Asmaa Mustafa Fawzy Khalifa
Assistant Lecturer of
Community Health Nursing,
Faculty of Nursing, Minia
University, Egypt

Dr. Yosria El-Sayed Hossien
Professor of Community
Health Nursing, Faculty of
Nursing, Minia University,
Egypt

**Dr. Ekhlass Mohammed
Ibrahim**
Assistant Professor of
Community Health Nursing,
Faculty of Nursing, Minia
University, Egypt

Dr. Reham Refat Taha
Assistant Professor of
Obstetrics, Faculty of
Medicine, Minia University,
Egypt

Effect of education based on health belief model on women's attitudes toward cervical cancer screening

Asmaa Mustafa Fawzy Khalifa, Dr. Yosria El-Sayed Hossien, Dr. Ekhlass Mohammed Ibrahim and Dr. Reham Refat Taha

DOI: https://doi.org/10.33545/26641658.2023.v5.i2a.145

Abstract
Background: In women under 45, cervical cancer is the second most common form of cancer worldwide, making it a significant public health concern worldwide.
Research design: Quasi-experimental design (pre-test, post-test) was used to achieve the aim of this study.
Sample: A purposive sample of 100 women.
Data Collection Tool. Questionnaire (I): A structured interviewing questionnaire includes the socio-demographic characteristics of women.
(II): The Health Belief Model Scale for Cervical Cancer and the Pap Smear Test.
Results: Before introducing the educational program, 38% of the participant women had a negative attitude regarding cervical cancer, and screening improved to 18% post-implementation. Also, 62% of the participant women who had positive attitudes before implementing the educational program increased to 82% regarding cervical cancer screening after implementation. Likewise, 45% of the participant women had good beliefs regarding cervical cancer, and screening before implementing the educational program improved to 90% of them after implementation.
Conclusion: Providing health education to women based on the principles of the health belief model can positively affect women's beliefs and attitudes toward Cervical Cancer Screening.
Recommendation: Periodically enhancing women to perform cervical cancer screening guided by health belief model principles.

Keywords: Attitudes, cervical cancer screening, health belief model

1. Introduction
Cervical cancer occurs when cells in the cervix (the opening of the uterus to the vagina) become malignant. Cervical cancer is the second most common cancer in women and a major public health concern in many countries. High-risk strains of the human papillomavirus (HPV) are responsible for nearly all cases of cervix cancer [1].
Cervical cancer is a major cause of death among women of childbearing age, despite the fact that it is almost always avoidable. The highest death rates can be found in low and middle-income nations. Cervical pre-cancer and cancer are typically caused by chronic or recurrent infection with one or more "high risk" (or oncogenic) types of human papillomavirus (HPV) [2].

Theoretical Definitions
Belief: Belief in something as true or right without having concrete evidence to support that belief; an intuitive grasp of the truth.

Values: Concepts, principles, and standards that inspire strong feelings of support or opposition.

Attitude: an innate propensity to approve or disapprove of a given concept, item, person, or setting. An individual's attitude affects their actions and reactions to obstacles, incentives, and rewards (collectively called stimuli). There are three parts to an attitude: an emotional one (how you feel about it), a cognitive one (your thoughts on the matter), and a behavioral one (whether you put your thoughts into action or not) [3].

Corresponding Author:
Asmaa Mustafa Fawzy Khalifa
Assistant lecturer of
Community Health Nursing,
Faculty of Nursing, Minia
University, Egypt

The Health Belief Model (HBM) is a framework for describing people's perspectives on their susceptibility to developing a health problem (perceived susceptibility), the severity of that problem (perceived severity), the likelihood that using the prevention service will help them (perceived benefit), and the barriers they perceive to adopting healthy behaviors (perceived barriers). To the original HBM, two other concepts were added later on: cues to action (a cue or trigger that prompts one to engage in health-promoting behaviors) and health belief models [4].
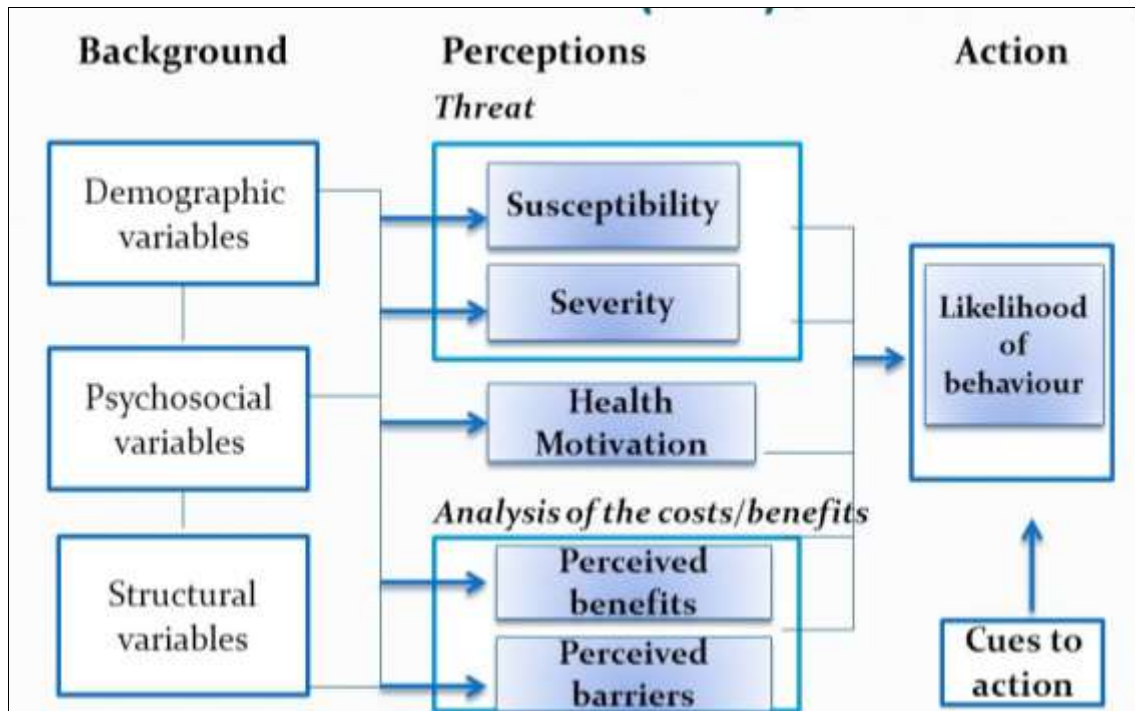

Fig 1: The health belief model [5].

The Health Belief Model (HBM) is a highly prevalent theoretical framework employed in analyzing and elucidating health-related behaviors, particularly in the context of screening and prevention. The utilization of the Health Belief Model (HBM) framework has been prevalent in numerous studies due to its demonstrated consistency across various research endeavors, particularly in investigating the screening behavior of women who have not undergone or have been insufficiently screened for breast and cervical cancer [6].

Perceived susceptibility is related to individuals' beliefs regarding the likelihood of acquiring a particular disease or condition. Perceived seriousness pertains to individuals' subjective perceptions and emotions regarding the severity of contracting an illness or the potential consequences of not seeking treatment. The perceived benefits of engaging in a healthy behavior are centered on its effectiveness in mitigating the risk associated with the condition. Perceived barriers refer to the potential adverse aspects of specific health behavior. It involves an unconscious evaluation of costs and benefits, wherein individuals recognize that the perceived barriers outweigh the perceived benefits. Health motivation can be defined as a broad and overarching state of intention that leads to actions aimed at either maintaining or enhancing one's health. Incorporating health motivation into the five Health Belief Model (HBM) concepts has been supported by substantial empirical evidence, demonstrating its noteworthy predictive capacity [7].

Community health nurses' examination of women across various age groups is essential to enhance their attitudes, impacting the adoption of healthy behaviors. It is plausible that individuals could implement the model in practical settings, assuming the role of responsibility and accountability for women, thereby potentially contributing to enhancing women's reproductive health. Preventing morbidity and mortality among women caused by cervical cancer is now achievable [8].

Significance of the Study
Cervical cancer ranks as the fourth most frequently diagnosed cancer in females globally, with an estimated 604,127 new cases and 341,831 fatalities reported in 2020. Globally, cervical cancer mortality rates exhibit a significant decrease compared to its incidence, with a mortality-to-incidence ratio of 57% [9].

Among Egyptian women, cervical cancer has a 14th overall prevalence and an 11th prevalence among those aged 15 to 44. Egypt records an annual incidence of approximately 969 newly diagnosed cases of cervical cancer. The administration of treatments for cervical cancer frequently results in adverse effects that are undesired, encompassing physical alterations, psychological strain, impairments in digestive and urinary functions, manifestations of menopause, infertility, and sexual dysfunction, such as discomfort during sexual intercourse, disturbances in arousal and orgasm, as well as dyspareunia [10].

Attitudes organize the individuals' relationship with interrelated actions and the outside world. They provide a certain level of control by making human interactions more predictable. The Health Belief Model (HBM) is particularly suitable for prevention-oriented programs because it emphasizes individuals' beliefs and attitudes. This model is centred around health motivation, making it well-suited for interventions such as cervical cancer screening, condom use for HIV prevention, and breast cancer screening programs. Moreover, these programs typically aim to promote specific

actions, and the HBM serves as a valuable tool in guiding participants toward undertaking these specific actions [11].

Aim of the study
The current study aims to evaluate the effect of education based on the health belief model on women's attitudes toward cervical cancer screening.

2. Research Hypotheses
H1- The health belief model principles will enhance women's attitudes toward cervical cancer screening on the post-test than the pre-test.

H0- The health belief model principles will not enhance women's attitudes toward cervical cancer screening on the post-test than the pre-test.

3. Subject and Method
Research design
This study used a quasi-experimental approach (pre-test, post-test) to reach its aim.

Setting
The study was conducted at the out-patient clinic for gynecology at Minia university hospital for maternity and child. The gynecology out-patient clinic works from Saturday to Thursday every week, from 8 am to 2 pm., it is located on the first floor of the Minia Obstetric and Child University Hospital; it consists of two doctors and two nurses, who provide a physical examination for each woman, perform laboratory examinations, x-ray, and abdominal sonar, and describes medications. Also, it deals with further health care inside or outside the hospital according to the women's needs or problems; it serves about 60702 women of reproductive age in Minia City according to the last demographic health survey in 2014 [12].

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

Sample size
A purposeful sample was utilized to perform the present study. According to the Minia university hospital registration office for maternity and child, the total number of patients attending the gynaecology out-patient clinic during the last year, 2019/2020, was (800). The sample size was determined according to the statistical Formula [13] as follows:

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

Description
n = required sample size.
z = is the Z score at 95% confidence level equal 1.96.
p = Prevalence of Patients diagnosed with cervical cancer

m = Margin of error at 5% (Standard value of 0.05).
N= population size (800)
Based on the previously mentioned formula, a sample of (112) women were selected by purposive sampling technique. Two participant women were drawn from the study; ten were excluded and used as pilot. So, the actual recruitment number was 100 participants women.

Inclusion criteria
- Women aged 20–50 years.
- Married women.
- Women have any risk factors for cervical cancer.

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

Data collection Tool
I: Socio-demographic questionnaire: it was designed after extensive revision of review [14, 15]. It consisted of five questions: educational level, family income, occupation, residence, and age. All of the questions were MCQ questions.

II: The Health Belief Model Scale for Cervical Cancer and the Pap Smear Test: It was adapted from Champion [16] and Guvenc *et al.*, [17] and modified by the researcher to accommodate Egyptian women's culture in the form of omitting some questions as Health professionals doing Pap Smear Test are rude to women, and simplifying the translation of it into the Arabic language to be suitable for the study use. Each question of the health belief model had five Likert scale responses, including strongly agree, agree, strongly disagree, disagree, and neutral. It consisted of two subscales as follows: Belief items: it consisted of 4 domains: susceptibility to cervical cancer screening (3 questions), the perceived severity of cervical cancer screening (7 questions), and perceived benefits of cervical cancer screening (5 questions), and perceived barriers to cervical cancer screening (8 questions).

Scoring system of beliefs: The subscales consist of items that utilize a five-point Likert-type scale for response options. These options include strongly disagree (1 point), disagree (2 points), neutral (3 points), agree (4 points), and strongly agree (5 points). Greater scores are indicative of more intense emotions towards that particular construct. There is a positive correlation between all scales and screening behavior, except for barriers, which exhibit a negative association [17]. Total number of questionnaire items = 23 questions with maximum total scores = 115.

Belief classification and scoring were considered as follows
Poor beliefs: 1: 35 or 1%: 30%
Moderate belief: from 36 to 75 or from 31% to 65%
Good belief: from 80 to 115 or 66% and more

Attitude items: it was consisted of 2 domains as healthy motivations (7 questions) and constraints for adopting cervical cancer screening (5 questions).

Scoring system of attitude: Total number of questionnaire

items = 12 with maximum total scores = 60.

Attitude classification and scoring were considered as follows
Negative attitude: 1:29 or less than 50%
Positive attitude: 30:60 or 50% and more.

Ethical consideration
The ethical committee approved the research proposal in the faculty of nursing. Each participant in the previously mentioned gathering was given an explanation of the study's goals. Informal consent was obtained from each woman who agreed to participate in the study. Information collected was held in the highest of confidence.

Validity
The content validity of the tools was assessed through an exhaustive assessment conducted by a jury panel consisting of five experts in the fields of community health nursing and obstetric health nursing. This panel thoroughly examined the tools to ensure their content accuracy, internal validity, relevance, comprehensibility, applicability, and ease of use. Additionally, a panel of experts was requested to assess the items in terms of their comprehensiveness and clarity, thereby evaluating their content validity. The experts evaluated the questionnaire's relevance, fluency, and simplicity. Their findings indicate that the questionnaire is deemed valuable and beneficial. The tool modifications took into account and considered the suggestions provided.

Reliability
Test-retest reliability was examined to test internal consistency using Cronbach's alpha tools of 0.810 & 0.924, respectively, which referred to the strong, reliable tool.

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

Study procedures
The director of the mentioned setting received an official letter of study approval from the Dean of the Faculty of Nursing at Minia University. The letter contained a concise explanation of the study's objectives. A formal request was made to the chairman to authorize the study.

Data was collected through the following phases
After obtaining written permission from the Dean of the Faculty of Nursing at Minia University, written approval was gained from the director of maternity and child hospital affiliated with Minia University hospitals for data collection. The researcher had the approval of the ethical committee in the Faculty of Nursing, Minia University. The study was performed in four phases: assessment, planning, implementation, and evaluation.

1. **Assessment phase**: The investigator conducted pre-tests for participants about attitudes related to cervical cancer and screening. The interview took 10 - 15 minutes for each woman to fill out the questionnaires (Some filled by participant women and some by the researcher according to the educational level of each woman).

2. **Planning phase:** Based on the baseline data in the assessment phase, the program was conducted; other facilities were checked and arranged during this phase, such as teaching places and types of sessions. The teaching strategies involve the teaching place, which was a classroom in the hospital. Teaching sessions were implemented using lectures, presentations, group discussions, and audiovisual aids. The researcher designed and developed a booklet in Arabic for each woman to use during the different sessions and after finishing the study.

3. **Implementation Phase:** The program was implemented for the women regarding sessions. A total number of participants was divided into small groups. Each group included 8-12 women to attend the session. The sessions included:

A. Theoretical sessions included: orientation about the educational program, introduction to cervical cancer and its risk factor, sign and symptoms of cervical cancer, complications, treatment, and prevention guided by health belief model domains, correction of misbeliefs and misconceptions about cervical cancer, and screening.

B. The practical session included a detailed explanation of menstrual hygiene practices, genital hygiene, how to use condoms during intercourse for protection against human papillomavirus or other sexually transmitted diseases, and an explanation about Papanicolaou cytology screening (Pap smear) and HPV test. At the beginning of each meeting, a review of the previous meeting's material and an explanation of the meeting's purpose were given. It begins on the first day of May and to the end of June 2022(two days per week).

4. **Evaluation phase**: The evaluation was done using post-tests after three months of implementing and completing the program.

Statistical analysis
The data undergo a coding process. The inputting and examining data was conducted utilizing SPSS (Statistical Package for Social Science) version 22. The graphic was generated utilizing the Excel software application. The data was analyzed using a student t-test to compare the pre-test and post-test results. On the other hand, frequency distribution tables represent qualitative data regarding numbers and percentages. The data was subjected to analysis using the chi-square (χ2) test. The significance level was established at a P value of less than 0.05.

4. Results

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

Socio-demographic characteristics of the studied women	No	%
Age (years)		
20- <30	34	34
30- <40	47	47
40-50	19	19
Educational level		
Basic	18	18
Illiterate	13	13
Secondary	36	36
University	28	28
Postgraduate	5	5
Family Income /month		
Insufficient	33	33
Sufficient	67	67
Occupation		
Housewife	57	57
working woman	43	43
Residence		
Urban	51	51
Rural	49	49

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

Table 2a: Mean correct responses of participant women's beliefs regarding cervical cancer screening using the Health Belief Model Scale for Cervical Cancer and the Pap Smear Test, 2022, (N= 100)

Belief items	Pre%	Post%	Paired t-test	P value
Susceptibility to Cervical Cancer screening				
Eventually, I will most likely be diagnosed with cervical cancer.	52.7	46	1.253	.213
There is a significant risk that I will develop cervical cancer within the next few years.	38.3	63.5	-6.584	.000*
Cervical cancer is something I fear will strike me at some point.	45.5	66	- 5.194	.000*
The perceived severity of Cervical Cancer screening				
Cervical cancer is a terrifying prospect.	34.5	72.2	-12.653	.000*
My heart rate increases whenever I consider cervical cancer.	43.7	66.7	-5.641	.000*
I shudder at the thought of cervical cancer.	44.5	67.5	-5.419	.000*
Cervical cancer would cause me a lot of pain for a very long time.	48.2	64.2	-3.840	.000*
My love for my husband would suffer if I were diagnosed with cervical cancer.	28.7	69	-9.252	.000*
Cervical cancer would completely alter my life.	40.7	69.2	-8.856	.000*
If I were to get cervical cancer, I wouldn't have more than five years to live.	34	65.2	-9.005	.000*

Significant* or P<0.05

Table (2. a): Reveals the variations of the correct responses of participant women's beliefs percentage regarding cervical cancer screening using the Health Belief Model Scale for cervical cancer and the pap smear test before and after implementing the educational program. Regarding susceptibility to cervical cancer screening, the chances of getting cervical cancer in the next few years are high; it ranges from 38.3% to 63.5%, and feel they will get cervical cancer sometime during their life ranges from 45.5% to 66%, respectively.

Concerning the perceived severity of cervical cancer screening, the thought of cervical cancer scares them is ranged from 34.5% to 72.2%; when they think about cervical cancer, the heart beats faster is ranged from 43.7% to 66.7%, they afraid to think about cervical cancer is ranged from 44.5% to 67.5%, problems they would experience with cervical cancer would last a long time is ranged from 48.2% to 64.2%, cervical cancer would threaten a relationship with husband of participant women is ranged from 28.7% to 69% before and after implementing the educational program, respectively.

Significant differences before and after implementing the educational program regarding participant women's beliefs regarding susceptibility to cervical cancer screening and the perceived severity of Cervical Cancer screening, except regarding susceptibility to cervical cancer screening as it is likely that they will get cervical cancer in the future.

Table 2b: Mean correct responses of participant women's beliefs regarding cervical cancer screening using the Health Belief Model Scale for Cervical Cancer and the Pap Smear Test, 2022, (N= 100)

Belief items	Pre%	Post%	Paired t-test	P value
Perceived Benefits of Cervical Cancer Screening				
Regular smear testing can alleviate my concerns about developing cervical cancer.	71.5	71.7	-.077	.939
Cervical abnormalities can be detected and treated early with Pap smear testing.	70.5	73.2	.900	.370
Cervical cancer treatment would be easier if detected at routine Pap smear screenings.	73.7	70.5	1.018	.311
In my opinion, the best way to detect cervical cancer early is through regular Pap smear testing.	70.7	72	-.422	.674
I can lower my risk of dying from cervical cancer by getting regular Pap smears.	69.7	72.5	.883	.380
Perceived barriers to Cervical Cancer screening				
The location of a Pap smear testing center is unknown to me.	80	66.7	4.058	.000*
The time required to undergo a Pap smear test is excessive.	78.2	58.2	6.105	.000*
It hurts too much to get a Pap smear.	79.2	57.7	6.413	.000*
To be honest, I tend to forget or put off getting regular Pap smears.	64	65.2	-.400	.690
I need to prioritize other things over getting a Pap smear right now.	64	64.7	-.235	.814
The Pap Smear Test is no longer recommended for someone of my age.	65	57.7	1.998	.048
No Pap Smear testing facility is conveniently located to my home.	71	66.2	1.271	.207
Having a Pap smear test will not change my fate if developing cervical cancer is in it.	75.7	65.2	3.202	.002*

Significant* or *p*<0.05

Table (2. b): shows the variations of the correct responses of participant women's beliefs percentage regarding cervical cancer screening using the Health Belief Model Scale for cervical cancer and the pap smear test before and after implementing the educational program regarding the perceived benefits of cervical cancer screening, as If cervical cancer were found at a regular Pap Smear Test its treatment would not be so bad is ranged from 73.7% to 70.5%. Also, having regular pap smear tests will decrease my chances of dying from cervical cancer, ranging from 69.7% to 72.5%.

Also, regarding the perceived barriers to cervical cancer screening as they don't know where to go for a pap smear test, it ranged from 80% to 66.7%; having a pap smear test takes too much time ranging from 78.2% to 58.2%. Also,

participant women reported that having a pap smear test is too painful, ranging from 79.2% to 57.7%. Likewise, participant women reported that if there is cervical cancer development in their destiny, having a Pap Smear Test cannot prevent it ranged from 75.7% to 65.2% before and after implementing the educational program, respectively.

Significant differences before and after implementing the educational program regarding participant women's beliefs concerning perceived barriers to cervical cancer screening, including not knowing where to go for a pap smear test, having a pap smear test takes too much time, and having a pap smear test is too painful. On the other hand, there is no statistically significant difference regarding all items of perceived benefits.

Table 2c: Mean correct responses of participant women's attitudes regarding cervical cancer screening using the Health Belief Model Scale for Cervical Cancer and the Pap Smear Test, 2022, (N= 100)

Attitude items	Pre%	Post%	Paired t-test	P value
Healthy Motivations:				
Early diagnosis of health issues is important to me.	39.5	73.2	-9.625	.000*
Taking care of my health is a top priority of mine.	66.2	72.7	-2.258	.026
To that end, I actively seek out new knowledge in this area and prioritize engaging in practices that will ultimately benefit my health.	59.2	76	-4.395	.000*
For the sake of my health, I try to eat healthy, well-rounded meals.	57.7	73.7	-4.283	.000*
For the sake of my health, I try to work out three times per week.	66.5	81.7	-4.578	.000*
Even when I'm feeling fine, I still make it a practice to see my doctor regularly.	66.2	75	-1.572	.119
Taking care of my health is a top priority of mine.	71.7	74.2	-.770	.443
Constraints of adopting Cervical Cancer screening				
I am worried about getting a negative Pap smear result, so I have put off getting one.	77	68.2	2.650	.009
For unknown reasons, the prospect of a Pap smear fills me with dread.	80	70.2	2.862	.005
To have a Pap smear, I would have to lie on a gynecological exam table and expose my privates, which is something I am not comfortable doing.	78.2	62	4.588	.000*
A Pap smear should be performed by a female doctor, in my opinion.	85.2	70	5.027	.000*
If I have to pay for my Pap Smear, I'm not getting one.	83.5	69.5	4.101	.000*

Significant* or P<0.05

Table (2. c): Presents the variations of the correct responses of the participant women's attitudes percentage regarding cervical cancer screening using the Health Belief Model Scale for cervical cancer and the pap smear test before and after implementing the educational program. Concerning healthy motivations, participant women reported wanting to discover health problems early, ranging from 39.5% to 73.2%; they looked for new information to improve their

health ranging from 59.2% to 76%.

Also, they feel it is important to carry out activities that will improve their health, ranging from 57.7% to 73.7%. Finally, women reported they eat well-balanced meals for their health, ranging from 66.5% to 81.7% before and after implementing the educational program.

Regarding the constraints of adopting cervical cancer screening: women who are afraid to have a pap smear test

for fear of a bad result are ranged from 77% to 68.2%; they afraid to have a pap smear test because they don't know what will happen is ranged from 80% to 70.2%. Participant women prefer a female doctor to conduct a pap smear test ranging from 85.2% to 70%, and they never have a pap smear test if paid, ranging from 83.5% to 69.5% before and after implementing the educational program, respectively.

Significant differences before and after implementing the educational program regarding participant women's attitudes

regarding all items of healthy motivation for cervical cancer screening except maintaining good health is extremely important to them, they exercise at least three times a week for their health, and they have regular health check-ups even when they not sick. Also, regarding all items of constraints for cervical cancer screening, they are afraid to have a pap smear test for fear of a bad result, and they are afraid to have a Pap Smear Test because they don't know what will happen.
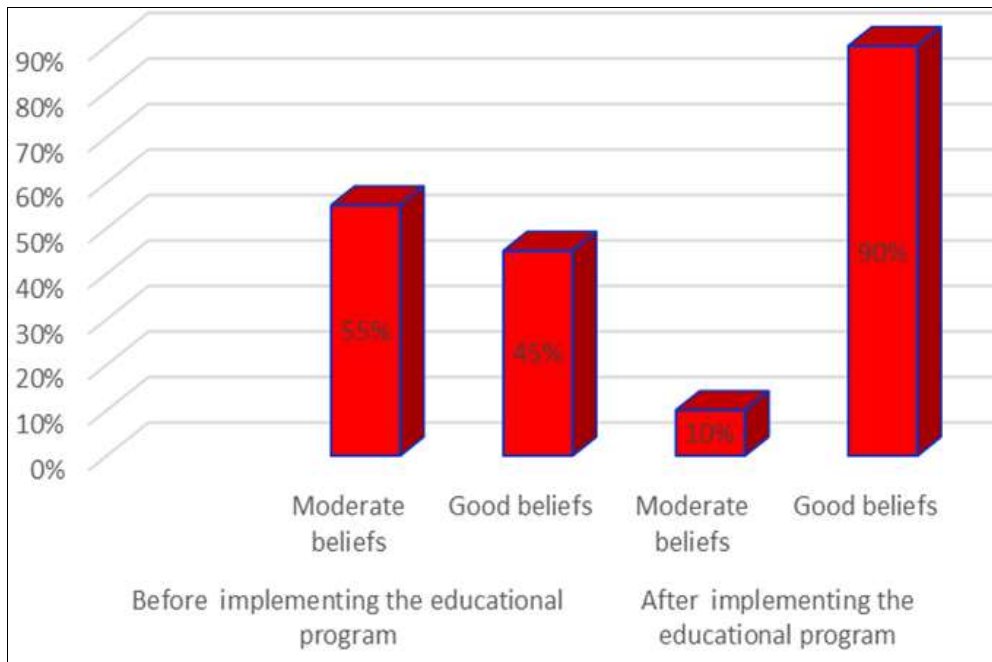

Fig 2: Beliefs level regarding cervical cancer screening among the participant women before and after implementing the educational program, 2022, (N= 100):

Figure (2): illustrates that 55% of participant women who had moderate beliefs before implementing the program turned to only 10% after implementing the program. Also, 45% of participant women had good beliefs before

implementing the program, which increased to 90% of them having good beliefs regarding cervical cancer and screening after implementing the program.
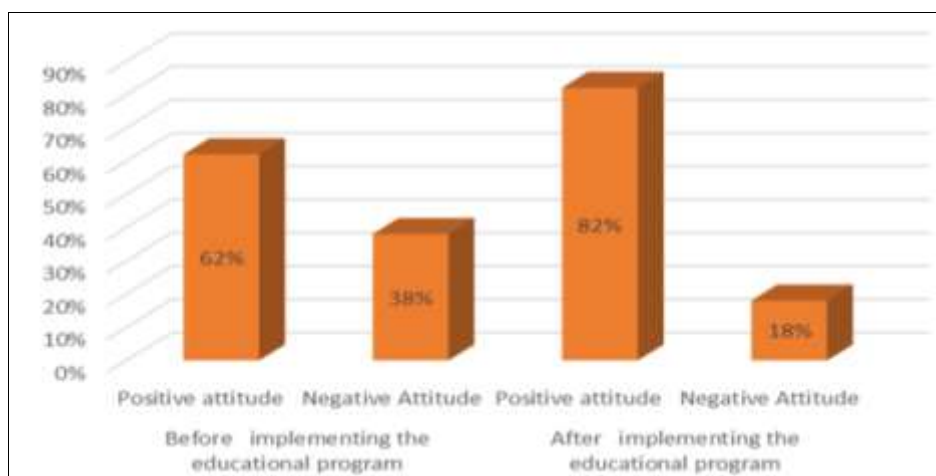

Fig 3: Total attitudes responses regarding cervical cancer screening among the participant women before and after implementing the educational program, 2022, (N= 100):

Figure (3): illustrates that 38% of participant women had a negative attitude before implementing the program and turned to only 18% after implementing the program. Also, 62% of participant women had a positive attitude before

implementing the program, which increased to 82% of them having a positive attitude regarding cervical cancer and screening after implementing the program.

Table 3: The relationship between socio-demographic characteristics and the post attitudes of the participant women, 2022, (N= 100)

Socio-demographic characteristics	Attitudes classifications post interventions.				Total%	X² P
	Negative		Positive			
	No	%	No	%		
Educational level						
Illiterate	2	2	11	11	13	3.325 0.504
Basic	2	2	16	16	18	
Secondary	5	5	31	31	36	
University	7	7	21	21	28	
Postgraduate	2	2	3	3	5	
Family Income /month						
Insufficient	4	4	29	29	33	1.218.270
Sufficient	14	14	53	53	67	
Occupation						
Housewife	5	5	52	52	57	7.692 .006
working woman	13	13	30	30	43	
Residence						
Urban	11	11	40	40	51	.905 .341
Rural	7	7	42	42	49	
Age (years)						
20- <30	8	8	26	26	34	1.506 0.23
30- <40	8	8	39	39	47	
40-50	2	2	17	17	19	

Significant* or *p*<0.05

Table (3): shows 21% of the participant women who have positive attitudes after the educational program have university revealing no significant difference. Also, 52% of the participant women who have positive attitudes after the educational program are housewives. Likewise, 39% of the participant women with positive attitudes after the educational program are aged 30 - *p*<40 with no significant difference.

5. Discussion
The current study found that susceptibility to cervical cancer screening ranged from more than one-third pre-test to about two-thirds post-test. Concerning the perceived severity of cervical cancer screening, the thought of cervical cancer scares them from more than one-third to nearly three-quarters, their heart beats faster, and they are afraid of thinking about it from more than two-fifths to more than two-thirds. Near half compared to nearly two-thirds have long-term problems with cervical cancer. Cervical cancer threatened participant women's husbands from 25% to 2/3 before and after the educational program. Before and after the educational program, participant women's beliefs about cervical cancer screening's susceptibility and severity differed, except for the probability of developing cervical cancer.

This study's findings align with the research conducted by Eghbal *et al*., [18] which examined the impact of an educational program on enhancing cervical cancer screening behaviour among rural women in Guilan. The researchers concluded that following the implementation of the educational intervention, a notable disparity was observed between the two groups in terms of their understanding and perception of the importance, severity, advantages, obstacles, and self-confidence associated with screening (*p*< 0.001).

The present study's findings align with the research conducted by Malmir *et al*., [19] which examined the impact of an educational intervention rooted in protection motivation theory on the prevention of cervical cancer among marginalized women in western Iran. Malmir *et al*.

[19] discovered that the experimental group exhibited significant increases in perceived vulnerability, perceived severity, self-efficacy, response efficacy, and protection motivation values while experiencing decreases in response cost and perceived reward in relation to cervical cancer screening behaviors before and after the educational program (*p*<0.05).

In contrast, Khademolhosseini *et al*., [20] conducted a study examining the impact of education rooted in the health belief model on women's adherence to Pap smear testing. The findings indicated that the educational intervention did not significantly influence participants' perceived susceptibility and severity. These results may be attributed to the limited duration of the intervention and the number of training sessions provided.

The current study found that the perceived benefits of cervical cancer screening, including finding changes to the cervix before they become cancer and decreasing women's chances of dying from cervical cancer, ranged from more than two-thirds to about three-quarters before and after the educational program. The majority of participants didn't know where to get a pap smear test, and more than three-quarters said it took too long. Pap smear tests hurt from three-quarters to half. Before and after the educational program, women reported that a pap smear test did not prevent cervical cancer. After the educational program, participant women's beliefs about perceived barriers to cervical cancer screening, such as not knowing where to go for a pap smear test, taking too long, and being too painful, changed significantly. All perceived benefits are statistically insignificant.

The present study's results are in contrast with the findings of Drokow *et al*., [21] which indicated that the video-based educational intervention did not lead to any changes in the potential obstacles to cervical cancer screening, including factors such as insufficient knowledge, limited understanding of the screening procedure, stigma, superstition, fear of embarrassment, anxiety, discomfort associated with the pap test, and lack of familial support. The findings of the Drokow *et al*. [22] study indicated that relying solely on educational interventions may not be

sufficient to reduce potential screening barriers. The study sample's lack of interest can be considered the contributing factor.

The present study's findings align with those of Coronado *et al*., [22] who conducted a study on the efficacy of a theory-based educational intervention to enhance cervical cancer awareness and screening in Jamaica, they reported that before the intervention, most women believed that pap tests were associated with discomfort, with fear of pain being the second most commonly cited barrier to undergoing such tests. There was no significant alteration in the proportion of women who perceived pap tests as embarrassing, as observed from the pre-test to the post-test. Despite observing substantial increases in the proportion of participants who believed that cervical cancer is preventable, it is noteworthy that nearly half of the women surveyed at the post-test stage still maintained the perspective that cervical cancer is not preventable.

There are significant differences before and after implementing the educational program regarding participant women's attitudes regarding all items of healthy motivation except maintaining good health is extremely important to them, exercising at least three times a week, and having regular health check-ups even when absent of sickness. Also, there are significant differences regarding all items of constrains for adopting cervical cancer screening except fear of having pap smear test not having a bad result and fairness of having a pap smear test because of not knowing what will happen.

The present study's findings align with those of Eghbal *et al*. [19], who conducted a study examining the impact of an educational program on enhancing cervical cancer screening behavior among rural women in Guilan, they observed that the participant's perception of the advantages and obstacles associated with undergoing a pap smear test was similar in both groups before implementing the educational intervention. Following the implementation of the intervention, there was a notable increase in the perceived benefits and a corresponding decrease in the perceived barriers among participants in the experimental group.

The findings of this study align with the findings of Ahmed *et al*., [23] as they demonstrated significant differences in all aspects of perceived barriers, perceived benefits, and cues to action scores before and after the program.

The study conducted by Thahirabanuibrahim and Logaraj [24] aligns with the current study and demonstrates that there were statistically significant differences in the factors of knowledge about cervical cancer, knowledge about cervical cancer screening, perceived barriers, and benefits between the pre-test and post-test stages of the health education intervention.

The findings of the present study are consistent with those of El-Sayed *et al*., [25] whose research demonstrated notable improvements in all dimensions of the Health Belief Model (HBM)-namely, perceived susceptibility, perceived seriousness, barriers to Pap smear test, benefits of Pap smear test, and health motivation. These enhancements were observed following the implementation of an educational intervention grounded in the HBM, compared to the period before the intervention.

Concerning beliefs of the studied women regarding cervical cancer screening using the health belief model for cervical cancer and the pap smear test, more than half of the participant women who had moderate beliefs regarding

cervical cancer and screening before implementing the program turned to less than one-fifth after implementing the program. Also, more than two-fifth of participant women had good beliefs before implementing the program, with the majority having good beliefs regarding cervical cancer and screening after implementing the program.

Women's beliefs play a significant role in influencing applications for early cervical cancer diagnosis. According to Reis *et al*., [26] research has demonstrated that social beliefs and values significantly influence women's engagement in cervical cancer screening. These factors can act as barriers to adopting pap test behaviors and hinder participation in screening activities. Nevertheless, several studies have indicated that inadequate knowledge, incorrect behaviors, and misconceptions among women regarding screening procedures hinder the efficacy of early detection measures for cervical cancer. The behaviors and beliefs discussed in Duran [27] study may substantially influence women's inclination to engage in preventive measures for cervical cancer.

Concerning attitudes of the studied women regarding cervical cancer screening using the health belief model for cervical cancer and the pap smear test, more than one-third of participant women had negative attitudes regarding cervical cancer and screening before implementing the program turned to less than one-fifth after implementing the program. Also, less than two-thirds of participant women had a positive attitude before implementing the program, which increased to the majority having a positive attitude after implementation.

The present study aligns with the findings of Abd El-Hamed, [28] which revealed that a significant proportion of the women under investigation (36.2%) initially exhibited a positive attitude toward cervical cancer screening. However, following the program's implementation, this percentage increased to two-thirds. Furthermore, the study conducted by Ramjan *et al*. [29] revealed a significant disparity in the attitudes of the women under investigation toward cervical cancer, both before and after the intervention's implementation. The present study findings are attributed to implementing intervention sessions, wherein participants were provided pertinent and effective information. This information was found to positively impact their beliefs, subsequently influencing their attitudes in a positive manner. Furthermore, the researcher compiled a comprehensive list of erroneous beliefs reported by female participants and appropriately incorporated them into the educational booklet.

The current study results presented that; about one-fifth of the participant women who have positive attitudes after the educational program have university, revealing no significant difference. Also, more than half of the participant women who have positive attitudes after the educational program are housewives revealing significant differences. Likewise, less than half of the participants were women who had positive attitudes after the educational program aged 30 - < 40 with no significant difference. This may be because housewives may have enough time to seek screening tests other than working women and be less likely to take leave to attend the screening.

The present study's findings are incongruent with the research conducted by Liu [30], which examined the evaluation of knowledge and attitudes toward cervical cancer screening among rural women in Eastern China.

Liu's study demonstrated that older women were more likely to participate in cervical cancer screening than younger women. There is a higher probability that women in their younger years are engaged in both employment and the responsibility of caring for their young children within the household. Women may have limited availability to attend screenings due to time constraints, in contrast to older women, who typically have more flexibility in their schedules.

Moreover, the current study's findings are incongruent with the research conducted by Said et al. [18], which reported a lack of statistically significant association between personal characteristics and the attitude of the sample under investigation. The observed disparity can be attributed to variations in environmental factors and cultural backgrounds among the female participants.

This suggests that health education may have facilitated the participants' ability to assess the potential complications linked to the disease and the potential effects on their overall health and well-being. Additionally, the implementation of health education allowed women in the intervention group to assess their individual risk levels pertaining to cervical cancer. It is plausible that individuals, having acquired sufficient knowledge regarding the various risk factors, may be better equipped to implement preventive measures aimed at safeguarding themselves against contracting the disease.

The observed improvement is attributed to the nursing educational program, which imparted valuable information to the participant women, potentially influencing their health beliefs and preventive behaviors in a positive manner, consequently impacting their attitudes.

6. Conclusion

Before implementing the educational program, about two-fifths of the studied women had negative attitudes, and more than two-fifths had good beliefs regarding cervical cancer and screening, respectively. Later, most of the studied women had positive attitudes and good beliefs regarding cervical cancer screening after implementation, respectively. So, a health education program based on the Health Belief Model principles improved the beliefs and attitudes of the women under study for doing Pap smear tests as reported by women on pre-and post-test.

7. Recommendations

1. Periodically enhancing women to perform cervical cancer screening guided by using health belief model principles.
2. Undertaking comparable studies applying alternative behavior change frameworks.
3. It is proposed to undertake comparative research applying the Health Belief Model (HBM), with particular emphasis on the constructs of perceived severity and benefits, together with other behavior models. The objective is to identify the most effective model for influencing women from diverse cultural backgrounds to undergo the pap smear test in Egypt.

8. References

1. Véronique B, et al. The IARC perspective on cervical cancer screening. New England Journal of Medicine. 2021;385(20):1908-1918.
2. Laia B, et al. Cervical cancer screening programmes and age-specific coverage estimates for 202 countries and territories worldwide: A review and synthetic analysis. The Lancet Global Health. 2022;10(8):e1115-e1127.
3. Kotton Camille N, et al. The third international consensus guidelines on the management of cytomegalovirus in solid-organ transplantation. Transplantation. 2018;102(6):900-931.
4. Mantwa CM, Jonathan L, Mary K. Beliefs and perceptions regarding cervical cancer and screening associated with Pap smear uptake in Johannesburg: A cross-sectional study. PloS one. 2021;16(2):e0246574.
5. Green Edward C, Murphy Elaine M, Kristina G. The health belief model. The Wiley encyclopedia of health psychology; c2020. p. 211-214.
6. ICE, Vatanasook U. Knowledge, attitudes, and beliefs regarding cervical cancer and screening and perceived barriers to cervical cancer screening programs among Thai immigrant women living in Germany. The University of New Mexico; c2012.
7. Karen G, Rimer Barbara K, Kasisomayajula V. (ed.). Health behavior: Theory, research, and practice. John Wiley & Sons; c2015.
8. Ndila KS. Knowledge, attitude and practices on cervical cancer screening and prevention methods among nurses at two Nairobi hospitals in Kenya. Submitted in accordance with the requirements for the degree of master of arts in Nursing Science at the university of south Africa; c2016.
9. Sargazi S, et al. Application of Green Gold Nanoparticles in Cancer Therapy and Diagnosis. Nanomaterials. 2022;12:1102.
10. Shankar Abhishek, et al. Sexual dysfunction in carcinoma cervix: Assessment in post-treated cases by LENTSOMA scale. Asian Pacific journal of cancer prevention: APJCP. 2020;21(2):349.
11. CHA, Yujin E. Korean Immigrant Women's Perceptions of Cervical Cancer Screening in Hawaii. Ph.D. Thesis. Walden University; c2018.
12. EL-Zanaty F, et al. Ministry of Health and Population [Egypt], El-Zanaty and Associates [Egypt], ICF International, Egypt health issues survey 2015. Ministry of Health and Population, ICF International Cairo, Rockville; c2015.
13. Cochran William G. Sampling techniques. John Wiley & Sons; c1977.
14. Belete WA, et al. Socio-demographic characteristics and associated factors influencing cervical cancer screening among women attending in St. Paul's Teaching and Referral Hospital, Ethiopia. BMC women's health. 2020;20:1-9.
15. Abiodun Afolabi B, et al. Awareness and perception of risk for cervical cancer among women in Ogbomoso, Nigeria. Tropical Journal of Obstetrics and Gynaecology. 2017;34(3):218-223.
16. Champion Victoria L. Revised susceptibility, benefits, and barriers scale for mammography screening. Research in nursing & health. 1999;22(4):341-348.
17. Gulten G, Aygul A, Han AC. Health belief model scale for cervical cancer and Pap smear test: Psychometric testing. Journal of advanced nursing. 2011;67(2):428-437.

18. Bab ES, *et al*. Evaluating the effect of an educational program on increasing cervical cancer screening behaviour among rural women in Guilan, Iran. BMC women's health. 2020;20(1):1-9.

19. Shabnam M, *et al*. Effect of an educational intervention based on Protection Motivation theory on preventing cervical cancer among marginalized women in West Iran. Asian Pacific journal of cancer prevention: APJCP. 2018;19(3):755.

20. Farzaneh K, Azita N, Rahim T. The effect of health belief model-based education through telegram instant messaging services on Pap smear performance. Asian Pacific journal of cancer prevention: APJCP. 2017;18(8):2221.

21. Kwateng D, *et al*. The impact of video-based educational interventions on cervical cancer, pap smear and HPV vaccines. Frontiers in public health. 2021;9:681319.

22. Evelyn CI, *et al*. Increasing cervical cancer awareness and screening in Jamaica: Effectiveness of a theory-based educational intervention. International journal of environmental research and public health. 2016;13(1):53.

23. Areej A. Perceptions of using assistive technology for students with disabilities in the classroom. International Journal of Special Education. 2018;33(1):129-139.

24. Thahirabanuibrahim I, Muthunarayanan L. Impact of health education intervention in promoting cervical cancer screening among rural women of Chengalpattu district-The community-based interventional study. Clinical Epidemiology and Global Health. 2021;12:100895.

25. EL Sayed, Hanan A, *et al*. Impact of an educational intervention on deaf and hard hearing females' knowledge and health beliefs regarding cervical cancer in Tabuk, Saudi Arabia: A theory-based study. African Journal of Reproductive Health. 2022;26(7s):52-60.

26. REIS Nesrin, *et al*. Knowledge, behavior and beliefs related to cervical cancer and screening among Turkish women. Asian Pacific Journal of Cancer Prevention, 2012;13(4).

27. Tasci DE. Examination with the health belief model of women's attitudes to cervical cancer and early diagnosis in Turkey: a qualitative study. Asian Pac J Cancer Prev. 2011;12(5):1179-84.

28. ABD EL-Hamed Mona. Effect of Teaching Back Model intervention on Premenopausal Women's Knowledge, Attitude and Barriers Regarding Cervical Cancer and its Screening. International Egyptian Journal of Nursing Sciences and Research, 2023;3(2):524-545.

29. Ramjan Lucie M, *et al*. Educational programs to improve nurses' knowledge, attitude, and practice in adolescent and young adult health: An integrative review. Nurse Education Today; c2022. p. 105510.

30. LIU Tongtong, *et al*. Assessing knowledge and attitudes towards cervical cancer screening among rural women in Eastern China. International journal of environmental research and public health. 2017;14(9):967.