Socio-Demographic Factors Associated with Risk of Cancer Cervix in Women

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Abstract: Introduction: Carcinoma of cervix is one of the leading malignancies in developing countries including India having an incidence of 14.42 and mortality 2.83 per lakh population .It has a multifactorial etiology. **Objectives:** To study some socio-demographic risk factors and their strength of association with cervical cancer. **Material And Methods:** Hospital based case control study was carried out at Obstetrics and Gynecology and Radiotherapy departments, Government Medical College and Hospital, Nagpur; a tertiary-care, teaching-hospital in Central India. A sample of 130 cases and 130 controls was included. Cases were histopathologically diagnosed patients of cancer cervix from out-patient and in-patient departments. For each case, one concurrent control (i.e. woman with normal pap smear) was selected from the hospital, excluding those women with any other cancer. **Analysis:** Data in case and control groups were summarized in the form of frequency and percentages. Crude and adjusted estimates of odds ratios (OR) were calculated along with 95% confidence intervals (CI), chi-square test and unconditional multiple logistic regression (MLR) were used to assess associations. Data were analyzed in Epi–info (3.5.1), and SPSS version 18.0. **Results:** Out of a total 130 cases, majority i.e. 87 (66.9%) were diagnosed in stage IIIB of cervical cancer. On multivariate analysis, seven risk factors were found to be significantly associated with cervical cancer. These were: Early age at 1st sexual intercourse(OR= 9.62, 95%CI=6.84-33.42, p value<0.001), illiteracy(OR=3.58, 95%CI=1.72-7.46, p value <0.001), poor genital hygiene (OR=3.35, 95%CI=1.59-7.03, p value <0.001), multiparity(OR=3.16, 95%CI=1.17-8.53, p value =0.023), low socioeconomic status(OR=2.11, 95%CI=1.12 -4.41, p value =0.044), OCP use for $\geq$3 yrs (OR=1.78, 95%CI=1.65-1.94, p value =0.009), Early age at menarche(OR=1.44, 95%CI=1.21-1.97, p value =0.042) **Conclusion**: Early age at 1st sexual intercourse, illiteracy, poor genital hygiene, multiparity, low socioeconomic status, OCP use for $\geq$3 yrs, and early age at menarche are important risk factors in women in Central India. Imparting health education and early screening of women will help in prevention and reduction of cervical cancer.
Keywords: case control study, cancer cervix, risk factor, health education, early screening.

INTRODUCTION

Cervical cancer is the second most frequent cancer amongst women globally [1]. Developing countries like India account for roughly 80% of these cases. Cervix is the most common site of genital cancer, having incidence of 14.42 and mortality 2.83per lakh population [1, 2]. In India, a large proportion of female population is vulnerable to cervical cancer since its recognized risk factors are widely prevalent like illiteracy, low socioeconomic status, early menarche, early marriage, first childbirth at an early age, multiparity, poor genital hygiene etc. It has a multifactorial etiology. If the relative importance of these various risk factors is known then it would have a great potential as a primary preventive measure for cervical cancer.

Further, if an attempt is made to identify the population at risk, then possibly early detection efforts can be directed specifically to the group at risk. This is useful when routine screening procedure for the whole population is not feasible.

Since modifiable risk factors like age at marriage, multiparity, genital hygiene, number of sexual partners etc. are important risk factors in the

etiology of cervical cancer; there is a need for epidemiological studies to determine ways to minimize them.

AIM AND OBJECTIVES
- To study some socio-demographic risk factors association with cervical cancer
- To study strength of association of socio-demographic risk factors with cervical cancer
- To suggest suitable recommendations for its prevention

MATERIALS AND METHODS
Hospital based case control study was carried out at Obstetrics and Gynecology and Radiotherapy Departments, Government Medical College Hospital, ,Nagpur a tertiary-care teaching-hospital in Central India A sample of 130 cases and 130 controls was included. Cases were histopathologically diagnosed patients of cancer cervix from out- patient and In-patient Departments. For each case, one concurrent control (i.e. woman with normal pap smear) was selected from the study hospital, excluding those women with any other cancer. Cases and controls were matched for age.

METHODOLOGY
Written approval from ethical committee, GMCH, Nagpur was obtained. Written permission from HOD,OBGY department and HOD, Radiotherapy department ,GMCH , Nagpur was obtained to carry out the study .Informed consent from patients were obtained.

A pilot study with 50 cases and 50 controls was carried out for assessing the feasibility of the study and proforma. Rapport was developed with the patient and strict confidentiality was assured. Interview was carried out in private room (side room).From each case, demographic information was first obtained by interview method. Details of presenting complaints and personal history like genital hygiene practices were noted. Also, menstrual history regarding age at menarche, previous menstrual cycles, age at menopause was taken. Details of marital history like marital status, age at marriage and duration of married life was obtained. About obstetric history, information of parity, age at first and last childbirth was noted. Careful behavioural history about number of sexual partners was taken .Regarding contraceptive use, details like method used, duration of use etc.were noted. Further, Pap smear was collected from selected women from gynecology OPD and it was sent to cytology section of Pathology department, GMCH, Nagpur. Those patients with negative Pap smear report were included in controls. Each control was questioned in the same

manner like the cases and the information obtained was noted down in the same predesigned proforma. In each study subject, complete general and systemic examination was done. Local examination of genital tract was carried out in detail and noted. Sample size was calculated by using previous study of Biswas L [3]. Using appropriate statistical software, which came out to be 130 subjects in each case and control group.

DATA ANALYSIS
Data in case and control groups were summarized in the form of frequency and percentages. Crude and adjusted estimates of odds ratios (OR) were calculated alongwith 95% confidence intervals (CI), chi-square test and unconditional multiple logistic regression (MLR) were used to assess associations. Data were analyzed in Epi–info (3.5.1) and SPSS version 18.0

STUDY VARIABLES
Age, religion, education, residence, socioeconomic status, age at menarche, marital status, age at marriage, age at 1st sexual intercourse ,parity, age at 1st childbirth, age at last childbirth, age at menopause, duration of married life, oral contraceptive pills(OCP),number of sexual partners, genital hygiene.

RESULTS
Maximum cases i.e.77 (59.2%) was diagnosed in IIIB stage of cervical cancer. Table 1 Shows distribution of study subjects according to socioeconomic and demographic factors. The age distribution of study subjects ranged from 28 years to 80years. Majority of study subjects were in age group of 41-60yrs, i.e.79(60.8%), followed by 31-40yrs , i.e.26(20%).

105(80.8%) of cases and 93(71.5%) controls were Hindus, while others were non-Hindus. Stronger difference is seen in education. Illiteracy was seen in 102(78.5%) cases as opposed to 48(36.9%) controls. Maximum study subjects were found from urban area .95(73.1%) cases and 104(80.0%) controls were married. Others were either widows/separated /divorced. There was no unmarried subject in our study. Table 2 Shows mean and standard deviations of reproductive variables.

Table 3 gives bivariate analysis for risk factors. There are no significant differences between cases and controls with respect to place of residence, but when stratified analysis was done in urban and rural area, significant relation between socioeconomic status and cancer cervix was seen in urban setting only. (Odds ratio =2.68;95%CI=1.44-4.98;p<0.001).Odds ratio for illiterate women compared with literate ones was 6.22 (95%CI=3.47-11.22;p<0.001).

Table-1: Distribution of study subjects according to socioeconomic and demographic factors

Factor	Cases		Controls	
	No.	(%)	No.	(%)
Age				
	N= 130	(%)	N= 130	(%)
≤ 30	4	3.0	4	3.0
31-40	26	20	26	20
41-50	39	30	39	30
51-60	40	30.8	40	30.8
> 60	21	16.2	21	16.2
Religion				
	N= 130	(%)	N= 130	(%)
Hindu	105	80.8	93	71.5
Buddhist	20	15.4	23	17.7
Muslim	04	03.0	11	08.5
Christian	01	00.8	03	02.3
Educational status				
	N= 130	(%)	N= 130	(%)
Illiterate	102	78.5	48	36.9
Literate	28	21.5	82	63.1
Place of residence				
	n= 130	(%)	n= 130	(%)
Rural	35	26.9	27	20.8
Urban	95	73.1	103	79.2
Socioeconomic status (Urban)				
Socioeconomic status	(n=95)	(%)	(n=103)	(%)
Upper	1	1.1	0	0
Upper middle	14	14.6	41	39.8
Lower middle	27	28.4	29	28.1
Upper lower	39	41.2	25	24.3
Lower	14	14.7	8	7.8
Socioeconomic status (Rural)				
Socioeconomic status	(n=35)	(%)	(n=27)	(%)
II	2	5.7	3	11.1
III	8	22.9	5	18.5
IV	20	57.1	13	48.2
V	5	14.3	6	22.2
Marital status				
	n= 130	(%)	n= 130	(%)
Married	95	73.1	104	80
Widow	31	23.8	19	14.6
Separated	1	0.8	3	2.3
divorced	3	2.3	4	3.1

Table-2: Mean and standard deviation of reproductive variables

Variable	Cases		Controls	
	Mean	SD	Mean	SD
Age (yrs)	51.01	11.34	51.01	11.34
Age at menarche (yrs)	13.51	1.16	14.32	1.06
Age at marriage (yrs)	17.33	2.24	19.45	2.23
Age at first sexual intercourse(yrs)	17.37	2.08	19.45	2.23
Parity	4.1	1.57	3.2	1.47
Age at first childbirth (yrs)	18.56	1.96	20.62	2.24
Age at last childbirth (yrs)	30.23	6.43	29.87	5.52
Age at menopause(yrs)	43.9	3.59	43.81	2.63
Duration of married life(yrs)	33.75	11.87	31.25	12.41

Table 3 also gives distribution of study subjects and association of reproductive and sexual factors. Women with age at menarche before 13 yrs of age were at a strikingly higher risk for cancer cervix.(Odds ratio=2.19;95%CI=1.28-3.77; p=0.0023). Marriage before 18 yrs of age was also statistically significant risk factor for cancer cervix.(Odds ratio=5.52;95%CI=2.98–10.37; p<0.001).Women who had first sexual intercourse before 18 yrs of age were at 9.71 times higher risk.(95%CI=5.16-18.54; p<0.001).

Multiparity was found to be a risk factor for cervical cancer.(Odds ratio for≥3Vs<3=3.32, 95%CI=1.77–6.36; p<0.001).Early age at first childbirth (Odds ratio for<18Vs≥18 =6.86;95%CI=2.83–18.93; p<0.001), older age at last childbirth (Odds ratio for ≥30 Vs <30=2.87; 95%CI=1.67–4.96; p<0.001), late age at menopause (Odds ratio for≥45Vs<45=2.45; 95%CI=1.22–4.96; p=0.006), longer duration of married life (Odds ratio

for≥15Vs<15=4.67; 95%CI=1.77–14.44; p<0.001), duration of use of OCP for more than 3 yrs(Odds ratio=6.67; 95%CI=1.13–37.27; p=0.0135),were all significantly associated with cancer cervix. Having had 2 sexual partners compared to one was associated with 7.34 fold increased odds ratio (95%CI=1.92–33.32; p=0.0312).

Grading for genital hygiene was done according to frequency of cleaning genitalia as: Grade I-more than once in a day, Grade II-once in a day, Grade III-at least once/more time per wk but less than once in a day, Grade IV-less than once a wk. Maximum cases i.e.61 (46.9%) had gradeIII genital hygiene whereas maximum controls i.e.87 (66.9%) had grade II genital hygiene. Women with genital hygiene of grade III and IV were at 3.72 times greater risk of getting the disease than that of grade I and II. (95%CI=2.15–6.43; p<0.001).

Table-3: Distribution of risk factors among study subjects

Factor	Cases		Controls		p value	Odds ratio and 95 %CI
	No.	(%)	No.	(%)		
Educational status						
	(n=130)	(%)	(n= 130)	(%)	<0.001	6.22 (3.47 - 11.22)
Illiterate	102	78.5	48	36.9		
Literate	28	21.5	82	63.1		
Place of residence						
	(n=130)	(%)	(n= 130)	(%)	0.2443	1.41 (0.76 -2.61)
Rural	35	26.9	27	20.8		
Urban	95	73.1	103	79.2		
Socioeconomic status (Urban)*						
	(n=95)	(%)	(n=103)	(%)	<0.001	2.68 (1.44 - 4.98)
Lower **(UL + L)	53	55.9	33	32.1		
Upper***(U+ UM +LM)	42	44.1	70	67.9		
Socioeconomic status (Rural)****						
	(n=35)	(%)	(n=27)	(%)	0.9275	1.05 (0.29-3.63)
Lower (IV + V)	25	71.4	19	70.4		
Upper (I + II + III)	10	28.6	8	29.6		
Age at menarche (yrs)						
	(n=130)	(%)	(n= 130)	(%)	0.0023	2.19 (1.28-3.77)
≤13	91	70	67	51.5		
>13	39	30	63	48.5		

Factor	Cases		Controls		p value	Odds ratio and 95 %CI
	No.	(%)	No.	(%)		
Age at marriage (yrs)						
	(n=130)	(%)	(n= 130)	(%)	<0.001	5.52 (2.98 – 10.37)
< 18	67	51.5	21	16.2		
≥ 18	63	49.5	109	83.8		
Age at first sexual intercourse (yrs)						
	(n=130)	(%)	(n= 130)	(%)	<0.001	9.71 (5.16- 18.54)
<18	108	83.1	46	35.4		
≥ 18	22	16.9	84	64.6		
Parity						
	(n=130)	(%)	(n= 130)	(%)	<0.001	3.32 (1.77 – 6.36)
≥3	110	84.6	81	62.3		
<3	20	15.4	49	37.7		
Age at first childbirth (yrs)						
	(n=129)		(n=122)		<0.001	6.86 (2. 83 –18.93)
< 18	38	29.5	7	5.7		
≥ 18	91	70.5	115	94.3		
Age at last childbirth (yrs)						
	(n=129)		(n=122)		<0.001	2.87 (1.67 – 4.96)
≥ 30	80	62	48	39.4		
< 30	49	37.9	74	60.6		
Age at menopause (yrs)						
	(n=93)		(n=85)		0.006	2.45 (1.22 – 4.96)
≥ 45	40	43	20	23.5		
< 45	53	57	65	76.5		
Duration of married life (yrs)						
	(n=130)	(%)	(n= 130)	(%)	<0.001	4.67 (1.77 – 14.44)
≥ 15	124	95.4	106	81.6		
<15	6	4.6	24	18.4		
Duration of OCP use (yrs)						
	(n= 21)		(n= 13)		0.0135	6.67 (1.13 –37.27)
≥ 3	14	66.6	3	23.1		
< 3	7	33.3	10	76.9		
No. Of lifetime sexual partners						
	(n=130)	(%)	(n= 130)	(%)	0.0312	7.34 (1.92 –33.32)
>1	7	5.4	1	0.8		
1	123	94.6	129	99.2		
Grades of genital hygiene						
	(n=130)	(%)	(n= 130)	(%)	<0.001	3.72 (2.15 – 6.43)
III + IV	81	62.3	40	30.8		
I +II	49	37.7	90	69.2		

*as per Modified Kuppuswamy classification ,
Lower**= Upper lower + Lower
Upper*** = Upper+ Upper middle +Lower middle
**** As per   Modified Prasad's classification

Table 4 gives results of Multivariate analysis. Out of 16 factors studied, 13 turned out significant at α =0.20 in bivariate analysis. These 13 factors were then entered in full model for multivariate analysis. Unconditional multiple logistic regression (MLR) was applied. Out of 13 risk factors, 7 were significantly associated with cancer cervix at α =0.05 in the final model. According to their significance they were as follows: Early age at 1st sexual intercourse (Odds ratio= 9.62;95%CI=6.84-33.42; p<0.001), Illiteracy (Odds ratio=3.58;95% CI=1.72-7.46; p <0.001), Poor genital hygiene (Odds ratio=3.35; 95% CI=1.59-7.03; p<0.001), Multiparity (Odds ratio=3.16; 95%CI=1.17-8.53; p=0.023), Low socioeconomic status (Odds ratio=2.11;95%CI=1.12-4.41; p=0.044), OCP use for≥3 yrs(Odds ratio =1.78;95%CI=1.65-1.94; p=0.009), Early age at menarche(Odds ratio =1.44; 95%CI=1.21-1.97; p=0.042).

Table-4: Results of unconditional multiple logistic regression (MLR) analysis showing the significant risk factors for cervical cancer (final model)

Variable	Odds ratio	p value	95% conf. Interval
Age at 1st sexual intercourse	9.62	<0.001	6.84-33.42
Education	3.58	<0.001	1.72-7.46
Genital hygiene	3.35	<0.001	1.59-7.03
Parity	3.16	0.023	1.17-8.53
Socioeconomic status	2.11	0.044	1.12 -4.41
OCP use	1.78	0.009	1.65-1.94
Age at menarche	1.44	0.042	1.21-1.97

DISCUSSION

Several studies reveal that there is definite association of some risk factors like early marriage, high parity, early age at first sexual intercourse, unsatisfactory genital hygiene, etc. with cancer cervix [13-16].

Early age at first sexual intercourse i.e. before 18 yrs of age was most significant risk factor in our study. Similarly, Melissa Schiff M *et al*. [4] in their case control study reported women with age at 1st sexual intercourse<16 yrs were at 1.6 times higher risk for cancer cervix.(95%CI=1.3-3.6) and Pandey K *et al*. [5] quoted the risk to be 9.6 times more for intercourse at <15 years of age.(p<0.001;95%CI=3.2-28.8)

Our study showed that illiteracy is a highly significant risk factor as observed by other studies of Hammouda D *et al.* [6] (Odds ratio=3.92),Rostad B *et al*. [7] (Odds ratio =17.8). In the present study 62.3% cases had poor genital hygiene which contributed to 3.72 folds increased risk for cervical cancer. Dasgupta A *et al*. [8] quoted 69% cases with poor genital hygiene in their study. Dutta PK *et al*. [9] noted 2.5 times greater risk of cervical cancer in cases with poor hygiene.

Sule S *et al.* [10] quoted that patients with parity>7(Odds ratio=4.32) were at a higher risk for cervical cancer while Teharian A *et al*. [11] stated that Parity>6(Odds ratio=3.2) and Rostad B. *et al*. [7] in a hospital based study in sub-saharan african population found that multipara≥ 5(Odds ratio=4.0) had risk of getting cancer cervix, which is similar to our finding for parity ≥3.(Odds ratio=3.16).

From our data, low socioeconomic status is also a significant risk factor associated with cervical cancer as earlier observed by Pandey K [5] (Odds ratio=5.79) Several investigators have documented risk of cancer cervix with OCPuse for long duration like Teharian A *et al* [11] (Odds ratio=3.6), Chichareon S *et al.* [12] (Odds ratio=1.1). Though duration of use was slightly different i.e.5 and 4 yrs respectively. Likewise in our study, we found the duration of OCP use for >3yrs as a significant risk factor. (Odds ratio=1.78).

CONCLUSION

From the findings of our study ,it can be concluded that cancer cervix is associated with various risk factors like early age at 1st sexual intercourse, Illiteracy, poor genital hygiene, multiparity,low socioeconomic status ,long duration of OCP use, early age at menarche; most of which are modifiable. Hence, health education and early screening should be imparted in the vulnerable group.

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