Effect of Educational Program on Knowledge and Attitudes towards Cervical Cancer Screening among Women of Reproductive Age

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Abstract

Background: Cervical cancer is a leading cause of morbidity and mortality among women in low and middle-income countries. **The aim:** to evaluate the effect of educational program on knowledge and attitudes towards cervical cancer screening among women at reproductive age. **Research design:** Quasi-experimental design (pre-test, post-test) was used to achieve the aim of this study. **Sample:** A purposive sample of 100 women was used. **Data Collection Tool, questionnaire (I):** A structured interviewing questionnaire which included socio-demographic characteristics of women, marital and reproductive history **(II)** knowledge regarding cervical cancer and screening questionnaire **(III)** Attitudes toward cervical cancer and screening questionnaire. **Results:** Before the educational program, 21% of the participated women had poor knowledge regarding cervical cancer and screening; later, that number dropped to none, and 31% and 69% had moderate and good knowledge respectively, post-implementation. On the other hand, 62% of the studied women had a positive attitude regarding cervical cancer screening before the educational program but it increased to 82% post-implementation of an educational program. **Conclusion:** The study concluded that the educational program positively affected knowledge and attitudes toward cervical cancer screening among women at reproductive age. **Recommendation:** Periodically screening for cervical cancer among women of reproductive age in the obstetric hospital and maternal–child health centers

Keywords: Attitudes; Cervical Cancer Screening; Educational Program; Knowledge; Women of Reproductive Age

INTRODUCTION

Cervical cancer is cancer of the cervix, extending into the upper end of the vagina **(Sonawane & Mendagudli., 2020)**. Cervical cancer is mainly caused by persistent infection with certain types of human papillomavirus (HPV), including sixteen and eighteen types responsible for approximately 70% of cervical cancer cases worldwide. Other risk factors include early sexual debut, multiple sexual partners, smoking, genetic predisposition, and compromised immunity associated with cervical cancer development **(Tiiti et al., 2022)**.

Cervical cancer is a leading cause of morbidity and mortality among women in low and middle-income countries; of 500,000 new cervical cancer cases diagnosed annually worldwide, where more than 80% are diagnosed at an advanced stage and have poor treatment outcomes. Cervical cancer is both preventable and treatable **(Anandaraj., 2021)**. Vaccination against the human papillomavirus vaccine (HPV) has been shown to prevent cervical cancer and genital warts and reduce the number of women requiring treatment and follow –up **(Said et al., 2018)**.

Prevention, early diagnosis, and treatment have been shown to reduce mortality due to cervical cancer. Many countries have significantly reduced morbidity and mortality through cervical cancer screening education and early treatment. In the United States, the introduction of the Pap smear has been responsible for a 90% decrease in deaths from cervical cancer. Early detection through cervical cancer screening has decreased the incidence of cervical cancer by 50% over the last 30 years **(Michael., 2018)**

Implementing a Pap smear and HPV screening is essential for detecting the HPV virus and early cell changes on the cervix. Pap smear facilitates early detection and successful treatment of precancerous cervical lesions. A pap smear is recommended for all women between 21 and 65 years. HPV tests eliminate the need for an initial pelvic exam by allowing women to collect samples of their vaginal cells for testing. With normal pap test results, a woman must wait three years before repeating another. With normal HPV and Pap test results, a woman can wait five years before getting another screening test **(Nkwonta., 2018)**.

Developments in the prevention and screening of cervical cancer are taking place so; the benefits must be utilized by all women, including those living in developing countries. Good knowledge and awareness will help ensure the disease's burden does not increase. Moreover, the cost of treating late-stage cervical cancer is substantially higher than that of early-stage cancer **(Mwangelwa., 2020)**.

Knowledge is defined as familiarity, awareness, or comprehension of someone or something, such as facts (descriptive knowledge), abilities (procedural knowledge), or objects (objective knowledge). Knowledge can be acquired in a variety of ways and through a variety of sources, including but not limited to perception, reason, memory, experience, scientific research, education, and practice, according to most accounts. Epistemology is the philosophical study of knowledge**.** A theoretical or practical understanding of a subject is referred to as "knowledge." It might be implicit (as with actual skill or expertise) or explicit (as with a subject's theoretical understanding). Knowledge can be formal or informal; systematic or specific **(Kotton et al., 2018)**

Lack of knowledge about HPV and low understanding of the importance of HPV vaccination directly affect women's participation in cervical cancer screening. Despite this, the importance of health education as an integral part of primary prevention for cervical cancer is often ignored. Cancer incidence can be reduced by controlling the causes and risk factors. Health education includes presenting information

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about cervical cancer prevention may be the key to changes in knowledge and attitude and preventive measures **(Said et al., 2018)**.

A person's attitude is a psychological construct, a mental and emotional entity that resides in or defines them. They're complicated, and they're a result of life experiences. It is a person's predisposition state of mind about a value that is triggered by a responding expression toward oneself, a person, a location, an item, or an event (the attitude object), which then influences the person's thought and action. Gordon Allport, a well-known psychologist, called this hidden psychological construct "the most distinctive and significant concept in current social psychology."(**Kotton et al., 2018**).

The prognosis can be improved if screening is embraced and widely employed. Health care workers must be educated and aware of influencing the general public's beliefs and actions**(Heena et al., 2019)**.A woman's reproductive health needs are very important to the family's health, as women have important roles in their families. They need to be healthy in order to function optimally. Thus, women's health must be seen as a holistic concept that includes all bio-psychosocial aspects of the women's being. When a woman is free from organic problems, diseases, and deficiencies that affect her ability to reproduce, she is considered healthy **(Engels et al., 2020)**

The division of reproductive health at the CDC places a high priority on women's health and reproductive health, its objective is to improve women's health throughout menopause and menarche. Reproductive age women are defined as ages 18–44 years **(Sully et al., 2020).** A woman's reproductive system is a delicate and complex system in the body. It is important to take steps to protect it from infections and injury, and prevent problems—including some long-term health problems. Taking care of woman health based on making healthy choices can protect the woman and her family. Protecting the reproductive system for all women means having control of their health **(Lebuso et al., 2022).**

In addition, in Middle Eastern countries, in particular, patients seeking medical care prefer women as their caregivers, with several studies providing traditional and religious beliefs as the main reason. Women are most likely to feel comfortable discussing their symptoms only with a female. Even female healthcare providers hesitate to discuss these issues with male physicians **(Heena et al., 2019)**.

Prevention, early recognition, intervention, and treatment of cervical cancer are critical to improving the quality of life of women with cervical cancer. Community health nurses serve a vital role in the prevention of cervical cancer. Community health nurses should educate women of different ages to improve their knowledge and attitude. They may be able to apply the knowledge into practice & assume responsibility and accountability for women. Eventually community health nurses should help to improve the reproductive health of women and can prevent morbidity and mortality of women due to cervical cancer **(Kieti., 2020)**

Significance of the Study

Cervical cancer is a major cause of female mortality and morbidity worldwide, an estimated 311,000 deaths and 570,000 new cases were reported worldwide in 2018, with about 85% of the registered cases occurring in low- to middle-income countries**(Bevilacqua et al., 2022)**. It is the fourth most common cancer among women worldwide, in Egypt; 25.76 million Egyptian women over the age of 15 are at risk for developing cervical cancer. According to current estimates, 514 women are diagnosed with cervical cancer annually, and 299 die from the disease**(Chisale Mabotja et al., 2021)**.

Women's knowledge and beliefs about Pap tests were shown to be the strongest predictors of repeated screening. Several studies represented that improving women's awareness, "knowledge, and attitude " had a gold role in improving the prevention and prognosis of cervical cancer among studied women **(Dhaher., 2019)**.

Community health nurses must play an important, influential role in educating, encouraging, and informing women to be screened for cervical cancer. Community health nurses combine their knowledge of health care and available screening services to educate women about cervical cancer **(Kieti., 2020)**

Aim of the study

The present study aimed to evaluate the effect of educational program on knowledge and attitudes toward cervical cancer screening among women at reproductive age.

Research hypotheses:

- H1- Health education program will enhance women's knowledge toward cervical cancer screening post-test than pre-test.
- H2- Health education program will enhance women's attitudes toward cervical cancer screening post-test than pre-test.

Research design:

Quasi-experimental research design (pre-test, post-test) was utilized to achieve the aim of the current study.

Setting:

The study was conducted at the out-patient clinic for gynecology at Minia University Hospital for Maternity and Childhood. The out-patient clinic of gynecology works from Saturday to Thursday every week, and it works from 8 a.m. to 2 p.m., it located on the first floor of the Minia obstetric and child university hospital, and consists of two doctors and two nurses, who provides a physical examination for each woman, performs laboratory examinations, x-ray, and abdominal sonar, and describes medications, also, it deals with further health care inside or outside the hospital according to the women's needs or problems, it serves about 60702 women of reproductive age at Minia city according to last demographic health survey at 2014 **(El-Zanaty, 2015)**

Subject:

The researcher met the participated women at the out-patient clinic for gynecology and they were interviewed at official clinic time from 8 Am: 2 pm. The interview took 10 - 15 minutes for each woman to fill out the questionnaires (some filled by participant women and some by the researcher according to the educational level of each woman). It begins on the first day of May and to the end of June 2022(two days per week).

Sample size:

A purposive sample was utilized to perform the present study. According to the Minia university hospital registration office for maternity and child, the total number of patients attending the out-patient clinic of gynecology during

the last year, 2019/2020, was (800). The sample size was determined according to the statistical Formula **(Cochran et al., 1963)** as following:

$$n = \frac{\frac{z^2\ p\,(1-p)}{m^2}}{1 + \frac{z^2\ p\,(1-p)}{m^2\,N}} = \frac{\frac{(1.96)^2\ (0.5)\,(0.5)}{(0.05)^2}}{1 + \frac{(1.96)^2\ (0.5)\,(0.5)}{(0.05)^2\ 800}} = 112$$

Description:

n = required sample size.

z = is the Z score at 95 % confidence level equal 1.96.

p = Prevalence of Patients diagnosed with cervical cancer

m = Margin of error at 5 % (standard value of 0.05).

N= population size (800)

Based on the previously mentioned formula, a sample of (112) women were selected by purposive sampling technique. Two women were drawn from the study and 10 was excluded used as pilot. So, the actual recruitment number was 100 women

Inclusion criteria:
o Women aged 20–50 years.
o Married women.

Exclusion criteria:
o Women have previous cervical cancer screening.
o History of hysterectomy or surgical treatment on the cervix

Data Collection Tool:

I: Socio-demographic characteristics and history questionnaire: it was a structured interviewing questionnaire. It was used to illicit the socio-demographic characteristics and marital and reproductive history of the participant women. It was designed after extensive revision of review **(Woldetsadik et al., 2020), (Abiodun et al., 2017).** All questions were in the form of MCQ or yes and no questions (closed ended questions). It consisted of the following parts:

- **Part I:** Socio-demographic characteristics of women. It consisted of five questions such as educational level, family income, occupation, residence, and age.
- **Part II:** Marital and reproductive history. It consisted of 17 questions such as the family history of cervical cancer, age of first menstrual period, number of days of menstruation, amount of blood during menstruation, the interval between each menstruation, bleeding in the days of non-date monthly menses, age of marriage, numbers of pregnancies, number of parties, and age at first birth(years).

II: Knowledge about cervical cancer questionnaire. It was used to assess the knowledge level of women about cervical cancer screening and its complications; it was adapted from **Kumar et al., 2014**.It was consisted of 27 questions about the definition of cervical cancer, risk factors, causes, signs & symptoms, diagnosis, cervical cancer development, methods of treatment, side effects of chemotherapy and radiotherapy, prevention, vaccination, pap smear screening, setting for

screening, and complications of cervical cancer. All the used questions were in the form of MCQ questions.

Scoring system: for each item, a correct response was scored 1, and the incorrect was scored zero. For each area, the scores of the items were summed up, and the total divided by the number of the items, giving a mean score of the part. These scores were converted into a percentage score. Total number of the questionnaire items = 27 questions with total scores = 27.

Knowledge classification and scoring was considered as following:
- Poor was from 0% or ≤ 33%.
- Moderate or satisfactory was from 10:18 or from 34% - less than 70%.
- Good was from 19-27 (70% and more).

Cronbach's alpha test was 0.810. It was used to determine the tool internal consistency, which referred to the strong, reliable tool.

III: Attitudes toward Cervical Cancer and screening questionnaire: it was used to assess the studied women attitudes responses toward cervical cancer and screening. It was adapted from **Champion 1999** and **Guvenc et al., 2011** and modified by the researcher to accommodate with Egyptian women culture in the form of omitting some questions as Health professionals doing Pap smear test are rude to women, and simplifying the translation of it into Arabic language to be suitable for the study use. It was consisted of 2 main parts:

- Proper incentives: it was consisted of 7 questions with 5 responses including strongly agree, agree, disagree, strongly disagree or neutral. It included questions about healthy incentives such as the desire to discover the health problems early and the importance of maintaining good health, I look for new information to improve my health, I feel it is important to carry out activities which will improve my health, I eat well balanced meals for my health, I exercise at least 3 times a week for my health, and I have regular health check-ups even when I am not sick.

- Challenges affecting cervical cancer screening (as reported by participant women): it was consisted of 5 questions with 5 responses including strongly agree, agree, disagree, strongly disagree or neutral. It included questions about if women were afraid to have a Pap Smear Test due to a bad result, or because of unexpected consequences, I would be ashamed to lie on a gynecologic examination table and show my private parts to have a Pap Smear Test, I prefer a female doctor to conduct a Pap Smear Test, and I will never have a Pap Smear Test if I must pay for it.

Overall attitude classification and scoring was considered as following:
- Negative attitude: 1:29 or less than 50 %
- Positive attitude: 30:60 or 50% and more.

Cronbach's alpha test was estimated as 0.820 to determine the internal consistency of the questionnaire, indicating strong and reliable one.

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Ethical consideration:

The ethical committee approved the research proposal in the faculty of nursing. The purpose of the study was explained to every woman in the previously mentioned sitting. Informal consent was obtained from each woman who agreed to participate in the study. The confidentiality of the collected information was respected.

Validity:

The tools were tested for content validity by a jury panel of five experts in the community health nursing field and obstetric health nursing field who reviewed the tool for content accuracy and internal validity, relevance, understanding, applicability, and easiness. Also, experts were asked to evaluate the items for completeness and clarity (content validity). The relevancy, fluency, and simplicity of each component in the questionnaire were examined by the Experts and they found the questionnaire is useful and helpful. Suggestions were involved and considered into the tool modifications.

Pilot Study:

The pilot study was conducted on 10% (10 women) of the total study sample to test the study process and evaluate the efficiency and clarity of the tool used and necessary modifications were done then excluded, it was also helpful in estimating the time needed to fill the questionnaire, it started on the fifteenth day of April 2022 for one week.

Study procedures:

An official letter of the study approval was obtained from the Dean of the Faculty of Nursing at Minia University to the director of the previously mentioned setting; the letter included a brief explanation of the study's objectives, and permission was requested from the chairman to carry out the study.

Data was collected through the following phases:

Written permission was granted from the Dean of the Faculty of Nursing at Minia University. Written approval was obtained from the director of maternity and child hospital affiliated with Minia University hospitals for data collection after approval of the ethical committee in the Faculty of Nursing, Minia University. The study was performed in four phases as following:

Assessment phase: in this phase, the researcher conducted the study tool (pre-test) for participants about knowledge and attitudes related to cervical cancer and screening. The interview took 25-35 minutes for each woman to complete all the assigned questionnaires

1. **Planning phase:** Based on the baseline data in the assessment phase, the program was conducted; other facilities were checked and arranged during this phase, such as teaching places and types of sessions. For the teaching sessions, the researcher used lectures, presentations, group discussions, and audiovisual materials performed in specified classroom at the hospital. The researcher designed and developed a booklet in Arabic language for each woman to be used during the different sessions and after finishing the study.

2. **Implementation Phase:** The program was implemented for the women in terms of educational sessions. Total number of participants was divided into small groups; each group included **(8 - 12)** women to attend the session. The sessions included:
   A. Educational sessions included: orientation about the educational program, introduction to cervical cancer and its risk factor, sign and symptoms of cervical cancer, complications, treatment, and prevention guided by health belief model domains. Correction of misbeliefs and misconceptions about cervical cancer and screening was scheduled and involved in the educational booklet after explanation.
   B. Practical session included detailed explanation about menstrual hygiene practices, genital hygiene, how to use condoms during intercourse for protection against human papillomavirus or other sexually transmitted diseases, Papanicolaou cytology screening (Pap smear) and HPV test. Each session started with a summary of what was given during the previous session and the objectives of the new topics. It begins on the first day of May and to the end of June 2022.

3. **Evaluation phase**: The evaluation was done through introducing post-test after three months of implementing and completing the program to avoid overestimation of knowledge level. Post-test evaluated the same knowledge and overall attitudes.

Statistical analysis:

Data was coded. Entry and analysis of data was performed using SPSS (Statistical Package for Social Science) version 22. Graphic was extracted using Excel software program. It was analyzed using student t- test to compare between pre and posttest. In the other hand, frequency distribution tables, number and percentage represented qualitative data. It was analyzed by chi-square ($\chi 2$) test. Level of significance was set as P value less than 0.05

Results:

Table (1): Socio demographic characteristics of the studied women, 2022, (N= 100):

Socio-demographic characteristics of the studied women	No	%
Age (years)		
20- <30	34	34
30- <40	47	47
40-50	19	19
Educational level		
Basic	18	18
Illiterate	13	13
Secondary	36	36
University	28	28

Socio-demographic characteristics of the studied women	No	%
Postgraduate	5	5
Family Income /month		
Insufficient	33	33
Sufficient	67	67
Occupation		
Housewife	57	57
working woman	43	43
Residence		
Urban	51	51
Rural	49	49

Table (1) shows that 47 % of the participants were women aged 30- <40. Also, 36 % and 28 % have Secondary or University education. 67 % of the participant women have sufficient income. 57 % of the participant women are a housewife, and 51 % of the total live in urban places

Table (2): Number and percent distribution of marital and reproductive history of the studied women, 2022, (N= 100):

Marital and reproductive history	No	%
Family history of cervical cancer		
No	91	91
Yes	9	9
Age of first menstrual period		
<12 year	39	39
≥ 12year or more	61	61
Number of days of menstruation		
1-< 3	13	13
3-<5	67	67
≥ 5	20	20
Amount of blood during menstruation		
Mild	35	35
Moderate	58	58
Sever	7	7
Interval between each menstruation		
Irregular	36	36
Regular	62	62
Bleeding in the days of non-date monthly menses		
No	72	72
Yes	28	28
Age of marriage		
< 18	28	28
18 – 30	67	67
> 30	5	5
Numbers of pregnancies		
1	15	15
2	33	33
3 and more	52	52
Number of parities		
0	4	4
1-4	91	91
4 and more	5	5
Age at first birth(years)		
17 or less	3	3
18 to 24	74	74
more than 24	23	23

Table 2 presents that 91 % of the participant women haven't family history of cervical cancer, 67% have -3 < 5 days of menstruation and 58 % of the participant women have moderate amount of blood during menstruation. Also, 62% of the participant women have regular amount of blood during menstruation and 28% of them have bleeding in the days of non-date monthly menses.

Concerning age of marriage, 67% of the participant women marriage at 18 – 30 years, 52% have 3 and more than three number of pregnancies, 91% have 1- 4 number of parities, and 74% have first birth at age 18 – 24 years.

Continue table (2): Number and percent distribution of marital and reproductive history of the studied women, 2022, (N= 100):

Marital and reproductive history	No	%
Suffering from STDs (Sexually Transmitted Disease)		
No	97	97
Yes	3	3
If yes, what kind of STDs (Sexually Transmitted Disease) did you Suffer from?		
I don't Know	98	98
Herpes	1	1
Gonorrhea	1	1
Using condom or diaphragm during sex during STDs		
No	77	77
Yes	23	23
Suffering from any type of infection		
Vaginal infection	86	86

Marital and reproductive history	No	%
Cervical infection	4	4
Tubal infection	3	3
Uterine infection	7	7
Using any type of contraceptive methods?		
No	23	23
Yes	77	77
If yes, kind of contraceptive method did you use?		
Pills	74	74
Intra -uterine device(IUD)	10	10
Injection	6	6
Natural method	2	2
Barrier (condom)	8	8
Duration of using contraceptive pills		
< 5 years	93	93
>5years	7	7

Continue table (2): Illustrates that 97% of the participant women ever suffered from STDs, and 98% who suffered form it don't known the kind of STDs. 77% not using a condom or diaphragm during sex, 86% of them have viral infection, 77% of them used contraceptive methods, 74% using pills as contraceptive methods and, 93% of the participant women their duration of using contraceptive is 5 years

Part II: Knowledge of the studied women regarding cervical cancer and screening.
Table (3.a): Distribution correct knowledge percentages of the studied women regarding cervical cancer and screening before and after implementing the educational program, 2022, (N= 100):

Knowledge items	Pre %	Post %	Paired t test	P - value
Definition of Cervical cancer	56	95	-7.361	.000*
Risk factors of cervical cancer (more than one answer can be applied)	66.5	82.5	-3.288	.001*
The most common cause of cervical cancer	69	92	-4.912	.000*
Symptoms for cervical cancer (more than one answer can be applied)	55	63	-1.245	.216
The diagnosis of cervical cancer (more than one answer can be applied)	55.5	76	3.721	.000*
Development of cervical cancer takes years	47	81	-5.456	.000*
Cervical cancer be treated	75	87	-2.234	.028
If yes, the methods of treating cervical cancer (more than one answer can be applied).	66	66.7	.10169	1
Side effect of radio therapy(more than one answer can be applied)	59	78.5	-.09342	.000*
Side effect of chemotherapy: (more than one answer can be applied)	55.5	73	-.07007	.001*
Cervical cancer Can be prevented	74	90	2.839	.005
If yes, how can cervical cancer be prevented? (More than one answer can be applied).	73	73.5	-.095	.924
Complications of cervical cancer (more than one answer can be applied)	52	54	-.280	.780
If you have cervical cancer, you will know it right away?	31	50	-3.092	.003*
Which test can effectively screen for cervical cancer	35	76	-6.002	.000*
Have you heard of pap test (pap smear)?	31	74	-7.283	.000*

Significant* or P<0.05

Table (3.a): explains the variations of the distribution correct knowledge percentage of the studied women regarding cervical cancer and screening before and after implementing the educational program as regarding definition of cervical cancer is ranged from 56% to 95%, risk factors of cervical cancer is ranged from 66.5% to 82.5%, the diagnosis of cervical cancer is ranged from 55.5% to 76 %, development of cervical cancer takes years is ranged from 47% to 81 % and cervical cancer be treated is ranged from 75% to 87 % respectively.

Concerning the variations of the distribution correct knowledge percentage of the studied women regarding cervical cancer and screening before and after implementing the educational program as regarding side effect of radio therapy, it is ranged from 59% to 78.5%, side effect of chemotherapy is ranged from 55.5% to 73%, cervical cancer can be prevented is ranged from 74% to 90%. Also, type of selected test can effectively screen for cervical cancer is ranged from 35% to 76%, and if women heard about Pap test is ranged from 31% to 74% respectively.

There are significant differences before and after implementing the educational program in all items of knowledge except regarding the symptoms for cervical cancer, the methods of treating cervical cancer, cervical cancer be prevented, and complications of cervical cancer

Table (3.b): Distribution correct knowledge percentages of the studied women regarding cervical cancer and screening before and after implementing the educational program, 2022, (N= 100):

Knowledge items	Pre %	Post %	Paired t test	P - value
If yes, what does a pap test screen?	51	81	-4.780	.000*
A Pap test can detect	59	66.2	-1.185	.239
women should start getting Pap tests at	62	87	-4.220	.000*
women ages between 21-65 should get a Pap test	0.64	0.85	-3.553	.001*
Setting for HPV test /pap screening?	45	80	-5.326	.000*
Have you heard of human papilloma virus vaccine?	30	78	-8.077	.000*
Who should get human papilloma virus vaccine?	63	76	-2.254	.026
Did you receive all 3 doses of HPV vaccine such as Gardasil® and cervarix™?	0.02	0.04	.815	.417
If you have received an HPV vaccine, you don't need to be screened for cervical cancer?	21	51	-4.662	.000
Have you ever had a Pap/ HPV test in your lifetime?	20	20	--	-
If No, are you going to have a cervical cancer screening soon?	58	69	-1.583	0.11

Significant* or P<0.05

Table (3.b): reveals the variations of the distribution correct knowledge percentage of the studied women regarding cervical cancer and screening before and after implementing the educational program as regarding definition of pap test screen, it is ranged from 51% to 81 %.Likewise, women should start getting Pap tests is ranged from 62% to 87 %, women ages between 21-65 should get a Pap test is ranged from 0.64% to 0.85%, setting for HPV test /pap screening is ranged from 45% to 80 %,and heard of human papilloma virus vaccine is ranged from 30% to 78 %, who should get human papilloma virus vaccine is ranged from 63% to 76 % ,and participant women have received an HPV vaccine, they need no screening for cervical cancer is ranged from 21% to 51 % respectively

There are significant differences before and after implementing the educational program except regarding uses of a Pap test, receiving all 3 doses of HPV vaccine such as Gardasil® and cervarix™, having Pap/ HPV test in lifetime, and future performing of cervical cancer screening
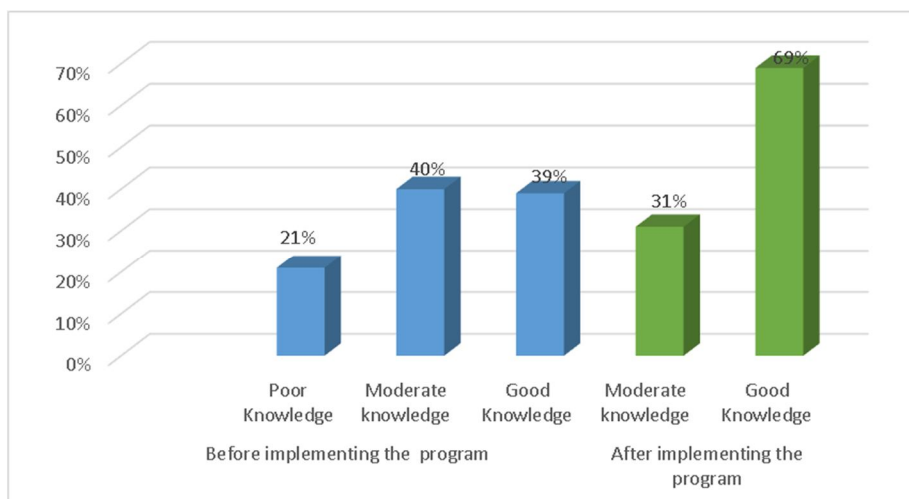

Figure (1): Total knowledge percentages of the participant women regarding cervical cancer and screening before and after implementing the educational program, 2022,(N= 100):

Figure (1): illustrates that 21% of participant women had poor knowledge regarding cervical cancer and screening decreased to none of them having poor knowledge, and 31% and 69% have moderate and good knowledge after implementing the educational program respectively

Table (4): The relationship between socio-demographic characteristics and the post knowledge of the participant women, 2022, (N= 100):

| socio-demographic characteristics | Knowledge classifications post interventions | | | | Total % | X² P |
| | Moderate knowledge | | Good knowledge | | | |
	No	%	No	%		
Educational level:						
Illiterate	2	2	11	11	13	5.321
Basic	9	9	9	9	18	0.255
Secondary	9	9	27	27	36	
University	9	9	19	19	28	
Postgraduate	2	2	3	3	5	
Family Income /month						
Insufficient	6	6	27	27	33	4.006
Sufficient	25	25	42	42	67	0.045
Occupation						
Housewife	17	17	40	40	57	0.085
working woman	14	14	29	29	43	0.770
Residence						
Urban	17	17	34	34	51	0.265
Rural	14	14	35	35	49	0.606
Age (years)						
20- <30	10	10	24	24	34	.441
30- <40	16	16	31	31	47	.802
40-50	5	5	14	14	19	

Significant* or P<0.05

Table (4): shows 27% and 19% of the participant women who have moderate or good knowledge, respectively after the educational program are having university or post-graduate education, revealing no significant difference between those who have moderate or good knowledge. Also, 17 % and 40% of the participant women who have moderate and good knowledge, respectively after the educational program are housewives revealing no significant difference between those who have moderate or good knowledge. Likewise, 16 % and 31 %, respectively after the educational program aged 30- <40 with insignificant difference. There is significant difference regarding family income P<0.05.
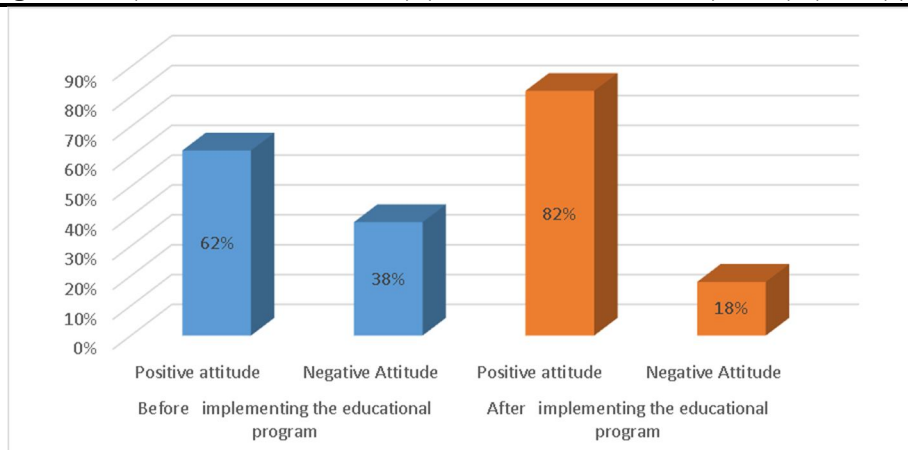
Figure (2): Total attitudes responses regarding cervical cancer screening among the participant women before and after implementing the educational program, 2022, (N= 100):

Figure (2): illustrates that 38% of participant women have a negative attitudes regarding cervical cancer screening dropped to 18% after implementing the educational program. 62% of participant women have positive attitudes before implementing the educational program increased to 82% of them after implementation

Discussion:

Concerning socio-demographic data of the studied women, the current study results revealed that; Less than half of the participant women aged 30- <40 years old. Also, more than one-third and more than one-quarter have secondary or university education. More than two-thirds of participant women have sufficient income and more than half are housewives and live in urban places.

The current study results are consistent with **Mutambara et al., (2017)** who concluded that the majority of participants were in the age range 30–39, and most of the participants were women with secondary education. On the other hand, the current study findings were inconsistent with **Eghbal et al., (2020)** who studied evaluating the effect of an educational program on increasing cervical cancer screening behavior among rural women in Guilan, Iran, and found that; the majority of the participants in the experimental group were illiterate or had elementary education.

Regarding the marital and reproductive history of the studied women, the current study results showed that; the vast majority of the participant women haven't a family history of cervical cancer, more than two-thirds have 3- < 5 days of menstruation, and more than half of the participant women have a moderate amount of blood during menstruation. Also, more than half of the participant women have regular blood during menstruation, and more than one-quarter have bleeding in non-date monthly menses.

Concerning the age of marriage, more than two-thirds of the participant women married at 18 – 30 years, more than half have 3 – and more than three pregnancies, the vast majority have 1- 4 parties, and more than three-quarters have first birth at age 18 – 24 years

The current study results are in the same line with **Surakatu., (2022)** who studied knowledge, attitude, and practices of cervical cancer screening among female teachers in an Urban community in Lagos, Nigeria, illustrated that; more than two-fifths of the studied women had 1-3 times of pregnancy, the majority of them had more than five children, more than three-quarters of women were married at the age of 21-30 years.

The current study results are disagreed with **Said et al., (2018)** who studied the effect of an educational intervention on women's knowledge and attitude regarding cervical cancer, illustrated that; about one-third of the studied

women had gravid1-2, and more than half ranged from (1-2) of parity. The researcher attributed frequent childbearing to the ignorance of some women about different types of family planning methods and their being in the childbearing period. Egypt is one of the developing countries where having many children is an asset to the family.

The current study results illustrated that; most of the participant women ever suffered from STDs, and most who suffered from it didn't know the kind of STDs. More than three quarter of them were not using a condom or diaphragm during sex, the majority of them have a vaginal infection, more than three-quarters of them used contraceptive methods, nearly three quarter used pills as contraceptive methods, and the vast majority of the participant women their duration of using contraceptive is five years.

The present study results are inconsistent with the study by **Surakatu., (2022)**, who claimed that; more than half of the studied women utilized family planning methods including natural and injectable methods as the most commonly used

The current study results are incongruent with **Mohamed et al., (2021),** who studied women's knowledge, attitude, and practice toward cervical cancer and its screening tests in a teaching hospital in Khartoum, Sudan and concluded that; more than one-third of the respondents used contraceptives methods.

The current study findings showed that; regarding definition of cervical cancer, it is ranged from more than half to the most, risk factors of cervical cancer is ranged from more than two thirds to the majority, the diagnosis of cervical cancer is ranged from more than half to more than three quarters, development of cervical cancer takes years is ranged from more than two fifth to the majority and cervical cancer be treated is ranged from three quarters to the majority respectively.

On the other hand; regarding side effect of radio therapy, it is ranged from more than half to the majority ,side effect of chemotherapy is ranged from more than half to less than three quarter ,cervical cancer can be prevented is ranged from near three quarters to the most ,which test can effectively screen for cervical cancer is ranged from near one fifth to more than three quarters and if women heard about pap test is ranged from more than one quarter to near three quarters respectively.

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There are significant differences before and after implementing the educational program in all items of knowledge except regarding the symptoms for cervical cancer, the methods of treating cervical cancer, cervical cancer can be prevented, and complications of cervical cancer.

The study results are congruent with **Coronado et al., (2016)** who studied increasing cervical cancer awareness and screening in Jamaica, and concluded that; most knowledge items regarding cervical cancer symptoms increased significantly between pre-test and post-test. Similarly, knowledge items regarding cervical cancer prevention increased percentage points (p < 0.0001).

The current study results are supported by **Said., (2018)** who studied the effect of an educational intervention on women's knowledge and attitude regarding cervical cancer, and concluded that; there was a highly statistical significant differences regarding cervical cancer knowledge concerning meaning, types, risks, symptoms, diagnostic and treatment (p<0.001).

The current study findings are consistent with **Thahirabanuibrahim and Logaraj., (2021)**, who studied the impact of health education intervention in promoting cervical cancer screening among rural women of Chengalpattu district, who found that; statistical value for paired t-test, Pre and post intervention, the test was found to be significant for the variables warning signs, risk factors and cervical cancer screening knowledge. However, knowledge about vaccination were statistically insignificant.

The present study results are supported by **Drokow., (2021)** who studied the impact of video-based educational interventions on cervical cancer, pap smear and HPV vaccines ,and illustrated that; before the educational intervention, more than half ,more than one fifth and more than one third knew that "bleeding in between periods, genital warts, and vaginal discharge with foul smell" respectively, were some of the symptoms of cervical carcinoma compared to most , the majority and less than two thirds after the intervention with statistical significant difference.

Also, they found that; more than half compared to the most respondents understood that Human papillomavirus (HPV) infection is one of the key significant risk factor in the development of cervix carcinoma. Other correctly identified risk factors with significant rise in knowledge level including family history of cervical cancer from more than half to the most, for early age at marriage and obesity from near one quarter to the most, for long term use of oral contraceptives pills, and unprotected sexual practices from more than half to the most, respectively with all at a P < 0.001.

Meanwhile; the current study results are supported by **El Sayed et al., (2022)** who studied impact of an educational intervention on deaf and hard hearing females' knowledge and health beliefs regarding cervical cancer in Tabuk, Saudi Arabia: found that; a significant improvement was found in the participants' scores post-intervention related to CC definition, symptoms, risk factors, diagnostic and preventive measures, treatment modalities, and other general knowledge related to human papillomavirus and CC compared to the pre intervention.

The current study results showed that, regarding definition of Pap test screen, it is ranged from more than half to the majority. Participant women reported that they should start getting Pap tests is ranged from less than two thirds to the majority, also, women ages between 21-65 reported that they should get a Pap test is ranged from half to the majority.

Setting for HPV test /pap screening is ranged from one fourth to the majority after implementing the educational program. Participant women who heard about human papilloma virus vaccine is ranged from more than one quarter before implementing the educational program to more than three quarters after implementing the educational program.

Also, those who should get human papilloma virus vaccine is ranged from less than two thirds before implementing the educational program to more than three quarters after implementing the educational program. Likewise, participant women who reported that receiving an HPV vaccine need no screening was ranged from less than one quarter before implementing the educational program to more than half after implementing the educational program respectively

The current study results are supported by **Indracanti, et al., (2018**) who studied role of pre and post interventions on cervical cancer knowledge levels among women students at the University of Gondar, Gondar, Ethiopia, and indicated that*;* before the educational intervention, only minority versus more than two thirds after interventions were aware of screening test after intervention .How often more than one quarter of women correctly respond that should undergo screening before intervention compared to more than half after the intervention. Only minority of respondents' identified Pap smear test can pick cell changes before intervention and it increased to less than two thirds after educational intervention. Also, less than half of total respondents before and the vast majority after education intervention were aware of HPV vaccination.

The first and foremost step in health education is to educate individuals so as to create awareness and bring about behavior change, as it is the association between knowledge and behavior that changes attitudes by inculcating knowledge that might lead to behavior change **(Ghalavandi, et al., 2021).**

Regarding total knowledge of the studied women regarding cervical cancer screening, the current study results illustrated that; less than one quarter of the participant women had poor knowledge regarding cervical cancer screening decreased to none after the educational program. Also, more than one-quarter and more than two-thirds of them have moderate and good knowledge respectively after the educational program.

The study results are supported by the study done by **Ahmed et al., (2018)** who studied health belief model-based educational program about cervical cancer prevention on women knowledge and beliefs and revealed that; all the women had poor knowledge scores about cervical cancer prevention before the program and improved to less than one quarter and the majority of the women having an average and good level of knowledge, respectively. This difference was significant (*P*<0.001).

This might be because the nursing educational program provided the participants with simplified and summarized information that can enhance knowledge and attitudes.

Concerning the relationship between socio-demographic characteristics and the post-knowledge of the participant women, the current study results showed that; about one fifth and more than a quarter of the participant women who have good knowledge, respectively after the educational program have University or secondary education. Also, less than one-quarter and two-fifth of the participant women who have moderate and good knowledge respectively

after the educational program are housewives revealing no significant difference between those with moderate or good knowledge. Likewise, the minority and more than one quarter, respectively, after the educational program aged 30- <40 with insignificant difference.

The current study result is consistent with **Said., (2018)** who studied the effect of an educational intervention on women's knowledge and attitude regarding cervical cancer showed that; there was a significant relation between knowledge and educational qualification pre-intervention phase. Moreover, a highly statistically significant relationship existed between total knowledge score and education. The researcher attributes the difference of results to different of the studied sample.

The present study results are in agreement with **Bansal et al., (2015)** who studied knowledge, attitude, and practices related to cervical cancer among adult women: A hospital-based cross-sectional study and found that age, level of education, and income were significantly associated with the highest knowledge score among women with higher education were more likely to have adequate knowledge.

These findings may be because a highly educated woman pays more attention to health and has more opportunities to obtain relevant information, increasing knowledge.

Concerning attitudes of the participant women regarding cervical cancer screening; the current study results illustrated that; more than one third of participant women had negative attitudes regarding cervical cancer and screening turned to less than one quarter after implementing the program. Also, less than two third of participant women have positive attitudes before implementing the program, increased to the majority of them after implementation.

The results of the current study are congruent with **Ebrahim et al., (2021)**, who studied the effect of the educational package based on the health belief model on nursing students' knowledge and attitude regarding human papillomavirus and cervical cancer, and found that; one-fifth, three-quarters, and slightly less than three-quarters of the studied sample had positive total attitude scores at pre-intervention, immediate post-intervention, and four weeks post-intervention phases, respectively. On the other hand, it revealed that the majority, one-quarter, and slightly more than one-quarter of the studied sample had negative total attitude scores in pre-intervention, immediate post-intervention, and four weeks post-intervention phases, respectively. Moreover, there was a marked improvement in all items of the studied sample attitude regarding all items of students' attitudes regarding cervical cancer, Pap test, human papillomavirus infection, and human papilloma virus vaccination post-implementation of the educational package based on the health belief model with a highly statistically significant difference (p.001) between pre, immediate post, and four weeks post-intervention.

The researcher attributes the present results to the educational sessions providing the participants with exemplified and concluded information accompanied with feedback that can positively affect their knowledge level which in turn positively affect their attitudes.

Conclusion:

Based on the findings of the present study, it can be concluded that before implementing the educational program, more than one fifth the studied women had poor knowledge regarding cervical cancer and screening; later, that number dropped to none, and about one-third and more than two-thirds had satisfactory and good knowledge respectively, after implementation.

Also, before implementing the educational program about two fifth of the studied women had negative attitudes regarding cervical cancer and screening, later the majority of the studied women have a positive attitudes regarding cervical cancer screening after implementation. So, the educational program positively affected knowledge and attitudes toward cervical cancer screening among women at reproductive age

Recommendations
Based on the present study's findings the following are recommended:
- Periodically screening for cervical cancer among women at reproductive age in the obstetric hospital and maternal–child health centers.
- Performing more studies to evaluate the effect of long-term follow-up of the effect of educational programs on knowledge and attitudes toward cervical cancer screening among women at reproductive age.
- Conducting similar studies on females before reproductive period (12 to less than 19 years) can be more preventive.

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