

Effectiveness of Health Education Regarding Prevention of Cervical Cancer Among Students Studying in Selected Junior College of Vidarbha Region Maharashtra.

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Abstract—Background: Cervical cancer is an important public health problem and is largely preventable through appropriate health education, HPV vaccination, early detection, screening, personal hygiene, and adoption of preventive practices. Lack of adequate knowledge regarding risk factors, symptoms, prevention, vaccination, and screening may delay preventive action. Adolescence and the junior-college period provide an appropriate opportunity for health education because students can acquire accurate knowledge and develop positive health-related practices. The present study was therefore undertaken to assess the effectiveness of health education regarding prevention of cervical cancer among students studying in selected junior colleges of the Vidarbha region of Maharashtra. The study was guided by the Health Belief Model, which considers perceived susceptibility, perceived severity, perceived benefits, perceived barriers, modifying factors, and cues to action. **Objectives:** The primary objective was to assess the effectiveness of health education regarding prevention of cervical cancer among students. The secondary objectives were to assess the pre-test knowledge, assess the post-test knowledge after the educational intervention, compare pre-test and post-test knowledge scores, and determine the association between knowledge scores and selected demographic variables.

Methods: A quantitative research approach was adopted. The study was conducted among junior college students in selected junior colleges of Vidarbha region, Maharashtra. The study included a total sample of 60 students, with 30 students in the experimental group and 30 students in the control group. The sampling technique used was non-probability convenience sampling. The sample-size section reported calculation using the Cochran formula, with a calculated requirement of approximately 56.70 participants and a final sample of 60 students.

Results: In the experimental group, the pre-test mean knowledge score was 14.33 ± 4.237 , representing

approximately 47.8%, and the post-test mean score increased to 25.00 ± 4.017 , representing approximately 83.33%. In the experimental group, before the intervention, 50% had good knowledge, 26.7% had average knowledge, 20% had very good knowledge, 3.3% had poor knowledge, and none had excellent knowledge. After the intervention, 63.3% achieved excellent knowledge, 26.7% achieved very good knowledge, and 10% achieved good knowledge; no participant remained in the poor or average categories. The increase in experimental-group knowledge was statistically significant. The paired t-test yielded $t = 16.754$, $p = 0.0001$, indicating a statistically significant difference between pre-test and post-test scores at the 0.05 level. Therefore, the null hypothesis was rejected and the alternative hypothesis was accepted for the intervention effect.

Index Terms—Cervical cancer; Health education; Prevention; Knowledge; Junior college students; HPV; Screening; HPV vaccination; Experimental group; Control group; Vidarbha; Maharashtra.

I. INTRODUCTION

Cervical Cancer tops the list of cancers among women worldwide with an estimated new case of 530,000 and a mortality of 275,000 deaths annually with an overall mortality ratio of 52%. This can be largely prevented by early detection and timely screening tests. Awareness and education regarding this, is the key to curtail the rise of such cancers in the community. Objectives of the studies were to assess knowledge, attitude regarding cervical cancer among women of reproductive age group and to correlate with various socio-demographic & marital factors.¹

Cervical cancer is considered to be the most common cancer in women in India over the past two decades.

India has a population of approximately 365.71 million women over the age of 15 who are at risk of developing cervical cancer. Current estimates put about 132,000 newly diagnosed cases and 74,000 deaths per year in India, accounting for nearly 1/3 of cervical cancer deaths worldwide. The effects on prevalence quotes supplied through the Population Based Cancer Registries (PBCRs) have proven the version in styles of most cancers in standard and that of most cancers' cervix in particular. All the city Population Based Cancer Registries at Bangalore, Bhopal, Chennai, Delhi and Mumbai have proven a statistically tremendous lower in prevalence quotes of this web website online of most cancers. Since over 70 consistent with cent of the Indian populace is living withinside the rural areas, most cancers cervix nevertheless constitutes the primary most cancers in both sexes. Based at the information of the PBCRs, the predicted quantity of recent cancers for the duration of 2007 in India become 90.708. The relative five-12 months survival mentioned a while in advance averaged 48.7 consistent with cent.²

Cervical cancer is the third most common malignancy in women worldwide, and it remains a leading cause of cancer-related death for women in developing countries. In the United States, cervical cancer is relatively uncommon. (See the image below). The incidence of invasive cervical cancer has declined steadily in the United States over the past few decades; however, it remains at high levels in many developing countries. The change in the epidemiologic trend in the United States has been attributed to mass screening with Papanicolaou (Pap) tests, which permits detection and treatment of preinvasive disease. Recognition of the etiologic role of human papillomavirus (HPV) infection in cervical cancer has led to the recommendation of adding HPV testing to the screening regimen in women 30-65 years of age. However, women who have symptoms, abnormal screening test results, or a gross lesion of the cervix are best evaluated with colposcopy and biopsy.³

In 2020 the World Health Organization rolled out a global strategy to eradicate cervical cancer by 2030. This is the fourth-most common cancer among women, claiming an estimated 350,000 lives globally in 2022. More than 80,000 of these deaths were recorded in sub-Saharan Africa. Currently, one woman dies every two minutes from this disease, which is caused by the human papillomavirus (HPV).

Cervical cancer is preventable. The global strategy has three pillars: getting 90% of girls vaccinated against HPV by age 15; ensuring 70% of women are screened by the age of 45; and having 90% of women with invasive cancer managed. We spoke to a team of researchers and oncologists dedicated to eliminating cervical cancer in Africa for insights into the disease.⁴ Cervical cancer is one of the most common cancers in women worldwide. In India, cervical cancer is the most common woman-related cancer, followed by breast cancer. 80% of the new cervical cancer cases occur in developing countries, like India, which reports approximately one fourth of the world's cases of cervical cancer each year.⁵

II. OBJECTIVES

General Objective

- To assess the effectiveness of health education regarding prevention of cervical cancer among students.

Secondary Objective

- To assess the pre-test knowledge regarding prevention of cervical cancer.
- To assess the post-test knowledge after health education.
- To compare pre-test and post-test knowledge scores.
- To associate post-test knowledge scores with selected demographic variables.

III. HYPOTHESIS

H_0 = There is no significant difference in the knowledge regarding prevention of cervical cancer among students before and after health education.

H_1 = There is a significant increase in the knowledge regarding prevention of cervical cancer among students after receiving health education.

IV. METHOD

A quantitative research approach was adopted. The study was conducted among junior college students in selected junior colleges of Vidarbha region, Maharashtra. The study included a total sample of 60 students, with 30 students in the experimental group and 30 students in the control group. The sampling

technique used was non-probability convenience sampling. The sample-size section reported calculation using the Cochran formula, with a calculated requirement of approximately 56.70 participants and a final sample of 60 students. The inclusion criteria included students studying in selected junior colleges, students who were present during data collection, students willing to participate, and students able to understand Marathi or English. Students who were absent, unwilling to participate, or had already attended a similar health-education program were excluded.

Data were collected using a self-structured knowledge questionnaire. The tool consisted of three sections. Section A collected demographic information such as age, gender, educational qualification, area of residence, marital status, religion, previous knowledge/program attendance, and source of information. Section B consisted of a 30-item pre-test multiple-choice knowledge questionnaire, while Section C consisted of a 30-item post-test questionnaire. Each correct response received one mark and an incorrect response received zero marks, giving a maximum possible score of 30.

Sample Size:

The sample size for study is will consist of 60 students of junior college student Vidarbha, Maharashtra.

Sampling Technique:

non-probability convenient sampling technique for the selection of study participants. The sample was selected from students studying in the selected junior college of the Vidarbha region, Maharashtra. A total of 60 junior college students were selected for the study. The selected participants were divided into two groups: 30 students were included in the experimental group and 30 students were included in the control group. The participants were selected according to their availability and accessibility to the researcher during the period of data collection. The convenient sampling technique was used because it enabled the researcher to select eligible students who were readily available and willing to participate in the study. The selected participants were assessed using a structured knowledge questionnaire regarding prevention of cervical cancer. The experimental group received the planned health education intervention, while the control group was assessed for comparison.

V. DATA COLLECTION TOOLS AND TECHNIQUES

Data collection is a crucial aspect of research. The study aims to assess the health education knowledge regarding on cervical cancer among junior students, and for this purpose, a self-structured questionnaire was developed.

Data Analysis: The data collected from 60 junior college students were coded, tabulated, organized and analyzed according to the objectives of the study. The data were analyzed using both descriptive and inferential statistics. The demographic characteristics of the participants were summarized using frequency and percentage. The study included 30 students in the experimental group and 30 students in the control group. Descriptive statistics, including frequency, percentage, mean and standard deviation, were used to describe the demographic characteristics and knowledge scores regarding prevention of cervical cancer. Knowledge scores were categorized into poor, average, good, very good and excellent levels.

To determine the effectiveness of the educational intervention, pre-test and post-test knowledge scores were compared. The paired Student's t-test was used to assess the difference between pre-test and post-test knowledge scores within the experimental and control groups at the 5% level of significance. In the experimental group, the mean pre-test knowledge score was 14.33 ± 4.237 , which increased to 25.00 ± 4.017 in the post-test. The mean difference was 10.67, with a calculated t value of 16.754 and $p = 0.0001$, indicating a statistically significant improvement in knowledge.

In the control group, the mean pre-test knowledge score was 13.20 ± 4.072 , while the post-test mean score was 21.47 ± 6.124 . The mean difference was 8.27, with a calculated t value of 7.228 and $p = 0.0001$, which was statistically significant at the 0.05 level.

For comparison between the experimental and control groups, the post-test mean knowledge scores were analyzed using an independent comparison of means. The experimental group obtained a mean post-test score of 25.00 ± 4.017 , whereas the control group obtained 21.46 ± 6.124 . The mean difference was 3.53, with a calculated t value of 2.822 and $p = 0.0009$, demonstrating a statistically significant difference between the two groups at the 0.05 level.

The association between post-test knowledge scores in the experimental group and selected demographic variables was assessed using the Chi-square test. A statistically significant association was reported for age ($\chi^2 = 11.094$, $df = 4$, $p = 0.026$) and marital status ($\chi^2 = 12.066$, $df = 2$, $p = 0.002$). No, statistically significant association was reported with gender ($\chi^2 = 1.011$, $p = 0.603$), educational qualification ($\chi^2 = 1.241$, $p = 0.871$), area of residence ($\chi^2 = 1.011$, $p = 0.603$), or religion ($\chi^2 = 3.823$, $p = 0.431$).

A significance level of $p < 0.05$ was considered statistically significant. The statistical findings demonstrated a significant improvement in knowledge scores following the educational intervention, with the experimental group showing a higher post-test mean knowledge score than the control group.

VI. RESULTS

In the experimental group, the pre-test mean knowledge score was 14.33 ± 4.237 , representing approximately 47.8%, and the post-test mean score increased to 25.00 ± 4.017 , representing approximately 83.33%. In the experimental group, before the intervention, 50% had good knowledge, 26.7% had average knowledge, 20% had very good knowledge, 3.3% had poor knowledge, and none had excellent knowledge. After the intervention, 63.3% achieved excellent knowledge, 26.7% achieved very good knowledge, and 10% achieved good knowledge; no participant remained in the poor or average categories. The increase in experimental-group knowledge was statistically significant. The paired t-test yielded $t = 16.754$, $p = 0.0001$, indicating a statistically significant difference between pre-test and post-test scores at the 0.05 level. Therefore, the null hypothesis was rejected and the alternative hypothesis was accepted for the intervention effect.

In the control group, the pre-test mean knowledge score was 13.20 ± 4.071 and the post-test mean was 21.46 ± 6.124 . The paired t-test showed $t = 7.228$, $p = 0.0001$, indicating a statistically significant increase in knowledge within the control group as reported by the dissertation. However, the experimental group achieved a substantially higher post-test mean score than the control group.

The post-test mean score was 25.00 ± 4.017 in the experimental group compared with 21.46 ± 6.124 in the control group, producing a mean difference of

approximately 3.53 marks. The calculated t value was 2.822 with $p = 0.0009$, which was statistically significant at the 0.05 level. Thus, the experimental group demonstrated significantly better post-test knowledge than the control group.

Regarding the association between post-test knowledge and demographic variables in the experimental group, significant associations were found with age ($\chi^2 = 11.094$, $df = 4$, $p = 0.026$) and marital status ($\chi^2 = 12.066$, $df = 2$, $p = 0.002$). No significant association was found with gender ($p = 0.603$), educational qualification ($p = 0.871$), area of residence ($p = 0.603$), religion ($p = 0.431$), or previous participation in a cervical-cancer-prevention programme ($p = 0.716$).

Table 1: Percentage wise distribution of subjects according to their demographic characteristics.

n=60

Demographic variables	Experimental group (N=30)		Control group (N=30)	
	Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)
Age in Years				
16-17 years	21	70.0	14	46.7
17-18 years	05	16.7	10	33.3
18-19 years	04	13.3	06	20.0
19 years and above	00	00	00	00
Gender				
Male	05	16.7	01	3.3
Female	25	83.3	29	96.7
Educational qualification				
11 th	30	100	30	100
12 th	00	00	00	00
Area of residence				
Urban	15	50	15	50
Rural	15	50	15	50
Marital Status				
Married	00	00	00	00
Unmarried	30	100	30	100
Religion				
Hindu	19	63.3	16	53.3
Buddhist	06	20	05	16.7
Muslim	04	13.3	06	20.0
Christian	01	3.3	03	10
Have you attended any previously prevention of cervical cancer program?				
Yes	06	20	10	33.3
No	24	80	20	66.7

It is observed that, out of 60 subjects, 30 subjects were included in experimental group and 30 subjects were included in control group about.

With regards to age in years 21 (70%) of the subjects from experimental group and 14 (46.7%) of the subjects from control group were from the age group of 16-17 years, 05 (16.7%) of the subjects from experimental group and 10 (33.3%) of the subjects from control group were from the age group of 17-18 years, 04 (13.3%) of the subjects from experimental group and 06 (20%) of the subjects from control group were from the age group of 18-19 years and 0% of the subjects from experimental group and 0% of the subjects from control group were from the age group of 19 years and above. With regards to gender, 05 (16.7%) of the subjects from experimental group and 1 (3.3%) of the subjects from control group were belongs to male and 25 (83.3%) of the subjects from experimental group and 29 (96.7%) of the subjects from control group were belongs to female.

With regards to educational qualification, 30 (100%) of the subjects from experimental group and 30 (100%) of the subjects from control group having 11th, 0% of the subjects from experimental group and 0% of the subjects from control group having 12th.

In terms of area of residence, 15 (50%) of the subjects from experimental group and control group are belongs to rural area and 50 (50%) of the subjects from experimental group and control group are belongs to urban area. With regard to marital status, 30 (100%) of the subjects from experimental group and 30 (100%) of the subjects from control group are unmarried and 0% of the subjects from experimental group and 0% of the subjects from control group are married.

In terms of religion, 19 (63.3%) of the subjects from experimental group and 16 (53.3%) of the subjects from control group are Hindu, 6 (20%) of the subjects from experimental group and 5 (16.7%) of the subjects from control group are Buddhist, 4 (13.3%) of the subjects from experimental group and 6 (20%) of the subjects from control group are Muslim and 1 (3.3%) of the subjects from experimental group and 3 (10%) of the subjects from control group are Christian. In terms of have you attended any previously prevention of cervical cancer program, 6 (20%) of the subjects from experimental group and 10 (33.3%) of the subjects from control group having attended program and 24 (80%) of the subjects from experimental group and 20 (66.7%) of the subjects from control group having no any program attended.

Table 2: Assessment of level of pre-test and post-test knowledge among subjects from experimental group on prevention of cervical cancer among students.

n=30

Level of knowledge score	Score range	Percent age score	Level of pre-test knowledge score		Level of post-test knowledge score	
			Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)
Poor	0-6	0-20%	01	3.3	00	00
Average	7-12	21-40%	08	26.7	00	00
Good	13-18	41-60%	15	50	03	10
Very Good	19-24	61-80%	06	20	08	26.7
Excellent	25-30	81-100%	00	00	19	63.3
Mean $\pm$ SD knowledge score			14.33 $\pm$ 4.237		25.00 $\pm$ 4.017	
Mean % knowledge score			47.8%		83.33%	
Minimum score			05		16	
Maximum score			21		30	

In pre-test, 50% of the subjects had good level of knowledge, 26.7% had average level of knowledge, 20% of the subjects had very good level of knowledge, 3.3% had poor level of knowledge and 0% had excellent level of knowledge. Minimum knowledge score in pre-test was 5 and maximum knowledge score in pre-test was 21. Mean knowledge score in pre-test was 14.33 ± 4.237 .

While in post-test, 63.3% of the subjects had excellent level of knowledge, 26.7% had very good level of knowledge, 10% of the subjects had good level of knowledge and 0% had poor and average level of knowledge. Minimum knowledge score in pre-test was 16 and maximum knowledge score in pre-test was 30. Mean knowledge score in pre-test was 25.00 ± 4.017 .

Table 3: Assessment of level of pre-test and post-test knowledge among subjects from control group on prevention of cervical cancer among students.

n=30

Level of knowledge score	Score range	Percent age score	Level of pre-test knowledge score		Level of post-test knowledge score	
			Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)
Poor	0-6	0-20%	03	10	00	00
Average	7-12	21-40%	10	33.3	03	10

Good	13-18	41-60%	14	46.7	02	6.7
Very Good	19-24	61-80%	03	10	16	53.3
Excellent	25-30	81-100%	00	00	09	30
Mean $\pm$ SD knowledge score			13.20 $\pm$ 4.071	21.46 $\pm$ 6.124		
Mean % knowledge score			44%	71.5%		
Minimum score			05	08		
Maximum score			22	30		

In pre-test, 46.7% of the subjects had good level of knowledge, 33.3% had average level of knowledge, 10% of the subjects had poor and very good level of knowledge and 0% had excellent level of knowledge. Minimum knowledge score in pre-test was 5 and maximum knowledge score in pre-test was 22. Mean knowledge score in pre-test was 13.20 ± 4.071 .

While in post-test, 53.3% of the subjects had very good level of knowledge, 30% had excellent level of knowledge, 10% of the subjects had average level of knowledge, 6.7% of the subjects had good level of knowledge and 0% had poor level of knowledge. Minimum knowledge score in pre-test was 8 and maximum knowledge score in pre-test was 30. Mean knowledge score in pre-test was 21.46 ± 6.124 .

Table 7: Effectiveness of experimental group versus control group on prevention of cervical cancer among students in junior college.

n=30

Overall	Post Test Mean	SD	Mean Difference	t-value	p-value
Experimental Group	25.00	4.017	3.53 ± 6.857	2.822	0.0009
Control Group	21.46	6.124			S.P<0.05
S- Significant		NS – Non-Significant			df-
degree of freedom					

The comparison of post-test knowledge scores of subjects regarding prevention of cervical cancer among students in junior college receiving experimental group and control group. The post-test means knowledge score of experimental groups was 25.00 with SD 4.017 compared with post-test mean knowledge score of control group which was 21.46 with SD 6.124. Mean, standard deviation and mean difference values are compared and t-test for difference between two means is applied at 5% level of significance. The tabulated value for t test for 5%

level of significance was 2.045. The calculated "t" value i.e., 2.822 are higher than the tabulated value at 5% level of significance for overall knowledge score of subjects which is statistically acceptable level of significance. Hence, it is interpreted that there is a statistically significant difference was found in post-test knowledge score of subjects receiving experimental group and control group. There is no difference in knowledge level of prevention of cervical cancer among students in junior college who attended experimental group and control group which is measured by structured knowledge questionnaire at $p < 0.05$ level of significance.

VII. DISCUSSION

The present study was conducted to assess the effectiveness of health education regarding prevention of cervical cancer among students studying in a selected junior college in the Vidarbha region of Maharashtra. A total of 60 students participated in the study, with 30 students in the experimental group and 30 students in the control group. Data were collected using a structured knowledge questionnaire and analyzed using descriptive and inferential statistics.

The findings of the study demonstrated an improvement in knowledge regarding cervical cancer prevention following the educational intervention. In the experimental group, the mean pre-test knowledge score was 14.33 ± 4.237 , which increased to 25.00 ± 4.017 in the post-test. The mean difference was 10.67, and the calculated paired t value was 16.754 with $p = 0.0001$, indicating a statistically significant improvement in knowledge. This finding suggests that the educational intervention was effective in improving students' knowledge regarding prevention of cervical cancer. The control group also showed an increase in knowledge scores, from a pre-test mean of 13.20 ± 4.072 to a post-test mean of 21.47 ± 6.124 . The calculated paired t value was 7.228 with $p = 0.0001$, indicating a statistically significant difference between the pre-test and post-test scores. However, the post-test mean knowledge score of the experimental group was higher than that of the control group.

Comparison of post-test knowledge scores between the two groups further supported the effectiveness of the intervention. The experimental group achieved a mean post-test score of 25.00 ± 4.017 , compared with 21.46 ± 6.124 in the control group. The mean

difference was 3.53, with a calculated t value of 2.822 and $p = 0.0009$. Since the p value was less than 0.05, the difference between the groups was statistically significant. These findings indicate that students who received the educational intervention demonstrated better post-test knowledge regarding cervical cancer prevention than those in the control group.

The distribution of knowledge levels also demonstrated improvement. The reported post-test findings showed a greater proportion of students achieving the higher knowledge categories, particularly very good and excellent levels. In the comparison, the experimental group had a higher proportion of students in the excellent knowledge category, whereas the control group had a greater proportion in the very good category. This pattern further supports the positive effect of the educational intervention on knowledge regarding cervical cancer prevention.

The study also examined the association between post-test knowledge scores and selected demographic variables in the experimental group. A statistically significant association was found between knowledge scores and age ($\chi^2 = 11.094$, $p = 0.026$) and marital status ($\chi^2 = 12.066$, $p = 0.002$). However, no statistically significant association was found with gender ($p = 0.603$), educational qualification ($p = 0.871$), area of residence ($p = 0.603$), or religion ($p = 0.431$). Overall, the findings indicate that structured health education can be an effective approach for improving knowledge regarding cervical cancer prevention among junior college students. The substantial increase in knowledge in the experimental group and the significant difference between the experimental and control groups support the effectiveness of the intervention.

The findings also emphasize the importance of providing appropriate cervical cancer prevention education to adolescents and young students as part of health promotion and preventive education.

VIII. CONCLUSION

The findings demonstrate that the health-education intervention was effective in improving students' knowledge regarding prevention of cervical cancer. The experimental group showed a marked improvement from a mean score of 14.33 before the intervention to 25.00 after the intervention. The

significantly higher post-test score in the experimental group compared with the control group further supports the effectiveness of the educational intervention. The findings indicate that structured health education can be an important nursing and community-health strategy for increasing awareness about cervical cancer prevention among young students.

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