

**Effect of Educational Intervention Based on Health Belief Model  
On Postmenopausal Women's Health Behaviors and Attitude Regarding Vaginal Atrophy**  
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**Abstract:**

**Background:** Vaginal atrophy is one of the most common menopausal symptoms that have a significant negative impact on women's health, sexual function and quality of life. **The aim** of this study was to investigate effect of educational intervention based on Health Belief Model on postmenopausal women's health behaviors and attitude regarding vaginal atrophy. **Design:** A quasi experimental, one group study design was utilized. **Setting:** at out-patient clinic at Obstetrics and Gynecological department in Helwan General Hospital. **Sampling:** A purposive sample of 123 menopausal women according to inclusion criteria. **Tools:** A structured interviewing questionnaire, assessment of women's knowledge regarding menopause and vaginal atrophy, the Health Belief Model, it composed of the five main HBM constructs, and health behaviors to vaginal atrophy and assessment of women's attitude regarding vaginal atrophy. **Results:** Minority of the postmenopausal women had good knowledge regarding menopause and vaginal atrophy pre intervention which increased to post intervention. However more than half of the studied women had positive attitude regarding vaginal atrophy pre intervention which increased to post intervention. On the other hand, there was an increase in total mean score of five constructs of health belief model toward vaginal atrophy and health behavior pre and post educational intervention with highly statistically significant differences ( $P \leq 0.001$ ). Additionally, there were statistically significant correlation association between women's total score of knowledge and total score of attitudes. **Conclusion:** The educational intervention based on health belief model had improved postmenopausal women's knowledge, health behaviors and attitude regarding vaginal atrophy. **Recommendation:** Health belief model could be used as a routine model in health care sitting to permit women with comprehensive evidence on healthy and positive attitude about menopause and vaginal atrophy among women. **Key words:** Attitude, Educational intervention, Health Belief Model, Menopausal women, vaginal atrophy.

**Introduction**

The period of a woman's reproductive life known as menopause is characterized by estrogen deficiency, which has numerous negative effects on the vaginal mucosa, including dryness, irritation, and atrophy. In postmenopausal women, vaginal atrophy is

common. The vaginal epithelium is rotated, moist, and thick in a normal condition; however, when estrogen is deficient, the vagina becomes dry and thin, resulting in dyspareunia.<sup>(1)</sup>

A change in the vagina that occurs when estrogen levels drop significantly is known

as vaginal atrophy. The ovaries produce estrogen, which is essential for maintaining healthy and lubricated vaginal tissues. Vaginal tissue becomes trophic, thin, dry, and shrunken when estrogen levels are low. In an atrophic state, the vagina may become more susceptible to inflammation <sup>(2)</sup>

Around 80% of women experience vaginal atrophy after menopause. Notably, vaginal atrophy occurs in 65% of women within one year of menopause. Before menopause, younger women can also experience vaginal atrophy symptoms. Ladies matured somewhere in the range of 40 and 55 years noticed a high predominance of vaginal decay <sup>(3)</sup>

Vaginal dryness, soreness, itching, irritation, or pain is the most common symptoms of vaginal atrophy. These symptoms can affect women's daily activities, feelings, and relationships. After women stop having periods, vaginal dryness frequently persists for decades, causing discomfort and distress for women who are older. <sup>(4)</sup>

Additionally, the appropriate application of health behavior theories and models is crucial to the effectiveness of education. By assisting in the clarification of risk factors and modifying health-related behaviors, such models have been shown to be beneficial to health promotion. <sup>(5)</sup> One of the best models for changing negative beliefs and adopting healthy behaviors is the health belief model (HBM), which places an emphasis on behavior as a function of a woman's knowledge and beliefs. <sup>(6)</sup>

The efficacy of health education programs determines their value. The correct application of health education theories and models is crucial to the success of health education programs. The health belief model is the model used in this study <sup>(7)</sup>.

One of the most widely used conceptual frameworks for motivating women to take positive health actions focuses on the desire to avoid a negative health consequence. This model is known as the Health Belief Model (HBM). HBM is also a psychological principle that aims to explain and predict health behaviors by focusing on predicting a person's health behavior, such as using health services, and defending interventions to change maladaptive health behaviors. Five constructs make up the model: perceived susceptibility, perceived severity, perceived benefits, perceived barriers, and cues to action. <sup>(8)</sup>

In order to avoid the long-term health effects of estrogen deprivation, nurses should discuss menopause and vaginal atrophy in daily clinical practice. Individual counseling, early detection of signs and symptoms of vaginal atrophy, and individualized treatment plans are crucial steps in assisting women to maintain their vaginal health. <sup>(9&10)</sup>

Additionally, nurses empower women to comprehend vaginal atrophy. In order to improve outcomes in middle age and beyond, it is important to educate women and healthcare providers on how to have open conversations about urogenital health. Ladies ought to get this instruction before menopause. <sup>(11)</sup>.

Nurses play a crucial role in health promotion. Nurses have traditionally focused their health promotion efforts on disease prevention and correcting women's health-related misconceptions and beliefs. However, due to nurses' multidisciplinary knowledge and experience in health promotion in nursing practice, their role as promoters of health is more complex. Nurses play a crucial role in assisting pregnant women in taking an active role in

the decision-making process by providing adequate information about the safest method of delivery during pregnancy, adhering to a health belief model that facilitates health behavior adaptation. <sup>(12)</sup>

### Significance of the study

Approximately 1.2 billion women worldwide will be menopausal or postmenopausal by the year 2030, with 47 million new entrants each year <sup>(13)</sup>. About 45% of healthy postmenopausal women have symptoms related to vaginal atrophy <sup>(14)</sup>. Dryness (75%), dyspareunia (38%), and vaginal itching, discharge, and pain are the most common symptoms of vaginal atrophy. Only about 25% of women who are experiencing symptoms actually seek medical attention. Instead, women believe that the symptoms are a normal, unavoidable part of getting older. <sup>(15)</sup>

Up to 40 percent of postmenopausal women had lack knowledge of postmenopausal vaginal atrophy <sup>(16)</sup>. Up to 40% of women who had gone through menopause were unaware of postmenopausal vaginal atrophy. To the researchers' knowledge, there are no studies that have applied HBM educational interventions for postmenopausal women have symptoms related to vaginal atrophy. Therefore, the researchers know of limited studies that have used HBM educational interventions to manage vaginal atrophy symptoms in postmenopausal women. As a result, this study was conducted.

### Aim of the study

The study aimed to investigate effect of educational intervention based on the Health Belief Model on postmenopausal women's health behaviors regarding vaginal atrophy.

### Research hypotheses

The following research hypotheses were formulated to fulfill the aim of the current study:

H 1: Postmenopausal women who exposed to educational intervention based on the Health Belief Model will have improved knowledge regarding vaginal atrophy than those who do not expose.

H 2: Postmenopausal women who exposed to educational intervention based on the Health Belief Model will have positive changes of health behavior regarding vaginal atrophy than those who do not expose.

H 3: Postmenopausal women who exposed to educational intervention based on the Health Belief Model will have improved attitude regarding vaginal atrophy than those who do not expose

### Subject and Methods

#### Study design:

A quasi-experimental design was utilized to fulfill the aim of the study, research design (pretest / posttest, one group). A quasi-experiment is an empirical interventional study used to estimate the causal impact of an intervention on target population without random assignment <sup>(17)</sup>.

#### Study setting:

This study was conducted at out-patient clinic at Obstetrics and Gynecological department in Helwan General Hospital.

#### Sample type:

A purposive sample was used to achieve the aim of the study.

Sample size: 123 menopausal women were selected according to inclusion and exclusion criteria. Sample size was calculated utilizing following formula <sup>(18)</sup>.

$$n = \frac{N}{1+N(e)^2} = 123 \text{ menopausal women}$$

Where n= sample size N= total population number (180) according to Helwan General

Hospital Census, 2020.e= margin error (0.05).

**Inclusion criteria:**

- 1- Women aged of 45 - 60 years.
- 2-Women free from any medical, psychological and obstetric problems.

**Exclusion criteria:**

**1- Women not receive chemotherapy or radiotherapy.**

- 2- Women with reproductive age.

**Operational definition:**

Health Belief Model (HBM) The health belief model (HBM) is a social psychological health behavior change model developed to explain and predict health-related behaviors, particularly in regard to the uptake of health services.

**Tools of data collection:**

**Four tools were used for data collection:**

**Tool I:** A structured interviewing questionnaire: It was designed by the researcher after reviewing related literature<sup>19</sup>: It was written in Arabic language and encompassed of two parts;

**Part 1:** Demographic data of the postmenopausal women which included age, residence, level of education, marital status, occupation and work nature.

**Part 2:** Menstrual and obstetric history of the postmenopausal women which included age of onset of menses, gravidity, parity, age of menarche, previous abortion, contraceptive methods used and it's type and age of last menses.

**Tool II:** Assessment of women's knowledge regarding menopause and vaginal atrophy: It was designed by the researcher after reviewing related literature to assess postmenopausal women's knowledge regarding menopause and vaginal atrophy. It was encompassed of two parts;

**Part 1:** Assessment of women's knowledge regarding menopause encompassed of 7

items including definition, types, causes, initial symptoms, physical, psychological symptoms and complication.

**Part 2:** Assessment of women's knowledge regarding vaginal atrophy encompassed of 9 items including definition of vagina, definition of vaginal atrophy, causes, occurrence of vaginal atrophy, symptoms, risk factors, treatment, complication and healthy measures for vaginal atrophy.

**Scoring system:**

Each item was assigned a score of 2 when the answer was correct complete, 1 when the answer was correct incomplete and 0 when answer was do not know. The total of each part was calculated by summation of the scores of its items. The total score for the knowledge of a participant was calculated by the addition of the total score of two parts. As women's total knowledge score was classified as the following:

- Good when total score was 75% to 100%.
- Average when the total score was 60% to less than 75%.
- Poor when the total score was less than 60%.

**Tool III:** Health Belief Model scale. This scale was adapted from **Tehrani, 2014** <sup>(19)</sup>, and Modifications were done by the researchers to assess menopausal women's health beliefs regarding vaginal atrophy, on Arabic language form.

This tool composed of two parts.

**Part I:** Composed of the main five HBM constructs: perceived susceptibility (four items), perceived severity (five items), perceived benefits from compliance with preventive measures (four items), and perceived barriers to compliance with preventive measures (five items) and cues to action (2 items).

Scoring system for Part I: The five constructs included 20 items were measured

using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Subscale mean scores were obtained by summing and averaging the items. Each subscale was calculated separately, and therefore four different scores were obtained for each subject. The possible total score range was (20-100), and higher scores indicate more positive health beliefs toward vaginal atrophy.

**Part II:** Health behaviors. Which include 12 questions regarding vaginal atrophy. For each behavior, the positive response scored "one", and the negative response scored "zero". The total behavior score was calculated by adding the scores for the positive one.

**Tool IV:** Assessment of women's attitude regarding vaginal atrophy: It was adapted from Afifi 2015 ,<sup>(20)</sup> The tool was designed by the researcher after reviewing related literature to assess menopausal women's attitude regarding vaginal atrophy, that was measured by three points Likert scale that included degree of agreement and disagreement which encompassed of 13 items including vaginal atrophy is chronic disease, vaginal atrophy is dryness and irritation of vagina, vaginal atrophy occurs to all menopausal women, vaginal atrophy is a natural symptom from menopausal symptoms, vaginal atrophy occurs due to lack of estrogen, vaginal atrophy leads to pain during intercourse, absence of labor lead to vaginal atrophy, absence of sexual activity lead to vaginal atrophy, vaginal atrophy has complication, using lubricants regularly reduce incidence of vaginal atrophy, avoid using of ointment reduce incidence of vaginal atrophy, regular sexual activity reduce incidence of vaginal atrophy, treating vaginitis once occur reduce incidence of vaginal atrophy.

Scoring system: - Each item was scored as the following; score 2 for agree, score 1 for uncertain and score 0 for disagree. Women's attitude was classified to the following:

- Positive when the total score was 75% to 100%.
- Uncertain when the total score was 60% to less than 75%.
- Negative when the total score was less than 60%.

Educational brochure about vaginal atrophy was constructed by the researcher in Arabic language after reviewing the related literature and the brochure was included general information about menopause including definition, causes, symptoms, suitable foods, treatment and complication and general information about vaginal atrophy including definition of vagina, definition of vaginal atrophy, causes, symptoms, risk factors, complication, treatment and health measures regarding vaginal atrophy.

#### **Tools validity and reliability**

Validity of tool was assessed by three of expertise of the nursing fields. The expertise reviewed the tool for clarity of sentences, consistency and appropriateness of content, the sequence of items, accuracy, relevance, comprehensiveness, simplicity and applicability of the tools. No modifications were done. Reliability of tools was done by Cronbach's Alpha test and it was reliable for knowledge equal 0.84. HBM five main construct was 0.91, and health behavior was 0.70 and reliable for attitude equal 0.75.

#### **Ethical considerations:**

An official permission from the selected study setting was obtained for the fulfillment of the study. The current research was conducted under the approval of the Faculty of Nursing Ethical Committee, Helwan University. The aim of

the study was explained to each woman before applying the tools to gain women confidence and trust. A written consent was used to obtain women agreement to participate in the study and withdraw when women need. The study was not having any physical, social or psychological risk of the women. The data was collected and treated confidentially. Each woman was informed about time throughout the study.

#### **Pilot study:**

Pilot study was carried out on 10% of the total sample (12women) to test the content validity, clarity and applicability of tools as well as time needed for data collection. According to the results obtained from data analysis, items correction, modification, omission and addition was done as needed.

#### **Field work: -**

The study started from the beginning of March 2021 to the end of August 2021 covering period of six months. The researchers visited the pre mentioned setting from 9 am to 1 pm 2 days per week (Saturday and Wednesday). The researchers obtained essential administrative permission from the director of the selected study setting. The study was conducted through the following phases;

#### **Preparatory and assessment phase**

The researcher introduced herself and explained the aim of the study briefly to women to gain their co-operation and obtain their written consent to participate in the study. The data collected would be treated confidentially and used only for the purpose of the research. The researcher interviewed each woman and took demographic data including age, residence, level of education, marital status and work nature. The average time took 5-10 minutes.

The researchers explained questionnaire to women and complete data according to

respond to questions about menstrual and obstetric history and women's knowledge regarding menopause and vaginal atrophy. HBM and health behaviors. The average time took 10-15 minutes. Then, the researcher asked women about their attitude toward vaginal atrophy. The average time took 10-15 minutes, so the average time needed to complete tools ranged from 25-40 minutes. The researcher interviewed about (2-3) women per day and totally (4-5) women per week to be prepared for the upcoming educational intervention sessions,

#### **Planning phase**

The researcher designed educational brochure in Arabic language supported by figures after knowing women's deficit knowledge and health behavior regarding vaginal atrophy. The educational brochure was designed according to woman's need and emphasizing the principles of adult learning and enhancing active participation, interaction, and critical thinking.

#### **Implementation phase**

This phase was done by collecting women and distributing the educational brochure and the researchers developed power point presentation about vaginal atrophy based on HBM with simple Arabic language to suit women' level of understanding and stressed the areas of major deficiency in women' knowledge about menopause and vaginal atrophy, which was in clear Arabic language and has sufficient information about the topic of menopause and vaginal atrophy. Different teaching methods were used by the researchers, in addition to a brochure given to each woman at the end of the session.

#### **Evaluation phase**

The effectiveness of the educational intervention based on HBM was evaluated by using the same tools of pretest, after one

month of implementation of the educational intervention the posttest was administered to women.

### Results:

**Table (1)** shows that 54.5% of studied women aged less than 45 years, and 25.2% aged from 55 to 60 years with Mean  $\pm$  SD of age  $30.33 \pm 7.13$  years. 79.7% of studied women are married and 88.6% are Housewives. 76.4% of studied women attended primary education and 63.4% of them live in rural community. Regarding the work nature, 61.8% of studied nurses work in neurological and physical exhaustive work environment.

**Table (2):** clarify that 55.3% of studied women experienced their first menses within the age of 12 to 14 years, and 4.9% of them had it after the age of 16 years old, for menstrual duration 52% of them have their menses around 7 to 10 days and 59.5% of them experienced dysmenorrhea. 77.2% of studied women get pregnant more than 2 times and 4.1% of them never get pregnant. Regarding abortion times, 69.9% of studied women never experienced abortion, while 9.8% of them experienced abortion 2 times. In addition, 88.6% of studied women use a contraceptive method, out of this percentage 54.5% use IUD and 17.9% use hormonal methods. 85% of studied women had their last menses at 50 < 55 years.

**Table (3)** illustrates that there was highly significant improvement between pre- post educational interventions regarding women's level of knowledge (P value .000). Regarding definition of menopause, in pretest, 23.6% of studied women did not know the correct answer, while in posttest 50.4% of them gave complete and correct answer. 60.2% of them couldn't identify the

different types of menopause while 65.1% gave correct and complete answer and 39.8% gave correct and incomplete answer at posttest. Regarding the physical symptoms of menopause, 73.2% of them gave correct and incomplete answers at pretest while 45.5% gave correct and complete answers at posttest.

For the psychological symptoms of menopause, 23.6% of them gave correct and complete answers at pretest while 57.7% gave correct and complete answers at posttest. Regarding the complication of menopause 77.2% of studied women gave correct and incomplete answers at pretest while 58.5% of them gave correct and complete answers at posttest.

**Figure (1)** clarifies that minority of the studied women (9.80%) had good knowledge about menopause pre-educational intervention which increased to (57.70%) post educational intervention.

**Table (4)** displays that there were significant improvement regarding women's level of knowledge about vaginal atrophy ( $P < 0.001$ ). Regarding the definition of vaginal atrophy, 50.4% of studied women did not know the definition while, 59.3% of them were able to give correct and complete definition in posttest. Also 58.5% of them didn't know the causes of vaginal atrophy in pretest while 69.1% gave correct and complete answer in posttest. Regarding the symptoms of vaginal atrophy 69.9% of them gave correct and incomplete answer, while in posttest 53.7% of them gave correct and complete answer.

As in pretest, 77.2% of studied women gave correct and complete answer regarding risk factors of vaginal atrophy, while in posttest 58.5% of them correct and complete answer

and 32.5% gave correct incomplete answer. 45.5% of studied women did not know the treatment of vaginal atrophy, while 64.4 of them give correct and complete answer in posttest. Also, 44.7 of studied women did not know the complications of vaginal atrophy, while 59.3% of them give correct and complete answer in posttest. 37.4% of studied women did not know the healthy measures toward vaginal atrophy while, 45.5% of them were able to give correct and complete answer in posttest.

**Figure (2)** exposes that minority of the studied women (12.20%) had good **Table (5)** displays that the mean health belief scores about vaginal atrophy in the pre the educational intervention were similar in all subscales ( $p > 0.05$ ). However, post one month of the educational intervention, mean scores for perceived susceptibility, perceived severity, perceived benefits, perceived barriers as well as Cues for action were significantly higher ( $P < 0.001$ )

**Table (6)** illustrates that, there was a highly statistically significant difference ( $p < 0.001$ ) pre and post educational intervention implementation between menopausal women health behavior regarding vaginal atrophy pre and one month post educational intervention implementation.

**Table (7):** explains that, there was highly statistical significant difference in all items related to the studied women's attitude about vaginal atrophy at pre and post intervention phases ( $P \leq 0.001$ ).

**Figure (4)** reveals that, more than two half of the studied women (56.90 %) had

knowledge about vaginal atrophy pre-educational intervention which increased to (59.30%) post educational intervention.

**Figure (3)** shows that there was highly significant difference in studied women' total knowledge regarding the menopause and vaginal atrophy between pre and one month post educational intervention with  $P < 0.000$ . As 47.1% of them did not know the answer at pretest, while 58.5% of them gave correct and complete answers with respect to 27.6% gave correct and incomplete answer at posttest.

positive attitude regarding vaginal atrophy pre intervention which increased to (85.40%) post intervention.

**Table (8):** illustrates the pattern of correlation association between studied women's total score of attitude (and their marital status, education level, and Occupation). It's clearly that there is strong positive highly significant correlation between total score of attitude and marital status (Pretest  $r = 0.739$ ,  $p = .000$  and posttest  $r = 0.806$ ,  $p = .000$ ). Also, there is strong positive highly significant correlation between total score of attitude and educational level (Pretest  $r = 0.778$ ,  $p = .000$  and posttest  $r = 0.866$ ,  $p = .000$ ).

**Table (9)** clarifies the pattern of correlation association between studied women's total score of knowledge and total score of attitude. It's clearly that there is strong positive highly significant correlation between total score of knowledge and at total score of attitude.



**Table (1): Distribution of the studied women according to demographic data (n=123).**

Demographic Data		NO	%
Age	45< less than50	56	45.5
	50< less than 55	36	29.3
	55-60	31	25.2
Marital status	Married	98	79.7
	Divorced	23	18.7
	Widow	2	1.6
Level of education	Primary education	94	76.4
	Secondary education	22	17.9
	University education	7	5.7
Occupation	Working	14	11.4
	Not Working	109	88.6
Work nature	Need to physical power	35	28.5
	Neurological and physical exhaustive	75	61.8
	Neurological exhaustive	12	9.8
Residence	Urban	45	36.6

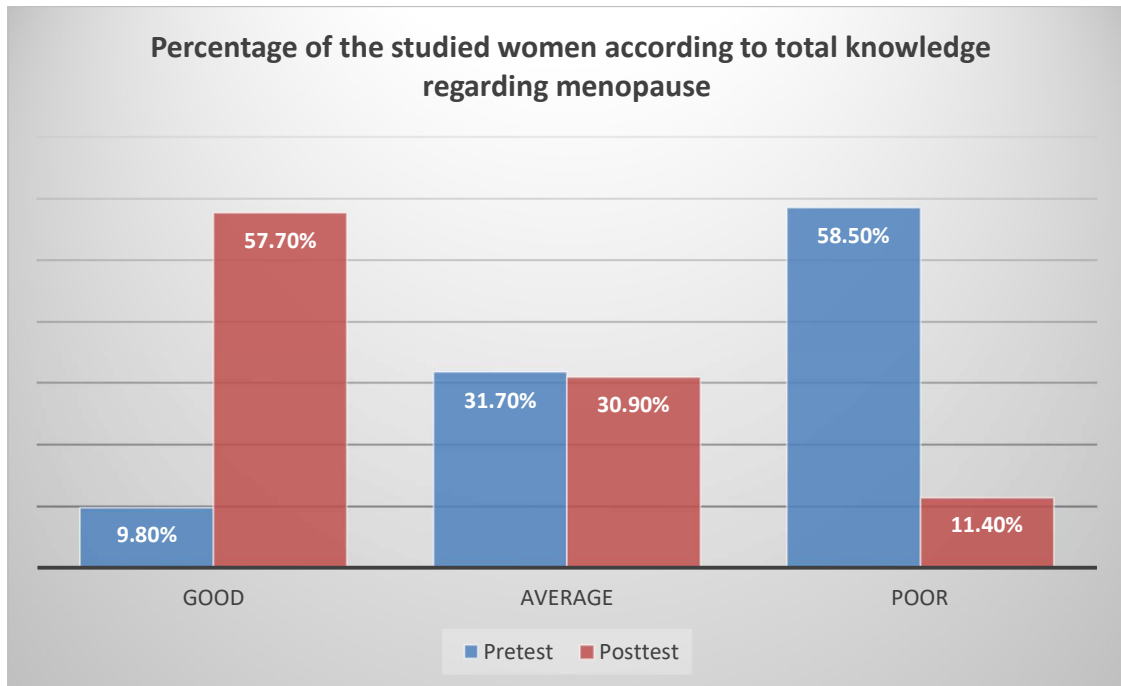
**Table (2). Distribution of the studied women according to menstrual and obstetric history. (N = 123)**

Menstrual history		NO	%
Age of menarche	<12year	14	11.4
	12<14year	68	55.3
	14<16year	35	28.5
	≥16 y	6	4.9
Duration of menstruation	Less than 3 days	13	10.6
	3-6 days	39	31.7
	7-10 Days	43	52.0
	More than 10 Days	7	5.7
Dysmenorrhea	Yes	73	59.3
	No	29	40.7
Gravidity	Non	5	4.1
	Once	9	7.3
	Twice	14	11.4
	More than two times	95	77.2
Parity	Non	6	4.9
	Once	9	7.3
	Twice	16	13
	More than two times	90	74.8
Abortion	Non	86	69.9
	Once	22	17.9
	Twice	12	9.8
	More than two times	3	2.4
Use of contraceptive	Yes	109	88.6
	No	14	11.4
Type of contraceptive used (n=109)	Hormonal	22	17.9
	Hormonal and I U D	20	16.3
	Intra Uterine Device(IUD)	67	54.5
Age of last menses	<45y	25	20.3
	45<50y	85	69.1
	50<55y	9	7.3
	≥55y	4	3.2

**Table (3): Distribution of the studied women according to knowledge regarding menopause pre and one month post educational intervention (n=123).**

Knowledge of women regarding menopause	Pre educational intervention						One month Post educational intervention						X <sup>2</sup>	p-value
	Correct complete answer		Correct Incomplete answer		Do not know		Correct complete answer		correct Incomplete answer		Do not know			
	No	%	No	%	No	%	No	%	No	%	No	%		
Definition of menopause	22	17.9	72	58.5	29	23.6	62	50.4	56	45.5	5	4.1	60.80	0.000**
Types	1	8	48	39	72	60.2	69	56.1	49	39.8	5	4.1	63.74	0.000**
Initial Symptoms of menopause	11	8.9	57	46.3	55	44.7	48	39.0	65	52.8	10	8.1	72.04	0.000**
Physical symptoms	15	12.2	90	73.2	18	14.6	56	45.5	52	42.3	15	12.2	117.04	0.000**
Psychological symptoms	29	23.6	68	55.3	26	21.1	71	57.7	39	31.7	13	10.6	85.53	0.000**
Complications	12	9.8	95	77.2	16	13.0	72	58.5	40	32.5	11	8.9	91.25	0.000**

\*\*A statistical significance difference ( $P \leq 0.001$ ).

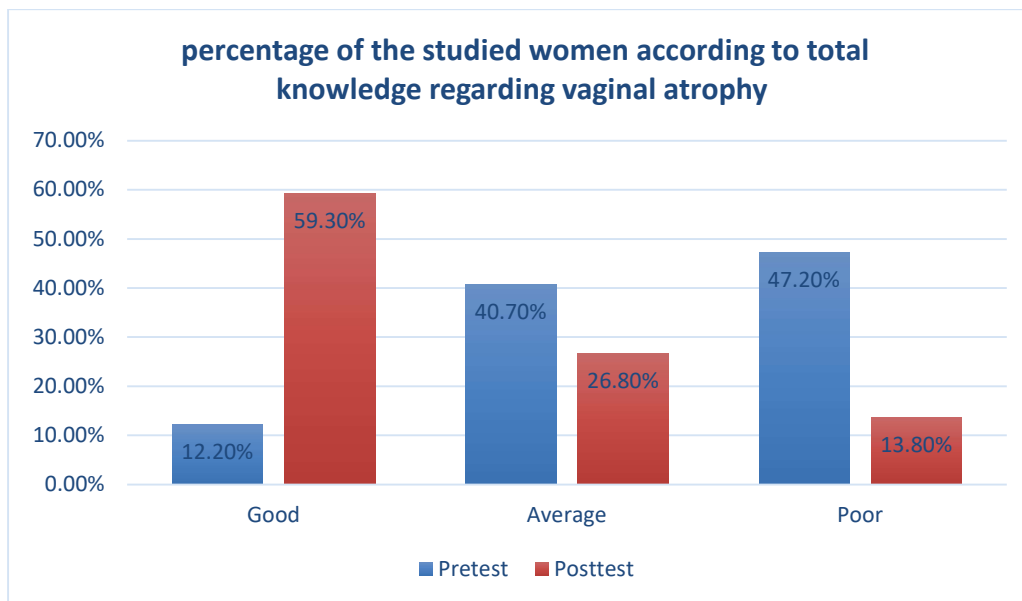


**Figure (1): Percentage of the studied women according to total knowledge regarding menopause**

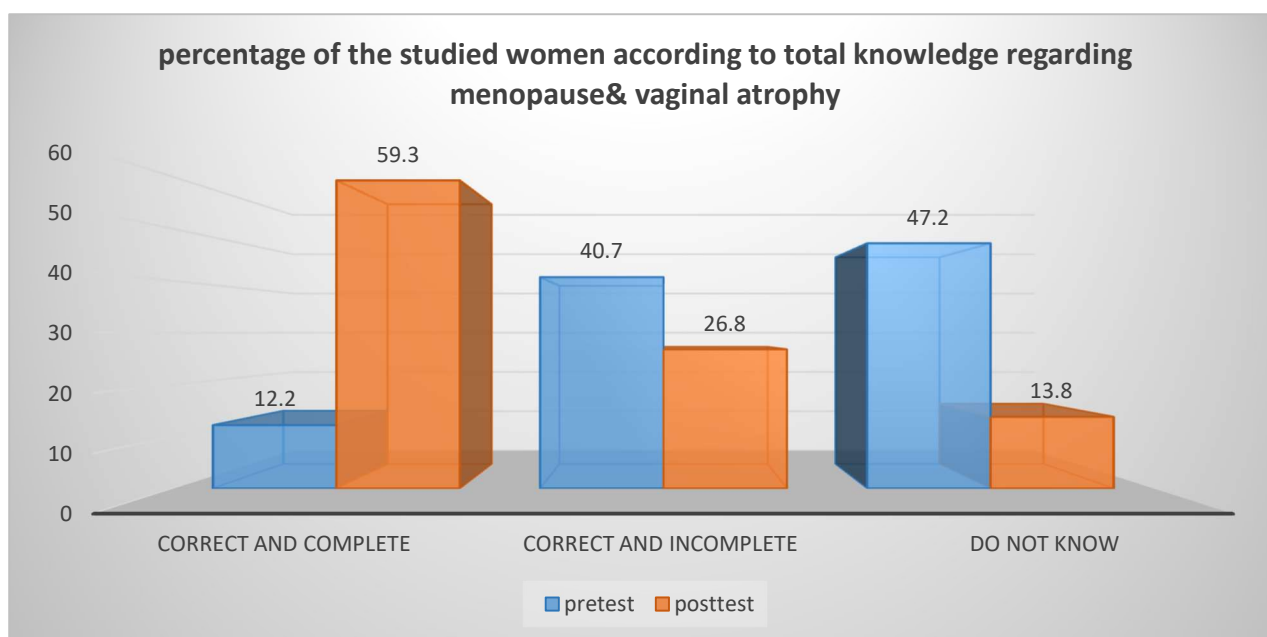
**Table (4): Distribution of the studied women according to knowledge regarding vaginal atrophy pre and one month post educational intervention (n=123).**

Knowledge of women regarding vaginal atrophy	Pre educational intervention						One month Post educational intervention						X 2	p-value
	Correct complete answer		correct Incomplete answer		Do not know		Correct complete answer		correct Incomplete answer		Do not know			
	No	%	No	%	No	%	No	%	No	%	No	%		
Definition of vagina	25	20.3	75	61.0	23	18.7	74	60.2	31	25.2	18	14.6	108.10	0.000**
Definition of vaginal atrophy	26	21.1	35	28.5	62	50.4	73	59.3	33	26.8	17	13.8	82.88	0.000**
Causes of vaginal atrophy	35	28.5	16	13.0	72	58.5	85	69.1	16	13.0	22	17.9	39.95	0.000**
Occurrence vaginal atrophy	12	9.8	53	43.1	58	47.2	71	57.7	35	28.5	17	13.9	100.95	0.000**
Symptoms of vaginal atrophy	9	7.3	86	69.9	28	22.8	66	53.7	45	36.6	12	9.8	66.61	0.000**
Risk factors of vaginal atrophy	12	9.8	95	77.2	16	13.0	72	58.5	40	32.5	11	8.9	91.25	0.000**
Treatment of vaginal atrophy	19	15.4	48	39.0	56	45.5	79	64.2	31	25.2	13	10.6	81.96	0.000**
Complication of vaginal atrophy	15	12.2	53	43.1	55	44.7	73	59.3	33	26.8	17	13.8	104.15	0.000**
Healthy measures toward vaginal atrophy	8	6.5	69	56.1	46	37.4	56	45.5	53	43.1	14	11.4	71.48	0.000**

\*\*A statistical significance difference ( $P \leq 0.001$ ).



**Figure (2):** Percentage of the studied women according to total knowledge regarding vaginal atrophy pre and one month post educational intervention (n=123).



**Figure (3):** Percentage of the studied women according to total knowledge regarding menopause and vaginal atrophy pre and one month post educational intervention (n=123)

**Table (5): Comparison of mean scores for vaginal atrophy health belief model subscales pre and post one month after educational intervention (n=123)**

Subscales	Pre educational intervention	One month post educational intervention	Independent t-test	p-value
	Mean ±SD	Mean ±SD		
Perceived susceptibility	7.26 ± 3.14	13.21±1.28	14.405	0.000**
Perceived severity	9.98 ±1.65	17.18 ±1.88	17.507	0.000**
Perceived benefits	17.29 ± 2.53	26.15 ± 2.58	20.752	0.000**
Perceived barriers	27.93 ± 1.26	21.11 ± 1.28	14.423	0.000**
Cues for action	4.87 ± 2.49	6.24 ± 2.05	1.352	0.000**

SD: Standard Deviation \*\*A statistical significance difference ( $P \leq 0.001$ ).

**Table (6) Mean differences between menopausal women health behavior regarding vaginal atrophy pre and one month post educational intervention (n=123).**

Health behavior total score				
	pre educational intervention	One month post educational intervention	Independent t-test	p-value
	Mean ±SD	Mean ±SD		
one month after implementation	6.20±2.57	9.62±0.60	16.507	0.000**

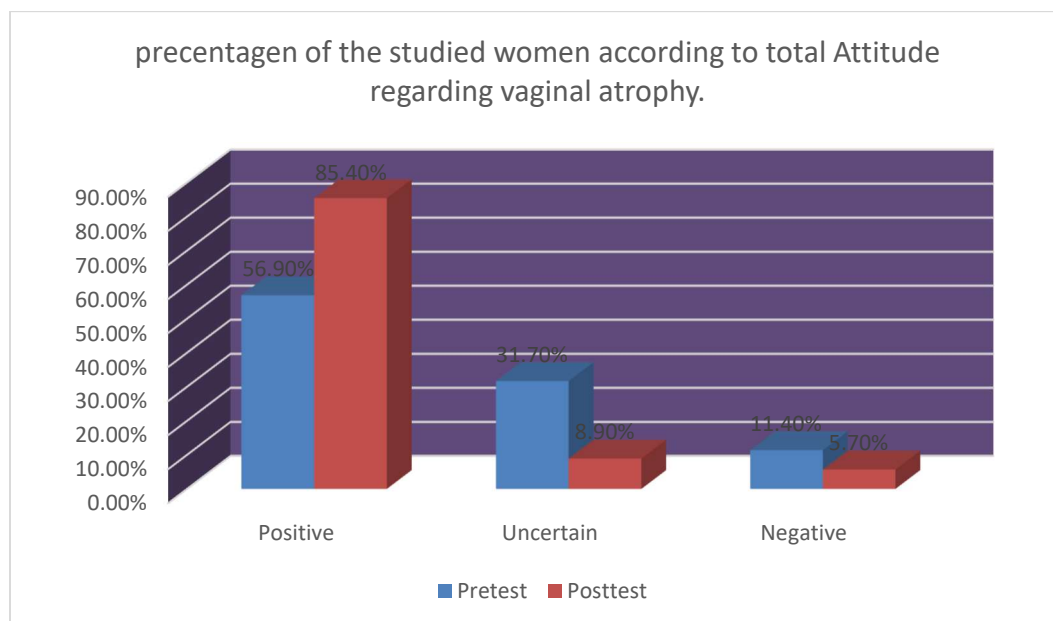
SD: Standard Deviation \*\*A statistical significance difference ( $P \leq 0.001$ ).

Table (7): Distribution of the studied women according to women's attitude regarding vaginal atrophy pre and one month post educational intervention (n=123).

Women's attitude regarding vaginal atrophy (VA)	Pre educational intervention						One month POST educational intervention						X <sup>2</sup>	p-value
	Agree		Uncertain		Disagree		Agree		Uncertain		Disagree			
	No	%	No	%	No	%	No	%	No	%	No	%		
VA is chronic and untreatable disease	24	19.5	48	39.0	51	41.5	31	25.2	17	13.8	75	61.0	123.15	0.000**
VA is dryness and irritation of vagina	76	61.8	35	28.5	12	9.8	112	91.1	4	3.3	7	5.7	111.74	0.000**
VA is normal symptom from menopausal symptoms	90	73.2	31	25.2	2	1.6	109	88.6	8	6.5	6	4.9	68.75	0.000**
VA occurs for all menopausal women	48	39	67	54.5	8	6.5	26	21.1	25	20.3	72	58.5	123.00	0.000**
VA occurs due to lack of estrogen	70	56.9	47	38.2	6	4.9	106	86.2	14	11.4	3	2.4	111.36	0.000**
VA cause pain during sexual activity	85	69.1	28	22.8	10	8.1	107	87.0	15	12.2	1	.8	83.84	0.000**
Lack of vaginal delivery exposes women to VA	47	38.2	53	43.1	23	18.7	81	65.9	28	22.8	14	11.4	101.75	0.000**
Absence of sexual activity expose women to VA	45	36.6	64	52.0	14	11.4	98	79.7	16	13.0	9	7.3	95.90	0.000**
VA has complication	81	65.9	38	30.9	4	3.2	108	87.8	13	10.6	2	1.6	92.18	0.000**
Using vaginal lubricants regularly reduce incidence of VA	86	69.9	34	27.6	3	2.5	114	92.7	4	3.3	5	4.1	85.83	0.000**
Avoid applying strong ointment reduce incidence of VA	39	31.7	68	55.3	16	13.0	99	80.5	20	16.3	4	3.2	83.11	0.000**
Continuation sexual activity regularly reduce incidence of VA	57	46.3	59	48.0	7	5.7	105	85.4	16	13.0	2	1.6	67.88	0.000**
Treating vaginitis once occur reduce incidence of VA	103	83.7	12	13.0	4	3.3	119	96.7	2	1.6	2	1.6	123.00	0.000**

\*\*A statistical significance difference ( $P \leq 0.001$ ).





**Figure (4):** Percentage of the studied women according to total attitude regarding vaginal atrophy.

**Table (8):** Correlation between total attitude score and demographic characteristics pre and post educational intervention (n=123).

Variables	Marital Status		Level of Education		Occupation	
	R	Sig. 2 tailed	R	Sig. 2 tailed	R	Sig. 2 tailed
Total Score of Attitude "Pretest"	0.739**	0.000**	0.778**	0.000**	.238**	.002**
Total Score of Attitude "Posttest"	0.806**	0.000**	0.866**	0.000**	1.39	1.26

**Table (9): Correlation between total knowledge score and total attitude score pre and post educational intervention (n=123).**

Variables	Total Score of Knowledge			
	Pretest		Posttest	
	R	Sig. 2 tailed	R	Sig. 2 tailed
Total score of Attitude	.748**	0.000**	.367**	.000**

### Discussion

Vagina atrophy (AV) is a chronic and liberal medical condition facing postmenopausal women. Symptoms of VA such as dyspareunia, vaginal dryness, irritation and burning can negatively impact sexual health and quality of life, **Marina 2018** <sup>(21)</sup>

Despite the presence of vaginal symptoms and worries about the security, practicality, and effectiveness of existing VA therapies, there is a lack of understanding of the issue among women and poor communication with healthcare professionals. This research was conducted to investigate effect of educational intervention based on the Health Belief Model on postmenopausal women's health behaviors and attitude regarding vaginal atrophy.

The current study hypothesized that postmenopausal women who exposed to educational intervention based on the Health Belief Model will have improved knowledge regarding vaginal atrophy than those who do not expose, postmenopausal women who exposed to educational intervention based on the Health Belief Model will have positive changes of health behavior regarding vaginal atrophy than those who do not expose. Also, postmenopausal women

who exposed to educational intervention based on the Health Belief Model will have improved attitude regarding vaginal atrophy than those who do not expose

The findings of this study examine the personal characteristics of studied women and their level of knowledge regarding Menopause and vaginal atrophy, their attitude regarding vaginal atrophy. Also finding out the relationship between studied women' total attitude score and demographic characteristics pre and post intervention. Also, the relationships between studied women total knowledge score and total attitude score pre and post intervention.

The current study found that nearly half of the women it studied were between the ages of 45 and 50 in terms of socio-demographic characteristics. The majority of the women who were studied do not have jobs, and only a small percentage do. It is important to note that three quarters of the women who were studied who do have jobs that are physically and neurologically strenuous. Similarly, **Ramadan et al, 2020** <sup>(22)</sup> who studied Effect of an Educational Package on Knowledge, Practices, and Attitude of Premenopausal Women Regarding Sexuality in Egypt, reported that more than half of the analyzed sample was over

45 years old. More than half of the surveyed sample also lived in urban areas. Moreover, more than half of the studied sample was housewives.

Regarding women's level of education, the present study finds out that there was highly statistically significant correlation between their level of education and their level of knowledge. In contrast, a study by **Gebretatyos, 2020** <sup>(23)</sup> that looked at the impact of health education on women's knowledge and attitudes about menopause among middle-aged teachers in Eritrea found that women's knowledge did not correlate significantly with their educational level.

The differences between both studies may be because the current study sample has different educational background, while the other study sample was homogenous as they all were teachers with the same educational background.

Regarding the age of last menses, current study concluded that more than Two Third of studied women had their last menstrual period at the age between the ages of 45 to 50 years old.

In the same line, the finding of the current study agrees with <sup>(24)</sup> in the study about women's knowledge, attitude and practice towards menopause and hormonal replacement therapy, United Arab Emirates, who reported that, more than half of the studied women reported that the age of last menses being at 48 years.

This finding is also supported by **Santoro, 2018** <sup>(24)</sup> who looked at perimenopause management: The majority of the women in the study experienced menopause between the ages of 45 and 50, according to a study that

was published in Clinical Obstetrics and Gynecology.

In relation to hypothesis one that postmenopausal women who exposed to educational intervention based on the Health Belief Model will have improved knowledge regarding vaginal atrophy than those who do not expose. According to the results of the current study, women's knowledge levels were extremely statistically significant. At the pretest, when the majority of them had poor awareness of menopause and vaginal atrophy, women's general knowledge was low. However, in the posttest, most of the women who were studied had good knowledge, and a small number of them had an average level of knowledge.

In a similar vein, **Gebretatyos, 2020** <sup>(23)</sup>, who conducted research on the effect of health education on the knowledge and attitude of middle-aged teachers in Eritrea about menopause, found that after the health education program, the overall knowledge score significantly rose. Women's understanding of menopause symptoms was highly statistically significant, according to the current study. Contrarily, only a tiny portion of the women tested accurately identified menopause symptoms on the pretest, whereas more than half of the women tested correctly identified them on the posttest.

Similar to this, **Harper et al, 2022** <sup>(25)</sup>, found that the majority of perimenopausal women in the United Kingdom were completely unaware that their symptoms were menopausal in an online survey of their attitudes and knowledge of the menopause, they experienced shock and confusion at the

onset of symptoms, which frequently had a significant impact on their lives.

On the other hand, this result agrees with **Shams-Eldin, 2018** <sup>(26)</sup>, who studied knowledge, attitude and severity of menopausal symptoms among women attending primary health care centers in Cairo, Egypt, who reported that, the level of good knowledge about menopause was significantly low among premenopausal and postmenopausal women. . In the same line, this finding agrees with **El habashy et al, 2018**, <sup>(27)</sup> who mentioned that, more than two thirds of the women in the study have limited knowledge about menopausal symptoms. According to study researchers, these findings indicate the necessity of holding a women's education session to inform them about the menopause.

According to symptoms of vaginal atrophy, the present study revealed that there was highly statistically significance in women's knowledge. As in response to pretest few percentages of studied women identified the correct symptoms of vaginal atrophy while at posttest around two third of them were able to give the correct answer and enumerate the complete symptoms of vaginal atrophy. This improvement in women's knowledge may be due to women's active participation and good communication with researchers who helped them to acquire information. Beside, brochure plays a very important role in helping women to acquire knowledge about menopause and vaginal atrophy.

This finding was supported by **Bleibel and Nguyen, 2022** <sup>(28)</sup>, who noted that women with vaginal atrophy experience symptoms such vaginal dryness, burning, irritation, dyspareunia, post-coital

hemorrhage, vaginal bleeding, and dysuria in research published by the National Library of Medicine. Women are also more likely to get recurring vaginal infections and urinary tract infections as the pH of the vagina change. In relation to hypothesis two that postmenopausal women who exposed to educational intervention based on the Health Belief Model will have positive changes of health behavior regarding vaginal atrophy than those who do not expose. The current study results regarding the five main HBM constructs, showed a significant increase in the mean scores of perceived susceptibility on postmenopausal women after one month of intervention implementation.

This result is compatible to **Aligol et al, 2014** <sup>(29)</sup>, studies. Both of them had studied the effects of education based HBM on promoting preventive behaviors regarding brucellosis among women. They documented that the mean scores of perceived susceptibility to brucellosis increased. On the other hand, **Bakhtari Aqdam et al 2012** <sup>(30)</sup>, had studied the effect of HBM based education on screening behaviors of breast cancer among women. The findings revealed no appreciable variation in the perceived vulnerability following the education.

In the present study, the perceived severity score was found to be significantly higher among the postmenopausal women after one month of intervention implementation. In line with the current study findings, **Farma et al, 2014** <sup>(31)</sup>, who had investigated the impact of education, based HBM on breast cancer prevention practices among female teachers in the city of Zahedan.

The study indicated that the score of the perceived severity increased, after the educational intervention. Additionally, the current findings also reported a significant increase in the mean scores of perceived barriers. This result is similar to at least two studies **Khoramabadi et al. 2016,** <sup>(32)</sup> and **Shahnazi et al. 2015** <sup>(33)</sup>. They had studied the effects of education based HBM on different health behavior among pregnant women. They documented that a significant increase in the mean scores of perceived barriers.

On the contrary, **Karimy et al. 2012,** <sup>(34)</sup>, who had studied the effect of health education program based on HBM on the performance of pap smear test among women. The results reported significant decrease in the perceived barrier mean score after the intervention. The present study findings indicated that the mean scores of perceived benefits and cues to action to vaginal atrophy increased among women after one month with highly statistically significant difference observed between pre and post intervention.

The current study clarified that there was a highly significant improvement in the health behavior regarding vaginal atrophy among women after one month of intervention implementation.

The present study result is in the same line with some other recent studies **Khoramabadi et al., 2016,** <sup>(32)</sup> and **Shahnazi et al. 2015,** <sup>(33)</sup> who studied the effect of education based on HBM on different health behaviors. They emphasized that changing the health belief is prerequisite for behavior change. In relation to hypothesis three that, postmenopausal women who exposed to educational intervention based on the

Health Belief Model will have improved attitude regarding vaginal atrophy than those who do not expose. This research found there, was a very positive change in women attitude between pre and post intervention. As in post intervention, more than half of studied women believing that vaginal atrophy could be treated, most of cases agreed that vaginal atrophy cause dryness and irritation of vagina.

The present study revealed that there was highly statistically significance in women attitude between pre and post intervention. As in posttest the majority of studied women agreed on that vaginal atrophy occur due to lack of estrogen.

On the same line, the report published by **Woelber et al., 2020** <sup>(35)</sup> which highlighted that vaginal atrophy is most commonly caused by a decreasing or lower estrogen state, which cause secretions diminish, and the atrophy of genitourinary tissues which lead to vaginal atrophy.

Women's attitude regarding if the vaginal atrophy is a normal symptom from menopausal symptoms, the present study revealed that there was highly statistically significance in women's attitude between pre and posttest. As in posttest the majority of studied women agreed on that vaginal atrophy is a normal symptom of menopause.

On the same line, the article that was published by **Bleibel and Nguyen, 2022** <sup>(28)</sup>, revealed that vaginal atrophy is a problem that affects all women. However, postmenopausal women have a significantly higher prevalence rate.

Regarding women's attitude about the relation between sexual activity and liability of having vaginal atrophy, the

present study revealed that there was highly statistically significance in women's attitude between pre and posttest. As in posttest the majority of studied women agreed on that absence of sexual activity increase the risk of vaginal atrophy and they also agreed on that vaginal atrophy cause painful sexual intercourse.

Additionally, the present study results confirmed that, there was a positive highly statistically significant correlation between total attitude score and demographic characteristics pre and post intervention.

These findings agree with El habashy **Said et al. 2018,** <sup>(27)</sup> in the study about effect of an educational intervention on women's knowledge and attitude regarding cervical cancer, who reported that, there was no statistical significant relation among the studied women's total attitude score regarding their age and residence at both pre and post intervention phases.

In view of the above-mentioned findings, hypothesis which stated that postmenopausal women's knowledge, behavior and attitude regarding vaginal atrophy improved after application educational based intervention on the Health Belief Model than before application was supported.

### **Conclusion**

The educational intervention based on health belief model had improved postmenopausal women's knowledge, health behaviors and attitude regarding vaginal atrophy. On the light of the current study findings, it was concluded that; the minority of the studied women had good knowledge about menopause and vaginal atrophy pre intervention

which increased to more than half post intervention. More than two thirds of the studied women had positive attitude about vaginal atrophy pre intervention which increased to more than three quarters post intervention. Therefore, the study hypothesis was supported.

### **Recommendations**

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

Health belief model could be used as a routine model in health care setting to permit women with comprehensive evidence on healthy and positive attitude about vaginal atrophy and menopause among women.

Use a booklet and posters as methods to increase women's awareness about vaginal atrophy.

Apply health belief model as a framework for designing and performing education interventions to improve women's health behaviors and beliefs regarding vaginal atrophy.

Increase suitable knowledge about the risk factors of vaginal atrophy and importance of routine screening.

### **Further researches:**

- Replicate of the study on large sample size in different setting.
- Initiate the advising program for nurses about how to manage vaginal atrophy

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