



Original Research Article

Sexual risk factors for cervical carcinogenesis - A case control study

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ABSTRACT

Keywords

Cervical cancer; sexual risk factors; socio-demographic profile.

This report examines generally recognized sexual risk factors for cervical cancer among women in Western Tamilnadu. A matched case – control study was carried out at a referral hospital in Coimbatore. A standardized questionnaire that comprised socio-demographic and sexual risk factors was used to interview 200 histologically confirmed cervical cancer patients and controls. Controls were non cervical cancer patients who were matched for age and ethnicity and excluded those with malignancies or having gynecological, hormonal or endocrine problems. Conditional logistic regression was used for the analysis. Factors contributing for increased risk of cervical cancer were age (40-50 years), marital status, monthly house hold income (1000-5000), High school education, place of residence, use of oral contraceptives, HIV infection, lack of awareness on pap smear screening and vaccination. In summary, there was a significant difference between cervical cancer cases and controls subjects in relation to the above factors examined.

Introduction

Cancer of the cervix is the commonest genital tract malignancy in the female and it has been ranked second to breast cancer. About half a million new cases are seen worldwide each year, most occurring in developing countries (Awodele *et al.*, 2011 and Ertem, 2009). It is the top cancer site for women in most East African and South African countries both in terms of incidence and mortality (Ferlay *et al.*, 2010 and Arbyn *et al.*, 2011).

Cervical cancer has continuously been striking hard on the poorest countries such as central and South America, the Caribbean, sub-Saharan Africa, some parts of Asia with rates as high as 30 per 100,000 women, compared with North America and Europe that have reports of about 10 per 100,000 cases. Approximately 1.4 million women worldwide living with cervical cancer and India may account for more than one-fourth of the total reporting nearly 132,000

new cases annually. The exact cause of cervical cancer remains unknown. Cervical cancer can occur in any women however there are a number of associated risk factors that have been identified. Epidemiological studies conducted during the past 30 years have consistently indicated that cervical cancer risk is strongly influenced by measures sexual activity, number of sexual partners and sexual behaviour of women's male partners (Schiffman, 1995).

In light of the above facts, the present study attempts to find the sexual risk factors for cervical cancer among patients in Western Tamil Nadu covering Coimbatore, Erode, Karur and Salem attending Valavadi Narayanasamy Cancer Centre, G.Kuppusamy Naidu Memorial Hospital, Coimbatore. Determining the risk factors in cervical cancer may offers hopeful suggestions for modifying those factors, thus preventing cervical cancer occurrence.

Materials and Methods

A total of 200 cervical cancer patients were selected as the study participants. The age group of the patients varied from early 18-70 years. Age matched apparently healthy individuals were selected as control group participants. Study protocol was reviewed by the Ethics committee of G.Kuppusamy Naidu Memorial Hospital, Coimbatore (ECR/209/Inst/TN/2013).

Data collection

Both control and experimental group participants were administered a questionnaire to gather information regarding their socio demographic characteristics such as age, marital status, monthly household income, educational

status and place of residence and sexual risk factors consisted of questions assessing the knowledge about screening techniques, HPV and its vaccine, pap smear test and use of oral contraceptives (OCPs).

Data analysis

All questionnaires were reviewed for missing or incorrect data. All data entry and analysis were conducted using STATA. Percentage for categorical variables was calculated. The Chi Square test was used in the statistical analyses to evaluate the significant factors associated with cervical cancer risk by estimating Odds Ratio (OR) and 95% Confidence Intervals (CI). The level of significance was set at $p > 0.001$ for all hypothesis tests in the study. The OR was estimated with 95% CI.

Result and Discussion

Hundred cases (50%) and 76 (38%) of the control subjects were above 50 years of age. Seventy nine cases (39.5%) and 111 (55.5%) control subjects were in the age group of 40 – 50 years. Twenty one cases (10.5%) and 13 (6.5%) control subjects were under the age group of below 40 years. A significantly increased risk of cervical cancer was observed in the women of the age group of 40 – 50 years (OR = 1.2 ; 95% CI = 0.5 – 2.6 ; $p < 0.003$). (Table 1). Of the 200 cases, seven (3.5%) were single women, while other 193 (96.5%) were married women. Whereas in the control group, 6 (3%) were single women and remaining 194 (97%) were married women. The data was found to be statistically not significant.

There was a significant difference in monthly household income between cases and control subjects. Seventy cases (35%)

Table.1 Socio-demographic characteristics of study population

Characteristics		Cases (n = 200) No (%)	Control (n = 200) No (%)	OR	95% CI	p Value
Age (years)	> 50	100 (50)	76 (38)	1.00		
	40 – 50	79 (39.5)	111 (55.5)	1.2	0.5 – 2.6	0.003
	<40	21 (10.5)	13 (6.5)	0.5	0.3 – 0.8	0.5
Marital status	Single	7 (3.5)	6 (3)	1.00		
	Married	193 (96.5)	194 (97)	0.8	0.2 – 2.5	0.7
Monthly household income (₹)	>10,000	30 (15)	45 (22.5)	1.00		
	5000 – 10,000	100 (50)	145 (72.5)	1.03	0.6 – 1.7	0.8
	1000 – 5000	70 (35)	10 (5)	10.5	4.6 – 23.5	0.0001
High school education	Yes	91(45.5)	151 (75.5)	1.00		
	No	109 (54.5)	49 (24.5)	3.69	2.4 – 5.6	0.0001
Place of residence	Urban	127 (63.5)	80 (40)	1.00		
	Rural	73 (36.5)	120 (60)	0.3	0.2 – 0.5	0.2

Table.2 Odds ratio for sexual risk factors of the study subjects

Parameters		Cases (n = 200) No (%)	Control (n = 200) No (%)	OR	95% CI	p Value
Use of OCPs	Yes	62 (31)	30 (15)	2.46	1.54 – 3.92	0.0002
	No	138 (69)	170 (85)	1.00		
HIV infection	Yes	5 (2.5)	1 (0.5)	5.1	0.5 – 44.0	0.001
	No	195 (98)	199 (99.5)	1.00		
Awareness on Pap smear screening	Yes	2 (1)	8 (4)	1.00		
	No	198 (99)	192 (96)	4.1	0.8 – 19.6	0.05
Awareness on vaccination	Yes	22 (11)	71 (35.5)	1.00		
	No	178 (89)	129 (64.5)	4.4	2.6 – 7.5	0.0001

and 10 (5%) control subjects were earning monthly income between ` 1000 - 5000 (OR = 10.5; 95% CI = 4.6 - 23.5; $p < 0.0001$). Ninety one (45.5) cases and 151 (75.5%) control subjects were completed high school education. One hundred and nine (54.5%) cases and 49 (24.5%) control subjects never attend high school in their lifetime. In the present study, low level of education was associated with an increased risk of cervical cancer (OR = 3.69; 95% CI = 2.4 - 5.6; $p < 0.0001$). One hundred and twenty seven (63.5%) cases and 80 (40%) control subjects were urban people. Seventy three (36.5%) cases and 120 (60%) control subjects were rural people.

More of the cases (31%) were using oral contraceptives compared to the control subjects (15%). Intake of oral contraceptives was highly associated with a increased risk of cervical cancer (OR = 2.46; 95% CI = 1.54 - 3.92; $p < 0.0002$) (Table 2). A positive association was noted between the HIV infection and risk of cervical cancer. Five cases (2.5%) were affected with HIV when compared to control subjects (0.5%) (OR = 5.1; 95% CI = 0.5 - 44.0; $p < 0.001$). A strong association existed between the Pap smear screening and risk of cervical cancer. One hundred and ninety eight (99%) of the cases were never undergo Pap smear screening than controls (96%). Pap smear screening was found to be significantly associated with increased incidence of cervical cancer (OR = 4.1; 95% CI = 0.8 - 19.6; $p < 0.05$). The risk of cervical cancer was found to be increased with the less awareness on vaccination. Of the 200 cases one hundred and seventy eight (89%) cases and 129 (64.5%) control subjects does not have any awareness on vaccination (OR = 4.4; 95% CI = 2.6 - 7.5; $p < 0.0001$).

In the present study the peak incidence of cervical cancer was observed in the age group 40 - 50 years. This is in accordance with the reports of WHO / ICO information centre on HPV and cervical cancer (a) (2009). They found that in India, the peak age for cervical cancer incidence is 45 - 54 years which is similar to the rest of south Asia. Canadian Cancer Statistics (2011) revealed that the number of cases of diagnosed cervical cancer increaser among women aged 25 years and older, peaking during the fifth decade of life.

In the present study, incidence of cervical cancer is positively associated with low monthly household income and low educational status. According to Vallikad (2006) and Kurkure and Yeole (2006), the prevalence and burden of cervical cancer is much higher among women of low socio economic status as well as among rural women in India. Parkin *et al.* (2003) reported that some case control studies in Asia, Africa and South America indicated substantially higher risks of cervical cancer among women of lower social class groups. According to Aggarwal *et al.* (2006) women who were illiterate or had less than six years of education had a significantly higher rate of high risk HPV. A study conducted by Swaminathan *et al.* (2009 b), in a rural population revealed that the risk of cervical cancer is inversely associated with increasing educational levels. HPV positivity in the rural population of Dindigul district was found to be inversely associated with education level (Frances Chi *et al.*, 2005). Therefore, the present study evidently supports the role of education, low socio economic status as the determinants of cervical cancer.

Use of oral contraceptives was found to have an increased risk of cervical cancer

incidence. Similar findings were observed by Schemik (2008), who said that long term use of oral contraceptives may lead to a more frequent persistence of HPV. This was also supported by the studies of Hwang *et al.*, (2009) in that they opined that oral contraceptives may accelerate cervical maturation process, representing increased cell proliferation and thus a possible greater vulnerability to HPV.

Epidemiological studies, in developed countries shown that HIV infected women are at higher risk of being infected with HR-HPV (Sun *et al.*, 1997, Jamieson *et al.*, 2002), and are at a higher risk of persistence and associated cervical disease progression than HIV – uninfected women (Blossom *et al.*, 2007). Strickler *et al.* (2003) and Haiver *et al.* (2006) found that HIV related immune alteration appear to increase the risk of cervical disease progression. In the present study it is observed that HIV infected women are more susceptible to cervical cancer.

The awareness about cervical cancer screening test (Pap test) was found to be very low in the present study. Similar low levels of awareness have been reported in other studies (Ayinde *et al.*, 2004). Unlike most other cancers, cervical cancer is readily preventable when effective programs are implemented to detect and treat its precursor lesion (Ali *et al.*, 2010). In the present investigation only a very little cases were aware of the available vaccine. Low levels of awareness about the vaccine were also observed in a study done in Karachi by Ali *et al.*, (2010). Similar findings were noted by Hoque (2010) in their study conducted among university students in South Africa. According to Baylkeal *et al.*, (2008), public acceptance and usage of prophylactic vaccine are related to the

level of knowledge about the disease. Jayant *et al.* (1996) in their study concluded that the efforts to improve awareness of the population have resulted in early detection of and improved survival from cervical cancer in a backward rural region in Western India.

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