

## Effect of Educational program based on the Prevention Model on Women Knowledge Regarding Cervical Cancer Prevention

Basma Mohamed Osman<sup>1</sup>, Rehab Fouad Abd Elkodoos<sup>2</sup>, Doaa Mohamed Reda<sup>3</sup>,  
Hanaa Abd Elhady Soliman<sup>4</sup>, Reda M. Nabil Aboushady<sup>5</sup>

(1,2) Lecturer of Community Health Nursing, Faculty of Nursing, Cairo University

(3) Lecturer at Maternal and Newborn Health Nursing, Faculty of Nursing, Cairo University

(4) Lecturer at Maternal and Newborn Health Nursing, Faculty of Nursing, Minia University

(5) Assistant Professor of Maternal and Newborn Health Nursing, Faculty of Nursing, Cairo University

### Abstract

**Background:** Cervical cancer is a public health problem contributing to high levels of cancer morbidity and mortality among women. **Aim:** the aim of the current study is to evaluate the effect of educational program based on the prevention model on women knowledge regarding cervical cancer. **Methods:** A quasi-experimental design (one group pre / post-test) was utilized. **Sample:** A convenience sample of 150 women were recruited for the current study. **Setting:** The study was conducted at Obstetric outpatient clinics affiliated to Kasr El-Ainy hospitals, which is a Cairo University from December 2022 to May 2023. **Tool:** Using Knowledge in Cervical Cancer and Prevention Methods 55-items Structured interviewing questionnaire **Results:** After implementation of the educational program, the satisfactory level of the total knowledge scores increased from 34% in the pre-test to 86% in the post-test. This improvement was maintained during the follow-up assessment with 77.3% with statistically significant differences ( $P < 0.001$ ). **Conclusion:** The educational program, based on the preventative model was successful in enhancing women's knowledge about cervical cancer prevention. **Recommendations:** Empower the community health and obstetric nurses to implement the educational program to increase women's awareness regarding cervical cancer prevention in various healthcare settings. Health authorities should set up widespread screening initiatives, offer education, stimulate public knowledge through awareness campaigns, and remove obstacles to HPV vaccination to enhance cervical cancer prevention.

**Keywords:** Cervical cancer, Educational Package, woman, knowledge, the prevention model

### Introduction

Cervical cancer is a malignant reproductive organ tumour that manifests itself in the transformation zone of the exocervical opening. It constitutes the second highest cause of cancer-related deaths among women in countries with low and middle income levels. (Abera, Abebe, & Worku, 2022). Cervical cancer ranks as the fourth most common cancer and the fourth leading cause of cancer mortality among women globally. According to the 2020 GLOBOCAN estimation, approximately 604,000 women were diagnosed, and about 342,000 women died from the disease (Wilailak, Kengsakul, & Kehoe, 2021).

Nine in ten cervical cancer deaths worldwide occurred in low-and-middle-income countries (World Health Organization, 2020a). Based on the latest figures, cervical cancer is diagnosed in approximately 866 women annually, and tragically leads to the death of 373.

Among Egyptian females in the age bracket of 19 to 44, cervical cancer emerges as the tenth most frequently diagnosed cancer (Yakout, Ahmed & Tosson, 2022). According to the HPV Centre, there are about 30.55 million women aged 15 and above in Egypt who are potentially susceptible to developing cervical cancer. The current data suggests that each year, cervical cancer is detected in approximately 969 women, and 631 die from the disease (Elazab et al., 2021).

However cervical cancer is preventable, previous research have shown that in most Arab nations, public awareness is lacking, and national immunization programs are limited. Consequently, access to these preventative measures is restricted (Alsous et al., 2021). While cervical cancer can be easily prevented, its prevalence is unfortunately rising. This increase can be attributed to several factors: insufficient knowledge and awareness about the disease, feelings of embarrassment, misconceptions

about cancer screenings, shame related to sexual health, and fatalistic attitudes that hinder primary prevention efforts (Power et al., 2022).

Community mobilization and public education on cervical cancer prevention are crucial to encourage proactive measures against the disease (World Health Organization, 2020b). Studies have shown that comprehensive knowledge of cervical cancer significantly influences the intent to undergo screenings (Choi & Kim, 2020). Therefore, it's vital for women to have access to essential information, such as risk factors, signs, symptoms, and locations where screening services are available (Wilailak et al., 2021).

Furthermore, There is Extensive evidence suggests that when women are provided with information and guidance about cervical screening and early cancer detection, enhancing their health literacy, they are more inclined to participate in cancer screening procedure (Abera et al., 2022; Choi & Kim, 2022; Power et al., 2022; Alsous et al. , 2021; Rwamugira, Maree, & Mafutha, 2019; Ebu, Amissah-Essel, Asiedu, Akaba, & Pereko, 2019; Naz et al., 2018). Healthcare professionals, especially nurses, play a crucial role in disseminating information about risk factors and early detection signs of cervical cancer. They also have a significant part in encouraging women to regularly participate in cervical cancer screening (Mohamed, El-Sayed, Elsayed, & Aboushady, 2021).

Overall, the most important tool to fight against cervical cancer is prevention. The preventive approach is a comprehensive public health approach that addresses the different stages of disease and the various factors that contribute to it (World Health Organization, 2020a). It emphasizes the importance of prevention and early detection to promote health and well-being , reduce the burden of disease on individuals, families, and communities (Wilailak et al., 2021).

Both primary and secondary levels of prevention can make cervical cancer incidence and death largely avoidable when implemented (World Health Organization, 2020b). Conversely, without adequate awareness and availability of screening services, women

from underprivileged communities often only seek medical attention at advanced stages of the disease, a point at which a cure is no longer feasible (George & Batra, 2022).

Community health and obstetric nurses are pivotal in the fight against cervical cancer. They raise awareness, educate, and improve access to screening and vaccination initiatives. As key healthcare providers, they collaborate closely with individuals, families, and communities to encourage preventive measures and early detection (Said, Hassan & Sarhan, 2018). They share relevant information and refer individuals for further assessment and treatment when required. Their collaborative efforts with other healthcare providers enhance the success of prevention methods and vaccination programs (Yakout , Ahmed,& Tosson, 2022).

### Significant of the Study

The World Health Organization's strategy for eliminating cervical cancer by 2030 includes: ensuring 90% of girls receive the full HPV vaccination by age 15, providing treatment for 90% of women diagnosed with cervical disease, and screening 70% of women with a high-performance test by ages 35 and again at 45. Achieving these objectives could lead to a reduction of over 40% in new cervical cancer cases and prevent 5 million related deaths by 2050 (WHO. Egypt, 2021).

Nonetheless, achieving these goals requires enhancing community knowledge about this disease to encourage early detection and timely treatment. Success largely hinges on the population's level of awareness and their willingness to undergo screening tests or receive vaccinations. Health literacy plays a crucial role in enabling informed decisions, and contributes to better health outcomes and empowerment (Aziz et al., 2022).

Multiple Egyptian studies highlighted the limited awareness regarding cervical cancer screening and vaccination (Aziz, Mohamed, Mohammed, & AbdEl-hamed, 2022; Yakout ,Ahmed & Tosson, 2022; Mohamed et al., 2021; Amin, Galal, Shaheen, & Salem, 2021; Alsous et al., 2021; Alkalash, Al-kilany, & Shams El-deen, 2020; Marzouk & Fadel, 2020). Many women acknowledge that their understanding of cervical screening and HPV

vaccination is insufficient. They identify this as an aspect of health literacy they wish to enhance (Aziz et al., 2022; Zhang et al., 2022). There's a specific demand for programs aimed at improving knowledge about cervical cancer (Aziz et al., 2022).

In this context, there's an ongoing requirement for improved health education focused on cervical cancer prevention in Egypt. This aims to encourage cervical cancer screening and tackle the issues contributing to the low screening rate. Implementing educational intervention regarding the cervical cancer prevention is significant as it can help to bridge the knowledge gap and empower women to take charge of their health and helps them to adopt preventive measures and seek timely medical care, which can ultimately reduce morbidity and mortality rates. The Educational program can also contribute to the development of effective health promotion programs and policies that can improve community health outcomes in Egypt.

### **Aim of the study**

The aim of this study is to evaluate effect of the educational program on level of knowledge among women attending out-patient clinics toward cervical cancer prevention.

### **Research hypothesis**

**H1:** Women who will receive the educational program based on the prevention model regarding cervical cancer prevention will have higher mean knowledge scores in the immediate post-test and after three months than in the pre-test.

### **Subjects and Methods**

#### **Research Design**

A quasi-experimental design (one group pre / post-test) was utilized in the current study.

#### **Setting**

The study was conducted at Obstetrics outpatient clinic at Kasr El-Ainy hospital, which is affiliated to Cairo University-hospitals. Outpatient clinics includes anti-natal care, family planning and counselling clinics. the clinics are held by obstetrician and gynaecologist as well as diploma nurses.

### **Sample**

A convenience sample of 150 women were recruited for the purpose of the current study. According to the following inclusion criteria: can read and write, willing to participate and free from mental problems.

Sample size: A total of 150 women will be selected according to the following statistical formula:

$n = Z^2p(1-p) / d^2$ , where  $z$  = level of confidence according to the standard normal distribution (for a level of confidence of 95%,  $z = 1.96$ ).  $p$  = estimated proportion of the population that presents the characteristic (when unknown we use  $p = 0.5$ ),  $d$  = (d is considered 0.05).

### **Tools of data collection**

Knowledge in Cervical Cancer and Prevention Methods 55-items Structured interviewing questionnaire: Adapted from Al Saadi, (2021) in the Arabic language. Tool was designed to evaluate the knowledge of Arab women aged 20 and above regarding cervical cancer, its risk factors, and prevention methods. This instrument was employed in both pre and post-test evaluations.

The tool comprises 55 items: four related to demographic data, while the other 51 items are divided into four primary sections. These include general understanding of cervical cancer (6items), awareness of risk factors linked to the disease (17 items), knowledge of primary prevention with lifestyle subdomains (8 items) and HPV vaccine-related information (7items), and awareness of secondary prevention with subdomains related to symptoms of cervical cancer (9 items) and cytological screening (3 items). The final item pertains to the source of information.

### **Scoring system**

- For second and fourth sections: questions correct answer was scored 3, incorrect answers scored 2 and don't know scored 1.
- For the third section which ranks the relation between the identified risk factors and the incidence of cervical cancer. Participants were asked to rank the relation on a 6-item Likert scale (never=0, very

little=1, little=2, somewhat=3, much=4, and great=5).

- The total knowledge scores were calculated by adding up all the scores from each subsection. These scores were then divided into two categories:
  - A knowledge level deemed unsatisfactory if it is less than 60% of the total possible score.
  - A knowledge level considered satisfactory if it is 60% or more of the total possible score.

### Content validity and Reliability

- The Content Validity Index (CVI) was determined both at the item level (I-CVI) and the scale level (S-CVI). The I-CVI was calculated by summing up the number of experts who rated each item as 3 or 4, and then dividing this by the total number of experts, as indicated by Polit et al., (2007). A CVI cut-off point was established at 0-78. To compute the content validity of the overall scale, the average approach was used (S-CVI/Ave). The index of average congruity was assessed based on standards recommended by Waltz et al. (2005).
- In terms of the tool's reliability, the Cronbach alpha coefficient was 0.940 for the entire questionnaire, with individual domain scores ranging from 0.57 to 0.93. Test-retest reliability was evaluated in a subset of the total participant sample, yielding a correlation coefficient ( $r$ ) of 0.769 ( $p < 0.001$ ).

### Ethical considerations

The ethical committee of the Faculty of Nursing at Cairo University approved the current study (Ethical approval no 2022 -112). Official permission to conduct the proposed study was obtained from the hospital administrators. The participants were provided with information about the study's aim and benefits. The participation was voluntary, and informed that, the collected data would be used solely for research purposes. Data collection and coding were carried out with measures to maintain confidentiality and anonymity. Informed written consent was obtained from study participants who accept to participate in the study and met the inclusion criteria.

### Procedure

After obtaining the necessary approvals from the concerned authorities. Data collection took around 6 months from December 2022 to May 2023, two days a week, in a 2-hour session. Data collection was carried out through recruitment, assessment, implementation, and evaluation phases.

### Recruitment and Assessment phase:

The researchers attended the clinic and introduced themselves to women who met the eligibility criteria. The principal researcher gave the eligible women all the information about the study and its objectives then invited them to participate. Each woman was interviewed individually in a quiet environment which in the waiting area at obstetrics and gynaecology outpatient clinic. Then, the researchers distributed the questionnaire and collected answers before the women get educated using the structured interviewing questionnaire. In addition, each woman was assessed for their knowledge related to cervical cancer prevention as baseline information to develop the content of the health education intervention. Baseline interviews for about 20-25 minutes were done in the antenatal clinics with each woman.

### Implementation phase:

This phase was started after the results of the pre-test had been analyzed. The intervention (The Educational program based on the prevention model) was developed by the researchers based on the data collected in the assessment phase and reviewing of related literature and recommendations of the World Health Organization (2020).

- Each education session was conducted by the researchers and presented as teaching class and group discussion using unified education materials to ensure teaching the same knowledge in each session. The educational materials include brochures, and posters. Discussion was used as teaching method.
- The Educational program is eight sessions. Participants were divided into small groups; each group involved 10 or 15 participants.
- Each session has its title and objectives according to its content for 30-45 minutes

and ended with 5-10 minutes to review the session's content and take feedback from the participants.

- The educational sessions were conducted at the waiting area of the outpatient clinics over a 3months period.

#### **Description of the Educational program:**

**The Educational program:** is a culturally centred cervical cancer prevention educational Package constructed by the researchers after literature review, expert guidance, and set objectives. The educational program is grounded in preventive strategies endorsed by the World Health Organization (WHO). It follows the guidance notes provided by WHO (**World Health Organization, 2020a**) and The WHO Global strategy to enhance the elimination of cervical cancer as a public health problem and its associated targets for the period 2020 – 2030 (**World Health Organization, 2020b**).

**The goal of the educational program** is to maintain a healthy state and to prevent disease. Also, delineates the education about the preventive strategies at different points along the life course. The program comprises of health education on primary prevention and secondary prevention of cervical cancer as the following:

#### **Primary prevention of cervical cancer:**

- The goal of the primary prevention is promoting healthy lifestyle and prevent HPV infection. It encompasses Age-appropriate information on:
  - Promoting healthy lifestyle
  - Risk factor elimination
  - Warnings about infection with HPV.
  - Sexual and reproductive health.
  - Safer sexual practices
  - Vaccination of adolescent girl: Benefits, timing, indications, doses, types and barriers (as the most effective long-term intervention for reducing the risk of developing cervical cancer).

#### **Secondary prevention of cervical cancer:**

The principal goal of secondary prevention is early detection and treating women with precancerous lesions. It encompasses giving information on the following:

- Early detection of cervical cancer signs and symptoms who are at risk for a cervical pre-cancer.
- Visual inspection of the cervix using acetic acid, followed by immediate treatment (also known as the "screen and treat" approach), serves as an alternate method for secondary prevention in settings with limited resources.
- Cytology-based screening: Benefits, timing, indications, (as a highly effective method when it's integrated into national programs with broad coverage, particularly with adequate resources are available for monitoring patients in health setting).
- Myths and barriers to cervical screening.

#### **Evaluation phase:**

- This was the final phase of the program; the final two sessions were used to terminate the intervention.
- Once the educational session concluded, the same questionnaire was re-distributed to evaluate the effect after the intervention.
- The researcher conducted a follow-up assessment three months after the post-test evaluation by reaching out to the women.

#### **Statistical Analysis**

Upon the completion of data collection, the data was organized and analyzed employing the Statistical Package for the Social Sciences (SPSS) software, version 20. Methodologies such as inferential statistics, paired T-test, and Chi-square test were used to investigate the differences and similarities among the study groups. A P-value of less than 0.05 was considered to be statistically significant.

#### **Results**

Regarding demographic characteristics, Table (1) showed that the mean age of the study sample was  $33.45 \pm 7.11$  years. 3.3 % of the study sample are aged between (25 - 30), while 54.7 % are between (30 – 35). Regarding the educational level, 52% of the study sample can read and write, the majority of them (83.3%) were married and 82 % of the study sample were housewives, 18 % of them were working.

Table (2) revealed that, 26.7% of women have relatives or friends suffered from cervical cancer and 82% didn't perform pap smear. For reason for not performing pap smear, lacked awareness (52%), fear from results (18 %) and unavailable in their area (12%).

Table (3) shows that 60% of studied women know that cervical cancer is a silent deadly disease pre- test but post-test increased correct answer for 72%, forty-four point seven had to know cervical cancer may be caused by a viral infection pre- test but the post-test increased correct answer for 82.7 %, forty-four aware that there are effective ways to prevent cervical cancer pre- test but post-test increased correct answer for 77.3%, 26 and 72% in the follow up. For the knowledge regarding susceptibility to disease increased from 22.7% in the pre-test to 71.3% in the post-test and remained high at 82% in the follow-up assessment. Finally, the willing for cervical cancer screening was increased by 80% in the post-test and 73.3% in the follow-up.

Figure (1) shows that less than half of the women in the sample had reported correct answers about risk factors of cervical cancer pre-test, while during the post-test most of the women in the sample had reported correct answers about cervical cancer risk factors. The knowledge regarding, heredity & genes, early pregnancy, age, Multiple sexual partners as risk factors for cervical cancer significantly increased from (96%,94.7%, 93.3%,91,3%) respectively in the post test compared to (57.3%, 37.3%,54.7%) in the pertest respectively.

Figure (2) shows improved knowledge regarding primary prevention of cervical cancer. There was an improvement in knowledge regarding primary prevention strategies from the pretest to the post-test. The post-test and follow-up results show higher percentages of correct answers for all the listed strategies compared to the pretest.

Figure (3) shows that the understanding that HPV vaccination as a primary prevention strategy can provide lifelong protection from HPV infection improved from 68% in the pretest to 90.7% in the post-test while slightly decline to 85.3% in follow-up. The acceptance of the HPV vaccination if it were available at the health center significantly increased from 62% in the pretest to 95.3% in the post-test and 81,3 in the follow-up. The majority of participants (72% in pretest, 96.7% in post-test and 76.7% in the follow-up) agreed to include HPV vaccination in the compulsory vaccination program. Knowledge regarding the age for HPV vaccination also increased, with the percentage of studied women correctly identifying the age of vaccination rising from 34% in the pretest to 58% in the post-test and 79.3% in follow-up.

Figure (4) shows improved knowledge regarding secondary prevention of cervical cancer post-test, around half of the women in the sample had knowledge regarding early detection of signs and symptoms during the pre-test, while the improved level of knowledge post-test for the majority of the women in the sample had regarding early detection of signs and symptoms. Moreover, regarding appropriate age for Pap smear, 8% of the women had knowledge test during the pre-test, while the improved level of knowledge post-test for the women (45.3%) and 37.3 in the follow up.

Table (4): reveals that there are statistically significant differences ( $P<0.001$ ) regarding general knowledge, risk factors, primary prevention, and secondary prevention after the intervention. Regarding general Knowledge: The mean score significantly increased from 1.58 (SD=1.06) in the pre-test to 4.56 (SD=2.34) in the post-test and further improved to 9.37 (SD=3.24) during the follow-up assessment. For the cervical cancer Risk Factors, the mean score for knowledge of risk factors increased significantly from 6.62 (SD=3.41) in the pre-test to 15.32 (SD=2.62) in the post-test and remained high at 14.63 (SD=3.40) during the follow-up assessment.

As regard to Knowledge related to primary prevention, (healthy lifestyle), the mean score increased from 15.49 (SD=2.99) in the pre-test to 16.76 (SD=3.05) in the post-test and remained stable at 16.72 (SD=2.86) during the follow-up assessment. Regarding

vaccination, the mean score rose from 9.22 (SD=2.90) in the pre-test to 13.75 (SD=1.47) in the post-test, and though it slightly decreased to 11.54 (SD=4.00) during the follow-up, it remained significantly higher compared to the pre-test scores.

In term of Secondary Prevention (Early Detection), The mean score for knowledge of early detection of signs and symptoms increased significantly from 10.79 (SD=4.94) in the pre-test to 15.53 (SD=4.20) in the post-test and slightly decreased to 13.97 (SD=4.46) during the follow-up assessment.

Table (5) shows that the satisfactory level of the total knowledge scores increased from

34% in the pre-test to 86% in the post-test. This improvement was maintained during the follow-up assessment, with 77.3% of participants still demonstrating a satisfactory level of knowledge with statistically significant differences ( $P<0.001$ ).

Table (6) reveals there is a significant relationship between woman's age and total knowledge scores  $X=10.27$ ,  $p=0.02$ . while there is no significant relationship between educational level, marital status, occupation with total knowledge scores.

**Table (1): Distribution of the study Sample regarding their personal characteristics (N=150)**

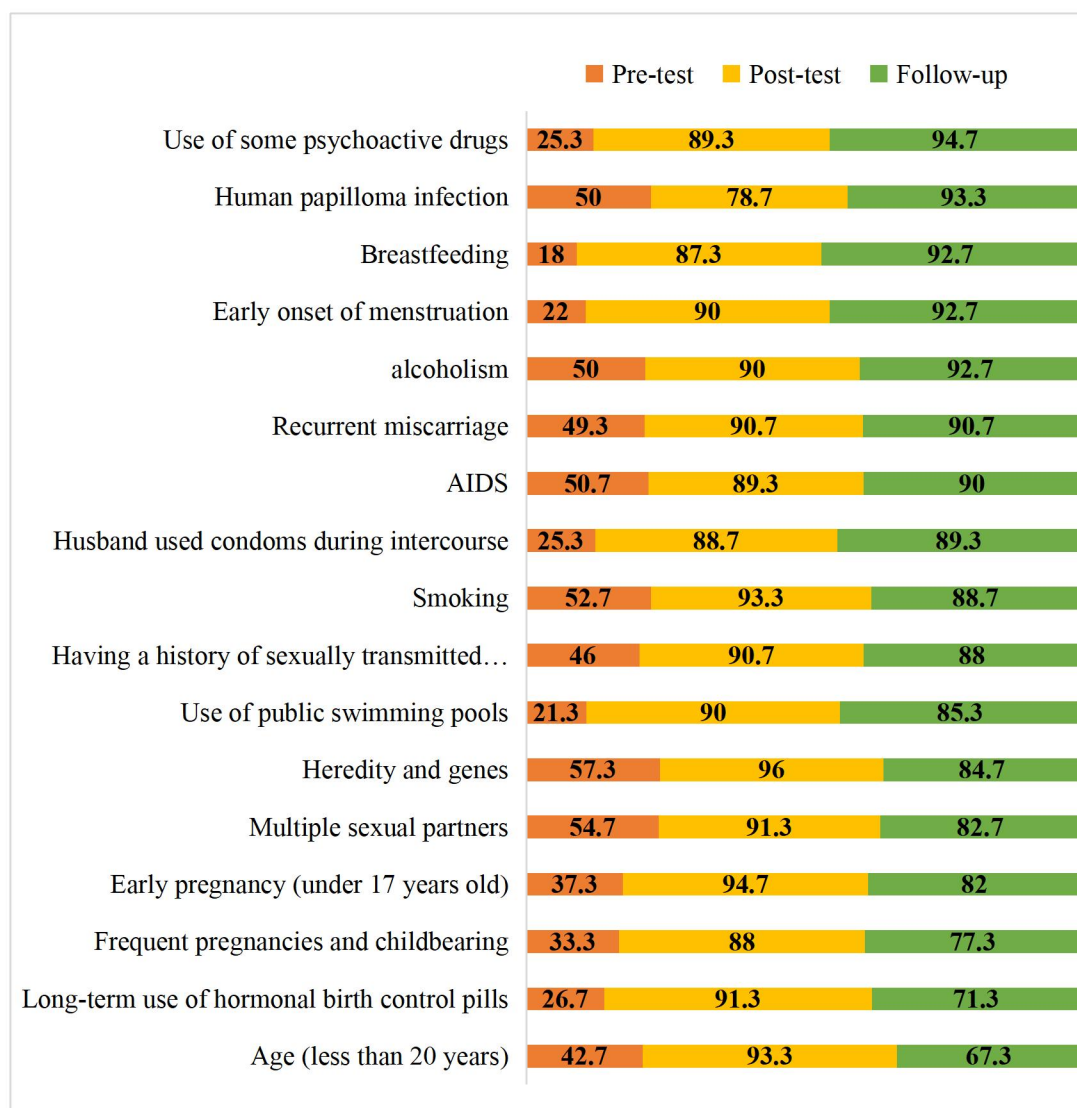
Variable	Freq.	%
<b>Age (yrs.)</b>		
20	7	4.7
25-	5	3.3
30	82	54.7
≥35	56	37.3
Mean ± SD	33.45 ± 7.11	
<b>Educational level</b>		
Cannot read and write	15	10
Can read and write	78	52
Basic education	42	28
Secondary education	15	10
<b>Marital status</b>		
Single	7	4.7
Married	125	83.3
Divorced	12	8
Widow	6	4
<b>Occupation</b>		
Housewife	123	82
Working	27	18

**Table (2): Distribution of the study sample regarding medical history related to cervical cancer (N=150)**

Variable	Freq.	%
<b>Have relatives or friends suffered from this disease?</b>		
Yes	40	26.7
No	110	73.3
<b>Perform pap smear</b>		
Yes	27	18
No	123	82
<b>The reason for not performing a pap smear</b>		
Lack of awareness	78	52
Fear from results	27	18
Not available	18	12

**Table (3): Distribution of the study sample regarding general knowledge about cervical cancer (N=150)**

Variable	Correct answer					
	Pre-test		Post-test		Follow up	
	No	%	No	%	No	%
Cervical cancer is a silent deadly disease	90	60	108	72	113	75.3
Cervical cancer caused by a viral infection	67	44.7	124	82.7	118	78.7
There are effective ways to protect and prevent cervical cancer	66	44	116	77.3	108	72
Susceptibility to this disease	34	22.7	107	71.3	123	82
Willingness for cervical cancer screening	20	13.3	120	80	110	73.3

**Figure (1): Percentage distribution of the study subjects regarding their knowledge of risk factors of cervical cancer (N=150)**



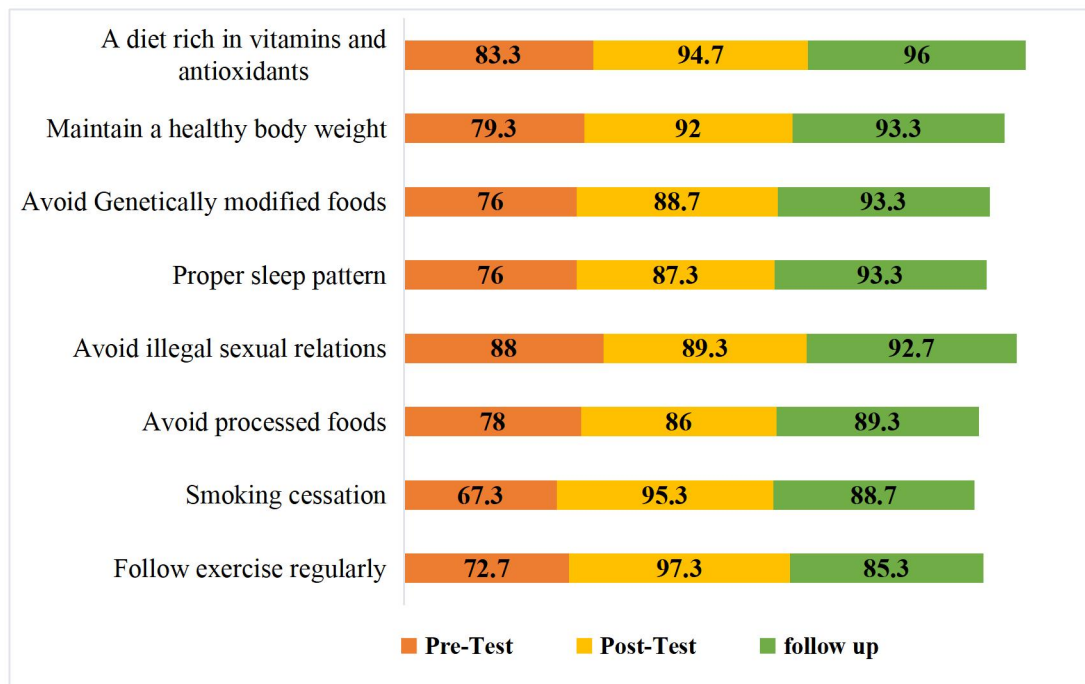


Figure (2): Percentage distribution of the study subjects regarding their knowledge of primary prevention of cervical cancer (N=150)

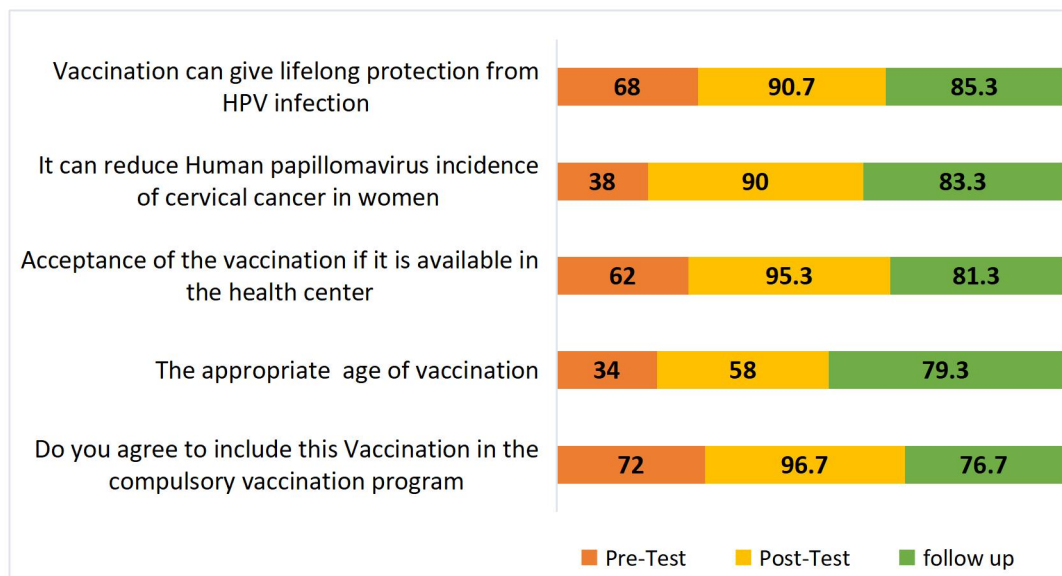
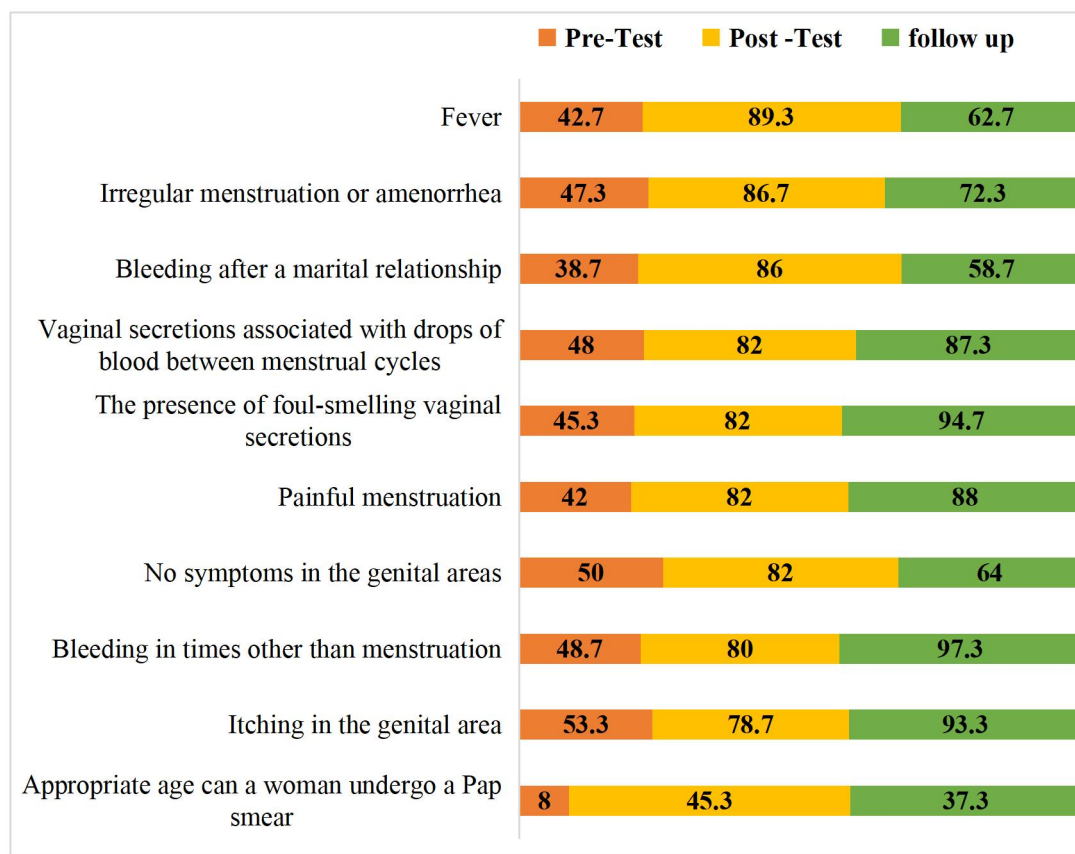


Figure (3): Percentage distribution of the study subjects regarding their knowledge of primary prevention of cervical cancer (vaccination) (N=150).



**Figure (4): Distribution of the study subjects regarding their knowledge of early detection of cervical cancer (warning signs and symptoms) (N=150)**

**Table (4): Mean scores of the study sample pre-test, post-test and follow-up toward knowledge of cervical cancer (N=150)**

Variables	Correct answers						t	p-value
	Pre		Post		Follow up			
	Mean	SD	Mean	SD	Mean	SD		
<b>General Knowledge</b>	1.58	1.06	4.56	2.34	9.37	3.24	-15.08	0.001*
<b>Risk factors</b>	6.62	3.41	15.32	2.62	14.63	3.40	-22.59	0.001*
<b>Primary prevention</b>								
Healthy lifestyle	15.49	2.99	16.76	3.05	16.72	2.86	-3.48	0.001*
Vaccination	9.22	2.90	13.75	1.47	11.54	4.00	-16.38	0.001
<b>Secondary prevention</b>								
Early Detection of Signs and Symptoms	10.79	4.94	15.53	4.20	13.97	4.46	-8.99	0.001

\*Significant at p-value<0.05

**Table (5): Distribution of the study sample pre- and post-regarding Level of knowledge (N=150)**

Level of knowledge	Pre		Post		Follow up		Chi-square	p-value
	No.	%	No.	%	No.	%		
Satisfactory $\geq$ 60%	51	34	129	86	116	77.3	12.57	0.001
Unsatisfactory < 60%	99	66	21	14	34	22.7		

\*Significant at p-value<0.05

**Table (6): Correlation between demographic characteristics and total knowledge scores (N=150)**

Variable	Total knowledge			
	Post test		Follow up	
	Satisfactory	Unsatisfactory	Satisfactory	Unsatisfactory
<b>Age (yrs.)</b>				
20	7(5.4%)	0(0.0%)	5(4.3%)	2(5.9%)
25-	5(3.9%)	0(0.0%)	1(0.9%)	4(11.8%)
30	72(55.8%)	10(47.6%)	64(55.2%)	18(52.9%)
$\geq$ 35	45(34.9%)	21(14%)	46(39.7%)	10(29.4%)
X2, p-Value	X=3.65, p=0.30		X=10.27, p=0.02	
<b>Educational level</b>				
Cannot read and write	11(8.5%)	4(19%)	8(6.9%)	7(20.6%)
Can read and write	72(55.8%)	6(28.6%)	64(55.2%)	14(41.2%)
Primary education	35(27.1%)	7(33.3%)	33(28.4%)	9(26.5%)
Secondary education	11(8.5%)	4(19%)	11(9.5%)	4(11.8%)
X2, p-Value	X=6.82, p=0.07		X=6.09, p=0.12	
<b>Marital status</b>				
Single	5(3.9%)	2(9.5%)	6(5.2%)	1(2.9%)
Married	108(83.7%)	17(81%)	96(82.8%)	29(85.3%)
Divorced	12(9.3%)	0(0.0%)	8(6.9%)	4(11.8%)
Widow	4(3.1%)	2(9.5%)	6(4%)	0(0.0%)
X2, p-Value	X=5.06, p=0.16		X=2.83, p=0.42	
<b>Occupation</b>				
Housewife	105(81.4%)	18(85.7%)	95(81.9%)	28(82.4%)
Working	24(18.6%)	3(14.3%)	21(18.1%)	6(17.6%)
X2, p-Value	X=0.22, p=0.63		X=0.004, p=0.95	

## Discussion

Results of the current study revealed that, most of the studied women had unsatisfactory level of total knowledge score in the pretest. This finding is supported by many recent Egyptian studies (Aziz et al., 2022; Ahmed, 2022; Amin et al., 2021; Mohamed et al., 2021). The limited knowledge about cervical cancer prior to the intervention in this study can partly be attributed to the lack of a national strategy for executing outreach and educational initiatives aimed at the general populace, particularly women of reproductive age. This could be due to the absence of a well-structured cervical cancer prevention scheme in Egypt. Furthermore, most primary health centers in Egypt do not offer any cervical cancer prevention programs due to shortages in manpower and financial resources.

The cervical cancer educational program was created based on the prevention model and implemented in response to a significant gap in the availability of cervical cancer educational materials for Egyptian women attending the outpatient clinic. The findings from this study could potentially aid in instituting future screening programs, which are currently non-existent in Egypt and guide awareness campaigns focused on cervical cancer prevention.

### **The effect of the educational program on the Women knowledge Cervical cancer and its risk factors.**

Results of the present study suggests that the Educational Package successfully increased knowledge of women regarding the cervical cancer as evidenced by increase of the mean score for general knowledge from 1.58 to 4.56 (posttest) and 9.37 (Follow-up), with a significant p-value of 0.001. Similarly, an Egyptian study examined the effect of nursing educational program on women knowledge about cervical cancer prevention, Ahmed, Esa & Elzayate, (2018) documented a notable enhancement in disease knowledge following the intervention. Also, Almutairi et al., (2022) assessed the effect of an educational intervention on cervical cancer awareness among pregnant women in Saudi Arabia. They observed a significant rise in the awareness about cervical cancer and its risk factors, increasing from 36.6% before the intervention to 63.4% post-intervention (p=0.000).

Current study results indicated that the educational program positively impacted participants' knowledge on the importance of taking proactive steps by identifying risk factors to prevent it and this knowledge was retained over time in the follow-up. A study aimed to evaluate the impact of an education intervention on awareness of cervical cancer among Saudi pregnant women. Almutairi et al., (2022) deduced that knowledge regarding cervical cancer risk factors improved significantly increased by 2-4 times (p=0.000) after the education session.

Additionally, In Egypt, Shapan Mohamed et al., (2016) investigating the influence of health guidelines on cervical cancer screening behaviors among women demonstrated that a large percentage of women acquired accurate knowledge about risk factors in the post-test compared to the pre-test. Moreover, a community-based interventional study in India by Thahirabanuibrahim & Logaraj, (2021) indicated a significant rise in knowledge and awareness about cancer risk factors, as evidenced by a mean difference of 21.32. This represents a statistically significant difference between pre-intervention and post-intervention values (p-value 0.03).

### **Primary prevention: adopting healthy lifestyle and HPV vaccine.**

As regard to the primary prevention, Findings of the current study indicated increased understanding of various strategies that promote a healthy lifestyle to reduce the modifiable risk cervical cancer. It is important to note that while there is an improvement in knowledge, it does not necessarily translate directly into behavior change or adoption of these prevention strategies. Further studies may be required to determine whether the increase in knowledge is associated with actual changes in behavior and the long-term impact on health outcomes.

The findings of the current study indicate a positive impact of the Educational Package on women knowledge towards HPV vaccination and its benefits, as well as the improved acceptance and support for its inclusion in compulsory vaccination programs as evidenced by the significant increase in mean scores for vaccination knowledge between pre- and post-intervention and follow-up with (p =0.001). Similarly, Almutairi et al., (2022) found significant improvement by 2-3 times increased from the pre-test with (p<0.005).

This result suggests a recognition of the importance of HPV vaccination as a preventive measure against cervical cancer and indicates a positive shift towards accepting the vaccination. However, the mean score for vaccination in the follow-up phase decreased slightly particularly regarding the appropriate age of HPV vaccination indicating that knowledge retention may be a challenge over time.

### Secondary prevention: early detection and screening

The results of the present study demonstrated a significant improvement in participants' knowledge regarding warning signs of cervical cancer. The notable increase in correct answers in the post-test and follow-up indicates that the intervention successfully addressed gaps in knowledge and enhanced participants' awareness of secondary prevention measures for cervical cancer. At the same line Thahirabanuibrhim & Logaraj, (2021) mentioned a considerable increase in the Knowledge about warning signs of cancer with mean difference of 3.33. (p value =0.03).

Concerning regular cervical cancer screening, Current study results showed that the majority of studied women didn't perform pap smear. Which attributed mainly to lacking awareness as reported by more than half of the studied women followed by fear from results, and unavailability of the test in their area. Similar results were reported in an Egyptian study investigating premenopausal women's knowledge regarding cervical cancer screening, Aziz et al. (2022) discovered that approximately two-thirds of the women studied had inadequate knowledge about cervical cancer screening. The most prevalent barriers preventing women from participating in cervical cancer screening included fear of vaginal examinations, anxiety about the results, lack of knowledge on where to get the test done, and the absence of cervical cancer symptoms.

Moreover, the present finding is partly and relatively conformable with a study done by Ghebrendrias et al. (2023) which evaluated the impact of a cervical cancer screening toolkit designed for Somali women. That study revealed that lack of information was a substantial barrier to women undergoing Pap smear tests.

Similarly, Ahmed (2022) found a significant direct correlation between the level of awareness and action meaning that increased awareness led to a higher likelihood of women obtaining a Pap smear test. Thus, education about cervical cancer screening is crucial to increase Pap test participation and HPV vaccination, especially in underserved populations.

Regarding, the willing for cervical cancer screening knowledge was increased in the post-test while slightly in the follow-up. In spite of the fact, increased knowledge is an important step towards reducing the burden of cervical cancer, it is important to ensure that interventions are also addressing other social determinants of health, such as access to healthcare services and structural barriers, that may impact cervical cancer prevention and outcomes. Ahmed, (2022) reported that the biggest predictors of screening behaviour were perceived barriers. This suggests that decreasing the barriers to Pap smear testing leads to a higher rate of testing.

However, these findings exceeded those of a randomized trial examining the impact of an educational intervention on women's demand for cervical cancer screening., Abera et al., (2022) found that after follow-up, the readiness for cervical cancer screening in the intervention group had increased by 46.4%. Additionally, Almutairi et al., (2022) revealed that the awareness and knowledge regarding Pap smear after the education session improved significantly by 1.5-3 times increase (p=0.000).

Furthermore, Power et al., (2022) reported that health literacy and intention to screen was improved after implementation of culturally tailored, community-based programs among migrant and refugee back- grounds in Australia. Additionally, Thahirabanuibrhim & Logaraj, (2021) found statistically significant difference in pre and post intervention for the cervical cancer screening knowledge (p value = 0.04).

Finally, there's a significant relationship between woman's age and total knowledge scores  $X=10.27$ ,  $p=0.02$ . while there's no significant relationship between educational level, marital status, occupation with total knowledge scores. These results were in accordance with Ahmed, (2022) who found post-intervention it associated with age and duration of marriage.

Regarding total knowledge, the satisfactory level of the total knowledge scores was increased from 34% in the pre-test to 86% in the post-test. This improvement was maintained during the follow-up assessment, with 77.3% of participants still demonstrating a satisfactory level of knowledge with statistically significant differences ( $P < 0.001$ ) these results were in agreement with several previous studies (Abera et al., 2022; Amin et al., 2021; Alkalash et al., 2020; Kazemi et al., 2022; Sonawane & G Mendagudli, 2020; Rosyda et al., 2019)

### **Conclusion:**

This study highlighted the deficiency in knowledge about cervical cancer prior to the intervention reflecting the pressing need for implementing educational programs to improve cervical cancer knowledge and increase women's readiness for cervical cancer screening. The educational program was notably effective in enhancing knowledge post-intervention and could play a vital role in molding the understanding of cervical cancer and its screening. There was a significant enhancement in knowledge following the delivery of the Educational Package ( $p < 0.001$ ). Furthermore, the findings suggest that Egyptian women are keen to learn more about cervical cancer prevention, as demonstrated by the remarkable improvement in their responses after the education. This could indicate the potential success of screening and vaccination programs when they become available in Egypt.

### **Recommendations:**

Based on the study results the following recommendations were suggested:

- 1- The community health nurse and obstetrics nurses should be involved in counselling women in different health care settings to raise the awareness regarding early detection and prevention of cervical cancer.
- 2- Conducting community-based health education intervention, which signifies an excellent opportunity to implement national strategies for the prevention and control of reproductive organ cancer.
- 3- Health authorities are recommended to establish comprehensive nationwide screening initiatives, and awareness-raising

campaigns to enhance early detection and treatment of cervical cancer. Additionally, work to remove obstacles to HPV vaccination, a key preventive measure against cervical cancer.

- 4- A self-instructional module can be developed for women and its effectiveness can be evaluated.
- 5- The creation of a demand for cervical cancer screening, facilitated by health education delivered by community health nurses and obstetrics nurses, is vital for the success and transformation of strategies aimed at preventing cervical cancer.
- 6- Future studies could evaluate the long-term impact of the educational program on women's screening behaviors and the incidences of cervical cancer.

### **Limitations and strengths of the study:**

The findings of the current study should be viewed within the following limitations: Firstly, the lack of a control group and the use of a singular pre-post-test design introduces potential flaws such as maturation effects, historical influences, and testing effects. Another limitation is the reliance on self-reporting tools, which could introduce errors due to memory lapses, lack of clarity, socio-cultural considerations, and individual biases, all of which could influence the results.

Strengths of the study: The longer follow-up period allows for the assessment of intermediate and long-term outcomes among women. Another advantage of this study is the method employed in creating the educational program. This process was grounded in a community-based approach using a preventative model, which is a significant strength of the study.

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