

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.

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Abstract:

Background : Females of all ages, races, and ethnicities are at risk for breast and cervical cancer. These forms of cancer have remained major public health issues throughout the whole world. **The aim of the study:** was to evaluate 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. **Subjects and Method:** This study was a quasi-experimental design and it is carried out at the faculties of the medical campus in Tanta university. The total studied sample was 65 women. **Tools of the study:** two tools were used for data collection; tool I: Structured interview schedule consisted of three parts. Tool II: Beliefs of women regarding breast and cervical cancer prevention based on health belief model (HBM) **Results:** Total knowledge and belief scores were significantly improved from preprogram and three months after program application for the studied women. **Conclusion:** The preventive program based on the health belief model was effective and improved the studied women's knowledge and beliefs regarding breast and cervical cancer. **Recommendation:** Breast and cervical cancer education services should be offered to all women of different ages and in all areas.

Key words: Breast cancer, Cervical cancer, Health belief model.

Introduction:

In both developed and developing countries worldwide, cancer is a major cause of death among women ⁽¹⁾. Due to aging of the population, the cancer burden increases in all income levels of countries. While most cancer affect individuals more as they grow older, young individuals are often at risk of many potentially lethal cancer, including cervical/breast cancer^(2,3). Cancer is a disorder in which abnormal cells divide and have the capacity to invade surrounding cells without regulation ⁽⁴⁾. Via the blood and lymph systems, cancer cells migrate into other cells of the body. Breast cancer is a type of cancer that develops in the breast tissues, typically the ducts and lobules, and breast cancer cells may spread to other parts of the body by splitting away from the breast ⁽⁵⁻⁸⁾.

According to American Cancer Society Facts (A.C.S.F.) in 2018, reported that one out of eight women is newly diagnosed with breast cancer during their lifetime yearly, and one out of thirty-three women die from this disease, making it one of the world's most deadly diseases⁽⁹⁾. Based on WHO (2019); annually more than one million females diagnosed with breast cancer and more than 500 thousand females die due to this cancer⁽¹⁰⁾.

In Egypt, 35.1 percent of females are diagnosed with breast cancer, according to the International Organization for Research on Cancer (2018). Breast cancer is the second common cancer among Egyptian women, after skin cancer ⁽¹¹⁾. In pathophysiology, diagnosis and outcomes, breast cancer is wide spread. Late childbearing, early menarche, smoking, history of mammary gland disorder, postmenopausal, obesity, and others are linked with breast cancer incidence ⁽¹²⁾. An early breast cancer diagnosis can decrease its mortality and morbidity. There are three methods for early detection of breast cancer (BC), including clinical examination, mammography, and breast self-examination (BSE)⁽¹³⁾.

Clinical breast examination (CBE) is recommended once every three years for women aged 20 to 39 years; regular screening for mammography is recommended for women aged 40 years. For all women, breast self-examination (BSE) is recommended once monthly, starting at the age of 20⁽¹⁴⁾.

Cervical cancer (CC) is an essential health issue and a common cancer in womenglobally. Based on WHO (2018), 570 thousand of women have diagnosed with cervical cancer yearly, 311 thousand

of women die from this cancer, and eighty percent of cervical cancer deaths occur in low income countries. It is the fourth female cancer killer in females after breast cancer. The inadequacy of screening systems and the shortage of knowledge of the disease in middle to low countries are reasons for such a high incidence⁽¹⁵⁻¹⁷⁾.

Egypt has around 30 million women who are at risk of cervical cancer aged 15 years and older. Recent data show that about 850 women are diagnosed with cervical cancer every year and about 300 females die of this disease⁽¹⁸⁾. Cervical cancer is the 14th most common cancer in Egypt among women and the 12th most common cancer among women between the ages of 15 and 50 years^(18,19). Cervical cancer (CC) is defined as abnormal cells from the cervix that extends to the upper end of the vagina. The human papillomavirus (HPV) is the main cause of cervical cancer. It is a major virus that is transmitted from one person to another during sexual contact⁽²⁰⁾.

Studies have shown that the majority of cervical cancer cases in the world are due to (HPV). In their lives, over 5 percent to 80 percent of sexually active women are infected and 10-20 percent develop a chronic cervical cancer infection that occurs in women over the age of 30 years⁽²¹⁾. Human immunodeficiency

viruses, herpes simplex virus), reproductive and sexual factors (multiple sexual partners, early age at first intercourse, parity and oral contraceptive pills), lifestyle choices (smoking and obesity), and host factors (genetic response) are several factors for cervical cancer⁽²²⁾.

Manifestations of cervical cancer often do not begin until a precancerous lesion becomes a true invasive cancer and metastasizes into nearby tissues. When this occurs, the most common symptoms are as follows: abnormal vaginal bleeding, post-coital bleeding, dyspareunia, and post-menopausal bleeding⁽²³⁾. Pelvic pain, lack of appetite, weight loss, exhaustion, back pain, and anemia may be advanced cervical cancer symptoms⁽²⁴⁾. In various countries, early detection by cervical cancer screening has reduced the incidence of cervical cancer by 50 percent. The use of Pap smear in the United States has been led to a 90% decline in the mortality rate from cervical cancer in the last 30 years. Furthermore, the HPV vaccine has prevented cervical cancer, genital warts and other cancer⁽²⁵⁾.

The Health Belief Model (HBM) is a theory of health behavior that regards the overall perceived risk of a disease as a precursor to constructive, preventive

behavior. It is an appropriate model for a needs assessment that is very useful for health developers to plan for intervention practice. Four psychologists created HBM, (Hochbaum, Leventhal, Kegeles, and Rosenstock) in the 1950s as a way to analyze the causes that reduced using national screening programs by persons that detect or prevent diseases. It consisted of four main constructs including susceptibility, seriousness, benefits, and barriers. In 1974, the construct of cues to action has been added to the model by Rosenstock, and self-efficacy was added by Bandura in 1977⁽²⁶⁻²⁸⁾.

Significant of study

In the prevention and early detection of cervical/breast cancer, community health nurses play a significant role. Nurse has a basic element in educating the public about the importance of screening and treatment services for breast and cervical cancer through the creation of promotional materials, media messages, and the training of health promoters. In addition, the nurse has an important role in providing information on risk factors, detecting early symptoms of cancer through routinely screening them^(29,30). Therefore, this study aims to evaluate 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.

Aim of the study:

The aim was to evaluate 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.

Research Hypothesis:

Knowledge and beliefs among women about breast and cervical cancer expected to be improved after implementation of health education program based on health belief model.

Subject and Method:

Design of study:

To conduct this study, quasi-experimental research design was used.

Setting of study:

This study was conducted at the faculties of the medical campus (Faculty of Nursing, Medicine, Pharmacy, Dentistry, and faculty of Science) affiliated to Tanta University.

Subjects:

The sample size was calculated using Epi-info 7 software program. The criteria for sample size selection were determined at 95% confidence limit, study power 80% with a 5% margin of error. The calculated sample size was found to be 51 women and

to be increased to 65 to increase the validity of the results. The actual total number of the studied sample was (325) women. They represented approximately 20% of women who meet the inclusion criteria as follows:

Faculty	Number of women	Selected number of women
Faculty of nursing	60	12
Faculty of Medicine	90	18
Faculty of Pharmacy	50	10
Faculty of Dentistry	65	13
Faculty of Science	60	12
Total	325	65

The following inclusive criteria were used for selecting the sample:-Married and sexually active women, free from breast or cervical cancer, haven't family history for breast or cervical cancer and agree to participate in the study.

Tools of the study:

The researcher used two tools to gather the necessary data as follows:

Tool 1: A structured interview schedule.

A structured interview schedule developed by the researcher based on recent related literatures ^(15, 20- 23,31-37,41). It comprises of three parts:

Part 1: Biosocial characteristics of the studied women.

This included pertinent data about the study subjects as:- age, education levels, family income, husband education and occupation, age and duration of marriage, number of children.

Part 2: - Menstrual, obstetrical, contraceptive methods history.

This included the following:age of menarche, duration, frequency, and regularity of the menstruation, number of pregnancies, deliveries and abortions, type of their infant feeding, previous use of contraceptive methods (type, duration of use).

Part 3: Women`s knowledge of breast and cervical cancer prevention. ^(20- 23,31)

It consisted of 20 questions that assess women's knowledge related to breast and cervical cancer that cover definition, causes and risk factors, manifestation, complications, treatment, prevention of cancer and vaccination for cancer disease.

Scoring system:

The knowledge score was computed as follows: "two" was scored for the correct complete response, "one" was scored for correct incompleteresponse and "zero" was scored for don't know and incorrect. The total score for knowledge was 40 degree.

Knowledge score had been classified into three categories as follows:

- Poor knowledge: <65% (<26) of a total knowledge scores.
- Fair knowledge: 65 - 75% (26-30) of a total knowledge scores.
- Good knowledge: >75% (>30) of a total knowledge scores.

Tool II: - Beliefs of the studied women regarding breast and cervical cancer prevention based on the health belief model (HBM) ⁽³⁷⁻⁴¹⁾

An interview sheet was developed by the researcher based on (HBM)constructs to evaluate women's beliefs regarding cervical and breast cancer. HBM scale covers six subscales and included 39 items (7 items for perceived susceptibility, 8 items for perceived severity, 6 items for

perceived benefits, 6 items for a perceived barrier, 6 items for cues to action, and 6 items for self-efficacy).

The scoring system:

A five-point Likert scale to evaluate the statements was used. Positive statements were given a score of strongly agree (5), agree (4), neutral (3), disagree (2), and strongly disagree (1) concerning each item. **Scores of negative statements** were inversed as follows: strongly disagree (5), disagree (4), neutral (3), agree (2), and strongly agree (1).

Scores were summed up for each construct than for the six constructs as follows: The score of perceived susceptibility was (7-35), perceived severity (8-40), perceived benefits (6-30), perceived barriers (6-30), perceived cues to action (6-30) and perceived self-efficacy (6-30). The total score ranged between (39- 195). The total score was classified into:

- Positive beliefs $\geq 60\%$ (≥ 117) of the total belief scores.
- Negative beliefs $< 60\%$ (< 117) of the total belief scores.

Method:

1. Obtaining approval:

- Official permission to conduct a study has been obtained from the Dean of the Faculty of Nursing and directed to the responsible authorities (the selected

faculties Deans) in order to obtain their approval and to cooperate in carrying out the study.

2. Ethical considerations:

- Every woman was informed about aim, nature, and benefits of the research at the beginning of the online questionnaire and that they had the right at any time to withdraw from the study.
- Informed consent was obtained from the study of women.
- The nature of the study didn't cause any harm and/ or discomfort for studied sample.
- Confidentiality and privacy regarding the collected data were put into consideration.
- The questionnaire sheets were anonymous.

3. Developing the study tools:

- The study tools were developed by the researcher based on a literature review ^(15, 20- 23,31-37,41)
- The study tools were tested by a jury of five experts in the field of community health nursing and public health for face and content validity. Validity of the questionnaires based on experts' opinions were calculated and found to be= (98%).

- The study tools reliability was computed by Cronbach's Alpha test. It has found to be 0.97.

4. Conducting a pilot study:

- A pilot study of ten women was performed to test the tools for their clarity, applicability, and reliability and to assess the length of time necessary to collect the data from each woman. The requisite modifications were done. (rephrasing a question in health beliefs). These women were excluded from the study subjects.

4. The actual study

- The program was performed by the researcher for providing complete, consistent, and accurate knowledge about breast and cervical cancer for the study group.
- The researcher met the studied subjects in their offices of their works as previously mentioned according to the work schedule.
- Collection of data continued during the period of about 4 months from the end of September 2019 to the end of January 2020.
- The researcher has met the women 3 days/week.
- Tools were administered individually to each woman to complete it by herself with the attendance of the researcher to

offer guidance and clarification when needed.

- The researcher was designed the educational intervention for breast and cervical cancer based on their needs and HBM constructs.

5. Developing and implementation program:

This was done according to the following phases:

I) Assessment phase:

In which the researcher used the pre-designed study tools and interviewing studied women individually in the predetermined setting to assess women's knowledge and beliefs regarding prevention of breast and cervical cancer as well as socio-demographic data about the study subjects as a pre-intervention assessment. The data obtained during this phase were considered the basis for the evaluation of an educational program (pretest).

II) Planning and implementation phases:

After identifying the needs of women in the assessment phase, the researchers developed a nursing educational program about cervical and breast cancer prevention based on HBM constructs with simple Arabic language to be suitable for women's level of understanding. It emphasized the areas of deficit in knowledge about cervical and breast

cancer prevention and health beliefs such as follows: definition, risk factors, causes, signs and symptoms, treatment, screening diagnosis, prevention, and vaccination of cervical and breast cancer (benefits, the age for vaccination, and who should receive the HPV vaccine. The program was divided into six sessions, the average time of each session was 40–50 min. Booklets were distributed to each woman. Teaching methods included PowerPoint, small group discussions, open discussion, and brainstorming.

III-Evaluation phase:

This evaluation was conducted on the studied women two times:

- 1- First time (pre-test): before the implementation of the preventive program (using tools I and II) for studied women.
- 2- Second time: (post-test): three months after implementation of the preventive program using tool I part 3 and tool II.

Statistical analysis:

The collected data organized, tabulated and statistically analyzed using Statistical Package for Social Sciences windows software (SPSS), version 20. For numerical Values the range, mean, and standard deviation were calculated. For comparison between two means, T-test was used. Differences between more than two means were tested by (F) repeated measures

analysis of variance. For categorical variable the number and percentage were calculated and differences between subcategories were tested by chi square (X^2). When chi square was not appropriate, Fisher and Monte Carlo exact testes were used. The level of significant was adopted at $p < 0.05$

Results:

Table (1): represents the distribution of the studied women related to their socio-demographic characteristics. It reveals that, the age of the studied women ranged from 22–57 years, with the mean age 31.55 ± 8.4 years. More than half (72.3% and 67.7%) of the studied women respectively had a university education or more and enough monthly income, respectively. More than two third (61.5%) of the studied women married at the age of 20 years or younger. The average duration of marriage was (10.80 ± 5.748) years. In respect to the menstrual history, The age and duration of menses ranged from (10-19) years (3-7) days, respectively with the most (75.4) of them had regular menses. Three quarter (76.9%) of studied women used family planning methods with ranged (5-15) and Mean + SD (7.00 ± 1.60).

Table (2): Distribution of studied women related to their knowledge of cervical and breast cancer prevention. It shows that a

statistically significant difference was found between studied women before and after the educational program in all of the knowledge items related to cervical and breast cancer prevention.

Table (3): Distribution of the studied women according to the total knowledge score regarding breast and cervical cancer. It illustrates that, there was improvement with a statistically significant in the total knowledge score of studied women before the intervention and 3 months after intervention ($P=0.000$).

Table (4): Distribution of studied women according to their beliefs about breast and cervical cancer based on health beliefs model (HBM) constructs. It shows that, the study women showed a statistically significant improvement in their total positive scores of all the HBM constructs (perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action and self-efficacy) among the study phases ($p= 0.001$).

Table (5): The correlation between total knowledge score and total beliefs score of the studied women pre and 3 months post program. It illustrated that, there was a significant positive correlation between the total knowledge score and total belief scores pre and three months post program ($p<0.05$). This means that increased

knowledge score was associated with positive beliefs.

Table (6): The correlation between a total score of knowledge and a total score of beliefs of the studied women and their socio-demographic characteristics pre and three months post- program. It's revealed that, a positive significant correlation is presented between educational levels, family monthly income and total knowledge score among the studied women pre and three months post-program ($p<0.05$). Also, there was a statistically significant correlation with total health belief scores and family monthly income of the study women pre and after the program ($p=0.000^{**}$).

Figure (1): Distribution of studied women in relation to type of infant feeding. It shows that, more than two third (69%) of the studied women had both breast and artificial feeding and less than one quarter (21%) of them had breast feeding only, while 10% of them had depended on artificial feeding only.

Figure (2): -It illustrates that, slightly less than half (46%) of the studied women reported social media as sources of information compared with less than one third (31%) of them were medical staff is their source of information.

Figure (3):- This figure represent the distribution of studied women in relation to the total beliefs score regarding breast and cervical cancer prevention. It illustrates that, there was improvement with a statistically significant in the total beliefs score of studied women before and 3 months after intervention ($P=0.000$).

Table (1): Distribution of the studied women related to their biosocial characteristics and their gynecological history.

Items	The studied women (n=65)	
	n	%
Age		
Range	22-57	
Mean ± SD	31.55±8.4	
Education level		
Secondary/technical	18	27.7
University level	28	43.1
postgraduate level	19	29.2
Family income		
Enough	51	78.5
Not enough	14	21.5
Age at marriage(years)		
Range	10-15	
Mean + SD	11.15±1.95	
Duration of marriage		
Range	2-24	
Mean + SD	10.80±5.748	
Children number		
Range	1-5	
Median	2	
Age of menarche		
Range	10-19	
Mean + SD	11.40±1.209	
Duration of menstruation(days)		
Range	3-7	
Mean + SD	4.00±1.52	
Regularity of menstruation		
yes	49	75.4
no	16	24.6
Using family planning		
yes	50	76.9
no	15	23.1
Duration of family planning use		
Range	5-15	
Mean + SD	7.00±1.60	

Table (2): Distribution of studied women related to their knowledge of cervical and breast cancer prevention.

Items	The studied women (n=65)		pre vs. post T- Test P-Value
	pre	Post (3months)	
	Mean± SD	Mean± SD	
Definition of cervical cancer	1.26±0.735	2.1±0.769	6.653 0.000**
Mode of transmission for cervical cancer	1.26±0.735	1.99±0.769	6.653 0.000**
Causes and risk factors of cervical cancer	0.57±0.661	1.72±0.451	9.416 0.000**
Manifestations of cervical cancer	0.69±0.683	1.72±0.573	9.052 0.000**
Methods for screening for cervical cancer	0.58±0.659	1.77±0.523	9.567 0.000**
Frequency for cervical smear testing	1.28±0.934	2.45±0.711	8.951 0.000*
There are a vaccine against cervical cancer	0.57±0.661	1.72±0.451	9.416 0.000**
A hard blow on the breast may cause breast cancer	1.28±1.083	1.88±0.875	3.399 0.001*
Psychological pressure lead to breast cancer	1.18±0.727	1.40±0.766	1.873 0.066
overweight increases the risk of breast cancer	1.18±0.727	1.40±0.766	1.873 0.066
Delayed childbearing can cause breast cancer	1.03±0.585	1.54±1.147	3.011 0.004*
Breast cancer does not affect men	1.03±0.585	1.54±1.147	3.011 0.004*
Women over age 70 rarely get breast cancer.	1.28±1.083	1.88±0.875	3.399 0.001*
Most breast lumps are cancerous	1.18±0.727	1.40±0.766	1.873 0.066
Breast self-examination (BSE) timing	1.26±0.735	2.31±0.769	6.653 0.000**
Breast self-examination (BSE) method.	0.95±0.909	1.78±0.838	5.226 0.000**
Mammogram is an x-ray of the breast	0.57±0.661	1.72±0.451	9.416 0.000**

*Significant P< 0.05

Table (3): Distribution of the studied women according to the total knowledge score regarding breast and cervical cancer.

Total knowledge score	The studied women (n=65)				X ² P
	pre		Post (3months)		
	n	%	n	%	
Poor	22	33.8	5	7.7	19.000 0.000**
Fair	38	58.5	8	12.3	
Good	5	7.7	52	80.0	
Range	16-31		25-40		
Mean + SD	21.86±3.37		33.25±3.17		

*Significant P< 0.05

Table (4): Distribution of studied women according to their beliefs about breast and cervical cancer based on health beliefs model (HBM)constructs .

Belief items about breast/ cervical cancer	The studied women (n=65)				pre / post P-value
	pre		Post (3months)		
	n	%	n	%	
Perceived susceptibility					0.025*
-Negative beliefs	22	49.2	8	16.9	
- Positive beliefs	43	15.4	57	12.3	
Perceived seriousness or severity					0.001*
-Negative beliefs	55	49.2	0	16.9	
- Positive beliefs	10	15.4	65	12.3	
Perceived benefits for breast/ cervical cancer					0.001*
-Negative beliefs	47	49.2	2	16.9	
- Positive beliefs	18	15.4	63	12.3	
Perceived barriers for breast/ cervical cancer					0.001*
-Negative beliefs	47	49.2	2	16.9	
- Positive beliefs	18	15.4	63	12.3	
Perceived cues to action					0.001*
-Negative beliefs	48	49.2	10	16.9	
- Positive beliefs	17	15.4	55	12.3	
Perceived self-efficacy					0.001*
-Negative beliefs	46	49.2	5	16.9	
- Positive beliefs	19	15.4	60	12.3	

*Significant P< 0.05

Table (5): The correlation between total knowledge score and total beliefs score of the studied women pre and 3 months post program.

variables	The studied women (n=65)	
	Total knowledge score	
	pre	Post 3 months
	r p	r p
Total belief score	0.205 0.101	0.243 0.051*

*Significant P< 0.05

Table (6): The correlation between a total score of knowledge and a total score of beliefs of the studied women and their socio-demographic characteristics pre and three months post- program.

variables	The studied women (n=65)			
	Total knowledge score		Total health Belief score	
	pre	post	pre	post
	r p	r p	r p	r p
Age	0.001 0.995	0.303 0.114	0.115 0.361	0.250 0.145
Educational levels	0.210 0.045*	0.199 0.013*	0.231 0.044*	0.117 0.355
Family monthly income	0.572 0.000**	0.152 0.027*	0.336 0.006**	0.531 0.000**

*Significant P< 0.05

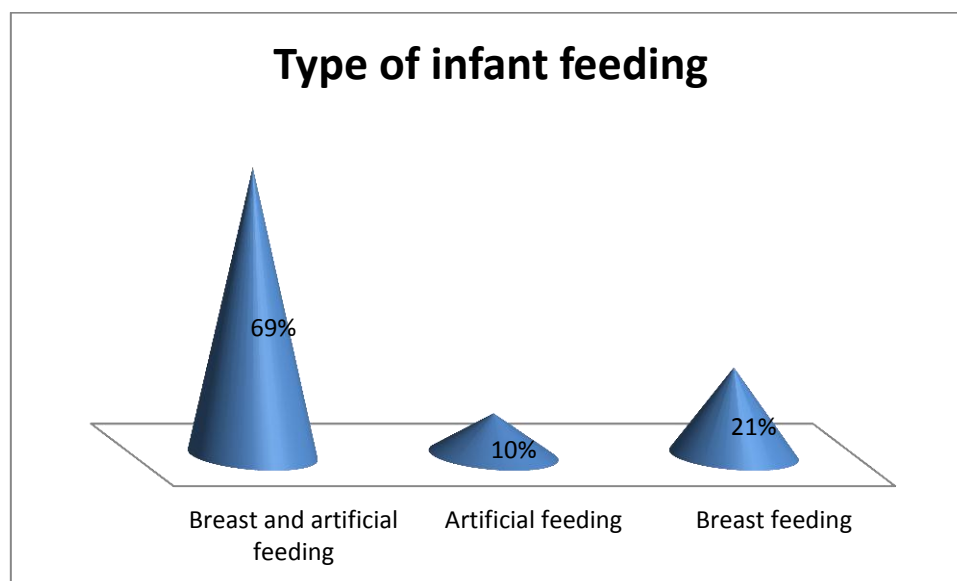


Figure (1): Distribution of studied women in relation to Type of infant feeding.

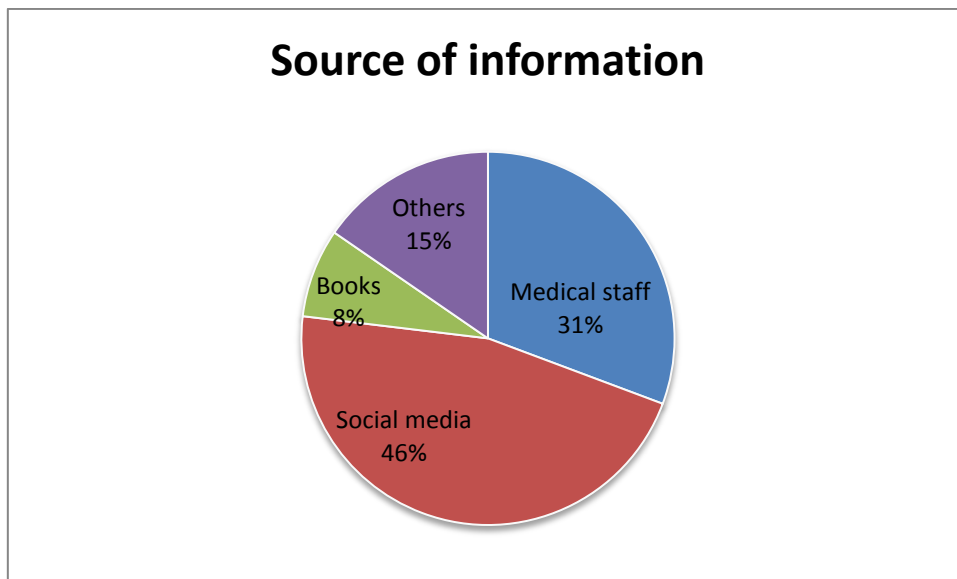


Figure (2):- This figure represent the distribution of studied women in relation to their sources of information about cervical/breast cancer.

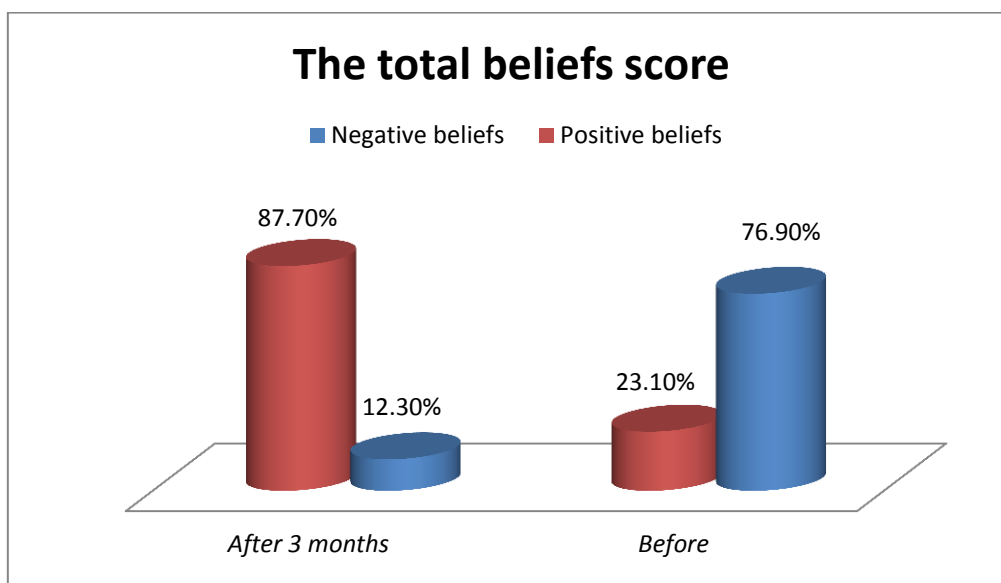


Figure (3):- The distribution of studied women in relation to the total beliefs score regarding breast and cervical cancer prevention.

Discussion:

Breast and cervical cancer are public health concerns worldwide. They are two of the major diseases regarding females' health and results in the highest fatalities⁽⁸⁾. HBM is one of the models used to improve preventive behaviors through improving a person's beliefs. It assumed that improving beliefs is a basic stone to improve the practice of people^(27,28). Thus, this study aims to evaluate 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.

Generally, the current study revealed that the preventive program based on HBM was effective in improving women's beliefs and knowledge related to cervical and breast cancer. The most of the study before the implementation of the HBM program reported poor knowledge and negative belief scores. Meanwhile, after implementation of the HBM, a significant improvement in the total knowledge and belief scores was observed. This is agree with the results of the studies conducted by Yanikkerem et al., (2018) and Masoudiyekta (2017), who reported that application of HBM was successfully in improving knowledge and beliefs scores of

the studied participants regarding breast and cervical cancer^(20,28).

One of the main aims of health education is knowledge improvement as it is the first necessary step for the development of beliefs and behaviors. That's many studies guide knowledge in their intervention programs^(29,30). In this study, women's knowledge about breast and cervical cancer was assessed throughout the study period. The results of this study stated that there was a statistically significant improvement of the total knowledge scores for the study group as, before the program implementation, the majority of the study group has a poor total knowledge score. Whereas after three months from the intervention, a majority of the study group had a significantly good knowledge score (table II,III). The enhancement of knowledge post program in the present study may be related to the ability of the studied women to develop knowledge easily due to all samples educated. This is supported by the findings of Temel et al. (2017), Ahmed (2019), Altay (2015), KIssal (2017) and Moodley (2020) who illustrated that, a significant increase after educational intervention in knowledge regarding breast and cervical cancer⁽³¹⁻³⁵⁾.

Health behavior is a form of social

behavior. Health belief model constructs are based on the idea that changing the beliefs are significant necessary for behavior change⁽³⁶⁾. The present research showed that the overall positive belief scores of each HBM build among the study community improved significantly (table IV). This positive change can be due to improving women's knowledge which may affect their beliefs. This can be supported by the presence of a positive correlation between total knowledge and total belief score (table V). Similarly, the study of Ahmed et al., (2019) and Hazboun et al., (2018), in Egypt, who demonstrated that total scores of all constructs of HBM toward breast cancer were significantly increased among a study group after the intervention^(36,37). Also, this is supported by the findings of Karimy (2017), who reported that there was an improvement with a statistically significant differences observed in the intervention group regarding knowledge items, perceived susceptibility, severity and benefits perception of cervical cancer prevention⁽⁵⁾.

The present study showed that there was a significant positive correlation between the total knowledge, belief scores of the studied group and their level of family income and education (table VI). From the

researchers' point of view, the education and financial levels improved the knowledge that strengthened their beliefs. This is in line with Ahmed (2019) finding that there was no statistically significant relation among studied women's a total knowledge score regarding their age and residence at both pre and post intervention phases. While there was a significant statistical correlation between the knowledge and educational levels and their occupational status at pre intervention phase. Also, there was a high statistical significant relation among total knowledge score and their education ($P < 0.001$) at post intervention⁽³⁶⁾. In contrast with Heena et al., (2019) and Mohamed (2018), that states that there wasn't any relation between knowledge scores and any social characteristics^(21,38).

Regarding the source of the studied group's knowledge, the present research stated that about one half of the studied sample reported that social media as a main source of their knowledge followed by medical staff and books (figure 2).

This finding contrasts with a study by Ahmed (2018), who reported that healthcare workers followed by social media and family members were the primary sources of knowledge of their participants relevant to breast and cervical

cancer⁽³⁶⁾. From baseline to three months after the HBM model implementation, the present study reported a significant positive correlation between the total score of the studied women's awareness and their beliefs ($P > 0.05$) (table V). The theory of reasoned action in which the intention of an individual to a specific behavior was a function of their attitude toward that behavior.

Furthermore, this study can be concluded that a good knowledge can lead to a positive attitude, leading to good behaviors. This finding was supported by Said (2018) that there was a correlation between total knowledge and attitude scores of the studied women pre and post intervention. This indicates that there was a positive correlation between the total knowledge of studied women and the total attitude score of women. This indicates that improving awareness is positively related to an improved attitude. Also, it agrees with Youssif and EL Sayed (2014), who stated that a statistically significant positive correlation between the total knowledge and the total health belief scores before and after HBM implementation^(15,39).

Finally, health education is a vital part of nursing care, especially when used comprehensive models that target all

aspects of the problem and factors that support improvement such as HBM. It is viewed as an important and integral part of the professional nurse's role. The use of health education theory can help us to improve future knowledge, behavior, and attitude toward cancer prevention. So, the present study highlights to take serious action toward adopting effective strategies for the prevention and management of cancer problems.

Conclusion:

Based on the results of the present research, it can be concluded that the implementation of an educational program based on HBM constructs were effective in improving level of knowledge and beliefs of the studied women toward breast and cervical cancer. In which before model application, the majority of studied women had poor knowledge and belief scores. While, after model application, the majority of them had good total knowledge and belief scores. There was a statistically significant correlation between a total score of knowledge and beliefs. The HBM is an effective educational model to be used in different settings.

Recommendations:

The following recommendations can be suggested based on the results of the present study:

1. Conducting lectures, workshops and campaigns to raise awareness about breast and cervical cancer among women and their families.
2. HPV vaccination should be recommended before marriage for females.
3. All possible forms of mass media such as (T.V, newspaper, radio, Posters, and booklets) are needed to help in the dissemination of information to a large sector of the community about breast and cervical cancer to educate people and especially women what, when, where and how to deal with domestic violence.
4. Allocating pages for women`s on the internet or journal to discuss the women issues regarding breast and cervical cancer prevention.
5. Breast and cervical cancer education services should be offered to all women of different ages and in all areas.
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