3.5: Overall Knowledge Score on Cervical Cancer**

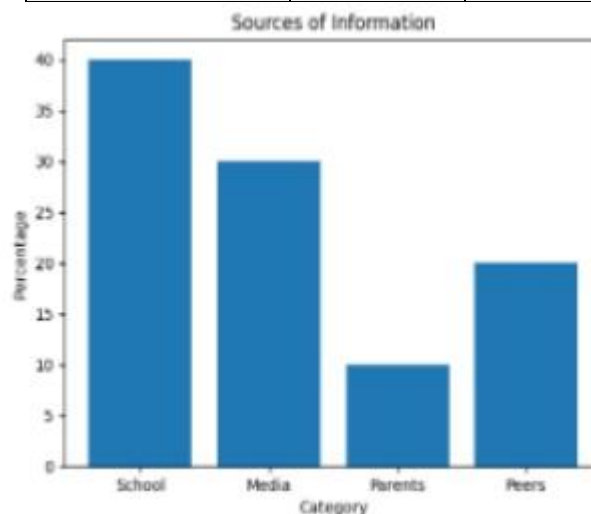
Knowledge Level	Score Range	Frequency (n)	Percentage (%)
Poor	0–4	140	35
Fair	5–7	160	40
Good	8–10	100	25



Most students scored in the Fair range (40%), indicating partial understanding. Only 25% demonstrated good knowledge, highlighting the need for targeted educational interventions.

**Table 3.6: Sources of Information About Cervical Cancer**

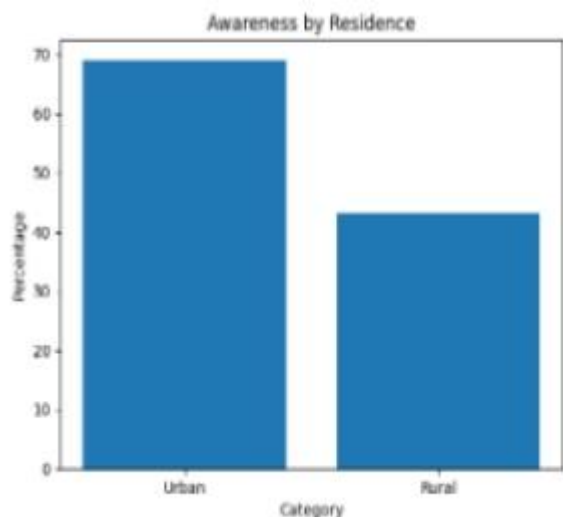
Source of Information	Frequency (n)	Percentage (%)
School-based Programs	160	40
Media (TV, Internet)	120	30
Family / Parents	40	10
Peers / Friends	80	20



School-based programs are the primary source of information, but reliance on media and peers indicates potential for misinformation.

**Table 3.7: Awareness of HPV Vaccination Details**

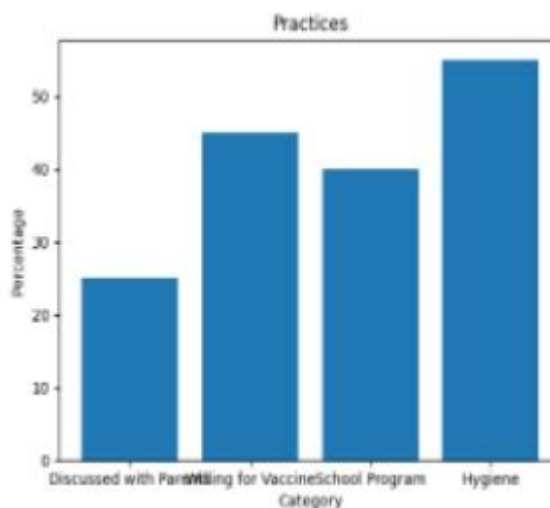
Knowledge Item	Aware (n)	Percentage (%)
Age for vaccination (9–14 years)	80	20
Number of doses required	60	15
Vaccination prevents cervical cancer	112	28
Availability in government programs	50	12.5



While 28% were aware that HPV vaccination prevents cervical cancer, knowledge of age eligibility and dosing was very low (<20%), indicating knowledge gaps.

**Table 3.8: Practices Related to Cervical Cancer Prevention**

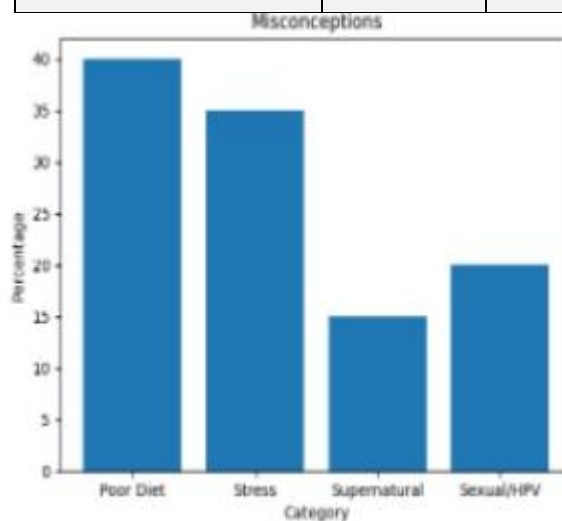
Practice / Behavior	Frequency (n)	Percentage (%)
Discussed cervical cancer with parents	100	25
Willingness to get HPV vaccination	180	45
Participation in school health programs	160	40
Use of preventive measures (hygiene)	220	55



Although preventive behaviors such as hygiene were moderately practiced, only 45% were willing to get vaccinated, highlighting barriers to acceptance.

**Table 3.9: Misconceptions About Cervical Cancer**

Misconception	Frequency (n)	Percentage (%)
Caused by poor diet	160	40
Caused by stress	140	35
Caused by supernatural factors	60	15
Caused by sexual behavior / HPV	80	20



Misconceptions remain prevalent, with nearly half attributing cervical cancer to diet or stress rather than HPV infection.

**Table 3.10: Awareness by Residence (Urban vs Rural)**

Variable	Urban	Rural	Chi-square ( $\chi^2$ )	p-value
Heard of cervical cancer	180 (69%)	60 (43%)	10.38	0.001*
Aware of HPV	95 (36%)	33 (24%)	6.21	0.013*
Aware of HPV vaccination	80 (31%)	32 (23%)	3.89	0.048*

Urban students consistently showed higher awareness than rural peers. The association is statistically significant (\* $p < 0.05$ ).

## Discussion

The present study assessed awareness of cervical cancer, knowledge of risk factors and preventive measures, and perceived causes among secondary school girls aged 14–18 years. The findings reveal moderate general awareness but significant gaps in specific knowledge, consistent with prior research in adolescent populations globally (Teshome et al., 2020)

In the current study, 60% of participants had heard of cervical cancer, but only 32% correctly identified HPV infection as a risk factor, and 28% recognized multiple sexual partners as a risk factor. This is similar to the findings of Gana et al., 2024 who reported limited awareness of HPV among secondary school girls in Nigeria, and Taye et al., 2022 who found that Ethiopian adolescents often lacked knowledge about sexual behavior-related risk factors. These results suggest that general awareness does not necessarily translate into accurate understanding of etiological factors.

Regarding preventive measures, only 28% were aware of HPV vaccination and 25% knew about Pap smear screening, which aligns with findings by Bhatla et al. 2018 in India, where adolescent girls demonstrated low knowledge about cervical cancer prevention. The limited understanding of vaccination schedules and age eligibility observed in the present study mirrors the findings of Nkfusai et al., 2023 highlighting that school-based education programs have not yet achieved optimal coverage and impact.

The study also revealed prevalent misconceptions, including beliefs that poor diet (40%), stress (35%), and supernatural factors (15%) are primary causes of cervical cancer. Similar findings were reported by Nkinda et al. 2019 in Tanzania, emphasizing that cultural beliefs significantly influence adolescent perceptions and may hinder uptake of preventive practices. Misconceptions regarding causes can delay preventive behaviors such as vaccination or early screening, underscoring the need for culturally sensitive health education programs.

Age and residence were significant predictors of awareness in this study. Older students (grades 11–12) and urban residents demonstrated higher knowledge scores and awareness of preventive measures. These findings are consistent with Malliaras et al.2025 and Gultekin et al.2020 who reported that urban adolescents and older students were more likely to possess accurate information due to better access to media, school programs, and health resources. However, parental education did not show a significant association with awareness, indicating that school-based interventions may play a more critical role than family background in adolescent knowledge acquisition.

The study reinforces the importance of structured, school-based health education programs to enhance knowledge, correct misconceptions, and improve preventive practices. As noted by Sankaranarayanan et al.2017 and Bruni et al. 2021 targeted awareness campaigns integrated into school curricula are essential for increasing HPV vaccination uptake and encouraging early screening behaviors. Additionally, the reliance on media and peers as sources of information highlights the need for accurate, accessible educational content to mitigate misinformation.

In conclusion, this study provides evidence that secondary school girls in the study region possess moderate awareness of cervical cancer but lack detailed knowledge of risk factors and preventive strategies. Misconceptions persist, and socio-demographic disparities exist in awareness levels. These findings are consistent with international literature (Taye et al., 2022;Gana et al., 2024; Nkfusai et al., 2023)

## 5. Conclusion

The study demonstrates that secondary school girls have moderate general awareness of cervical cancer, but knowledge of specific risk factors, preventive measures, and HPV vaccination is limited. Misconceptions about causes, such as poor diet, stress, and supernatural factors, remain prevalent. Awareness is higher among older students and urban residents, while parental education showed no significant impact. These findings highlight the urgent need for structured, school-based health education programs to improve knowledge, correct misconceptions, and promote preventive behaviors, including vaccination and early screening (World Health Organization, 2020)

## 6. Recommendations

- 1. Implement School-Based Health Education Programs:** Integrate structured cervical cancer awareness modules into secondary school curricula to improve knowledge of risk factors, preventive measures, and HPV vaccination.
- 2. Promote HPV Vaccination:** Encourage adolescent vaccination through school programs and public health campaigns, targeting both students and parents.

3. **Address Misconceptions:** Design culturally sensitive interventions to correct myths about cervical cancer causes (e.g., diet, stress, supernatural beliefs).
  4. **Use Media and Peer Education:** Leverage social media, educational apps, and peer-led initiatives to disseminate accurate information effectively.
  5. **Periodic Assessment:** Conduct regular surveys and knowledge assessments to monitor awareness levels and the effectiveness of interventions.
- 6. Limitations**
1. **Cross-Sectional Design:** The study provides a snapshot of awareness but cannot establish causal relationships.
  2. **Self-Reported Data:** Responses may be influenced by social desirability bias or recall errors.
  3. **Geographical Scope:** Conducted in selected schools of one district, limiting generalizability to other regions.
  4. **Focus on Adolescents Only:** Does not capture awareness among parents, teachers, or community members who influence preventive behaviors.
  5. **Limited Depth on Practices:** While awareness was assessed, actual adoption of preventive behaviors (e.g., vaccination uptake) was not fully measured.

### Author Contributions

Each author has significantly contributed to the study's conception, design, data collection, analysis, and interpretation. All authors were involved in writing the manuscript or critically reviewing it for its intellectual value. They have reviewed and approved the final version for submission and publication and accept full responsibility for the content and integrity of the work.

### Conflicts of Interest

The authors state that there are no financial, personal, or professional conflicts of interest associated with this research.

### Ethical Approvals

This research did not involve the use of human participants or animal subjects and therefore did not require ethical clearance.

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