RESEARCH COMMUNICATION

# Awareness of Cervix Cancer Risk Factors in Educated Youth: A Cross-Sectional, Questionnaire Based Survey in India, Nepal, and Sri Lanka

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## Abstract

**Objective: The main aim of this study was to evaluate the awareness of cervix cancer risk factors among Educated Youth with respect to socio demographic factors. Materials and methods: A cross-sectional questionnaire survey was carried out among 1268 female undergraduate students in Delhi , Mangalore (India), Pokhara (Nepal) and Kandy (Srilanka) between 25 April 2010 and 20 August 2010 using structured questionnaire containing details of awareness of cervix cancer risk factors and socio demographic details. Descriptive statistics and testing of hypothesis were used for the analysis. Data analyzed using EPI INFO and SPSS 16 software. Results: In the 1,268 subjects, the mean age of Indian (528, 41.6%), Nepalese (480, 37.9%) and Srilankan (260, 20.5%) were 18.3 ± SD 0.7, 18.6 ± SD 0.8 and 18.0 ± SD 1.5 years, respectively. Distribution of students according to religion varied across the countries. Majority of the students were Hindus in India (61.4%) and Nepal (89.6%) while in Srilanka the majority (53.8%) were Buddhist. Relationships could be established between nationality and risk factors viz. awareness regarding cervix cancer (p= 0.024), sexual activity at an early age (before 16) can cause cervix cancer (p=0.0001), multiple sex partners can cause cervix cancer (p=0.001), condom/other birth control measures cant prevent HPV infection (p=0.0001), smoking as a risk factor(p=0.0001), hereditary risk factor (p=0.015), and first degree relative (p=0.0001). Conclusion: These results indicate that there is an urgent need for a reinvigorated and tailored approach to cervix cancer prevention among the educated youth in India, Nepal and Srilanka. Prevention efforts should be focused on improving social awareness, enforcing education strategies to reduce risk factors and improving the strength and quality of counselling.**

**Keywords:** Cervical cancer - awareness - educated youth - India - Nepal - Sri Lanka

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## Introduction

Cervical cancer is the leading cause of cancer deaths among women worldwide, predominantly those in developing countries (Ashford and Collymore, 2004). Globally it is estimated that of 500,000 women develop cervical cancer and almost 274,000 of them die from the disease per year (WHO, PATH, and the United Nations Population Fund, 2009). It is the second most common cancer in women worldwide and the most common in women in under-developed and developing countries, which bear more than 80% (WHO, 2010) of the global burden of the disease. This reveals the lack of effective control measures in these countries.

Cervical cancer is the single largest killer of middle-aged women in India (WHO, 2010), although one-third of the world cervical cancer burden is endured in Nepal and Srilanka (Sankaranarayanan et al., 2008). South Asian countries like India, Nepal and Srilanka jointly contribute to nearly one-third of the global cervical cancer burden (Ferlay et al., 2010). The age standardized rate (ASR) of cervix cancer for women in Nepal, India and Srilanka were found to be 17.6, 15.2 and 6.9 for the year 2008 (Ferlay et al., 2010). The hazard of cervical cancer is still predominant in South Asian countries like India, Nepal and Srilanka despite of being a preventable disease (A Saha et al., 2010).

The morbidity and mortality rates of cervix cancer are very high, so early detection and treatment is the only solution to it. The primary underlying cause is human papillomavirus (HPV), the most common sexually transmitted infection worldwide with women having multiple sex partners or who have sex with men who had many other partners (Marrazzo et al., 2001). Other causes of cervix cancer include smoking, low consumption of fruit/vegetable, family history and finally, stress (Obiageli et al., 2010). Public health programmes will be of great success and beneficial only if the level of awareness among women is immense. Various studies (Price et al., 1996; Ralston et al., 2003; Sankaranarayanan et al., 2009; Saha et al., 2010) have been undertaken to evaluate women's awareness and knowledge level about cervical cancer.

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The main aim of this study was to evaluate the awareness of cervix cancer risk factors among educated youth with respect to socio-demographic factors.

## Materials and Methods

*Study design and participants*

A cross-sectional, self-administered anonymous questionnaire-based survey was carried out. The survey was carried out in a community setting from female undergraduate students and data was collected Delhi and Mangalore (India), Pokhara (Nepal) and Kandy (Srilanka). We used a convenient sample of population in Phulbari (Pokhara), Noida (Delhi), Ullal (Mangalore) and Dambulla (Srilanka), because of the nature of the study.

*Questionnaire design*

Extensive review of literature, exploratory research and qualitative piloting contributed to the development and refinement of a structured questionnaire in English. There were a series of questions such as the awareness of human papilloma virus (HPV). Then there were questions about the knowledge of risk factors associated with cervix cancer such as whether sexual activity at early age can cause cervix cancer, sexual contact with multiple partners, use of condom/piles, smoking , low consumption of fruits and vegetables and hereditary factors etc. The items were not grouped according to the type of question so that the individual influence of each variable could be examined.

*Data collection*

This study was carried out between 25 April 2010 and 20 August 2010. A total of 1268 female undergratude students were selected, for the total study samples. The study subjects were requested to complete a self-reported anonymous questionnaire. The authors described the purpose and process of the survey to the youth, gave instructions for completing the questionnaire, and emphasized the confidentiality and anonymity of the responses. Oral consent was taken from all subjects. Under the supervision of interviewers (authors), the questionnaires were completed and collected.

*Data management and statistical analysis*

The respondents were classified based on the self-report, in a yes/no response format. Of the female undergraduates who responded in the affirmative, questions were asked regarding awareness and risk factors of cervix cancer. The age, educational level and religion were considered in the analysis to mediate the demographic factors which had an influence on other variables. The other variables that were considered were awareness in relation to HPV infection, sexual activity at an early age can cause cervix cancer, smoking as risk factor, low consumption of fruits and vegetables and hereditary factors etc .The data were analyzed using Excel 2003, R 2.8.0 Statistical Package for the Social Sciences (SPSS) for Windows Version 16.0 (SPSS Inc; Chicago, IL, USA) and the EPI Info 3.5.1 Windows Version. The chi-square test was used to examine associations and p-value of $< 0.05$ (two-tailed) was considered significant.

**Table 1. Cross Tabulation of Nationality, Risk Factors and Awareness of Risk Factors of Cervix Cancer**

| Knowledge | Indian | Nepali | Sri Lankan | P-Value |
|---|---|---|---|---|
| Aware of cervix cancer | | | | |
| No | 180 | 198 | 110 | 0.024** |
| Yes | 348 | 282 | 150 | |
| Total | 528 | 480 | 260 | |
| Aware of humanpapilloma virus (HPV) | | | | |
| No | 270 | 228 | 134 | 0.426 |
| Yes | 258 | 252 | 126 | |
| Total | 528 | 480 | 260 | |
| Sexually active at early age can cause cervix cancer | | | | |
| No | 390 | 294 | 188 | 0.0001** |
| Yes | 138 | 186 | 72 | |
| Total | 528 | 480 | 260 | |
| HPV can be transmitted through multiple sex partners | | | | |
| No | 318 | 234 | 146 | 0.001** |
| Yes | 210 | 246 | 114 | |
| Total | 528 | 480 | 260 | |
| Condom can't prevent fully the transmission of HPV | | | | |
| No | 378 | 276 | 158 | 0.0001** |
| Yes | 150 | 204 | 102 | |
| Total | 528 | 480 | 260 | |
| Smoking cause cervix cancer | | | | |
| No | 360 | 384 | 206 | 0.0001** |
| Yes | 168 | 96 | 54 | |
| Total | 528 | 480 | 260 | |
| Low consumption of fruit/vegetable can cause cervix cancer | | | | |
| No | 438 | 420 | 218 | 0.116 |
| Yes | 90 | 60 | 42 | |
| Total | 528 | 480 | 260 | |
| Hereditary factor | | | | |
| No | 522 | 480 | 260 | 0.015** |
| Yes | 6 | 0 | 0 | |
| Total | 528 | 480 | 260 | |
| Are you at risk of getting cervix cancer as first degree relative | | | | |
| No | 510 | 480 | 254 | 0.0001** |
| Yes | 18 | 0 | 6 | |
| Total | 528 | 480 | 260 | |
| Stress may be a cause for cervix cancer | | | | |
| No | 468 | 432 | 236 | 0.610 |
| Yes | 60 | 48 | 24 | |
| Total | 528 | 480 | 260 | |

**Statistically significant ($p<0.05$)

## Results

*Demographic Characteristics*

In the 1,268 subjects, the mean age of Indian (528, 41.6%), Nepalese (480, 37.9%) and Sri Lankan (260, 20.5%) were 18.3 ± SD 0.7, 18.6 ± SD 0.8 and 18.0 ± SD 1.5 years respectively. Distribution of students according to religion varied across the countries. Majority of the students were Hindus in India (61.4%) and Nepal (89.6%) while in Srilanka the majority (53.8%) were Buddhist.

Table 1 depicts that there was a relationship between nationality and risk factors viz. awareness regarding cervix cancer (p= 0.024), sexually active at an early age (before 16) can cause cervix cancer (p=0.0001), multiple sex partners can cause cervix cancer (p=0.001), condom/other birth control measures cant prevent HPV infection (p=0.0001), smoking as a risk factor(p=0.0001), hereditary risk factor (p=0.015), and first degree relative (p=0.0001). Among the three nationalities the proportion

of youth who were aware of cervix cancer was found to be 65.9% (Indian), 58.6% (Nepal) and 57.7% (Srilankan). Awareness in relation to sexually active at early age can cause cervix cancer was 26.1% (Indian), 38.8% (Nepal) and 27.7% (Srilankan), in which it was found that Indians were less aware. Awareness in relation with multiple sex partners can cause cervix cancer was 39.8% (Indian), 51.3% (Nepali) and 43.85(Srilankan) showed that it was the Indians with least awareness. Awareness about use of birth control measures /condom cant prevent HPV infection were 28.4% (Indian) , 42.5% (Nepali) and 39.2% ( Srilankan) , this shows Indian youths was less aware . Awareness with regard to smoking causing cervix cancer were 31.8% (Indians), 0.2% (Nepali) and 20.8% (Srilankan), among this it was found to be Nepalese with less awareness. Awareness of Hereditary factor can cause cervix cancer were present in 5.1% (Indians), 0% (Nepalese and Srilankan). Awareness regarding risk of developing cervix cancer from 1st degree relative was 3.41% (Indians), 0% (Nepali) and 2.3% (Srilankan) respectively.

Regarding the relationship between nationality (Indian), religion and risk factors, significance was obtained viz awareness regarding human papillomavirus (p=0.00001), sexually active at an early age (before 16) can cause cervix cancer (p=0.00001), multiple sex partners can cause cervix cancer (p=0.00001), awareness about use of condom/other birth control measures cant prevent HPV infection (p=0.0001), smoking as risk factor (p=0.0034),and stress as a risk factor (p=0.0130). Among the 3 religion in India the proportion of youths aware of HPV were 30.8% (Christians), 55.6% (Hindus) and 62.5% (Muslims), this shows that Christians in India were less aware of HPV. Awareness against sexually active at early age can cause cervix cancer was 19.2% (Christians), 33.3% (Hindus) and 0% (Muslims), in this Muslim youth were unaware. Awareness in relation with multiple sex partners can cause cervix cancer were 26.9% (Christians), 42.6% (Hindu) and 62.5% (Muslims), in this it was Christians with minimal awareness. Awareness about use of condom/birth control measures cannot prevent HPV infection were 15.4% (Christians), 33.3% (Hindus) and 37.5% (Muslims), among which Christians were less aware. Awareness against smoking causing cervix cancer were 42.3 %( Christians), 27.85% (Hindus) and 25% (Muslims), in this it was the Muslims with minimum awareness. Awareness in relation with stress can cause cervix cancer were 15.4% (Christians), 11.1% (Hindus) and 0% (Muslims), among which the Muslims were unaware of this risk factor.

For Nepalis, religion and risk factors viz awareness against sexually active at early age can cause cervix cancer (p=0.0026), low consumption of fruit/vegetable as causative of cervix cancer (p= 0.0186), hereditary risk factor (p=0.0001), first degree relative (p=0.00001) and stress (p=0.0450). Among the 3 religion in Nepal the proportion of youths who were aware against sexually active at early age can cause cervix cancer was 15% (Buddhist), 60% (Christians), and 40.5 %( Hindus), among which the Buddhist youth had minimum knowledge. Awareness against low consumption of fruit/vegetable as causative of cervix cancer were 0% (Buddhist), 0% (Christians) and 14% (Hindus) , in which Buddhist and Christian youth were unaware of this risk factor. Hereditary factors causing cervix cancer were present were 0% for Buddhist, Christians and Hindus in Nepal. Awareness of the risk of developing cervix cancer from the 1st degree relative was 0% for all the 3 religion. Awareness in relation with stress was 11.2% (Hindus) where as the Buddhist and Christians were unaware of the risk factor.

For Sri Lankan's, religion and risk factors viz awareness regarding human papillomavirus (p=0.0011), sexually active at an early age (before 16) can cause cervix cancer (p=0.0003), condom/other birth control measures cant prevent HPV infection (p=0.0467), hereditary risk factor (p=0.00001) and first degree relative (p=0.0032). among the 4 religion proportion of youth aware of HPV was found to be 55.7% (Buddhist), 30%(Christians), 60% (Hindus and Muslims), in which Christians youth had less awareness. Awareness against sexually active at early age can cause cervix cancer was 25.7% (Buddhist), 30% (Christians), 60% (Hindus) and 0% (Muslims), in this the Muslims had no awareness. Awareness about use of condom/birth control measures can't prevent HPV infection were 47.1 % (Buddhist), 30% for Christians, Hindus and Muslims, so here the 3 community had equal ratio. Awareness against hereditary risk factors was 0% for all the 4 religions. Awareness of the risk of developing cervix cancer from the 1st degree relative was 7.5 % (Christians) and 0% for all the other religion.

## Discussion

ACervical cancer is the most commonly reported malignancy among women in Nepal, Srilanka (Sankaranarayanan et al., 2008) and India (WHO, 2010). In our study among the female educated youths from the three nationalities, it has been revealed that the awareness of cervix cancer was 66% in India, 58.8% in Nepal and 57.7% in Srilanka, which can be considered as average awareness. However, the educated youth from three countries had less knowledge of other risk factors, such as HPV, sex at an early age, sex with multiple partners, use of birth control measures, low consumption of fruits /vegetables and stress can also cause cervix cancer. Poor knowledge and awareness of cervical cancer among women of different demographic and other characteristics has been reported from many countries (Lambert, 2001; Ralston et al., 2003; Peter and Navkiran, 2009; Wong et al., 2009).

The awareness of human papillomavirus (HPV) was found to be 48.9%, 52.5% and 48.5% respectively in India, Nepal and Srilanka in our study. Survey carried out by IARC in Asia shows that there is a direct association between education level and HPV prevalence (Anh et al., 2003; Sukvirach et al., 2003).The Papanicolaou (Pap) test of human papillomavirus (HPV), has proved to be more effective to protect the new generations of girls (Canavan and Doshi, 2000; Peto et al., 2004). Screening and treatment approaches have been found to be encouraging factors (Murillo et al., 2008; Garland et al., 2008). In a study carried out in Kolkata, India, there was "limited" to

"no" knowledge of cervical cancer (84%) and the Pap test (95%) (Roy and Tang, 2008). A study (Peter and Navkiran, 2009) among college students aged 18-35 years in Ghana noted very low awareness (7.9%) of the link between HPV and cervical cancer. Only 19.0% of adult Korean women reported to know that HPV infection was a risk factor for cervical cancer (Oh et al., 2010). In yet another Korean study, a mere 9.5% of female high school and university students reported that they had ever heard of HPV (Han et al., 2007).

In our study it was revealed that 39.8%, 51.3% and 43.8% female youth of India, Nepal and Srilanka were aware of transmission of HPV via multiple sex partners. Females who had multiple sex partners showed 60% HPV infection in genital region and 40% in anorectal region (van Doornum et al., 1994). Strong association with sexual partners substantiates that HPV can be acquired predominantly by sexual contacts and often soon after the onset of sexual activity (Jamison et al., 1995).

In our study 26.1%, 38.8% & 27.7% students of India, Nepal, and Srilanka were aware of a link between sexual activity at an early age and cervical cancer. In a study carried out in Kolkatta, 41% students were aware of a link between sexual activity and cervical cancer (A.Saha et al., 2010). Better awareness (38.4%) of the link between sexual activity and cervical cancer has been demonstrated by college students aged 18 to 35 years in Ghana (Peter and Navkiran, 2009). In a Malaysian study, women aged 21-56 years could not identify any of these risk factors (Wong et al., 2009).

Use of birth control measures/condom cannot prevent the infection of HPV. The proportion of students who were aware about this was 28.4% (Indian), 42.5% (Nepali) and 39.2% (Srilankan) respectively. There is a high risk of cervical intraepithelial neoplasia and cervical cancer in the women who are under long term use of contraceptives (Burkett BJ et al., 1992). However it has been revealed that condoms may not prevent HPV infection, but may protect against genital warts, CIN II OR III and ICC (LE Manhart et al., 2002).

Awareness in relation to smoking can cause cervical cancer among the female educated youth in India, Nepal and Srilanka were 31.8% (Indians), 0.2% (Nepali) and 20.8% (Srilankan) respectively. Cigarette smoking has been found to increase the risk of cervical cancer and its immediate precursor, cervical intraepithelial neoplasia grade 3, among women infected with oncogenic human papilloma virus (HPV) compared with women who do not smoke (Deacon et al., 2000; Castle et al., 2002; Tolstrup et al., 2006).

Hereditary factor can cause cervix cancer awareness was found to be 31.8% (Indians), 0.2% (Nepali) and 20.8% (Srilankan) respectively. Genetic epidemiological studies show that genetic factors contribute individual significant risk to develop this virally induced cervical cancer (Patrik, 2000). Family history can be a risk factor for cervix cancer (de Zelmanowicz et al., 2004).

Awareness of risk due to first degree relative was found to be 3.41% (Indians), 0% (Nepali) and 2.3% (Srilankan) respectively. There is close association between invasive cervical cancer and its relationship between 1st degree relative (mother, sister, daughter). Risks appear to be stronger among full blood relatives compared to half-blood /adoptive relatives (de Zelmanowicz et al., 2004).

The conclusions of our study and that from other studies suggest that despite the advent of vaccines to prevent HPV and the impact of cervical cancer deaths, especially in developing and underdeveloped countries, like India, Nepal and Srilanka, there has not been any major improvement in HPV awareness among the undergraduate female students. The poor level of knowledge of being sexually active at an early age (before 16) can cause cervix cancer as in our study, indicates that the larger population of less educated women is in greater lack of awareness.

The potency of our study lies in the selection of the educated population i.e. undergraduate girls, as they are the most important source of information carriers and dissemination. During this survey we accessed an inhabitant that has not been broadly studied and our interpretation leads to conclude that the absence of an active national cervical awareness and screening program has resulted in the lack of basic knowledge about important risk factors for cervix cancer even among the literate population of women. Unless and until the women gather enough knowledge and awareness on cervical cancer, it will be difficult to achieve the mission of National Cancer Control Programme. There is need for a strong countrywide knowledge base about cervical cancer so that the community can easily identify the early symptoms of the disease and take preventive measures.

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