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Health Belief Model-based educational program about cervical cancer prevention on women knowledge and beliefs

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Abstract:

Background: Cervical cancer affects around half a million women each year, and the illness claims the lives of nearly 300,000 people globally. The illness is largely avoidable. Cervical cancer is the second most frequent cancer in women worldwide, and it is a major public health issue in poor nations. **Aim of the study**: This study aimed to evaluate the effect of health Belief Model-based educational program about cervical cancer prevention on women knowledge and beliefs. **Subjects and Method:** This study used a quasi-experimental design and was conducted at Shatby Hospital's outpatient clinic. The total studied sample was 160 women were selected using the non-probability convenience sampling technique. The inclusion criteria were: i) women between the ages of 20 and 55 years old, ii) who were willing to participate in the study, iii) who were able to read, write. The study did not include women who had been diagnosed with cervical cancer. Tools of the study: data were collected using a demographic questionnaire and a structured knowledge questionnaire developed by researchers and Health Belief Model Scale for Cervical Cancer screening. **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 in improving women's knowledge and beliefs regarding cervical cancer screening. **Recommendation**: cervical cancer education services should be offered to all women of different ages and in all areas.

Keywords: Cervical cancer prevention, Educational program & Health belief model.

Introduction:

Cervical cancer affects more than half a million women each year, resulting in over 300,000 deaths worldwide. In the majority of instances, high-risk subtypes of the human papillomavirus (HPV) are the source of the disease. The disease is largely avoidable. Around 90% of cervical cancers occur in low- and middle-income countries where there are no structured screening or HPV immunization programs. Since the establishment of former screening programs in high-income nations, cervical cancer incidence and mortality have more than halved **(Cohen et al., 2019)**. In Egypt 25.76 million women aged 15 years and older at risk of developing cervical cancer. The current estimates indicate that every year about 514 women are diagnosed with cervical cancer and 299 die from the disease. It is the second most frequent cancer in women worldwide, and in some underdeveloped countries, it is the main cause of cancer death Cervical cancer is Egypt's 14th most common cancer among women, and the 12th most prevalent cancer among women aged 15 to 50. The Papanicolaou smear is a safe, low-cost, and effective cervical cancer screening test **(Organization, 2015 & Said et al., 2018).**

The Pap smear has long been regarded as the most effective test for detecting cervical abnormalities at an early stage. The great efficiency of this preventative screening has resulted in a significant reduction in the incidence of invasive cervical cancer in women. However, the majority of women who die from cervical cancer have never had a previous Pap smear uptake or have had extensive periods between Pap screens. Any plan to promote healthy behaviour in any society requires a needs assessment. As a result, it's critical to investigate the direct risk factors for cervical cancer that are prevalent in various populations of women, as well as the cognitive, emotional, and environmental elements that may play a role in women's willingness to engage in preventive screening programs. So, Health Belief Model (HBM) has been considered one of the most representative ones due to its effectiveness in explaining change and maintaining healthy behavior **(Babazadeh et al., 2019 & Musa et al., 2017)**

The Health Belief Model was created in 1950 by a social psychologist working for the United States Public Health Service to explain why so many people fail to participate in disease prevention and detection programs. The model was then modified to investigate people's reactions to symptoms and behaviors in response to confirmed sickness, including adherence to medical regimens. This approach tries to explain preventive health behaviours rather than behaviors during disease **(Olaza-Maguiña & De la Cruz-Ramirez, 2019).** The Health Belief Model emphasizes the importance of preventing disease exposure while it is still asymptomatic. The Health Belief Model (HBM), for example, determines the likelihood that an individual would take action to avoid or detect disease . Several factors are considered: perceived susceptibility to the health condition, perceived severity of the health danger, perceived advantages of engaging in the health behavior, and perceived costs and barriers to engaging in the behaviour. Self-efficacy was then introduced to HBM to assess one's belief in one's own capacity to do a particular behavior. The HBM was created as a systematic technique to explain and predict preventive health behaviors, and it is today one of the most extensively utilized conceptual frameworks in the field **(Abraham & Sheeran, 2015; Jones et al., 2015)**

The Health Belief Model emphasises the importance of preventing disease exposure while it is still asymptomatic. The likelihood that an individual will take action to prevent or detect disease, for example, is determined by several factors, according to the Health Belief Model (HBM): perceived vulnerability to the health condition, perceived severity of the health threat, perceived benefits of performing the health behaviour, and perceived costs and barriers of performing this behaviour. Self-efficacy was then introduced to HBM to assess one's belief in one's own capacity to do a particular behaviour. The HBM was created as a systematic way for explaining and predicting preventive health behaviours, and it is still one of the most extensively used health behaviour conceptual frameworks today **(Abraham & Sheeran, 2015; Jones et al., 2015)** .

According to **Kessler (2017),** the increased risk of cervical cancer cases was linked to the countries' lack of cervical cancer prevention and screening programmes, as well as access to treatment facilities. Healthcare providers play a critical role in educating women about the need of Pap smear screening and distributing health information. Women adopt unfavourable habits and attitudes toward health protection and development as a result of their lack of understanding and incorrect attitudes and beliefs about the pap smear test. Individuals' views, barriers, decision-making processes, and behaviours regarding their health requirements must all be understood in this scenario. The Health Belief Model (HBM) is commonly utilised for this purpose **(Cangol et al., 2020; Kessler, 2017)**.

By increasing women's screening practises, maternity nurses have the potential to reduce the incidence and mortality of cervical cancer. Nurses need to know the degree of knowledge, health behaviour, and health beliefs of the women in the area while planning their initiations so that they can enhance their involvement in cervical cancer screening and benefit from the services provided. At the same time, these data may aid in the development of nursing programmes aimed at assisting and encouraging women in taking the initial step toward improving their cervical cancer screening participation **(Akinyemiju et al., 2015; Bal & Şahiner, 2020; Naz et al., 2018).**

Women's education is currently focused on programmes aimed at increasing women's participation in cervical cancer screening education. Culturally tailored educational programmes are more successful for raising knowledge and correcting incorrect information, according to studies on training efficiency. Accurate health-care information and communication from health-care providers are critical for gaining real knowledge and changing inaccurate ideas about health **(Damiani et al., 2015).**

Significance of the study

Egypt has a population of 30.55 million, where women aged 19 years and older are at a risk of acquiring cervical cancer. According to recent estimates, 866 women are diagnosed with cervical cancer each year, with 373 dying as a result. Cervical cancer is the tenth most common malignancy in Egyptian women between the ages of 19 and 44. Early identification is key in lowering cervical cancer-related mortality **(El-Zanaty, 2015).** Health education strategies give cervical cancer prevention information and may be the key to changing cervical cancer knowledge, beliefs, and preventive actions. Furthermore, the HBM is one of 40 models that are routinely used to guide health behaviour interventions. As a result , the goal of this study is to evaluate health belief model-based educational program about cervical cancer prevention on women knowledge and beliefs.

Aim of the study:

The aim was to evaluate the effect of health belief model-based educational program about cervical cancer prevention on women knowledge and beliefs.

Research Hypothesis:

Women who receive a health education program based on the health belief model exhibit positive beliefs about cervical cancer prevention.

Women who receive a health education program based on the health belief model exhibit increase in knowledge about cervical cancer prevention

Subject and Method:

Design of study: To conduct this study, a quasi-experimental research design was used.

The setting of study: This study was conducted in the gynecological outepatient clinic at Shatby Hospital . Alexandria Governorate Egypt.

Subjects: The study population constitutes women attending outpatients gynaecological clinic for any gynaecological problems, in Shatby hospital, Alexandria governorate between Janury – April 2021. On the other hand, the sample included 160 women who agreed to participate in the study. The sample of the study was determined using the sample size formula (Yamane, 1967), which is as follow;

Yamane T. Problems to accompany" Statistics, an introductory analysis." Harper & Row; 1967.

$$n = \frac{n}{1} + N + (e)^2$$

the sample size is found to be 160 women divided into two groups; case group (80 women) and control group (80 women). The case group women were provided with health education, whereas the control group participants were not. A consecutive random sampling method was used for recruiting equal numbers 80 women in each group based on the inclusion criteria as follows:

Women between the ages of 20 and 55 who were willing to participate in the study , married and sexually active women who were free of cervical cancer and had no family history of breast or cervical cancer. The study did not include women who had been diagnosed with cervical cancer..

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

Tool 1: Structured Interviewing Questionnaire (SIQ). A structured interview questionnaire was developed by the researcher based on recent related literature **(Becker, 1974; Rosenstock et al., 1988)**. It consisted of 20 questions that assess women's knowledge about cervical cancer screening. It comprises of two parts:

Part 1: Consists of nine questions that measure socio-demographic parameters such as age, level of education, marital relationship, length of marriage, number of children, place of residence, smoking, and family history of cervical cancer.

Part 2: Consists of the next 11 questions to assess the knowledge of subjects about the definition, causes and risk factors, manifestation, complications, treatment, prevention of cancer and vaccination for cancer disease, Pap test, HPV vaccine, cervical cancer screening.

Scoring system:

A scoring system was used for women's knowledge about cervical cancer screening. Each knowledge item was given a score; correct & complete (3); correct & incomplete (2); incorrect or don't know (1). The total score of knowledge for each pregnant woman ranged from (20-60) and classified as follows: Good (47-60), Fair (33- <47) & poor (20- <33).

Tool II: - Health Belief Model Scale for Cervical Cancer and Pap Smear Test

It was used to find out how women'beliefs about cervical cancer and screening. This measure is adapating from **(Ackerson K, Gretebeck K, 2007; Akyüz et al., 2006; Champion,1993),** which lists five motivating cognitions (perceived susceptibility, Perceived severity, Perceived Benefits, Perceived barriers, and cues to action). HBM scale contains six subscales and comprised 39 items (7 items for perceived susceptibility, eight items for perceived severity, six things for perceived Benefits, , six pieces for a perceived barrier, six items for signals to action, and six items for self-efficacy) (7 items for perceived susceptibility, eight items for perceived severity, six items for perceived benefits, six items for a perceived barrier, six items for cues to action, and six items for self-efficacy). For each individual, the scores are calculated based on the number of subscales. High scores indicate an increase in susceptibility, regard, and motivation, as well as a strong awareness of benefits and barriers for benefit perception and barrier perception, respectively. Subscales except for the subscale of barrier perception are positively connected with the pap smear screening behaviour. A high barrier perception score indicates that there are significant difficulties to getting a pap smear test.

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 (117-219) of the total belief 1scores.
- Negative beliefs (39-<117) of the total belief scores.

Method:

The study was accomplished according to the following steps:

Approvals:

- Approval was obtained from the Ethical Committee, Faculty of Nursing, Assuit University, Egypt.
- An official letter from the Faculty of Nursing, Assuit University was directed to the responsible authority of the study setting to take his permission to collect data after explaining the purpose of the study.

Tools development: Tools one and three were developed by the researchers based on extensive review of recent and relevant literature, while tool two was adopted and tool four was adapted.

Validity and reliability:

- Tools one and three were tested for content validity by a jury of 5 experts in the field
- Tools were checked for their reliability by Cronbach's alpha test and the result was reliable (0.887).

Pilot study: A pilot study was carried out on 9 women (excluded from the study sample) to test the feasibility of the study, ascertain relevance, clarity and the applicability of the tools as well as detect any problem peculiar to the statements as sequence and clarity that might interfere with the process of data collection. After conducting the pilot study, it was found that the sentences of the tool were clear and relevant; however, few words had been modified. Following this pilot study, the tool was revised, reconstructed and made ready for use.

Data collection:

An extensive literature review on awareness of cervical cancer was done before finalizing the content of the intervention program.

- During the First time, the basic data was completed using an Interviewing Assessment questionnaire during waiting in an outpatient clinic
- Data collection continued for about three months, from January to the end of April 2021. Tools were administered individually to t the woman to complete it by herself before intervention with the researcher's attendance to offer guidance and clarification when needed.
- The researcher was designed the educational intervention for cervical cancer based on their needs and HBM constructs.

The data was conducted through the following three phases:

Pre-intervention phase:

A pre-intervention assessment. The data obtained during this phase were considered the basis for evaluating women's knowledge about cervical cancer screening.

Planning and implementation phases:

After assessing the knowledge of women in the pre-intervention phase, the researchers developed a nursing educational program about cervical cancer screening based on HBM constructs with simple Arabic language to be suitable for women's level of understanding. It emphasized the areas of knowledge deficit. The intervention program contained four components, i.e., the objectives, the knowledge items about cervical cancer screening and health beliefs such as follows: definition, risk factors, causes, signs and symptoms, treatment, screening diagnosis, prevention, and vaccination of cervical cancer (benefits, the age for vaccination, and who should receive the HPV vaccine, method of teaching: the lecture by using PowerPoint slides, a video and a pamphlet small group discussions, open discussion. Each session takes 30 minutes.

Evaluation phase:

This evaluation was conducted on the studied women two times:

- The first time (pre-test): before implementing the preventive program (using tools I and II) for studied women.
- Second time: (post-test): after three months by telephone call following the educational programe. The same structured knowledge questionnaire that was used for the pre-test was used for the post-test. The post-test included all 80 women who had taken part in the pre-test.

Comparison between the two study subjects' groups was done to identify the effect of health belief model-based educational program about cervical cancer prevention on women knowledge and beliefs

Statistical analysis:

The IBM SPSS software programme version 20.0 was used to examine the data that was supplied into the computer. (IBM Corporation, Armonk, NY) Numbers and percentages were used to describe qualitative data. The Kolmogorov-Smirnov test was used to ensure that the distribution was normal. Range (minimum and maximum), mean, standard deviation, and median were used to characterise quantitative data. The significance of the acquired results was determined at a 5% level of significance. For categorical variables, the Chi-square test was employed to compare various groups. When more than 20% of the cells have an expected count less than 5, Fisher's Exact or Monte Carlo adjustment is employed to correct chi-square. The Mann Whitney test was developed to compare two groups with improperly distributed quantitative data. The Kruskal Wallis test is used to compare two or more groups with abnormally distributed quantitative data. To compare two eras, use the Wilcoxon signed ranks test for abnormally distributed quantitative data. The

McNemar and Marginal Homogeneity Tests were used to determine the relevance of the various stages. The Pearson coefficient is used to determine how well two normally distributed quantitative variables correlate. To find the correlation between two abnormally quantitative variables, use the Spearman coefficient.

Ethical considerations:
For each recruited subject the following issues were considered: securing the subjects' written informed consent, keeping their privacy and right to withdraw at any time as well as assuring confidentiality of their data.

Results:

Table (2): The number and percent distribution of the studied women according to their sociodemographic characteristics

Sociodemographic characteristics	Study (n = 80)		Control (n = 80)		χ^2	^{MC}p
	No.	%	No	%		
1- Age (years)					4.683	0.298
20 - < 30	69	86.25	64	80.00		
30 - < 40	9	11.25	9	11.25		
40 - 50	2	2.50	7	8.75		
4- Level of education					3.264	0.693
Illiterate/read & write	51	63.75	49	61.25		
Primary & preparatory	5	6.25	4	05.00		
Secondary or its equivalent	0	00.00	3	03.75		
University	24	30.00	24	30.00		
5- number of children					2.204	0.731
None	56	70.00	54	67.50		
1	5	06.25	2	02.50		
2 - 3	11	13.75	13	16.25		
4 - 5	6	07.50	7	08.75		
Six or more	2	02.50	4	05.00		
6- Duration of marriage						
One year	69	86.25	56	70	1.264	$^{MC}p=$ 0.962
2 - 3 years	3	3.75	2	2.5		
3 -<6 years	9	11.25	10	12.5		
6 -<10 years	2	2.5	4	5		
>10 years	7	8.75	8	10		
7- Smoking						
Yes	4	05.00	5	06.25	0.118	$^{FE}p=$ 1.000
No	76	95.00	75	93.75		
8- Passive smoke						
Yes	17	21.25	14	17.50	0.360	0.548
No	63	78.75	66	82.50		

χ^2: Chi square test *MC: Monte Carlo*

Table (2): The number and percent distribution of the studied women according to their reasons for not peroming Pap smear as a screening test

Variables	Study (n = 80)		Control (n = 80)		χ^2	^{MC}p
	No.	%	No.	%		
Reasons for not doing a pap smear					3.989	0.715
Fear of vaginal examination	3	03.75	2	02.50		
Sense of modesty	6	07.50	4	05.00		
Absence of symptoms	12	15.00	16	20.00		
Lack of interest	4	05.00	1	01.25		
My doctor did not ask me to do this examination	55	68.75	57	71.25		

χ^2: Chi square test *MC: Monte Carlo*

Table (3): The number and percent distribution of the studied groups according to their total scores of knowledge about cervical cancer screening .

Total score of Knowledge about cervical cancer screening	Study (n = 80)				Control (n = 80)				χ 2 (P1)	χ 2 (P2)
	Pretest		Posttest (3 months)		Pretest		Postest (3 months)			
	No.	%	No.	%	No.	%	No.	%		
Poor knowledge (47-60)	50	62.5	5	6.25	48	60.0	40	50.0	χ^2=10.667* (0.001*)	χ^2=152.605* (^{MC}p<0.01*)
Fair knowledge(33- <47)	20	25.0	15	18.8	19	23.8	18	22.5		
Good knowledge (20- <33).	10	12.5	60	75	13	16.2	22	27.5		
$^{MH}p_0$	<0.001*				1.000					

χ 2 (P): Chi-Square Test & P for χ 2 Test MC: Monte Carlo

p_0: p-value for comparing between **Pre and post in each group**

p_1: p-value for comparing between **the studied groups in Pre**

p_2: p-value for comparing between **the studied groups in post**

*: Statistically significant at p ≤ 0.05

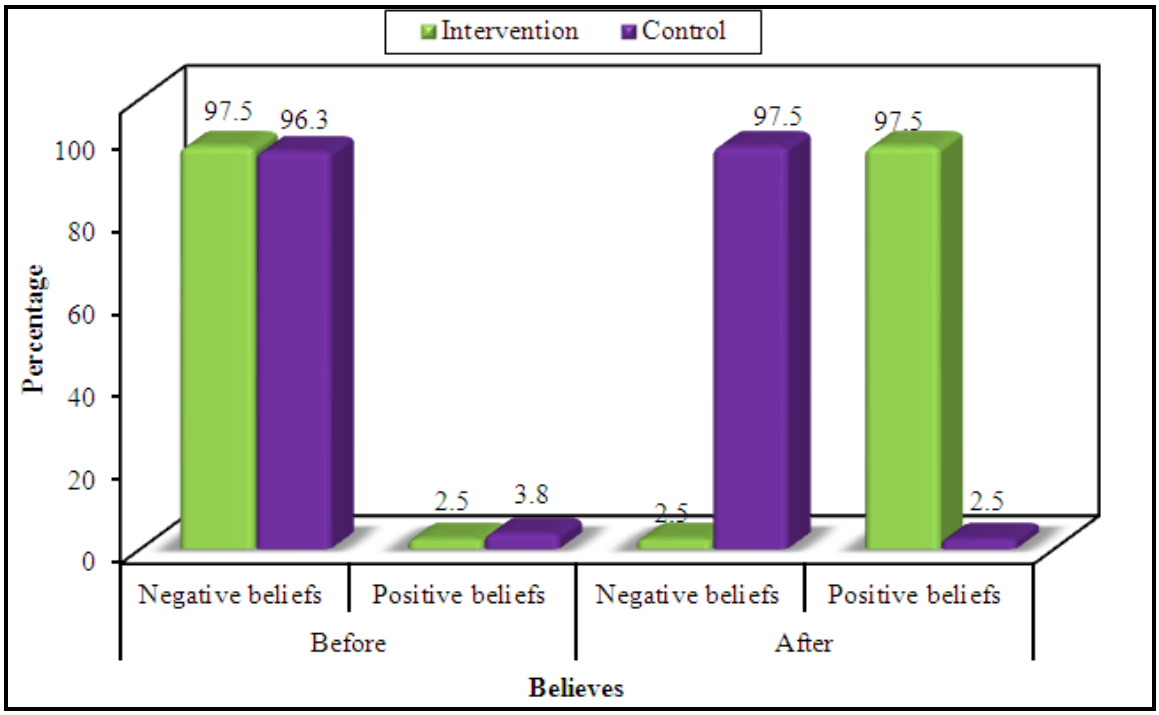

Figure (1): Number and percent distribution of studied women according to the total score of beliefes about cervical cancer screening based on health beliefs model (HBM)constructs

Table (4): Correlation coefficient between total score of knowledge and health beliefs of the study group pre and post-program

Variables		Total knowledge score	
		Pre	Post (3 months)
Total Beliefes score	R	0.178	0.239*
	P	0.115	0.033*

r: Pearson coefficient

*: Statistically significant at p ≤ 0.05

Table (5): Correlation coefficient between total score of knowledge and health beliefs of the study group and their socio-demographic characteristics

		Total knowledge score		Total Beliefes score	
		Pre	Post (3 months)	Pre	Post (3 months)
1-Age (years)	r_s	-0.020	0.330*	0.113	0.025
	P	0.862	0.003*	0.318	0.822
2- Level of education	r_s	0.247*	-0.002	0.152	-0.063
	P	0.027*	0.984	0.179	0.581
3- Number of children	r_s	0.009	-0.202	-0.183	-0.002
	P	0.940	0.073	0.105	0.985
4-Duration of marriage	r_s	-0.127	0.340*	-0.080	0.110
	P	0.263	0.002*	0.479	0.330

r_s: Spearman coefficient

*: Statistically significant at $p \leq 0.05$

Table (6):Mean distrubtion of the studied group according to total score of beliefs about cervical cancer screening using HBM pre & post educational program

Variables	Study (n = 80)		Control (n = 80)		U (p_1)	U (p_2)
	Pre	Post (3 months)	Pre	Post (3 months)		
Perceived susceptibility						
Total score (11–44)						
Min. – Max.	20.0 – 35.0	34.0 – 37.0	20.0 – 29.0	20.0 – 37.0	2779.0 (0.137)	418.50* (<0.001*)
Mean ± SD.	22.34 ± 3.01	35.76 ± 1.15	22.74 ± 3.01	22.64 ± 5.77		
Z(p_0)	**7.732* (<0.001*)**		**0.815(0.415)**			
Perceived severity Total score (8-40) Min. – Max. Mean ± SD.	25.0 – 39.0 26.34 ± 5.01	36.0 – 41.0 38.76 ± 3.15	22.0 – 30.0 24.74 ± 3.81	22.0 – 32.0 24.84 ± 4.77	3106.5 (0.740)	1505.0* (<0.001*)
Z(p_0)	**7.524* (<0.001*)**		**1.899 (0.058)**			
Perceived benefits Mean ± SD.	17.0 – 45.0 24.41 ± 7.34	38.0 – 45.0 41.14 ± 2.04	17.0 – 39.0 25.09 ± 8.19	17.0 – 45.0 25.04 ± 10.91	3161.50 (0.892)	598.50* (<0.001*)
Z(p_0)	**7.643* (<0.001*)**		**0.073(0.941)**			
Perceived barriers Total score (30–120)				63.0 – 98.0 63.88 ± 5.50	3130.00 (0.569)	124.00* (<0.001*)
Z(p_0)	**7.928* (<0.001*)**		**0.323 (0.746)**			
cues to action Total score (12–48) Min. – Max. Mean ± SD.	**17.0 – 45.0 24.41 ± 7.34**	**38.0 – 45.0 41.14 ± 2.04**	**17.0 – 39.0 25.09 ± 8.19**	**17.0 – 45.0 25.04 ± 10.91**	3161.50 (0.892)	598.50* (<0.001*)
Z(p_0)	**7.643* (<0.001*)**		**0.073(0.941)**			

U: Mann Whitney test ***Z: Wilcoxon signed ranks test***

*p_0: p-value for comparing between **Pre and post in each group***

*p_1: p-value for comparing between **the studied groups in Pre***

*p_2: p-value for comparing between **the studied groups in post***

**: Statistically significant at $p \leq 0.05$*

Table (1): Presents the number and percent distribution of studied women according to their socio-demographic data. Age clarified that about two third and more (65%, 67%) of the study and the control group respectively aged from 20 to less than 30 years old . In addition , majority of the former and latter group (85% & 86.25%) were married . Level of education also manifested that more than half (63.75 & 61.25) of the study and control respectively were read and write. A sizeable proportion and slightly more than two third of the former and latter groups (70% & 67.5%) had no children respectively . The duration of marriage revealed that majority and a sizable proportion of the study and control group (86.25% & 70.0%) were married for one year respectively. Moreover, the vast majority of of the former and the latter group (95% & 93.85%) were non-smokers respectively . Furthermore, A sizable proportion and majority of study and control group (78.8% & 82.5%) were passive smoke .However, no statistically significance differences were found between the two groups' socio-demographic data.

Table (2): Portrays the number and percent distribution of the studied women according to the reasons for not perfoming Pap smear as a screening test . Slightly more than two third and a sizable proportion of the study and control group (68.75% & 71.25 %) the doctor did not ask them to do a Pap screening test respectively. Meanwhile , absence of symptoms revealed that (15% & 20%) of the former and latter group respectively was another reason for not doing pap smear screening test .

Table (3): Demonstrates the number and percent distribution of the studied women according to their total score of knowledge about cervical cancer screening. A statiscally significant difference was observed among the study group in pre and post test ($p<0.001$). A stastically significant differences were also found between the study and control group in pre and post test ($P=0.001$), where 60% of the study group gained good knowledge, compared to 27.5% of the control group after the intervention .

Figure (1): Shows number and percent distribution of the studied women according to their total score of beliefs about cervical cancer based on health belefs model . It was noticed that vast majority (97.5 %) of the study group gained positive beliefes scores of all the HBM constructs (perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy) compared to a minority (2.5%) of the control group .

Table (4): Indicates the percent distribution of the study group according to the correlation coefficient between total scores of knowledge and beliefs. It was revealed that a statistically significant correlation between total knowledge score post-intervention and total beliefs about cervical cancer screening screening pap smear .

Table (5): displays the correlation coefficient between a total score of knowledge and health beliefs of the study group and their socio-demographic characteristics . It showed that the pre-test knowledge score on cervical cancer was independent of the level of education while post-intervention it associated with age and duration of the marriage. In respect to the total score of beliefs, there was no significant association related to the demographic variables.

Table (6): Manifests mean distrubtion of the studied group according to total score of beliefs about cervical cancer screening using HBM pre & post educational program**.** No statistically significant difference was found between the two groups before intervention in relation perceived susceptibility , Perceived severity, Perceived benefits, Perceived barriers, cues to action. Nevertheless, a statistically significant difference ($P=<0.001$) was realized between them where the mean total score was 35.76 ± 1.15 , 38.76 ± 3.15 , 41.14 ± 2.04 , 94.63 ± 3.68 and 41.14 ± 2.04 for the study group compared to 22.64 ± 5.77 , 24.84 ± 4.77 , 25.04 ± 10.91, 63.88 ± 5.50 and 25.04 ± 10.91 for the control group respectively

Discussion

Cervical cancer is a preventable cancer with a well-known aetiology that affects women all over the world. Early detection and public awareness of this disease and its risk factors. In order to reduce morbidity and mortality, health belief models and prevention strategies are extremely crucial. The purpose of this study was to assess the effect of an educational programme on screening of cervical cancer based on the health belief model among rural women and determining its effectiveness in terms of a significant increase in the knowledge of the women on cervical cancer **(Kieti, 2016).**

The results of the present study revealed that improved women's total score of knowledge and beliefs in the study group about cervical cancer than the control group (Tables III, IV,VII). This may be attributed to lack of awareness of cervical cancer has been identified as one of the high risk factors that contribute to cervical cancer in developing countries. The current finding coincides with a study conducted in Hamadan, Iran , where it was concluded that There is a significant and direct relationship between awareness level and performance, such that with higher awareness, the chance of doing a Pap smear test increases, as does the mean score of perceived sensitivity and severity after the intervention. Educational session classes about cervical cancer

play an important role in changing women's knowledge and beliefs about cervical screening. **(Shobeiri et al., 2016)**. It is also in line wih a study performed in khomeinishahr, khomeinishahr , where it was concluded that the finding of this study support the feasibility of the educational program based on HBM to improvement practice of women about Pap smear **(Hossaini et al., 2017)** . In addition, it is relatively agrees with a review study performed in Zarandieh, Iran, designing educational interventions for changing the knowledge and beliefs of women is recommended. **(Karimy et al., 2017)**. Moerover, the present finding is partly and relatively conformable with a study fulfilled in Korean , Asia , where it was showed that women's lack of information was one of the hurdles to getting a Pap screening test, therefore cervical cancer education is needed to boost Pap test uptake and HPV vaccination in this disadvantaged group. underserved population **(Lee & Lee, 2017).**

The current finding is partly and relatively matches with a study in South Carolina , United States reported that The biggest predictors of screening behaviour were perceived barriers. This suggests that decreasing the barriers to Pap smear testing leads to a higher rate of testing. It also stated that following the intervention, the mean score of perceived self-efficacy in the experimental group increased when compared to the control group, implying that high self-efficacy boosts one's capacity, capability, competence, and self-confidence to successfully display behaviour. **(De Peralta et al., 2015)**. In addition, it is coincides wih a study executed in Colombia, Medellín , where it was found that health education interventions help in reducing personal and psychological barriers associated with screening **(Garcés-Palacio et al., 2018).** It also agree wuth a systematic review , where it was showed that the different interventions and health behavior change frameworks provide an effective base for cervical cancer screening. Heath providers can chose educational methods based on the particular client situations **(Naz et al., 2018) .**

Regarding total score of knowledge about cervical cancer screening , the current findings showed that a significant positive correlation between the total score of the studied women's knowledge about cervical cancer screening and their beliefs . Furthermore, this study can be concluded that good knowledge can lead to a positive belief, leading to good behaviors. This findings also, agrees with a study implemented in Benha , Egypt , where it was stated that a statistically significant positive correlation between the total knowledge and the total health belief scores before and after HBM implementation. 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 **(Hanaa & Hend, 2014)**. In addition, It coincides with a study conducted in Benha , Egypt , where it was concluded that that there was a correlation between total score of knowledge and beliefs of the studied women pre and post-intervention. This indicates that an improving level of knowledge is positively related to an improved belief **(Said et al., 2018)** .

Conclusion and Recommendations:

It is clear that health care providers must make an effort to reach out to rural women. As a result, adopting the HBM to create and implement launching a national cervical cancer screening program, to be available and accessible to all women in primary health care centers and hospitals is suggested. A routine examination of behaviour change continuity with longer follow-ups (more than a year) and undertaking similar studies with other behaviour change models are also recommended. Similar research using the HBM, particularly the perceived severity and benefits components, as well as other behaviour models, should be conducted in developing countries to determine the optimal model for persuading women from various cultures to get a Pap smear test.

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