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Original Research Article

Effect of health education on knowledge regarding cervical carcinoma among the female college students of Nadia district, West Bengal

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ABSTRACT

Background: Cervical cancer, the second most common cancer among women globally, causes significant deaths in low- and middle-income countries, including India. This study aims to assess the effectiveness of health education on cervical cancer knowledge among female college students in Nadia district, West Bengal, highlighting the importance of awareness in this priority group.
Methods: A quasi-experimental study was conducted at two government colleges in the Nadia District. It involved three steps: initially, a baseline survey was performed using a pretested questionnaire and checklist to gather socio-demographic data and assess students' knowledge of cervical cancer. This was followed by a three-week intervention phase at the study college. Finally, knowledge scores were reassessed post-intervention at both the study and control colleges.
Results: Baseline comparisons of socio-demographic characteristics and median knowledge score showed no significant difference between the study and control groups (median scores: 4.50 versus 9.00, p=0.431), indicating comparability. Post-intervention, the study college exhibited a significant increase in knowledge scores (median 19, IQR 9.00-24) compared to the control college (median 8, IQR 2.00-12.75). The control college showed no significant change in median knowledge scores post-intervention (pre-test median 9.00, IQR 3-12; post-test median 8.00, IQR 2-12.75, p=0.320).
Conclusions: Structured health education programs with regular reinforcement significantly enhance college students' knowledge of cervical cancer. An integrated approach involving both education and health departments is essential for effective implementation.

Keywords: Eastern India, Genital carcinoma, Institution, Intervention, Perception, Scholars

INTRODUCTION

Cervical cancer is a long-term and rare outcome of persistent infection with one of the common oncogenic type human papillomavirus (HPV) infections.[1] One or more of the symptoms such as vaginal discharge, sometimes foul-smelling, irregular bleeding, postcoital spotting or bleeding, and postmenopausal spotting or bleeding are the symptoms of early-stage cervical cancer followed by urinary frequency and urgency, backache, low abdominal pain, kidney failure, and even more severe symptoms in later stages.[1] Cervical cancer is one of the most common types of cancer among women worldwide, with an estimated 604,000 new cases and 342,000 deaths in 2020.[2] In India, cervical cancer is the second most common cancer among women, accounting for

approximately 96,922 new cases and 60,078 deaths in 2018.[3] In West Bengal, the incidence of carcinoma cervix has declined in the urban population but continues to be highly prevalent in rural areas.[4]

Factors such as early age at marriage, early age at first sexual intercourse, early age at first full-term pregnancy, multiple pregnancies and long-term use of hormonal contraceptives, which facilitate the progression of HPV infection to neoplastic cervical lesions, may contribute to the increased incidence of cervical cancer in India.[5] Cervical cancer is caused by the HPV and is preventable through vaccination, screening, and early treatment.[6] In addition, the cause for the increased incidence of cervical cancer in India could be the increased burden of high-risk HPV strains in the country, with HPV-18 and 16 being the most common.[5]

Cervical cancer prevention includes primary, secondary, and tertiary-level activities. Health education and vaccination against HPV infection are components of primary prevention, whereas secondary prevention focuses on early detection.[7] Early diagnosis helps to identify and treat at an early stage in symptomatic women when having a better prognosis, whereas screening identifies precancers in asymptomatic women before they progress to invasive cervical cancer.[8] Diagnosis, management, and palliative care are part of tertiary prevention.[7]

Currently, three types of HPV vaccines (Cervix, Gardasil and Gardasil 9) are available for preventing HPV infections.[9] The three vaccines are safe and effective (90% to 100%).[9,10] Although HPV vaccines are safe and effective; acceptance of the same among at-risk individuals is not as high as anticipated, lowering its potential public health impact. HPV vaccination was even suspended in India until recently after being approved in 2008.[11] The factors that contributed to the suspension of HPV vaccination in India included lack of knowledge and misinformation about HPV, cervical cancer and HPV vaccine; negative attitudes and beliefs about HPV, cervical cancer and HPV vaccine; and sociodemographic and cultural factors.[11] Indeed, health behaviour theories indicate that knowledge, sociodemographic and cultural factors affect attitudes and beliefs of people to a disease pathogenesis, treatment and prevention measures.[12,13]

Health education is an essential component of cervical cancer prevention.[14] However, studies have shown that there is a lack of awareness regarding cervical cancer and its prevention among women, particularly in rural areas.[15,16] In West Bengal, limited research has been conducted on the knowledge and awareness of cervical cancer among college students, who are an important target group for health education interventions since they are the future generation of the country and in a position to spread awareness to peers. With this background, the current study has been conducted to find out the effect of intervention (i.e. health education) on knowledge regarding cervical carcinoma among female non-medical college students of Nadia district, West Bengal.

METHODS

A non-randomized before and after trial with control was conducted from February 2023 to July 2023, in two government general colleges in Nadia district, West Bengal. One of them was study college and the other was control college. Medical students had the opportunity to gain knowledge regarding cervical carcinoma through their medical curriculum and Engineering students had time constraints due to academic pressure. Hence this study considered only female students of general colleges.

Institutional ethical clearance was obtained from the Institute of Health and Family Welfare; necessary permissions from respective authorities were also obtained before conducting the study. Informed written consent was taken from every student. A study in a primary school located in a slum of Kolkata by Deb et al revealed that 74% of female students were suffering from any kind of morbidity.[17] Assuming a risk reduction of 20% after the intervention, with 80% power and 95% level of significance, the minimum required sample size for the intervention group using the Fleiss equation was 74 (intervention group) and 148 (control group). It was decided to incorporate twice the participants in the control group compared to the intervention group.

A line list of all the general colleges was prepared and two colleges were selected randomly from the list considering the facts of getting permission from the college authority, feasibility of work, and transportation. Those colleges which were running all 4 courses (science, arts, commerce, pass course) were approached to get consent and checked for feasibility of work. Two colleges were selected at a fair distance from each other so that the health educational messages could not be percolated from the study to the control college before the end of the study period. After consulting the college authorities, batches under more academic pressure were excluded from the study. For that reason, sixth-semester Arts students were selected as the study participants. A line listing of sixth-semester Arts students at both colleges had been prepared separately and estimated samples in study and comparison colleges were collected by simple random sampling method. All the students who gave informed written consent were thus included in the study, whereas the students who/whose family members had been previously diagnosed with cervical cancer or had received any health education related to cervical cancer were excluded from the study. The final study participants got an enrolment number and their contact details were taken.

Consent forms, information sheets in vernacular and pre-designed pretested structured questionnaires were used to collect socio-demographic information and assess knowledge regarding cervical cancer before and after the intervention. The questionnaire was first prepared in

English. Then it was translated into Bengali by a linguistic expert keeping semantic equivalence. Thereafter, to check the translation, it was retranslated into English by two independent researchers who were unaware of the first English version. Face validity of each item was checked from previous research in the presence of public health experts. They also decided the content validity of each domain. Reliability was checked by the test-retest method. Pretesting followed by pilot testing was done in a separate general college in Nadia district.

A health education program was developed based on the information obtained from the pre-test questionnaire. Weekly health education was provided through lectures enhanced by audio-visual aids with the help of laptops and projectors in the study college. A total of 6 classes each of 2 hours duration were arranged in the study college. The students (both male and female) who were not the study participants were also given a chance to get into the health educational program if they wished to attend the same. Attendance was strictly taken in each class. Those students having less than 85% overall attendance were not allowed to sit for post-test. A post-test questionnaire was applied to both the study and comparison college at the end of the health education program in study college. The students in the control college got one session of health education after the post-test was over in both colleges.

A pre-test was conducted using the structured questionnaire to assess the baseline knowledge regarding cervical cancer. The questionnaire was multiple-choice in pattern. Students were scored one for each correct answer and zero for each wrong answer. If any question had multiple correct answers and the student was unable to answer correctly, then she was scored as zero. Total 48 questions were there and total score was 54. Questionnaires were sent by email to each student in Google form. All the study participants in the study and comparison college were instructed to sit in a separate large classroom maintaining adequate distance from each other. One supervisor per 3 students was posted for guard to prevent information bias and they were strictly instructed not to copy each other. Teachers who gave voluntary consent were involved in this job.

Data (both pre and post-test) were checked for normality first by the Shapiro-Wilk test and found to be not normally distributed ($p<0.05$). Hence non-parametric tests were applied in case of inferential statistics. All the tests were two-tailed, and p-value <0.05 was considered as significant throughout the analyses. Data were entered and analysed subsequently in statistical package for the social sciences (SPSS) version 20.0.

RESULTS

A quasi-experimental study was conducted in two Government general colleges in Nadia district, West Bengal. Regarding the socio-demographic characteristics, there was no statistically significant difference in the socio-demographic profile of the students of both study and control colleges therefore they were comparable to one another. Most of the students in both study and control colleges were 21 years of age (62.1% and 48.6%), Hindu by religion (94.5% and 90.5%), and schedule caste (40.5% and 40.5%). Majority of the students lived in rural areas (58.1% and 64.8%) and were unmarried (100% and 95.2%).

Regarding parental characteristics study and control colleges were comparable to each other also. Majority of the fathers of the students of both study and control colleges surveyed were educated up to graduated and above (22.97% and 22.97%).

On a similar note, the majority of the mothers of both colleges were educated up to graduated and above (12.16% and 12.16%). Considering the occupation of father, both study and control colleges were engaged in business (31% and 28.3%) whereas the majority of mothers were housewives of both colleges. Social class had been evaluated according to Revised B. G Prasad socio-economic status classification; January 2022 and in this respect too, the study and control college students were found to be comparable. The majority of participants were in the upper class (63%, 76%) from study and control colleges respectively (Table 1).

Regarding knowledge about different aspects of cervical carcinoma, baseline survey revealed a huge gap in knowledge regarding risk factors, diagnosis, prevention as well as treatment and prognosis of the same in both study and control colleges, though after intervention the proportion of correct responses had been increased in study college. In baseline survey students of both the colleges secured poor marks (82.43% and 91.89%) regarding knowledge of cervical carcinoma, whereas after intervention only 36.48% of students were found to get poor marks (Tables 2 and 3).

There was no statistically significant difference between the study and control college regarding baseline knowledge level ($p>0.05$). So, both colleges were comparable to each other. However, there was a statistically significant difference between the median knowledge scores of the study and control colleges after the intervention ($p<0.05$) (Table 4).

There was a statistically significant difference in the median knowledge scores of the study college between baseline and after intervention ($p<0.05$); but there was no statistically significant difference between the median knowledge scores of the control college baseline and after intervention. ($p>0.05$) (Table 5).

Table 1: Distribution of study population according to socio-demographic characteristics (n=222).

S. no.	Variables	Study college (n=74)		Control college (n=148)		Total number	Test of significance
		Number	(%)	Number	(%)		
1	**Age (in completed years)**						
	20	20	27.0	64	43.2	84	χ^2=5.523, df=2, p value=0.063
	21	46	62.1	72	48.6	118	
	22	8	10.8	12	8.10	20	
2	**Religion**						
	Hindu	70	94.5	134	90.5	204	χ^2=1.088, df=1, p value=0.297
	Islam	4	5.4	14	9.45	18	
3	**Caste**						
	General	28	37.8	51	34.4	79	χ^2=2.655, df=3, p value=0.448
	O.B.C	15	20.2	28	18.9	43	
	S.C	30	40.5	60	40.5	90	
	S.T	1	1.35	9	6.08	10	
4	**Residence**						
	Rural	43	58.1	96	64.8	139	χ^2= 0.962, df=1, p value=0.327
	urban	31	41.8	52	35.1	83	
5	**Marital status**						
	Married	0	0	7	4.7	7	χ^2=3.614, df=1, p value=0.057
	Unmarried	74	100	141	95.2	215	
6	**Social class**						
	I (upper class)	47	63.51	112	75.67	159	χ^2=5.789, df=3, p value=0.122
	II (upper middle class)	8	10.81	17	11.48	25	
	III (middle class)	13	17.56	13	8.78	26	
	IV (lower middle class)	6	8.10	6	4.05	12	
	V (lower class)	0	0	0	0	0	
7	**Father's education**						
	Below primary	2	2.7	1	0.67	3	χ^2=11.676, df=6, p value=0.070
	Primary	8	10.8	31	20.94	39	
	Middle	11	14.86	28	18.91	39	
	Secondary	12	16.21	29	19.59	41	
	H.S.	23	31.08	22	14.86	45	
	Graduate and above	17	22.97	34	22.97	51	
8	**Mother's education**						
	Illiterate	0	0	5	3.37	5	χ^2=10.805, df=6, p value=0.095
	Below primary	1	1.35	1	0.67	2	
	Primary	6	8.1	27	18.24	33	
	Middle	15	20.27	39	26.35	54	
	Secondary	22	29.72	29	19.59	51	
	H.S.	21	28.37	29	19.59	47	
	Graduate & above	9	12.16	18	12.16	30	
9	**Father's occupation**						
	Agriculture	11	14.8	38	25.6	49	χ^2=12.251, df=11, p value=0.345
	Business	23	31.0	42	28.3	65	
	Daily wagers	19	25.6	29	19.6	48	
	Govt. sector	12	16.2	18	12.1	30	
	Pvt. sector	6	8.10	6	4.05	12	
	Others	1	1.35	5	3.37	6	
	Unemployed	2	2.70	10	6.75	12	
10	**Mother's occupation**						
	Agriculture	1	1.35	1	0.67	2	χ^2=10.586, df=8, p value=0.226
	Business	2	2.70	6	4.05	8	
	Daily wagers	3	4.05	0	0	3	
	Govt. sector	2	2.70	4	2.70	6	

Continued.

S. no.	Variables	Study college (n=74)		Control college (n=148)		Total number	Test of significance
		Number	(%)	Number	(%)		
	Pvt. sector	2	0.02	1	0.675	3	
	Housewife	61	82.43	129	87.16	190	
	Others	0	0	0	0	0	
	Unemployed	3	4.05	7	4.72	10	

Table 2: Distribution of study population according to knowledge regarding cervical carcinoma (n=222).

Knowledge statements	Before intervention		Before intervention		After intervention		Without intervention	
	Study college (n=74)		Control college (n=148)		Study college (n=74)		Control college (n=148)	
	Correct response (N)	%	Correct response (N)	(%)	Correct response (N)	(%)	Correct response (N)	(%)
Basic cancer	39	52.70	59	39.86	74	100	57	38.51
Cervical cancer	24	32.43	52	35.13	53	71.62	57	38.51
Transmission ability of cervical cancer	13	17.56	27	18.24	33	44.59	28	18.91
Diagnosis of cervical cancer	10	13.51	21	14.18	30	40.54	11	7.43
Prevention of cervical cancer	5	6.75	8	5.40	44	59.45	36	24.32
Treatment and outcome of cervical cancer	5	6.75	0	0	34	45.94	8	5.40

Table 3: Distribution of study population according to knowledge score regarding cervical carcinoma (n=222).

Description	Score	Study college (n=74)				Control college(n=148)			
		Before intervention (pre-test)		After intervention (post-test)		Before intervention (pre-test)		Without intervention (post-test)	
		N	%	N	%	N	%	N	%
Poor	<15	61	82.43	27	36.48	136	91.89	119	80.40
Average	15-20	6	8.10	16	21.62	10	6.75	21	14.18
Good	21-27	6	8.10	20	27.02	2	1.35	4	2.70
Excellent	>27	1	1.35	11	14.86	0	0	4	2.70
Total count		74	100	74	100	148	100	148	100

Table 4: Comparison of mean/median knowledge scores of the students of study college and control college before and after intervention (n=74, n=148).

College	Baseline					Post-intervention				
	Mean	SD	Median	(Q1-Q3)	Test of significance*	Mean	SD	Median	(Q1-Q3)	Test of significance*
Study (n=74)	7.93	7.20	4.50	(2-13)	P=0.431*	16.77	1	19	(9-24)	P<0.001*
Control (n=148)	7.97	5.14	9.00	(3-12)		8.41	7.08	8.00	(2-12.75)	

*Mann-Whitney u test

Table 5: Comparison of median knowledge scores of the students of study college and control college before and after intervention (n=74, n=148).

Intervention	Mean	S. D	Median	IQR (Q1-Q3)	Test of significance*
Study college (n=74)					
Before	7.93	7.20	4.50	(2-13)	P<0.001*
After	16.77	1	19	(9-24)	
Control college (n=148)					
Before	7.97	5.14	9.00	(3-12)	P=0.320
After	8.41	7.08	8.00	(2-12.75)	

* Wilcoxon signed ranks test

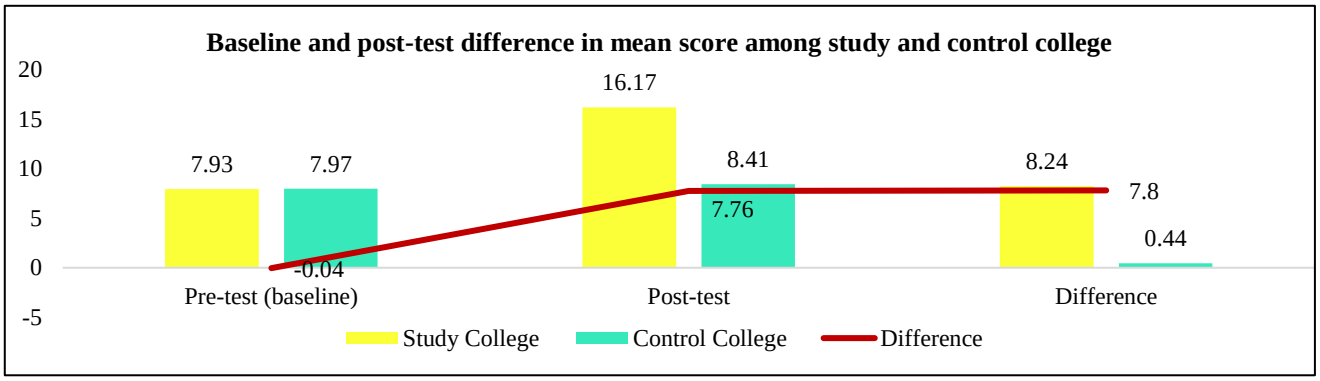

Figure 1: Difference of mean knowledge scores of the students of study college and control college, baseline, and post-test (n=222).

DISCUSSION

A quasi-experimental study was conducted in two government general colleges in the Nadia district of West Bengal to determine the effect of health educational intervention on knowledge regarding cervical carcinoma.

Knowledge about risk factors of cervical cancer

A baseline survey revealed that less than half of the study subjects (41.89%) in this current study of the study college had heard of HPV, the single most important etiologic factor for cervical cancer. A similar result was found in a survey in the United States (40%); whereas, none of the Malaysian women respondents aged 21-56 years had heard of HPV.[18,19] A study among college students aged 18-35 years in Ghana noted very low awareness (7.9%) of the link between HPV and cervical cancer.[20] Only 19.0% of adult Korean women reported knowing that HPV infection was a risk factor for cervical cancer.[21] In yet another Korean study, a mere 9.5% of female high school and university students reported that they had ever heard of HPV.[22] Low levels of knowledge of HPV and cervical cancer were reported among undergraduate and graduate college women aged 18 to 30 years in the US.[23] Another study in the US found that 21.5% of college women had never heard of HPV.[24] Even sexually active college women in America lacked awareness of HPV.[25] In this study, only 24.32% of students of study colleges were aware of a link between sexual activity and cervical cancer. Better awareness (38.4%) of the link was demonstrated by college students aged 18 to 35 years in Ghana.[26]

Out of all respondents of the study college 1.35%, 6.75%, and 12.16 % respectively could identify the delayed onset of sexual intercourse, parity and smoking as risk factors for cervical cancer in the baseline survey. In a Malaysian study, women aged 21-56 years could not identify any of these risk factors and the college students in Ghana had very low (1%) awareness of the link between smoking and cervical cancer.[19,27]

Personal hygiene had been identified by 22.66% and 35.14% of respondents of study and control colleges respectively at baseline in the current study. Some of the women respondents of a previous study also believed that failure to maintain hygiene or “dirtiness” and certain types of food were factors for cervical cancer development.[19]

Knowledge about signs and symptoms of cervical cancer

In the current study 38.78% knew vaginal bleeding in between periods and post-menopausal bleeding as common symptoms of cervical cancer, whereas previous studies revealed a higher proportion of awareness regarding the same (range 66.6-94.2%).[27-29]

Knowledge about prevention of cervical cancer

Very few participants of study college at baseline (a mere 12.16%) in this study had ever heard of ‘Pap smear test’ as

well as HPV vaccine (10.81%). Similar to this finding, most women recruited from a gynaecology clinic in Kolkata, India, reported "limited" to "no" knowledge of cervical cancer (84%) and the Pap test (95%).[30]

Effect of intervention

The findings of the study suggested an improvement in knowledge about cervical cancer in the intervention group compared to the control group. Similar findings were encountered in a health education intervention study on cervical cancer conducted in Nigeria, Jamaica and Egypt.[31-35] These studies highlighted the important role health education played in shaping the knowledge of health-appropriate behaviours.

Interestingly, although the control group did not receive any education, there was a marginal increase in knowledge of cervical cancer between the pretest and the post-test scores within this group. This suggested that the pretest might have motivated participants to search for information on cervical cancer.

Limitations

There were a few potential limitations of this study. This study focused on female students of general colleges in the Nadia district challenging the external validity. Contamination bias has been tried to overcome, but it might not be fully eliminated. The sustainability of health education programs cannot be evaluated due to time constraints.

CONCLUSION

This study aimed at assessment of effect of health educational programme on knowledge of cervical carcinoma among female general college students in Nadia district, west Bengal. As per the best literature review this is the first and foremost study of its kind. According to the baseline survey findings, the low level of knowledge regarding cervical cancer of the female students of two leading colleges of Nadia district, indicates that the larger population of female students is in greater lack of awareness. During this survey this study accessed a population that has not widely been studied and the observations leads the two conclusions that the absence of an active national cervical cancer screening and awareness programme has resulted in the lack of basic knowledge about important risk factors, screening methods, important clinical features, and preventive measures for cervical cancer even among the literate population of college going women.

The study has highlighted the remarkable effect of a health education intervention which employed lectures, discussion, and videos on increasing knowledge about cervical cancer among the study population. The intervention has been found to be highly effective, with the study group exhibiting a significant improvement in knowledge compared to the control group. This indicates that the health education intervention had a positive impact on the participants' understanding of cervical cancer.

Therefore, health educational programme should be stressed from the health sector in coordination with educational sector to improve the health behaviour of the upcoming generations.

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