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Effect of Cervical Cancer Preventive Program Based on a Health Belief Model on the Knowledge and Beliefs of Women in Port Said City

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Abstract

Background: Cervical cancer is the largest cause of mortality globally, especially in underdeveloped nations. Cervical cancer is a largely preventable and treatable malignancy if identified early.

Aim: The present study aims to assess the effect of cervical cancer preventive program based on a health belief model on the knowledge and beliefs of women in Port Said city.

Method: A quasi-experimental research design was utilized in this study one group (pre & post-test) at five gynecological and family planning clinics in primary health care centers in Port Said city which affiliated by Egypt Health Care Authority. A multi- stage cluster sampling technique was used for 110 women were included in the study. Two tools were used to gather the required data consisted of; Tool (1) women's knowledge questionnaire about cervical cancer (2) Health Belief Model Scale.

Results: The study revealed that 89.1% of the studied women had satisfactory level of total knowledge and 83.6% of them had high level of total beliefs about cervical cancer prevention at post implementation of cervical cancer preventive program.

Conclusion: It can be concluded that after implementation of the educational program, significant improvement with highly statistical differences were noticed in women's knowledge, and in all subscales of total women's beliefs about cervical cancer.

Recommendation: Based on the findings of the current study, it is recommended that increase women's awareness about cervical cancer screening through mass media and dissemination of health knowledge and beliefs through posters, photos, and booklets.

Keywords: Cervical Cancer, Health Belief Model, Knowledge, Preventive Program, Women.

Introduction

One of the most frequent gynecologic malignant tumors and a major contributor to female genital cancer deaths is cervical carcinoma. It denotes cervical cancer that has spread to the upper end of the vagina. Cervical cancer is the fourth most common cancer in women worldwide. It is estimated that 570 000 women were diagnosed with the illness, and 311 000 of them lost their lives to it. Death rates from the disease range from less than 2 to 75 per 100,000 women. With over 400,000 instances recorded yearly, this cancer type is also thought to be the second most frequent malignancy in developing nations (WHO, 2022).

The major cause of cervical cancer is human papillomavirus (HPV), a sexually transmitted infection. The most frequent HPV serotypes are 16 and 18. This virus causes changes in the cervical epithelial metaplasia, which often develop more rapidly throughout puberty. The etiology can progress over 10-20 years from precancerous lesions to aggressive malignancy, eventually leading to death (Mittal, Gupta, Kachroo, Sinha, & Goyal, 2024).

Cervical cancer risk factors include sexual activity before age 21, multiple sexual partners, long-term use of hormonal contraception, increasing parity (three or more full-term pregnancies), smoking, immunosuppressive disease, history of sexually transmitted infections, and dietary factors. The major objective of cervical cancer prevention is to lower the incidence by addressing the underlying causes and risk factors (Abd El Salam, Ali, & Hassan, 2021).

Unfortunately, many women remain asymptomatic until the disease progresses; when metastases appear, the most common symptoms are abnormal vaginal bleeding after sex, douching, menopause, bleeding and spotting between periods, heavier or longer menstrual periods than usual, pain during sex, and abnormal vaginal discharge. Furthermore, women with advanced cervical cancer may experience pelvic pain, urinary frequency and urgency, loss of appetite, weight loss, severe back pain, and a decrease in red platelets (El-Kurdy, Mohammed, Ali, Fadel, & Mohamed, 2021).

Any educational intervention's success is dependent on the appropriate application of health behavior theories and models. Such models proven helpful in health promotion by clarifying risk factors and changing health habits. The Health Belief Model (HBM) is one of the oldest and most extensively used models for encouraging individuals to use free preventative

programs to prevent and detect diseases. According to HBM, a person's intention to engage in a specific preventative behavior is influenced by his beliefs about the disease (Ahmed, Yakout, & Tosson, 2022).

According to the health belief model, increasing women's knowledge about cervical cancer can lead to an improvement in their beliefs. It consists of six components: perceived threats or the risk of becoming ill, perceived severity of outcomes, stimuli as cues to action, perceived barriers to adopting a behavior, perceived advantages of the new activity, and self-efficacy to perform the new behavior. As a result, the HBM is seen as critical for clarifying the relationship between health beliefs and behaviors, and it is thus the most commonly used model in the design of preventive educational programs (Baker & Elhossiny Elkazeh, 2020; El-Kurdy, Mohammed, Ali, Fadel, & Mohamed, 2021).

Knowledge is described as acquaintance, awareness, or comprehension of someone or something, such as facts (descriptive knowledge), skills (procedural knowledge), or objects (objective knowledge) (Fawzy, Hossien, Ibrahim, & Taha, 2023). Knowledge of cervical cancer screening programs can help reduce the risk of disease and death among women. The pap smear remains the principal technique for identifying cytological abnormalities in the cervical transformation zone, and it significantly reduces the incidence and fatality rates of cervical cancer. A pap smear test is advised once a year for three years, followed by every three years if the first three were negative (El-Sayed, Elsayed, Mohamed, & Aboushady, 2020). Currently, another strategy for preventing this cervical cancer is the human papilloma virus (HPV) vaccine, which has advanced clinical testing, it has been shown to prevent 65-76% of HPV-related infections and lesions in women who have not previously been exposed to the virus. Furthermore, preventive treatments include nutrition variables such as a vitamin A, C, and folic acid-rich diet, genital hygiene, seeing a doctor if symptoms appear, and adhering to ethical values are also involved in the preventive methods (Farag, Mohamed, Malk, & Hassan, 2024).

Because of their critical role in the healthcare delivery system, community health nurses are at the forefront of cervical cancer prevention efforts. Fortunately, they play an important role in health education and promotion by expanding their understanding of disease and changing their beliefs. Furthermore, they are responsible for educating women about risk factors, detecting early signs of cervical cancer, and urging them to have regular cervical cancer screenings. In addition, they work

directly with individuals, families, and communities to promote prevention and early detection (Elbialy, El-Shafie, & El-Gamelen, 2019).

Significance of the study:

Egypt has a population of 33.2 million women aged 15 and above who are at risk for cervical cancer. Current statistics indicate that every year 1320 women are diagnosed with cervical cancer and 744 die from the disease. Cervical cancer is the 12th leading reason of cancer death between Egyptian females aged 15 to 44, with an annual age-standardized death rate of 1.5 per 100,000 ((Bruni et al., 2021).

Studies have demonstrated the relevance of disseminating prevention programs based on the health belief model to prevent cervical cancer, such as a lack of screening programs, limited access to care, and certain behavioral characteristics, values, and beliefs (El-Sayed, Elsayed, Mohamed, & Aboushady, 2020)

Study Aim

Assess the effect of cervical cancer preventive program based on a health belief model on the knowledge and beliefs of women in Port Said city.

Research hypotheses:

1. Statistical significant will improve in the knowledge of women after implementation of cervical cancer preventive program based on a health belief model.
2. Statistical significant will improve in the beliefs of women after implementation of cervical cancer preventive program based on a health belief model.

Methods:**Research design:**

A quasi-experimental research design was utilized in this study one group (pre & post-test).

Study setting:

This study was conducted at gynecological and family planning clinics in primary health care centers within the city of Port Said. There are five districts located at Port Said namely; Eldawahey district, Elzhour district, Elarab district, Elmanakh district and Elshark district. One primary health care center chosen randomly from each district as follows; Mostafa Kamel health care center, Elgwhara health care center, Elarab health care center, Al-Elag El Tabeey health care

center, and Sehat Osra Alarab unit, respectively. These centers are accessible all days of the week from 8.00 AM to 8.00 PM.

Study Subjects:

Multi- stage cluster sampling technique was used in the study in which with total no. 110 women were chosen based on the inclusion and exclusion criteria until the sample size was completed.

The sample size was determined by the Epi-info 7 programs (Xu, Lin, Yang, & Zhang, 2020) using the following parameters:

- Population size =2700 (The number of women who meet the inclusion criteria who repeatedly visit the following centers (Mostafa kamel=720, El-gawhara=600, El-arab=600, Al Elag Altabeey=540, Sehat Osra Alarab =240) over a period of six months.
- Expected frequency =50%
- Acceptable error=10%
- Confidence coefficient=97%

The program revealed that the sample size =105 (women): Due to the expected non-participating rate (5%); the final sample size was 110 women who met the inclusion criteria and distributed in the centers as the following:

Table (1): Distribution of the studied women in the selected centers

No.	Centers	Number of women
1	Mostafa Kamel	30
2	El-Gawhara	24
3	El-Arab	24
4	Al Elag Altabeey	22
5	Sehat Osra Alarab Unit	10
Total sample size		110 women

Inclusion criteria

The study population included women aged between 18-50 years who attending above mentioned settings.

Tools for data collection:

Two data collection instruments were used:

Tool (I): women's knowledge structured interview questionnaire about cervical cancer:

This tool adopted from (Alshehri, Eltohamy, Elgzar, 2020; El-Sayed et al., 2020) in an Arabic language to assess women's knowledge about cervical cancer. It consisted of three parts:-

Part I: personal characteristics of the studied women.

This part included 6 items that used to collect the necessary data to assess personal characteristics of the studied women including: age, educational level, working condition, family monthly income, and marital status.

Part II: Medical history among the studied women

This part included 20 items that used to assess health history of the women including medical, obstetric, gynecological and menstrual history including age at menarche, age of marriage, age of first pregnancy, age of first delivery, number of gravida, number of parity, family history of cervical cancer, contraceptive method use, smoking exposure and stress exposure.

Part III: women's knowledge about cervical cancer.

This part involved 17 items (10 yes or no, and 7 multiple choice). It used to assess women's knowledge regarding cervical cancer including cervical cancer definition, symptoms, risk factors, diagnosis, treatment, prevention, Human Papilloma Virus vaccine, and Pap smear. It used in assessment phase (pretest) to measure the exact knowledge level of women about cervical cancer. The same tool used immediately after the implementation of the program (immediate posttest) to evaluate the gain in knowledge after implementation phase.

Scoring system:

The questions were scored as follows: For multiple-choice: One for a 'yes' answer and zero for a 'no' answer. The questions that having answers were categorized into: Do not know was given zero, incomplete answer was given one, and complete answer was given two. The total knowledge score was calculated by adding the scores for each correct answer which was (23) score. The higher scores reflected higher levels of knowledge about prevention of cervical cancer. It classified into: from (0-11) unsatisfactory level of knowledge if score less than 50 % and satisfactory level (12-23) of knowledge if score more than 50%.

Tools validity and reliability:

The tool of data collection was proven to be valid as the tool was ascertained by a jury consisting of 5 expertise in the field of community health nursing and maternal and neonatal health nursing. Additionally, the reliability was assured by calculating Cronbach's alpha coefficient ($r = 0.86$), which indicates that the Arabic version demonstrates an acceptable internal consistency (Abu shady, 2020).

Tool II: Women's beliefs regarding cervical cancer by using Health Belief Model Scale (HBMs):

This scale was developed by (Champion, 1999) in an English language and translated by (Alshehri, Eltohamy, Elgzar, 2020) in an Arabic language. HBM scale covers six subscales and included 41 items. Five items for perceived susceptibility such as (I am at a risk for developing cervical cancer, My chances of getting cervical cancer in the next few years are high.....etc.), four items for perceived seriousness such as (Cervical cancer may lead to death, Cervical cancer may lead to a hysterectomy.....etc.) , ten items for perceived barriers such as (Getting cervical test would only make me worry, Screening is not necessary as there is no cure for cancer,.....etc.), five items for perceived benefits such as (The Pap screening can save my life,.....etc.), nine items for cues to action such as (I eat a well-balanced diet,...etc.) , and eight items for self-efficacy such as to what extent that you sure to get a cervical test even if your friend advises you not to do it,...etc.). Each the subscale was assessed separately.

Scoring system of Health Belief Model Scale:

All the items of subscales have five-point likert scale response choices. In each item the participant has to choose one of five alternatives. All subscales had positive responses related to screening behavior, except for barriers which have negatively associated. Scores of positive statements were given score of strongly agree (5), agree (4), neutral (3), disagree (2) and strongly disagree (1) with regard to each item. Scores of negative statements were inversed as follows: strongly agree (1), agree (2), neutral (3), disagree (4) and strongly disagree (5). The scores summed up for each construct then for the six constructs. The score of perceived susceptibility (5- 25), perceived seriousness (4-20), perceived barriers (10-50), perceived benefits (5-25), perceived cues to action (9-45) and self-efficacy (8-40). The total score ranged from 41 to 205. It considered to have low ($41 \leq 95$), moderate ($96 \leq 149$) or high ($150 \leq 205$) health belief (Alshehri, Eltohamy, Elgzar, 2020)

Tools validity and reliability:

The tool of data collection was proven to be valid as the tool was ascertained by a jury consisting of five expertise in the field of obstetric nursing and a statistician. The reliability was assured by

calculating cronbach's alpha coefficient ($r=0.87$), which indicates that the scale demonstrates an acceptable internal consistency (Alshehri, Eltohamy, Elgzar, 2020).

Pilot study:

A pilot research was conducted prior to beginning the data collection phase. It was carried out on 10% of the study population, which consisted of 11 randomly selected women. The pilot research ran from October 1 to October 31, 2022. The pilot study was designed to assess the applicability and practicality of the study tools, as well as to estimate the time required to complete them. It also aided in identifying any potential barriers or issues that would impede data collecting. Women who participated in the pilot study were excluded from the overall research sample. The pilot study's findings indicated that the tools were clear and applicable. Therefore, no adjustments were made.

Ethical considerations:

The research consent was obtained from the scientific research ethical committee in the faculty of nursing at Port-Said University before starting the study {Code Number: NUR (13/2/2022) (10)}. Explain the aim of the study to the directors of gynecological and family planning clinics in primary health care centers and ask for their permission to do this study. The process of data collection did not disturb the harmony of the work. Oral consent was obtained from the studied women. Explain the aim of the study to each participant so they are familiar with the importance of their participation and have the right to withdraw from the study at any time. The researcher ensured participants that their identities and answers were kept confidential and used only for this study.

Fieldwork:

Data collection was carried out at Port Said's health care centers from the beginning of November 2022 until the end of March 2023, for a period of 5 months. Data collection was conducted through four phases (assessment phase, planning phase, implementation phase, and evaluation phase) as the follows:

Phase I (Assessment Phase): This phase was conducted by the researcher. After preparing the tools, the study sample was recruited according to the set criteria. This was followed by collecting baseline data. The researcher met the studied women who attended the outpatient clinic

for regular follow-up one day per week (Monday or Tuesday). The orientation was done about researcher's name, purpose of the study, content of the study tools, how the program will be implemented, and finally obtaining the oral consent to participate in the study.

The researcher began to clearly explaining how to fill it out the written pre mentioned tools and distributed the questionnaire sheet (pretest) in the form of Arabic language of the studied women to study their existing level of knowledge and beliefs regarding cervical cancer. Then distributed the questionnaire sheet after clearly explaining how to fill it out. Confidentiality of all collected information was strictly assured. The time needed to fill each one extended from 15 to 20 minutes, depending on the response of each woman. As well, the researcher obtained the telephone number of the studied women to communicate with them after the program implementation. The researcher also obtained information about the regular visits of the studied women from the outpatient record by assistance of nurse working at outpatient clinic.

Phase II (Planning): After identifying the needs of women in the assessment phase, the researchers developed a program about cervical cancer prevention based on HBM constructs with simple Arabic language to be suitable for women's level of understanding. Additionally, a booklet containing the content of the program was designed by the researcher and it was written in simple Arabic and supported by photos and illustrations to be distributed to the studied women at the beginning of the program implementation to help them understand the content. It emphasized the areas of deficit in knowledge about cervical cancer prevention and health beliefs such the following: definition of cervical cancer, risk factors, causes, signs and symptoms, diagnosis, prevention, and Human Papilloma Virus vaccination (benefits, age for vaccination, and who receives the vaccine). The program objective was developed during this phase.

Phase III (Implementation phase): The designed educational program was carried out in the aforementioned five settings. Subjects were divided into small groups (20 groups), each group ranged from 5-7 women according to the total number of women selected from each of the five centers. Groups and the period of data collection are mentioned in the below table.

Table (2): Distribution of the number of women, groups, and weeks at selected centers

No.	Centers	Number of women	No. of groups	No. of Weeks
1	Mostafa Kamel	30	6	6

2	El-Gawhara	24	4	4
3	El-Arab	24	4	4
4	Al Elag Altabeey	22	4	4
5	Sehat Osra Alarab Unit	10	2	2
Total		110 women	20 group	20 week

The researcher visited one of each center one day per week. After finishing the required number of women then visit another health care center. An orientation about the aim of the study and the objectives of the program took place. Also, women were oriented about the phases of the study and the program sessions (time, duration, place, and contents). The researcher stressed the importance of continuous attendance and active participation.

The program was implemented for each group of subjects; one day per week. The accessibility of the studied women were determined by their regular visits and follow- up to family planning clinics due to the existence of the Egypt health care authority, and the service was not provided to the women except through their health center. In addition, the researcher obtained their phone number to confirm attendance. The session varied in time from 50 to 55 minutes. The total allocated time for implementing health educational program objectives for all twenty groups was five months with a total of 20 weeks. Every time, started with a summary of what was given and the objectives of the topics. The program was presented in clear and concise form. Educational program booklet distributed to each woman. Direct reinforcement in the form of a copy of the educational booklet was given as a reward for each woman to use it as a future reference. Teaching methods included small group discussions, open discussion, and brain storming. After the program, an additional 30 minutes were offered for answering more questions.

Phase IV (Evaluation phase): After implementation phase, post-tests done to evaluate the effect of the program immediately after the program using the same tools of pretest evaluation (part III tool I) and (tool II). Finally, the studied women thanked for the effort and the time they offered.

Statistical design:

Upon completion of the data collection, collected data managed, coded, arranged, entered and analyzed according to the type of each data to answer the research question using Statistical Package

for Social Sciences program (SPSS) version 22. Data presentation done by using suitable tables and graphs. Frequency distribution, percentages, mean and standard deviation calculated. The following statistical techniques were used as Chi-square (X²) and Pearson's correlation coefficient were used to test correlation between variables and T-test used to compare between two groups. Statistical significant was considered at P value ≤ 0.05 and highly statistically significant at P value ≤ 0.01 .

Results:

Frequency distribution of the studied women according to their personal characteristics.

Table 3 illustrates distribution of the studied women according to their personal characteristics, 49.1% of them were in the age group 21-30 years with Mean $\pm$ SD is 29.63 ± 6.31 . Regarding education, 37.3% of them had secondary education. As regard to working condition and family monthly income, 71.8% of them were working and 60.9% of them had insufficient income. Moreover, 87.3% of them were married.

Frequency distribution of the studied women according to their medical and obstetric history.

Table 4-a shows the distribution of the studied women according to their medical and obstetric history, 69.1% of the studied women, their age at menstruation was $12 \leq 15$ years, with Mean $\pm$ SD is 12.80 ± 1.59 years. Also, 92.7% of them, their age at first pregnancy was $20 \leq 30$ years, with Mean $\pm$ SD is 22.71 ± 2.65 years. Moreover, 91.8% of them, their age at first labor was $20 \leq 30$ years, with Mean $\pm$ SD is 23.33 ± 2.66 years. Furthermore, 87.3% of them, their age at marriage was 18 - 29 years, with Mean $\pm$ SD is 22.65 ± 2.59 years. Also, 37.3% of them, their marriage duration was 1-5 years, with Mean $\pm$ SD is 6.87 ± 2.62 years. Regarding number of times marriage, 90.0% of them had one time marriage. Furthermore, 34.6% of them had two pregnancies and 34.6% of them had one time labor.

Table 4-b displays the distribution of the studied women according to their medical and obstetric history, 34.6% of them had one living children. Also, 91.8% of them didn't have history from abortion. Moreover, 63.6% of them didn't take medications to prevent abortion before. Furthermore, 74.5% of them performed gynecological examination before. Also,

40.0% of them didn't have a medical history for any of chronic diseases. Moreover, 79.1% of them had operations on the reproductive system before, 70.1% of them had caesarean section and 67.3% of them didn't have family history for cancer.

Table 4-c demonstrates the distribution of the studied women according to their medical and obstetric history. Regarding contraceptive method, 35.5% of them used pills and 59.8% of them used contraceptive method from 1-5 years. Also, 90.9 % of them exposed to continuous stress. In addition, 65.5% of them exposed to passive smoking.

Figure (1): Percentage distribution of the total women' knowledge about cervical cancer at pre and post implementation of cervical cancer preventive program.

Figure 1 shows that, 9.1% of the studied women had satisfactory level of total knowledge about cervical cancer at pre intervention and the percentage increased to 89.1% at post implementation of cervical cancer preventive program.

Table (5): Distribution of the studied women according to their total beliefs regarding cervical cancer at pre and post implementation of cervical cancer preventive program.

Table 5 illuminates that, there was a marked improvement in all subscales of total women's beliefs regarding cervical cancer post implementation of cervical cancer preventive program with a highly statistically significant difference at ($P \leq 0.01$) compared to pre providing educational sessions. As evidence, 9.1% of the studied women had high level of total beliefs regarding cervical cancer at pre intervention. While changed to be 83.6% at post implementation of cervical cancer preventive program.

Table (3): Frequency distribution of the studied women according to their personal characteristics (n=110).

Personal characteristics	No.	%
Age (years)		
18-20	3	2.7
21-30	54	49.1
31-40	40	36.4
>40	13	11.8
Mean ± SD	29.63 ± 6.31	
Educational level		
Don't read or write	2	1.8
Read and write	12	10.9
Basic education	22	20.0

Secondary education	41	37.3
University education	31	28.2
Postgraduate education	2	1.8
Working condition		
Working	79	71.8
House wife	31	28.2
Family monthly income		
Enough and more	4	3.6
Sufficient	39	35.5
Insufficient	67	60.9
Marital status		
Married	96	87.3
Divorced	12	10.9
Widow	2	1.8

Table (4-a): Frequency distribution of the studied women according to their medical and obstetric history (n=110). Cont

Medical history	No.	%
Age at menarche (in years)		
9≤12	18	16.4
12≤15	76	69.1
15-18	16	14.5
Mean ± SD 12.80 ± 1.59		
Age of first pregnancy		
<20	4	3.6
20≤30	102	92.8
30-40	4	3.6
Mean ± SD 22.71 ± 2.65		
Age of first labor		
<20	3	2.7
20≤30	101	91.8
30-40	6	5.5
Mean ± SD 23.33 ± 2.66		
Age at marriage /years		
< 18	6	5.5
18 – 29	96	87.2
30 – 40	8	7.3
Mean ± SD 22.65 ± 2.59		
Marriage duration/years		
1-5	41	37.3
6-10	33	30.0
11-15	20	18.2
> 15	16	14.5
Mean ± SD 6.87 ± 2.62		
Number of times marriage		
Once	99	90.0
Twice	10	9.1
Three	1	0.9
Number of pregnancies		

Once	35	31.8
Twice	38	34.6
Three	25	22.7
More than three	12	10.9
Number of labors		
Once	38	34.6
Twice	37	33.6
Three	21	19.1
More than three	10	9.1
Nothing	4	3.6

Table (4-b): Frequency distribution of the studied women according to their medical and obstetric history (n=110). "Con"

Health history	No.	%
Number of living children		
Once	38	34.6
Twice	37	33.6
Three	22	20.0
More than three	9	8.2
Nothing	4	3.6
Number of times of abortion		
Once	6	5.5
Twice	3	2.7
Nothing	101	91.8
Taking medications to prevent abortion before		
Yes	40	36.4
No	70	63.6
Performing any gynecological examination before		
Yes	82	74.5
No	28	25.5
Having a medical history for any of these diseases		
Sexually transmitted diseases	8	7.3
Immunodeficiency diseases	10	9.1
Pelvic inflammation	8	7.3
Cervix inflammation	8	7.3
Frequent infection	17	15.5
Chronic diseases as diabetes mellitus	14	12.7
Genital warts	1	0.9
Nothing	44	40.0
Previous operations on the reproductive system		
Yes	87	79.1
No	23	20.9
Specify the type of operation (n=87)		
Caesarean section	61	70.1
D &C	5	5.8

Cautery ulcer	2	2.3
IVF	3	3.4
Episiotomy	2	2.3
Caesarean section and D &C	14	16.1
Family history of cancer		
Yes	36	32.7
No	74	67.3

Table (4-c): Frequency distribution of the studied women according to their medical and obstetric history (n=110). Cont.

Health history	No.	%
A contraceptive method use		
IUD	32	29.1
Pills	39	35.5
Injection	6	5.5
Capsule	6	5.5
Condom	2	1.8
Natural methods	2	1.8
No	23	20.9
Duration of contraceptive use (n=87)		
< one year	21	24.1
1-5 years	52	59.8
6-10 years	12	13.8
> 10 years	2	2.3
Exposure to continuous stress		
Yes	100	90.9
No	10	9.1
Exposure to passive smoking		
Yes	72	65.5
No	38	34.5

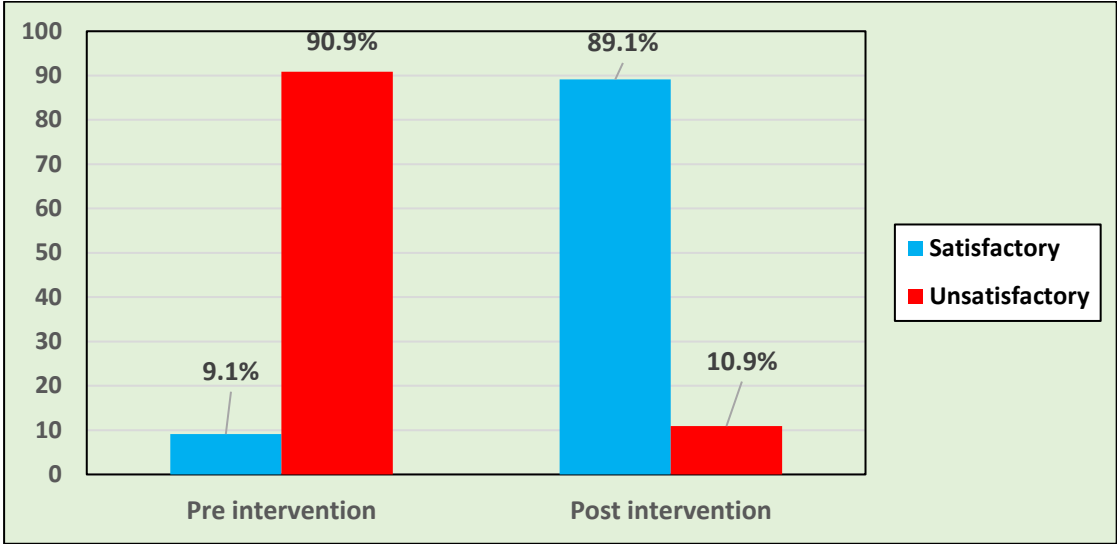


Figure (1): Percentage distribution of total women’ knowledge about cervical cancer at pre and post implementation of cervical cancer preventive program (n=110).

Table (5): Distribution of the studied women according to their total beliefs regarding cervical cancer at pre and post implementation of cervical cancer preventive program (n=110).

Subscales	Pre-intervention						Post-intervention						X ²	P value
	High		Moderate		Low		High		Moderate		Low			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%		
Perceived susceptibility	6	5.5	72	65.5	32	29.1	55	50.0	51	46.4	4	3.6	64.72	0.000**
Perceived seriousness	28	25.5	55	50.0	27	24.5	53	48.2	35	31.8	22	20.0	21.63	0.001**
Perceived barriers/obstacles	87	79.1	15	13.6	8	7.3	6	5.5	12	10.9	92	83.6	141.44	0.000**
Perceived benefits	13	11.8	28	25.5	69	62.7	86	79.1	18	16.4	6	5.5	107.51	0.000**
Cues to actions	18	16.4	38	34.5	54	49.1	80	72.7	21	19.1	9	8.2	84.87	0.000**
Self-efficacy	9	8.2	24	21.8	77	70.0	89	80.9	16	14.5	5	4.5	130.12	0.000**
Total beliefs score	10	9.1	24	21.8	76	69.1	92	83.6	10	9.1	8	7.3	126.73	0.000**
Mean ± SD	95.94±27.84						156.45±25.11						t=16.92	0.000**

X²: Chi-square test.

t= Paired test.

(**) highly statistically significant at p<0.01.

Discussion

Cervical cancer is a major public health issue worldwide. The World Health Organization reports that one woman dies from cervical cancer every two minutes (WHO, 2020). Cervical cancer remains one of the most common cancers in women around the world. Cervical cancer in its initial stages is typically asymptomatic. As a result, regular cervical cancer screening is the first step in detecting the dangerous cancer at an early stage and preventing its spread (Cohen, Jhingran, Oaknin, & Denny, 2019). Nursing health education gives accurate information about cervical cancer prevention and is essential in developing cervical cancer knowledge and beliefs, as well as laying the basis for cervical cancer preventative behaviors. Furthermore, HBM is one of the most commonly utilized models for guiding health-behavioral therapies. So, this study was conducted to assess the effect of cervical cancer preventive program based on a health belief model on the knowledge and beliefs of women in Port Said city.

Regarding the studied women according to their medical and obstetric history, the results of the present study revealed that more than two thirds of the studied their age at menstruation was $12 \leq 15$ years. Also, the most of them their age at first pregnancy was $20 \leq 30$ years. Moreover, the most of them their age at first labor was $20 \leq 30$ years. Furthermore, the most of them their age at marriage was 18 - 29 years. Furthermore, more than one third of them their marriage duration was 1-5 years. Regarding number of times marriage, the most of them had one time marriage. Moreover, more than one third of them had two pregnancies. Also, more than one third of them had one time labor.

The results of the present study are in similar with the results of study performed in India entitled " The effect of the health belief model education for cervical cancer prevention, screening promotion among rural women in Chengalpattu district, Tamil Nadu" by (Logaraj, 2023) who stated that more than half of the studied subject were pregnant in the age group of $20 \leq 35$ years old and had previous two pregnancies and labors and more than two thirds of them didn't have abortion and had first birth at the age from 20 to <30 year. Also, these results are in the same context with study entitled "The effect of a health education program on prevention of breast and cervical cancer based on the health belief model among female employees at medical campus" where carried out in Tanta by (El-kest, Elagemy, & El-Gamal, 2021) who showed that more than half of the studied women were aged from 20 to > 30 year at marriage and had previous from two to three numbers of pregnancy and labor.

Additionally, the current study revealed that more than one third of them had one living children. Also, the most of them didn't have history from abortion. Moreover, less than two-thirds of them didn't take medications to prevent abortion before. Furthermore, three quarters of them performed gynecological examination before. As well, two fifth of them didn't have a medical history for any of chronic diseases. Moreover, more than three quarters of them had operations on the reproductive system before, more than two thirds of them had caesarean section. Also, more than two-thirds of them didn't have family history for cancer.

These findings agree with the results of study entitled "Cervical cancer screening behavior of African women: The Rosenstock health belief model assessment" in Taiwan by (Maseko, Huang, & Lin, 2021).) who found that nearly two thirds of the studied women didn't have family history for cervical cancer but, more than half of them had history of previous gynecological surgery. Also, these results are in harmony with a study entitled "A cross-sectional study of barriers to cervical cancer screening uptake in Ghana: An application of the health belief model " by (Ampofo, Adumatta, Owusu, & Awuviry-Newton, 2020) who clarified that more than two thirds studied women didn't have family history for cervical cancer and had previous more than two times of cesarean section.

Also, the existing study showed that more than one third of the studied women used pills. Also, more than half of them used contraceptive method from 1-5 years. Moreover, less than two-thirds of them exposed to passive smoking. These results are supported by the study carried out in Benha entitled "Health Belief Model for Women regarding Cervical Cancer" by (Amin, Sabry, & Abdelrahman, 2023) who showed that the majority of the studied women used family planning methods, near to three quarters of them used intrauterine device and pills and less than half of them used the method for more than five years. Also, these finding are in the same direction with study done in Benha entitled "Knowledge, attitude and practices of women regarding cervical cancer" by (Omran, Attia, Said, & Abd ElAliem, 2020) who found that most of study subjects used contraceptive methods and more than half of them used intrauterine device and pills. These results might be due to increased women awareness about using family planning methods.

Concerning the studied women according to their total knowledge about cervical cancer at pre and post implementation of cervical cancer preventive program, the findings of the current study revealed that there was a marked improvement in total knowledge of the studied women about cervical cancer post implementation of cervical cancer preventive program with a highly statistically significant difference compared to pre providing educational sessions. As evidence, the minority of the studied women had satisfactory level of total knowledge about cervical cancer at pre intervention. While changed to be most of them at post implementation of cervical cancer preventive program.

On the same line, this finding agrees with an Egyptian study at Cairo university entitled "Effect of Educational program based on the Prevention Model on Women Knowledge Regarding Cervical Cancer Prevention" carried out by (Osman, Abd Elkodoos, Reda, Soliman, & Aboushady, 2023) who clarified that after implementation of the educational program, the satisfactory level of the total knowledge scores increased from near to one third in the pre-test to most of them in the post-test. Additionally, this result is in a harmony with study entitled "Increasing mothers' knowledge of cervical cancer risk through peer group health education with "PinKa" method" by (Utami & Purwani, 2019) who concluded that the knowledge score increased and be satisfactory in the experimental group after receiving health education. This result may be due to that the educational program was effective in improving knowledge of the studied women and have a positive impact on overall knowledge of the studied women. In addition, the use of simplified language during instructional sessions.

According to total beliefs of the studied women regarding cervical cancer at pre and post implementation of cervical cancer preventive program, the current study revealed that was a marked improvement in all subscales of total women's beliefs regarding cervical cancer post implementation of cervical cancer preventive program with a highly statistically significant difference compared to pre providing educational sessions. As evidence, the minority of the studied women have high level of total beliefs regarding cervical cancer at pre intervention. While changed to be the most of them at post implementation of cervical cancer preventive program.

This result is similar to study carried out by (Amin, Sabry, & Abdelrahman, 2023) who found that more than two fifths of the studied women had high total health belief level regarding cervical cancer. On the same line of the Iranian study entitled "The effect of

educational intervention based on the health belief model on knowledge, attitude, and function of women about Pap smear test at Iranian health centers" by (Samami et al., 2021) who stated that nursing educational intervention based on a HBM changed health beliefs positively toward cervical cancer prevention. This result indicates that the program was successful in improving the studied women knowledge. This could related to the structure and the content of the program which combined both scientific knowledge about the disease, its treatment based on health belief model. This program worked on supporting these subjects in understanding and accepting their illness, improving their ability to make proper decisions so that they will be able to effectively manage their problems. These factors could have led to the observed significant improvement in their health belief.

Conclusion:

Based on the findings of the present study, it can be concluded that:

After implementation of the educational program, significant improvement with highly statistical differences were noticed in women's knowledge, and in all subscales of total women's beliefs about cervical cancer. Furthermore, there was a highly statistically significant positive correlation between total women' knowledge and their total beliefs about cervical cancer at pre and post implementation of cervical cancer preventive program. Therefore, the educational program was successful in attaining its aim of positively changing knowledge and beliefs regarding cervical cancer among the studied women.

Recommendations

Based on the findings of the current study, the following recommendations were suggested:

- ❖ Increase women's awareness about cervical cancer screening through mass media and dissemination of health knowledge and beliefs through posters, photos, and booklets.
- ❖ Carry out health education programs for girls in the different stages to increase knowledge and beliefs about cervical cancer prevention
- ❖ Conduct community campaigns to encourage women about cervical cancer screenings and human papilloma virus vaccines.

Further Research:

- ❖ Health educational program about cervical cancer prevention in different setting and larger population should be done to achieve more generalization.

Limitation of the Study:

Not found.

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Competing interests

The authors declare that they have no competing interests.

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