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Effectiveness of Technology Enabled Learning Programme on Knowledge Regarding Prevention of Cervical Cancer Among Women

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ABSTRACT

Background: Cervical cancer remains a major public health challenge, particularly in low- and middle-income countries like India, where screening coverage is low and awareness is limited. Technology-Enabled Learning Programmes (TELPs) offer a promising approach to deliver culturally relevant, engaging, and accessible health education.

Objectives: This study aimed to assess women's knowledge regarding cervical cancer preventions.

Design: A pre-experimental one-group pre- and post-test design was used.

Settings: The study was conducted in selected villages of Allinayakkanpalayam and Pacchampalayam, Namakkal District, Tamil Nadu.

Participants: Sixty women with age group of 21–50 years, who has met inclusion criteria, were selected with use Stratified sampling technique.

Methods: A structured knowledge questionnaire was used to assess baseline knowledge. The intervention involved a 20 minutes researcher spoken in Tamil video on cervical cancer causes, risk factors, screening, HPV vaccination, symptoms, treatment, and prevention. Sessions were delivered twice in a week for four weeks duration. Data were analyzed using descriptive and inferential statistics, including paired *t*-tests and chi-square tests.

Results: In the pre-test, 72% of participants demonstrated average knowledge, while 22% showed poor knowledge. Post-test scores showed marked improvement, with 65% achieving very good knowledge levels and 30% good levels. The overall paired *t*-test value was 22.74, exceeding the table value of 2.05 ($p < 0.05$), confirming a highly significant improvement. Knowledge scores were also significantly associated with selected demographic variables such as education and occupation ($p < 0.05$).

Conclusion: The Technology-Enabled Learning Programme was highly effective in improving women's knowledge regarding cervical cancer prevention.

Keywords: Cervical cancer, Technology-Enabled Learning Programme, Prevention of cervical cancer.

INTRODUCTION

Cervical cancer is the serious health concern thought it is also preventable and treatable if detected early. According to WHO, cervical cancer is the fourth most common cancer in women globally with around 660000 new cases and around 350 000 deaths in 2022.Globally, an estimated 662,044 cases (ASIR: 14.12/100,000) and 348,709 deaths (ASMR: 7.08/100,000) from cervical cancer occurred in 2022, corresponding to the fourth cause of cancer morbidity and mortality in women worldwide. Specifically, 42 % of cases and 39 % of deaths occurred in China (23 % and 16 %) and India (19 % and 23 %). Both ASIR and ASMR of cervical cancer decreased with HDI, and similar decreasing links were observed for both early-onset (0–39 years) and late-onset (≥40 years) cervical cancer. Both ASIR and ASMR of overall cervical cancer showed decreasing trends during 2003–2012 (EAPC: 0.04 % and -1.03 %); however, upward trends were observed for early-onset cervical cancer (EAPC: 1.16 % and 0.57 %). If national rates in 2022 remain stable, the estimated cases and deaths from cervical cancer are projected to increase by 56.8 % and 80.7 % up to 2050. Moreover, the projected increase of early-onset cervical cancer is mainly observed in transitioning countries, while decreased burden is expected in transitioned countries. **Jiewu 2022 .**[1]

Ca Cervix In rural regions, factors such as limited access to healthcare facilities, lack of awareness, cultural beliefs, and socioeconomic constraints contribute to the low uptake of cervical cancer prevention strategies. Traditional health education methods often fail to reach or resonate with these populations. However, the advent of technology-enabled learning (TEL) offers a promising avenue to bridge this gap. TEL programs can deliver tailored health education through digital platforms, making information more accessible and engaging for women in remote areas. **Andrea H. Ross 2021**

Cervical cancer is a major public health problem worldwide. According to GLOBOCAN 2020 (WHO, 2021), about 604,000 new cases and 342,000 deaths occur globally each year, and more than 90% of these deaths happen in low- and middle-income countries. India contributes nearly one-fifth of the global burden, with about 123,000 new cases and 77,000 deaths annually. Although guidelines for early detection are available, screening coverage in India is still below 30%, so many women are diagnosed at late stages. Technology-enabled learning programs (TELPs) and educational videos shared through social media can help improve women's awareness about cervical cancer, screening, and prevention. Common symptoms include pelvic pain, dyspareunia, foul-smelling vaginal discharge, and abnormal bleeding such as intermenstrual, post-coital, or postmenopausal bleeding. In advanced stages, women may develop weight loss, severe fatigue, urinary or rectal obstruction, and lower limb edema. Therefore, early screening, health education, and preventive measures are essential to reduce the burden of cervical cancer.**(Singh et al., 2021).**[2]

Cervical cancer being mostly avoidable with prompt screening and vaccination, cervical cancer is nevertheless a major public health concern, especially in low- and middle-income nations. Cervical cancer is the fourth most frequent disease among women worldwide, accounting for about 662,000 new cases and 348,700 deaths in 2022, according to the World Health Organization (WHO). Women in underserved and rural areas, where access to healthcare and knowledge of preventive measures are

restricted, bear a significant burden of this disease. Lack of knowledge about human papillomavirus (HPV), cervical screening methods like the Pap smear, and the availability of vaccines often contributes to delayed diagnosis and poor outcomes. Traditional health education strategies have had limited reach in such communities, primarily due to logistical, cultural, and economic barriers. As a result, programs for technology-enabled learning, or TEL, have become a creative and promising way to close the knowledge gap. To provide accurate, interesting, and easily available health information, these programs make use of telehealth platforms, interactive videos, SMS reminders, and mobile applications. TEL interventions can greatly increase women's understanding, according to recent studies**. C.P. Sreeram Reddy et al (2022).**

STATEMENT OF THE PROBLEM

EFFECTIVENESS OF TECHNOLOGY ENABLED LEARNIG PROGRAMME ON KNOWLEDGE REGARDING PREVENTION OF CERVICAL CANCER AMONG WOMEN IN SELECTED VILLAGE AT NAMAKKAL (D.T). TAMILNADU.

OBJECTIVES

1. To assess the level of knowledge regarding prevention of cervical cancer among women before and after Technology Enabled Learning Programme.
2. To determine the effectiveness of Technology Enabled Learning Programme on knowledge regarding prevention of cervical cancer among women.
3. To find out association between pre- test score of knowledge regarding prevention of cervical cancer with their selected demographic variables.

METHODOLOGY

In this study, a pre-experimental - where one group pre and post- test research design was adopted. The aim of the study was to evaluate the effectiveness of a Technology Enabled Learning Programme (TELP) on knowledge regarding prevention of cervical cancer among women.The study was conducted in selected rural villages namely Allinayakkanpalayam, Pacchampalayam and Pallakkapalayam, Namakkal District, Tamil Nadu. The selection of the setting was based on feasibility, availability of samples. The permission from the concerned authorities, which is **5** km distance from Dhanvantri College of nursing. The population for this present study was women with age group between 21–50 years, women included who were married or unmarried, who were willing to participate and who gave informed consent, who could read and write Tamil. After obtaining informed consent, the samples were selected for this study. The total sample size was 60 women;non- probability purposive sampling technique were used to select women. Researcher excluded women who had a history of cervical cancer, who had prior exposure to structured education on cervical cancer prevention. Statistical methods were used for this study. Frequency and percentage distribution, mean, paired t test values and chi-square test were used to estimate the association between post test score of quality of life among women with their selected demographic variables.

Development of the Tool

The data collection instrument was developed after extensive review of literature and expert guidance. The tool consisted of **two sections**.

Section A: Demographic Variables

It included age, marital status, number of children, education, working status, occupational exposure to

radiation, history of oral contraceptive pill usage, history of Pap smear test, and history of Human Papilloma Virus (HPV) vaccination.

Section B: Structured Knowledge Questionnaire

A structured questionnaire was used to assess the level of knowledge regarding prevention of cervical cancer.

Scoring Procedure

Based on the total score obtained, the level of knowledge was categorized as follows:

Level of Knowledge	Actual Score	Percentage
Poor	1–7	1–25%
Average	8–14	26–50%
Good	15–21	51–75%
Very Good	22–30	76–100%

Validity

The content validity of the demographic variables and the content validity of the demographic variables and structured knowledge questionnaire was established by consultation with experts in **Medical-Surgical Nursing, Community Health Nursing and Statistics**. Necessary modifications were made based on expert suggestions.

Reliability

The reliability of the structured knowledge questionnaire was assessed using **Cronbach's Alpha method**. The reliability coefficient was found to be **r = 0.82**, indicating high reliability of the tool.

Ethical Consideration

1. Written permission was obtained from the **Director and Principal of Dhanvantri College of Nursing, Namakkal**.
2. Permission was obtained from the **Village Administrative Officers (VAO)** of the selected villages.
3. Informed written consent was obtained from each participant prior to data collection.
4. Confidentiality and anonymity of the participants were maintained throughout the study

Data Collection Procedure

The data collection was carried out in the selected villages of Allinayakkanpalayam, Pacchampalayam and Pallakkapalayam. After obtaining permission from village leaders and VAO officers, the investigator explained the purpose of the study and obtained informed consent from the participants.Pre-test was conducted for both control and experimental groups using the structured knowledge questionnaire. Following the pre-test, the **Technology Enabled Learning Programme (TELP)** was administered only to the experimental group through video-assisted teaching, PowerPoint slides and interactive discussion sessions in Tamil.The TELP sessions were conducted **twice a week for 30 minutes** over a period of **30 days**. Post-test was conducted on the **7th day after completion of intervention** for both groups using the same structured knowledge questionnaire.

Period of Data Collection

The data collection period was from **01-07-2025 to 31-07-2025**.

Plan for Data Analysis

1. Descriptive statistics such as **frequency and percentage** were used to assess the level of knowledge before and after the intervention.
2. Effectiveness of TELP was analyzed using **Mean, Mean Percentage, Standard Deviation, Paired t-test and Unpaired t-test**

3. Association between knowledge scores and selected demographic variables was analyzed using the **Chi-Square test**.

DATA ANALYSIS AND INTERPRETATION

The data were coded, tabulated and analyzed as per the objectives of the study under the following headings.

Section A: Description of samples characteristics.

Section B: To assess the level of knowledge regarding prevention of cervical cancer among women before and after Technology Enabled Learning Programme.

Frequency and percentage distribution of pre and post test scores of knowledge regarding prevention of cervical cancer among women

Section C: Determine the effectiveness of Technology Enabled Learning Programme on knowledge regarding prevention of cervical cancer among women.

Paired't test value of pre and post test scores knowledge regarding prevention of cervical cancer among women.

Area wise comparison of mean, SD, and mean percentage of pre and post test scores of knowledge regarding prevention of cervical cancer among women.

Section D: Find out association between pre- test score of knowledge regarding prevention of cervical cancer with their selected demographic variables.

Chi square value was used to find out the association between pre-test score of knowledge regarding prevention of cervical cancer with their selected demographic variables.

Section: a description of women according to their demographical variables

Table 4.1: Frequency and percentage distribution of women according to their demographic variables (N= 60)

Demographic Variables	Women	
	Frequency (N_1)	**Percentage (%)**
1. Age in years		
a. 25 - 35 years	7	12
b. 36 - 45 years	34	57
c. More than 45 years	19	31
2. Marital status		
a. Unmarried		
b. Married	0	0
c. Divorced	50	84
d. Widowed	5	8
	5	8
3. Number of children		
a. 1 - 2	42	70
b. 2 - 3	5	8
c. > 3	3	5
d. Nil	10	17

	0	0
4. Education		
a. No formal education	0	0
b. Primary	6	10
c. Higher secondary	45	75
d. Graduates	9	15
5. Occupation		
a. Private employee	4	6
b. Self-employee	7	12
c. House wife	18	30
d. Coolie	31	52
6. Age at marriage		
a. Below 20 years	4	6
b. 21 – 25 years	47	79
c. 25 – 30 years	6	10
d. Above 30 years	3	5
7. Family history of cervical cancer diseases		
a. No	48	80
b. Yes	12	20
8. History of oral Contraceptive pills		
a. Yes	60	100
b. No	0	0
9. Have you under gone previous diagnostic procedure		
a. Pap smear	5	8
b. Via villi	55	92
10. H/o Human papilloma vaccination		
a. Yes	0	0
b. No	60	100

SECTION-B ASSESS THE LEVEL OF KNOWLEDGE REGARDING PREVENTION OF CERVICAL CANCER AMONG WOMEN BEFORE AND AFTER TECHNOLOGY ENABLED LEARNING PROGRAMME.

Table-4.2: Frequency and percentage distribution of pre and post test scores of knowledge regarding prevention of cervical cancer among women(N=60)

Levels of knowledge regarding prevention of cervical cancer	Women			
	Pre- test		Post -test	
	Frequency	Percentage (%)	Frequency	Percentage (%)
Poor	13	22	-	-
Average	43	72	3	5

Good	4	6	18	30
Very good	0	0	39	65

SECTION-C - DETERMINE THE EFFECTIVENESS OF TECHNOLOGY ENABLED LEARNING PROGRAMME ON KNOWLEDGE REGARDING PREVENTION OF CERVICAL CANCER AMONG WOMEN.

Table 4.3 Paired 't' test value of pre and post test scores knowledge regarding prevention of cervical cancer among women.

Women	**Paired 't' test Value**	**Table value**	**Level of significant (p)**
Introduction	14.01	2.05	P < 0.05 significant
Risk factors	18.45	2.05	P < 0.05 significant
Symptoms	16.02	2.05	P < 0.05 significant
Management	17.52	2.05	P < 0.05 significant
Complications	16.23	2.05	P < 0.05 significant
Preventive measures	15.54	2.05	P < 0.05 significant
Total	**22.74**	**2.05**	**P < 0.05 significant**

Table 4.5 Comparison of mean, SD, and mean percentage of pre and post test scores of knowledge regarding prevention of cervical cancer among women

knowledge regarding prevention of cervical cancer among women	**Max scores**	**test scores**						**Difference Mean%**
		Pre-test			**Post-test**			
		Mean	**SD**	**Mean %**	**Mean**	**SD**	**Mean %**	
Introduction	3	1.18	0.12	39	2.85	0.57	95	56
Risk factors	4	1.32	0.44	33	3.80	0.74	95	62
Symptoms	5	2.21	1.42	44	4.58	1.23	92	48
Management	7	2.79	0.25	39	6.47	1.67	92	53
Complications	5	1.21	1.52	24	4.72	1.88	94	70
Preventive measures	6	2.12	2.85	35	5.61	2.01	94	59
Total	**30**	**12.41**	**1.81**	**41**	**26.82**	**1.41**	**89**	**48**

SECTION C: find out association between pre- test score of knowledge regarding prevention of cervical cancer with their selected demographic variables

Chi – square was calculated to analyse the association between demographic variables with the pre- test scores on knowledge regarding prevention of cervical cancer among women

Table 4.4 Association between control group post test scores on knowledge regarding prevention of cervical cancer among women with their demographic variables.

Demographic variables	**Post test scores**			**Level of significance**
	Df	$\chi 2$	**Table value**	
Age	1	1.08	3.84	P > 0.05 Not significant

Marital status	1	1.95	3.84	P > 0.05 Not significant
Number of children	1	1.19	3.84	P > 0.05 Not significant
Education	1	0.45	3.84	P > 0.05 Not significant
Occupation	1	1.95	3.84	P > 0.05 Not significant
Age at marriage	1	3.26	3.84	P > 0.05 Not significant
Family history of cervical cancer diseases	1	4.81	3.84	**P > 0.05 significant**
History of used oral Contraceptive pills	1	5.01	3.84	**P > 0.05 significant**
Have you under gone previous diagnostic procedure	1	2.05	3.84	P > 0.05 Not significant
H/o Human papilloma vaccination	1	1.88	3.84	P > 0.05 Not significant

DISCUSSION:

In the study group, the highest percentage of women (57%) were in the 36–45 years age group. About 31% were above 45 years, and 12% were in the 25–35 years age group.Most participants (84%) were married, while 8% were divorced and 8% were widowed. None of the participants were unmarried.Regarding the number of children, 70% of women had 1–2 children, 17% had no children, 8% had 2–3 children, and 5% had more than three children.In terms of education, 75% had completed higher secondary education, 15% were graduates, and 10% had primary education. None of the women had no formal education.Based on occupation, 52% of the participants were coolies, 30% were housewives, 12% were self-employed, and 6% were private employees.Regarding age at marriage, most women (79%) were married between 21–25 years, 10% between 25–30 years, 6% below 20 years, and 5% above 30 years.Most participants (80%) reported no family history of cervical cancer, while 20% had a positive family history.All participants (100%) reported that they had used oral contraceptive pills at some point.Regarding previous diagnostic tests, 92% had undergone VIA (Visual Inspection with Acetic Acid) testing, while 8% had undergone a Pap smear test.None of the participants (100%) had received the Human Papilloma Virus (HPV) vaccination.

CONCLUSION

Based on the findings of the present study, it is statistically evident that the **Technology Enabled Learning Programme (TELP)** was effective in improving the **knowledge regarding prevention of cervical cancer among women**. The significant difference observed between pre-test and post-test knowledge scores clearly indicates that the Technology Enabled Learning Programme enhanced women's awareness about cervical cancer, its risk factors, symptoms, preventive measures and early detection methods. Hence, the study concludes that Technology Enabled Learning Programme is an effective educational strategy for promoting knowledge and awareness regarding prevention of cervical cancer among women.

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