Breast Cancer Preventive Measures among Female Workers at Beni-Suef University: Educational Program Based on Health Belief Model

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Abstract

Background: Breast cancer's high incidence and mortality make it a significant global public health issue. Breast cancer affects women in a multifaceted way, affecting every part of their lives both before and after treatment. The Study was conducted to evaluate the effect of an educational program based on health belief model regarding breast cancer preventive measures among female workers at Beni-Suef University. An interventional, quasi-experimental (pre/post-test) research design was used, **Sample:** A purposive sample consisted of 323 of working female was used, **Setting:** The study was conducted on working women at Beni-Suef University, **Tool:** Four data collection tools were used; Structured interviewing questionnaire sheet, women's general knowledge about breast cancer, Health Belief Model Questionnaire**,** Breast Cancer Preventive Measures Checklist. **Results:** the current study revealed that the percentage of women with satisfactory level of breast cancer knowledge increased from 4% before the intervention to 65.7% after the intervention. The percentage of women with positive beliefs regarding breast cancer and its preventive measures as measured by the health belief model increased from 0.6% before the intervention to 63.2% after the intervention. The percentage of women with adequate practice of breast cancer preventive measures increased from 18.6% before the intervention to 91.6% after program implementation**. Conclusions:** The results of present study revealed that there was marked an improvement in knowledge, health beliefs and practice of studied female worker toward breast cancer compared to pre educational program implementation. **Recommendations:** It is recommended that educational materials and resources, such as brochures and online content about breast cancer prevention and self-examination, must be easily accessible to all employees.

Key word: Breast Cancer, Preventive Measures, Health Belief Model

1. INTRODUCTION

Breast cancer (BC) is the most prevalent cancer in women, and its death rate is increasing every day. Furthermore, because of the aging population, 19.3 million new instances of cancer are expected to be diagnosed in 2025, and over half of cancer-related deaths are expected to occur in less developed nations globally. Increased BC incidence is linked to greater death rates and higher health care expenses. However, one of the most crucial aspects of evaluating the results of cancer diagnosis and therapy is keeping up a reliable screening routine. This is why screening and early diagnostic programs are so important for preventing and controlling BC. Breast self-examinations (BSEs), clinical breast examinations (CBEs), and mammography are essential for detecting breast cancer in its early stages **(Akarsu & Andsoy, 2022; Qalawa, et al., 2015; Nady, et al., 2017).**

Breast cancer's high incidence and mortality make it a significant global public health issue. Breast cancer affects women in a multifaceted way, affecting every part of their lives both before and after treatment. Women may also feel disabled because of their inability to do everyday tasks and take care of their families and themselves. Patients with breast

cancer communicate significant, unfulfilled requirements for information, education, and assistance to enhance their quality of life and lessen their pain impairment **(Gooda, 2022; Nady , et al., 2018; Hassan, et al., 2021).**

The disease known as breast cancer starts in the breast and primarily develops from the cells that line the milk ducts. Ductal carcinoma in situ (DCIS) and lobular carcinoma in situ (LCIS) are benign breast tumors that are located inside the basement membrane, despite the fact that carcinomas are by definition malignant **(Testa et al.,2020; Hassan , et al., 2024; Mohammed , et al., 2018).**

Age, a history of breast cancer in the family, a genetic predisposition, radiation exposure, breast density, and being a female are the main risk factors for getting breast cancer **(McCarthy et al., 2021; Nady , et al., 2018; Hassan, et al., 2015).**

Alterations to a woman's estrogen and progesterone levels, in particular, can influence her breast cells in a big way. Having both estrogen and androgens in your bloodstream raises your chances of developing breast cancer. Due to changes in the usual quantities of sex hormones in their bodies, breast cancer is more common in women before and after menopause **(Daly et al., 2021).**

Preventing cancer is the most effective treatment. The goal of primary prevention in the fight against invasive cancers is to improve people's health and lower their risk of developing the disease. Quitting smoking, making dietary and lifestyle changes, and taking micronutrient and vitamin supplements are the main preventative steps. Decreased morbidity and mortality from malignancies in general, and particularly breast cancer, can be achieved by genetic risk identification, understanding of carcinogenesis, development of effective screening methods, avoidance of risk factors, and effective chemoprevention **(Pashayan et al., 2020).**

One example of secondary prevention is mammography screening, which helps detect and treat premalignant or subclinical cancers. Tertiary prevention refers to managing symptoms and rehabilitating patients. These definitions may not be applicable in the future because they don't take molecular data and other new incoming data into consideration **(Pashayan et al., 2020).**

The Health Belief Model is a cognitive paradigm that views people as rational beings that use a number of approaches to decide whether or not to participate in an activity connected to their health. Created to help explain the poor participation rates in disease prevention initiatives, the Health Belief Model looked into factors that can promote or hinder participation. The two main factors that have influenced the The Health Belief Model's development are the belief that a specific behavior will either prevent or improve health and the desire to avoid illness **(Ritchie, et al., 2021).**

Perceived susceptibility to illness, or risk perception; perceived severity of illness; perceived benefits of behavior modification; and perceived barriers to action are the six elements that comprise the updated Champion's HBM Scale (CHBMS) **(Foad, M.A, 2015).** Subsequently, proponents of health belief theory introduced the idea of self-efficacy as a component of health motivation and decision-making in health behavior. According to Champion's HBM, women who are perceived as more serious and breast cancer-prone are more inclined to participate in breast cancer screenings. But ladies must recognize the benefits of screening and think there aren't many barriers **(Htay et al., 2021; Mohamed, et al., 2019; Nady, et al., 2014; Hassan, et al., 2016)**

The maternity and gynecological nurses have an essential role in this regard. They are the first line health care providers who come in contact with women during their different stages of life, conducting assessment, examinations, investigations, care plans, and giving medications. They can provide information to women regarding breast cancer; definition, incidence causes, risk factors, signs and symptoms, diagnosis, and treatment options. They can coordinate care from diagnoses to treatment and follow up of women who have breast cancer **(Alenezi et al., 2022).**

1.2 Significance of the Study

In 2022: 2.3 million women were

diagnosed with breast cancer, and 670,000 lost their lives to the disease globally. Breast cancer is a global epidemic; it can develop in women of any age after puberty, however it disproportionately affects those in their later years. **(Giaquinto et al., 2022).**

In Egypt, breast cancer reports for 18.9% of all cancer incidents and has the greatest incidence rates among females (32.0% in women and 2.2% in men). According to estimates, the incidence of cancer will triple from 2013 to 2050, with an age-adjusted rate of 49.6 / 100,000 people. Breast cancer that is curable in its early stages has a 97% chance of surviving for five years. However, if it spreads to other bodily areas, a woman's chance of surviving five years drops to 20% **(McCormack et al., 2020).**

According to global estimates, there are significant disparities in the burden of breast cancer based on human development. One study found that among women in nations with a very high Human Development Index (HDI), 1 in 12 will receive a breast cancer diagnosis at some point in their lives, and 1 in 71 will succumb to the disease. On the other hand, in nations with a low HDI, it is 1 in 48 women who die from breast cancer, even if only 1 in 27 women get the diagnosis in their lifetime **(Ali Salman , 2023).**

1.4 Aim of the Study

The current study was conducted to evaluate the impact of an educational program based on health belief model regarding breast cancer preventive measures among female workers at Beni-Suef University.

1.5 Study Hypotheses:

Breast cancer preventive measures will be enhanced after the implementation of the educational program based on the Health Belief Model among female workers at Beni-Suef University.

2. MATERIALS AND METHODS

Subject and methods used for this Study were portrayed under the four main designs as the following:

Technical design

The technical design used for the study encompassed research design, setting of the study, study subjects, and tools of data collection.

2.1 Research Design

An interventional, quasi-experimental research design (pre and post-test) was used to achieve the aim of the current study.

2.2 Study Setting

This study was conducted on working women at Beni-Suef University.

2.2.1 Type of sample

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

2.2.2 Sample size

The study sample consists of 323 women; who were working at Beni-Suef University and accepted to participate in the study at the time of the data collection. Females were interviewed (the first time before interventions and the second one after interventions) to collect needed data with the following inclusion criteria.

2.2.3 Inclusion criteria

➢ Females' age 18-60

➢ Free from any types of cancer

➢ Did not receive any chemotherapy or radiotherapy

➢ Free from any diagnosed psychological disorders

2.3 Tools of Data Collection

Four data collection tools were used to carry out the current study;

2.3.1 Too I: A **Structured interviewing Questionnaire sheet**

It was developed by the researcher based on review of relevant literature. Its goal was to collect data about women and consisted from three parts as following:

Part (1): was concerned with the personal and socio-demographic details of the studied females, including their (age, level of education, marital status, place of residence and family income).

Part (2): was presented women's reproductive profile as (menstrual history, age of

menarche, days of monthly period, regularity of the menstrual cycle, contraceptive methods usage, any experienced complications while using contraceptives and history of breast feeding).

Part (3): was concerned with family history of breast cancer. Besides asking them where they got their information from.

2.3.2 Tool II: Women's knowledge about Breast Cancer, Breast Self – Examination and Breast Cancer Preventive Measures:

Concerned about the women's knowledge about breast cancer, breast self-examination and breast cancer preventive measures; there was closed ended questions, grouped into categories focused on three domains:

The first domain; general information about breast cancer (including its definition, a woman's risk of getting it, warning signs, the main treatment for early-stage breast cancer, the role of radiation therapy and chemotherapy in treating the disease)

The second domain; Knowledge about breast self-examination screening for early detection of breast cancer including: (what is breast self-examination, its main objective, when women should begin doing it on a regular basis, how often it should be done)

The third domain; Knowledge about breast cancer preventive measures as (most effective lifestyle changes for reducing breast cancer risk, dietary factors may help reduce breast cancer risk, recommended duration of breastfeeding to reduce breast cancer risk).

Scoring system: Each question was received a score one point if it was answered correctly; zero point if it was answered incorrectly with total score 54 degree. The distribution of the overall knowledge scores classified as follow:

▪ Good: for scores of ≥75%. ≥ 40 degree

▪ Average: for scores of 50%–74%. (27-40) degree

▪ Poor: for scores of <50%. < 27 degree.

2.3.3 Tool III: Health Belief Model Questionnaire:

It was from (Foad, 2015) designed to measure pregnant women psychological readiness to take positive action regarding prevention of breast cancer. It including six subscales for health belief

It was a self-reported In order to evaluate perceived susceptibility, perceived seriousness, perceived rewards, perceived barriers, cues to action, and self-efficacy, a self-reported questionnaire was adapted. Using a Likert scale with five possible answers—strongly disagree, disagree, neutral, agree, and highly agree—it was used to gauge women's attitudes on breast cancer screening. The attitude scale was made up of six sets of questions: ten questions about susceptibility, twelve questions about seriousness, seven questions about benefits, thirteen questions about barriers, ten questions about cues to action, ten questions about cues to action, and eight questions about self-efficacy.

Scoring system: On a five-point Likert scale, the responses were scored as follow: strongly disagree (1), disagree (2), neutral (3), agree (4), and strongly agree (5) with total score 300 degree. The total attitude score was calculated and divided into three categories:

▪ Positive beliefs: for scores of ≥75%. ≥ 225 degree

▪ Neutral beliefs: for scores of 50%–74%. (150-225) degree

▪ Negative beliefs: for scores of <50%. < 150 degree.

2.3.4 Tool IV: Breast Cancer Preventive Measures Checklist:

It was adopted from (Golubnitschaja et al.,2016) consisted of effective preventive measures against Breast Cancer and it was utilized as a pre and post educational model implementation and consisted from two parts:

Part (1) Concerned with lifestyle modification s for prevention of breast cancer as (maintains a healthy weight, limit alcohol consumption, engage in regular physical activity….etc).

Scoring system: Each step was received a zero point (if the step was incorrectly done) and a one point (if the step was correctly done) with total

score 13 degree. The total practical scores was calculated and scored into two groups:

▪ A score of ≥60% denoted adequate or satisfactory practice. (≥7.8 degree)

▪ A score <60% denoted inadequate or unsatisfactory practice. (<7.8 degree)

Part (2) Breast Self-Examination Observational Checklist, It was comprised practical steps to evaluate and track women's breast self-examination performance, and it was utilized as a pre and post educational model implementation.

Scoring system: Each step was scored a zero grade (if the step was not done) and a one grade (if the step was done) with the total score 35 degrees. The total practical scores were calculated into two groups:

▪ A score of ≥60% denoted adequate or satisfactory practice. (≥ 21 degree)

▪ A score <60% denoted inadequate or unsatisfactory practice. (<21 degree)

2.4 Tools Validity

Five experts (two professors and three assistant professors) from the obstetrics and gynecological nursing department of Beni-Suef University's faculty of nursing evaluated the study tools' content validity for comprehensiveness, accuracy, and linguistic clarity. Any necessary adjustments were made in accordance with the findings.

2.5 Tools Reliability

To make sure an evaluation tool yields steady and reliable results over time, its reliability was measured. Using the correlation coefficient Cronbach's Alpha test, the reliability coefficient for the study tools was computed and its internal consistency examined. Reliability of the study tools was 0.897 for total knowledge, 0.910 for HBM, 0.886 for breast cancer preventive measures and 0.976 for the reported practice of BSE.

Operational design

The operational design for this study included three phases namely; preparatory phase, pilot study, and field work.

A. Preparatory phase:

Using textbooks, articles, journals, and websites, this phase began with a survey of

previous and current national and worldwide related literature pertaining to the study's topics. The researcher used this review to help review and create the data collection tools. The researcher then used a panel of experts to test the tool's validity by evaluating its knowledge, content, accuracy, and relevancy of questions.

B. Pilot Study

In order to examine the feasibility of field work, the tools' applicability, efficiency, and clarity, as well as to identify any potential barriers that could hinder data collection, a pilot study was conducted on 32 women, or 10% of the entire study population. Based on the results of the pilot study, necessary changes were made, such as adding questions and removing others from the tool to improve its content or make it simpler and clearer. The pilot sample was also separated from the main study sample.

C. Field Work

The study's data collection process began in early December 2023 and was finished by the end of May 2024. This study's fieldwork was conducted during the phases of assessment, planning, implementation, and evaluation.

Program construction:

Phase 1: Assessment phase:

After receiving official authority to conduct the study, the researcher invited the women to participate and explained its purpose before conducting interviews. After that, the women were questioned to find out about their socio-demographic characteristics and level of breast cancer knowledge. The information acquired in this stage was used as a starting point for developing the educational program and was used in later comparisons to determine the effect of using the health belief model

Phase (II): Planning phase:

Based on the baseline data from the assessment phase (pre-test), the researcher created the instructional program following a thorough analysis of the pertinent literature. Based on a health belief model that takes into account the needs of the participants as indicated by the pretest scores, the educational program's design aimed to

improve the knowledge and habits of women with relation to breast cancer prevention strategies.

Phase (III): Implementation phase:

Program implementation included two session; Theoretical session which aimed to acquire women with awareness of breast cancer, breast self-examination, and prevention strategies through explanation of definition, causes and risk factor of breast cancer. Sings & symptoms, diagnosis, treatment and preventive measures of breast cancer. Practical session which focused on understanding and display steps of breast self-examination.

Program sessions:

Time allotted: 45 minutes per session have been set aside for health education courses.

An orientation to the program and its goals was provided at the start of the first session. During the discussions with the women, it was decided. Beginning with the second session, each one began with an overview of the prior sessions' contents and the goals of the current one.

Each session ended with a recap, time allotted for questions and responses, and a plan for the following one. Feedback was used to end the sessions, with the exception of the final one.

The usage of educational media during the presentation, the fake breast module was utilized for clarity, along with a laptop and a guidance booklet that contains instructions and

Phase (IV): Evaluation phase:

The post-test was administered to the participant female right after the model is put into practice in order to gauge their knowledge and practices of preventive behaviors as well as assess the model's efficacy. This assessment was carried out right away after the model's application. Finally; referral was done for all women who suspect abnormal signs and symptoms to the nearest maternal health care center to do necessary investigation.

Administrative Design:

The dean of Beni-Suef University's faculty of nursing gave permission to conduct this study. To conduct the study, the director of Beni-Suef University Hospital and Beni-Suef Specialist faculties received an official letter from the relevant authorities at Beni-Suef University's Faculty of

Nursing.

Ethical Consideration:

The study received ethical approval from Beni-Suef University's Faculty of Medicine Research Ethics Committee. Following a brief explanation of the study's purpose and an assurance that the data collected would be kept confidential and utilized exclusively for the study, consent was acquired from all female participants. They were also given the freedom to withdraw from the study at any moment without facing any repercussions. This study did not focus on women's religious, moral, ethical, or cultural concerns.

Statistical Design:

The updated, coded, and computer-entered data were statistically analyzed using the Statistical Package for Social Science (SPSS) version 20. Data were displayed in tables using mean, standard deviation, number, percentage distribution, Chi-Square, t-test, and correlation coefficient to compare women's awareness and usage of preventative behaviors before and after the installation of HBM. P-value ≤ 0.05 indicates statistical significance, p-value ≤ 0.001 indicates strong significance, while p-value >0.05 indicates insignificance.

3. Results

Table (1) reveals that, the age of 50.8% of the studied female workers was ranged from 30 years to less than 40 years and the mean of age 35.91 ± 7.122 years. Related to education, it declares that 45.8% of them had university education, beside 75.9% of them were married. Related to place of residence; 69.0% of them were urban residents and 84.2% had enough monthly income from their point of view.

Figure (1) presents that, 73.1% of the studied female workers didn't have family history of breast cancer while females who had family history of breast cancer with first degree relatives (mother) were 40.0%.

Figure (2) illustrates that, there is marked improvement in the female workers' total knowledge level after implementation of the health education program as; prior the health education program only 4% of them had good level of knowledge, which improved to 65.7% after one month.

Table (2) shows that, the overall score of perceived susceptibility increased from 22.61±4.73 prior to HBM application to 40.42±6.87 following the educational program, p≤0.01, indicating a highly statistically significant improvement in the female worker's beliefs regarding breast cancer and its preventive measures as measured by the health belief model.

Figure (3) illustrates that there is a marked improvement in the female worker's beliefs regarding breast cancer and it's preventive measures after the education program based on HBM; as pre implementation 52.3% of them has negative beliefs while decreased to 2.5% after the educational program based on HBM, also, 0.6% of them has positive beliefs regarding breast cancer, breast self-examination and breast cancer preventive measures pre implementation and increased to 63.2% post HBM based health education implementation.

Table (3) shows that the improvement is extremely statistically significant in female workers' practice regarding breast cancer preventive measures during posttest as p≤0.01 in all items comparing to pretest as noticed that 32.5% of the studied female workers avoid smoking and exposure to secondhand smoke before program implementation which increase to 85.1% after program.

Figure (4) indicates a noticeable improvement in female workers' total preventive measures after program implementation as 18.6% of the female workers have adequate practice pretest compared to 91.6% of them had adequate practice posttest.

Figure (5) presents that there is a marked improvement in female workers' overall degree of breast self-examination practice following program implementation as only 9.9% of the female workers have adequate practice pretest and improved to 87.9% posttest.

Table (4) demonstrates that there is no statistically significant correlation between age and the pre- and post-test total knowledge scores. On the pretest, 2.8% of women aged 30 to less than 40 demonstrated good knowledge and on the posttest that number rose to 31.3%.

Table (5) highlights that the total beliefs of the female employees under study, as determined by their age and health belief model level (pretest) score, have a highly statistically significant association, whereas the posttest shows no statistically significant relationship. Prior to the program, 0.6% of female employees between the ages of 30 and fewer than 40 had positive beliefs; following the training, this number rose to 31.7%.

Table (6) demonstrates that the total preventative measures score of the female employees under study and their age before and after the test do not statistically significantly correlate. Before the program, 11.8% of female employees between the ages of 30 and 40 had sufficient practice in preventive measures; following the program, this number rose to 46.2%.

Table (7) shows how all studies on breast cancer, overall beliefs as determined by the health belief model, and pre- and post-test breast cancer prevention measures are correlated. Total knowledge (before and posttest), total beliefs as determined by the health belief model, breast cancer prevention strategies, and breast self-examination were all statistically significantly positively correlated (P-value = 0.000, 0.002, and 0.000, respectively).

Table (1): Percentage distribution of the studied female workers regarding their socio-demographic data (n=323)

Items	No.	%
Age		
20 > 30 years	89	27.6
30 > 40 years	164	**50.8**
≥40 years	70	21.7
Mean± SD	35.91±7.122	
Educational level		
Intermediate education	97	30.0
University education	148	**45.8**
Above university	78	24.1
Marital status		
Single	53	16.4
Married	245	**75.9**
Divorced	25	7.7
Place of residence		
Rural area	100	31.0
Urban area	223	**69.0**
Monthly income from her point of view		
Enough and increases	13	4.0
Enough	272	**84.2**
Not enough	38	11.8
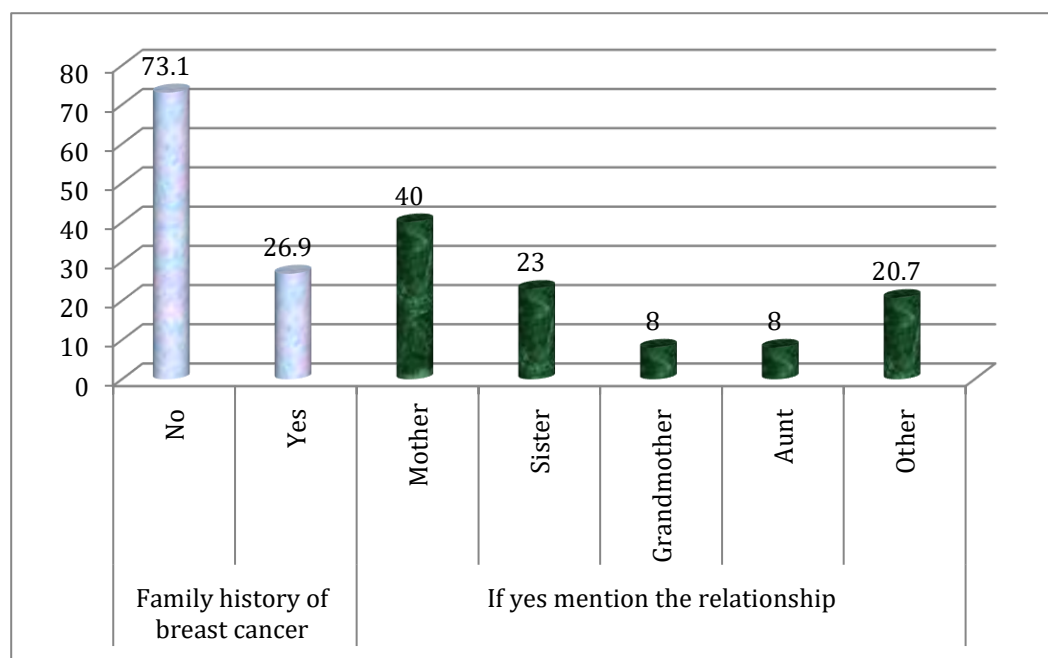
Figure (1): Percentage distribution of the studied female workers regarding their family history of breast cancer (n=323)
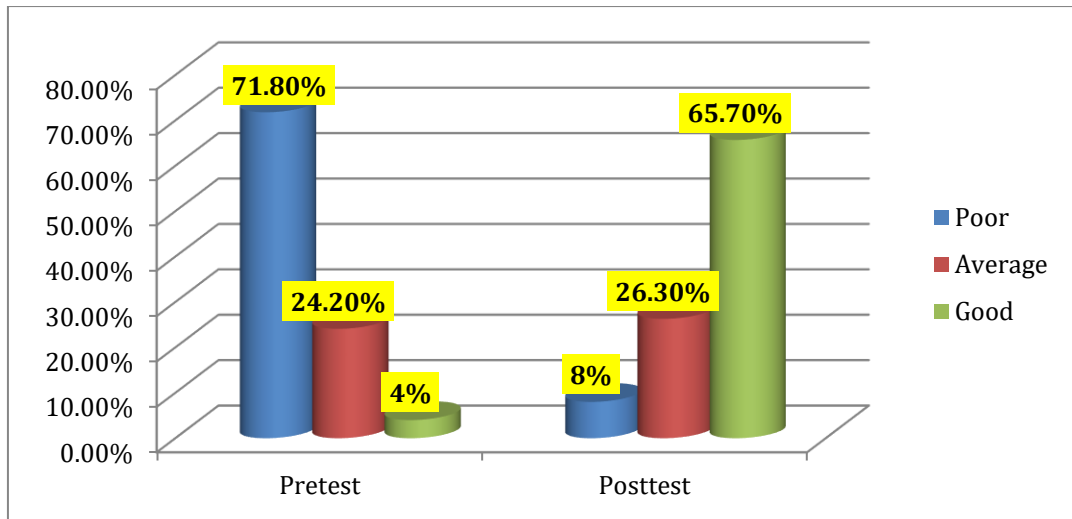
Figure (2): Percentage distribution of the studied female workers' regarding their total knowledge level about breast cancer (n=323).

Table (2): Percentage distribution of the studied female workers' beliefs regarding breast cancer and its preventive measures as measured by the health belief model (n=323)

| Sub-items of health belief model | Pretest | | | | | | | Posttest | | | | | | | X² (p value) |
	Negative		Neutral		Positive		Mean±SD	Negative		Neutral		Positive		Mean±SD	
	No.	%	No.	%	No.	%		No.	%	No.	%	No.	%		
Susceptibility	220	68.1	100	31.0	3	0.9	22.61±4.73	12	3.7	34	10.5	277	85.8	40.42±6.87	19.292 0.001**)
Seriousness	120	37.2	180	55.7	23	7.1	32.73±8.36	38	11.8	92	28.5	193	59.8	43.71±11.61	15.539 (0.016*)
The benefits	166	51.4	139	43.0	18	5.6	17.97±5.19	32	9.9	90	27.9	201	62.2	26.32±7.34	10.683 (0.030*)
The barriers	172	53.3	127	39.3	24	7.4	33.76±10.26	33	10.3	85	26.3	205	63.5	48.82±13.51	9.724 (0.045*)
Cues to action	214	66.3	88	27.2	21	6.5	23.91±8.09	38	11.8	48	14.9	237	73.4	37.68±10.56	10.620 (0.031*)
Self-efficacy	201	62.2	98	30.3	24	7.4	19.21±6.48	39	12.1	50	15.5	234	72.4	29.57±8.58	11.893 (0.018*)
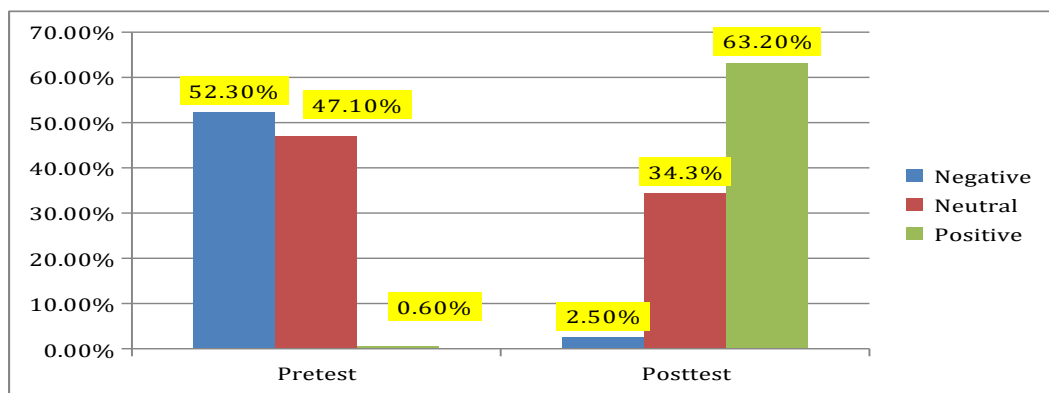
Figure (3): Percentage distribution of the studied female workers 'total beliefs regarding breast cancer and it's preventive measures as measured by the health belief model (n=323)

Table (3): Percentage distribution of the studied female workers' regarding preventive measures against breast cancer (n=323).

| Preventive measures	Pretest				Posttest				X2 (p value)
	Done		Not done		Done		Not done		
	No	%	No.	%	No.	%	No	%	
Maintain a Healthy Weight: Aim for a body mass index (BMI) within the healthy range (18.5-24.9) through a balanced diet and regular physical activity.	110	**34.1**	213	65.9	269	**83.3**	54	16.7	50.364 (0.000**)
Engage in Regular Physical Activity: Strive for at least 150 minutes of moderate-intensity aerobic exercise or 75 minutes of vigorous-intensity exercise per week.	96	29.7	227	70.3	242	74.9	81	25.1	67.773 (0.000**)
Limit Alcohol Consumption: If you drink alcohol, limit intake to no more than one drink per day for women.	107	**33.1**	216	66.9	276	**85.4**	47	14.6	61.215 (0.000**)
Don't Smoke: Avoid smoking and exposure to secondhand smoke	105	**32.5**	218	67.5	275	**85.1**	48	14.9	4.037 (0.045*)
Breastfeed, If Possible: Breastfeeding may reduce the risk of breast cancer, so aim to breastfeed your baby if you're able to.	114	**35.3**	209	64.7	270	**83.6**	53	16.4	4.851 (0.028*)
Limit Hormone Therapy: Use hormone therapy for the shortest time possible and at the lowest effective dose, under the guidance of your healthcare provider	108	33.4	215	66.6	246	76.2	77	23.8	22.426 (0.000**)
Be Aware of Family History: Know your family history of breast cancer and discuss it with your healthcare provider to assess your risk.	118	36.5	205	63.5	263	81.4	60	18.6	6.538 (0.011*)
Undergo Regular Screening: Follow recommended guidelines for breast cancer screening, including mammograms and clinical breast exams	103	31.9	220	68.1	249	77.1	74	22.9	5.745 (0.017*)
Conduct regular breast self-exams to become familiar with how your breasts normally look and feel, and report any changes to your healthcare provider.	106	32.8	217	67.2	275	85.1	48	14.9	4.219 (0.040*)
Eat a Healthy Diet: Include a variety of fruits, vegetables, whole grains, and lean proteins in your diet, and limit processed and red meats.	114	35.3	209	64.7	251	77.7	72	22.3	14.077 (0.000**)
Limit Exposure to Environmental Toxins: Minimize exposure to environmental pollutants and toxins, such as those found in certain chemicals, plastics, pesticides.	118	36.5	205	63.5	248	76.8	75	23.2	11.556 (0.001**)
Maintain a Healthy Lifestyle: Prioritize overall health and well-being by managing stress, getting enough sleep, and practicing relaxation techniques.	100	31.0	223	69.0	260	80.5	63	19.5	6.673 (0.010**)
Stay informed about breast cancer risk factors, symptoms, and preventive measures by regularly consulting and discussing any concerns with your healthcare provider.	108	33.4	215	66.6	255	78.9	68	21.1	13.577 (0.000**)
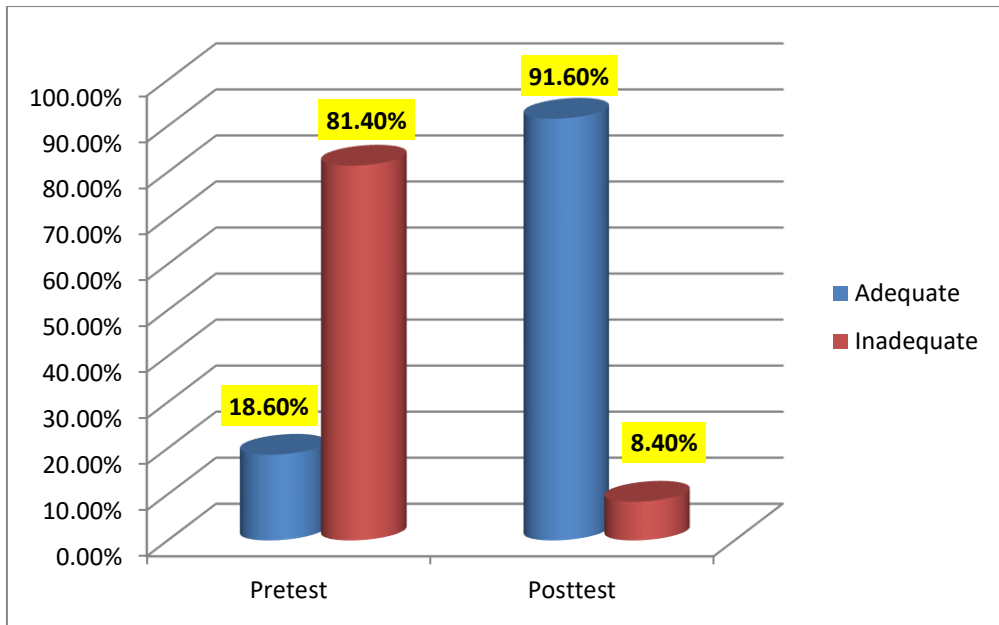
Figure (4): Percentage distribution of the studied female workers' total preventive measures against breast cancer (n=323)
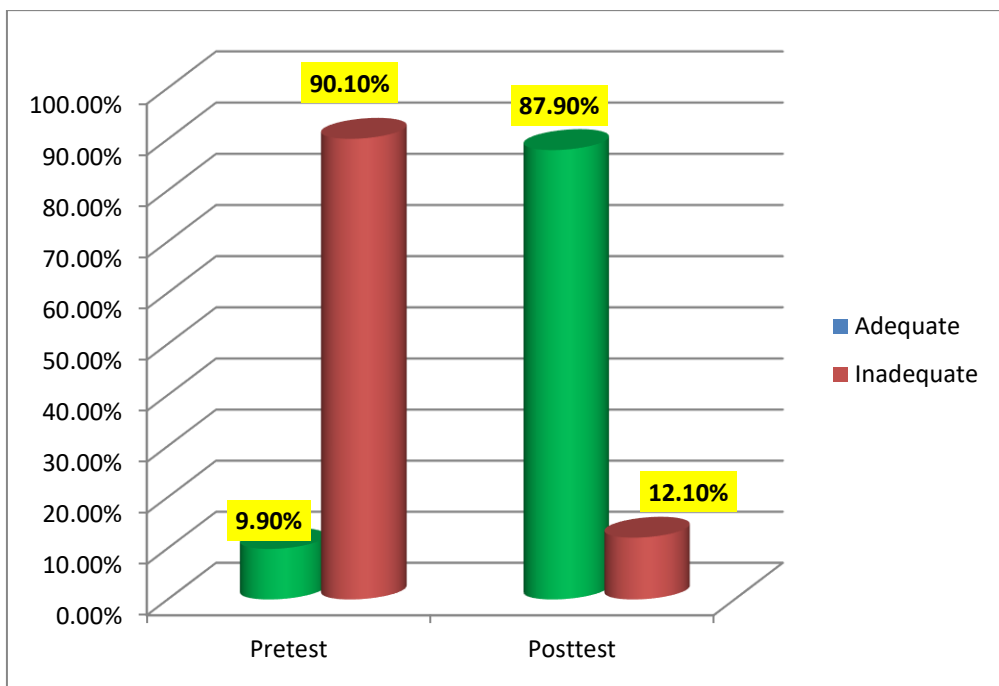

Figure (5): Percentage distribution of the studied female workers' tong breast self-examination (n=323)

Table (4): Relation between socio-demographic characteristics of the studied female workers and their total knowledge about breast cancer, breast self –examination and breast cancer preventive measures (n=323).

Items	No.	Pretest						X^2 (p value)	Posttest						X^2 (p value)
		Poor (n=232)		Average (n=78)		Good (n=13)			Poor (n=26)		Average (n=85)		Good (n=212)		
		No.	%	No.	%	No.	%		No.	%	No.	%	No.	%	
Age															
20 > 30 yrs.	89	64	19.8	21	6.5	4	1.2		6	1.8	21	6.5	62	19.2	
30 > 40 yrs.	164	113	35.0	42	13.0	9	2.8	4.748(0.314)	13	4.0	50	15.5	101	31.3	3.752(0.441)
≥40 yrs.	70	55	17.0	15	4.7	0	0.0		7	2.2	14	4.3	49	15.2	
Educational level															
Intermediate education	97	78	24.1	18	5.6	1	0.3		9	2.8	21	6.5	67	20.7	
University education	148	115	35.6	28	8.7	5	1.5	26.074(0.000**)	12	3.6	38	11.8	98	30.4	3.254 (0.516)
Above university	78	39	12.1	32	9.9	7	2.2		5	1.6	26	8.0	47	14.6	
Marital status															
Single	53	35	10.8	17	5.3	1	0.3		5	1.5	15	4.6	33	10.2	
Married	245	173	53.6	60	18.6	12	3.7	9.997 (0.040*)	18	5.5	57	17.6	170	52.6	11.936 (0.018*)
Divorced	25	24	7.4	1	0.3	0	0.0		3	0.9	13	4.0	9	2.8	
Place of residence															
Rural area	100	90	27.9	10	3.1	0	0.0	24.497(0.000**)	8	2.4	22	6.8	70	21.8	1.446 (0.485)
Urban area	223	142	43.9	68	21.1	13	4.0		18	5.6	63	19.5	142	43.9	
Monthly income of family from her point of view															
Enough and increases	13	11	3.4	2	0.6	0	0.0	8.680 (0.070)	3	0.9	6	1.8	4	1.2	11.976 (0.018*)
Enough	272	187	57.8	72	22.3	13	4.0		22	6.8	65	20.2	185	57.3	
Not enough	38	34	10.6	4	1.3	0	0.0		1	0.3	14	4.3	23	7.2	

Table (5): Relation between socio-demographic characteristics of the studied female workers and their total beliefs about breast cancer, breast self-examination and breast cancer preventive measures as measured by health belief model (n=323).

Items	No.	Pretest						X^2 (p value)	Posttest						X^2 (p value)
		Negative (n=169)		Neutral (n=152)		Positive (n=2)			Negative (n=8)		Neutral (n=111)		Positive (n=204)		
		No.	%	No.	%	No.	%		No.	%	No.	%	No.	%	
Age															
20 > 30 yrs.	89	59	18.3	30	9.4	0	0.0		3	0.9	29	8.9	57	17.6	
30 > 40 yrs.	164	65	20.1	97	30.0	2	0.6	22.597(0.000**)	3	0.9	59	18.3	102	31.7	.907 (0.924)
≥40 yrs.	70	45	13.9	25	7.7	0	0.0		2	0.7	23	7.1	45	13.9	
Educational level															
Intermediate education	97	54	16.7	43	13.4	0	0.0		2	0.6	31	9.6	64	19.9	
University education	148	79	24.5	67	20.7	2	0.6	4.189 (0.381)	4	1.3	55	17.0	89	27.6	1.120 (0.891
Above university	78	36	11.1	42	13.0	0	0.0		2	0.6	25	7.7	51	15.7	
Marital status															
Single	53	41	12.6	12	3.8	0	0.0		4	1.3	21	6.5	28	8.7	
Married	245	113	35.0	130	40.3	2	0.6	17.923(0.001**)	3	0.9	83	25.7	159	49.2	9.130 (0.058)
Divorced	25	15	4.7	10	3.0	0	0.0		1	0.3	7	2.1	17	5.3	
Place of residence															
Rural area	100	60	18.5	40	12.4	0	0.0	4.062 (0.131)	2	0.6	36	11.1	62	19.3	.276 (0.871)
Urban area	223	109	33.8	112	34.7	2	0.6		6	1.9	75	23.2	142	43.9	
Monthly income of family from her point of view															
Enough and increases	13	11	3.4	2	0.6	0	0.0		1	0.3	4	1.2	8	2.5	
Enough	272	132	40.9	138	42.8	2	0.6	11.084 (0.026*)	7	2.2	96	29.7	169	52.3	3.247 (0.517)
Not enough	38	26	8.0	12	3.7	0	0.0		0	0.0	11	3.4	27	8.4	

Table (6): Relation between socio-demographic characteristics of the studied female workers and their total preventive measures level against breast cancer (n=323).

Items	No.	Pretest					Posttest				X² (p value)
		Inadequate (n=263)		Adequate (n=60)		X² (p value)	Inadequate (n=27)		Adequate (n=296)		
		No.	%	No.	%		No.	%	No	%	
Age											
20 > 30 yrs.	89	77	23.8	12	3.8		8	2.5	81	25.0	
30 > 40 yrs.	164	126	39.0	38	11.8	4.667(0.097)	15	4.7	149	46.2	.818(0.664)
≥40 yrs.	70	60	18.6	10	3.0		4	1.2	66	20.4	
Educational level											
Intermediate education	97	82	25.4	15	4.7		9	2.8	88	27.3	
University education	148	125	38.6	23	7.1	6.304(0.043*)	10	3.1	138	42.7	.970(0.616)
Above university	78	56	17.4	22	6.8		8	2.5	70	21.6	
Marital status											
Single	53	48	14.9	5	1.6		6	1.8	47	14.5	
Married	245	191	59.1	54	16.7	8.385(0.015*)	17	5.3	228	70.6	3.157(0.206)
Divorced	25	24	7.4	1	0.3		4	1.3	21	6.5	
Place of residence											
Rural area	100	89	27.5	11	3.4	5.496(0.019*)	10	3.0	90	27.8	.509(0.476)
Urban area	223	174	53.8	49	15.1		17	5.2	206	63.7	
Monthly income of family from her point of view											
Enough and increases	13	12	3.7	1	0.3		1	0.3	12	3.7	
Enough	272	219	67.8	53	16.5	1.362 (0.506)	22	6.8	250	77.4	.267(0.875)
Not enough	38	32	9.9	6	1.8		4	1.3	34	10.5	

Table (7): Correlation between all studies of breast cancer, total beliefs as measured by health belief model and breast cancer preventive measures pre and posttest

		Total knowledge of breast cancer		Total beliefs as measured by health belief model		Breast cancer preventive measures	
		Pretest	Posttest	Pretest	Posttest	Pretest	Posttest
Total knowledge of breast cancer	R						
	P						
Total beliefs as measured by health belief model	R	.020	.214				
	P	0.724	0.000**				
Breast cancer preventive measures	R	.112	.168	.001	.158		
	P	0.04*	0.002**	0.990	0.004**		
Breast Self-Examination Observational checklist	R	.036	.398	.094	.186	.069	.259
	P	0.523	0.000**	0.091	0.001**	0.219	0.000**

4. DISCUSSION

Women are particularly vulnerable to malignant tumors, and breast cancer is just one of several. The onset and progression of breast cancer are influenced by a myriad of factors, both internal and external. Its prevalence is linked to environmental factors, unhealthy lifestyle choices, and social-psychological characteristics. Five to ten percent of breast cancers are attributable to hereditary abnormalities and family history, while twenty to thirty percent are attributable to modifiable risk factors. **(Obeagu & Obeagu., 2024).**

The most common cancer in women is breast cancer (BC), and the fatality rate from this disease is rising daily. In addition, it is predicted that 19.3 million additional cases of cancer would arise in 2025 due to aging, and that less developed areas of the world will account for more than half of all cancer-related deaths. High fatality rates and higher health expenditures are caused by an increase in BC incidence. However,

One of the most crucial elements in evaluating the results of diagnosis and therapy is maintaining an efficient cancer screening program. Because of this, early diagnosis and screening programs should be used to control and prevent BC. Breast self-examination (BSE),

clinical breast examination (CBE), and mammography are essential for the early identification of breast cancer **(Akarsu & Andsoy, 2022).**

The study's objective was to assess the impact of a health belief model-based training program on breast cancer prevention strategies among female employees at Beni-Suef University. This goal was accomplished by evaluating women's health beliefs on breast cancer, their awareness of breast cancer (knowledge and practices), and the impact of applying the health belief model to prevent and diagnose breast cancer in women.

In order to accomplish the goal, the current study also postulated that: Female employees' breast cancer prevention measures improved following the introduction of the Health Belief Model-based training program.

Based on the socio-demographic features of the female employees under investigation, the current study's findings showed that over half of the female employees were between the ages of 30 and over 40, with an average age of 35.91±7.122 years. This was consistent with the findings of **Mahmoud et al. (2020),** who said that the average age of the research participants was 35.90±6.45 years.

The mean age of the studied female workers was greater in the current study

compared to **Abd-Elaziz et al., (2021),** who found that mean age of the participants was 32.6 ± 4.7 years.

From the researcher point of view this difference related to difference in target population and sample size which was large sample, highly educated and employed female.

Regarding educational attainment, the current study found that fewer than half of the female employees under investigation held a university degree. This result was in line with **Masoudiyekta et al. (2015),** who demonstrated that fewer than half of the study sample had a diploma.

However, this result is also consistent with **Shakweer and Hamza (2016),** who found that two-thirds of the samples had only completed primary school. Since the majority of the female employees in this study come from metropolitan areas and is interested in education, the researcher believes that these differences in the demographics of the participants and study locations may be the cause.

Regarding the marital status and place of residence; the present study revealed that more than three-quarters of them were married and more than two-thirds of them were urban residents. This finding was in agreement with **Kamberi et al., (2017),** who found that the majority of women were married.

This finding was different with **Marmarà et al., (2017),** and **Masoudiyekta et al., (2015).** They stated that more than three-quarters of studied women lived in rural areas. From the researcher point of view this finding may be due to the current study focused on female worker at Beni-Suef University.

Related to monthly income of family; the present study presented that the majority of female worker had enough monthly income from their point of view. This finding was disagreed with **Abd-Elaziz et al., (2021)** who proved that one-fifth of the participants had Sufficient income. From the researcher point of view, this may be due to different community socio-economical level.

The recent study demonstrated that around three-quarters of the female employees under investigation had no family history of breast cancer. According to **Mohamed et al. (2023),** a small percentage of participants had a family history of breast cancer, which supported this finding. Additionally, **Khalili et al. (2014)** discovered that a minority of women had a history of cancer, which supported this finding.

This result contrasted with that of **Al-Hosni et al. (2023),** who discovered that two-fifths of the women who took part had a family history of breast cancer.

Less than half of the women had a family history of breast cancer and were consanguineous. This result is similar to that of **Mohamed et al. (2023),** who found that fewer than half of people with a first-degree relative with cancer had the disease. However, this data contradicts that of **Shubayr et al. (2022),** who reported that almost one-fifth had a friend or family member suffer from breast cancer.

According to the current study, there was an impact of the health education program on the improvement of the female workers' overall knowledge level regarding breast cancer, breast self-examination, and preventive measures before and after the implementation of the HBM-based educational program. Before the program, less than ten percent of the female workers had a good level of knowledge. After a month and program execution, this number increased to about two-thirds.

This finding was in accordance with **Elbasuony et al., (2020),** They showed that the adoption of the preventative breast cancer guideline resulted in a highly statistically significant increase in overall knowledge about breast cancer.

This finding was contradict with **Nema Ram, (2020),** who found that the posttest, around half of the women had good knowledge, two-fifths had poor knowledge and more than one tenth had average knowledge.

According to the researcher, this could be connected to the study subjects' varying educational backgrounds, which could impair their comprehension and the investigated female's capacity to pick up knowledge quickly because all samples are educated.

Concerning female workers' beliefs regarding breast cancer and its preventive measures as measured by the health belief model, it discussed under the following headlines. Firstly; regarding the studied female worker's perceived susceptibility of BC pre and post-implementation of HBM based educational program; the current study indicate regression in perceiving negative susceptibility and progression positive one with an improvement in Mean±SD. A highly statistically significant improvement in the posttest HBM compare with the pretest toward susceptibility of BC.

This finding in the same line with **Wondmu et al., (2022),** who discovered that, both before and one month after the intervention, there was a highly statistically significant difference between the intervention group and the control group in terms of perceived vulnerability to breast cancer and breast self-examination using HBM.

From the researcher point of view encouraging group discussions or support groups can create a supportive environment where participants motivate each other to act on their health

Scondly; concerning perceived severity (seriousness) of BC the current study found that there was a noticeable improvement both before and after the deployment of the HBM-based educational program in the posttest HBM compare with the pretest toward susceptibility of perceived severity of BC with highly statistically significant difference.

This finding in accordance with **Ştefănuţ et al., (2023),** who demonstrates that there was a statistically significant difference between perceived severity regarding BC& BSE beliefs. From the researcher point of view enhanced perceived severity by sharing information about the consequences of breast cancer; participants may better understand the seriousness of the disease and increasing their motivation to take preventive action.

Thirdly; regarding the studied female worker's perceived benefits; the current study presented that there was a marked improvement in the posttest HBM compare with the pretest toward perceived benefits of BC. Regression in

perceiving negative benefits and progression positive one with an improvement in Mean±SD with highly statistically significant difference was observed.

This finding was supported with **Elsawy et al.,(2023),**who showed that there was differences that are very statistically significant between perceived benefits regarding BC& BSE behavior.

From the researcher point of view this finding may be due to the program highlight the advantages of early detection and preventive behaviors, helping individuals recognize the positive outcomes of screening and lifestyle changes.

Fourthly; in relation to the studied female worker's perceived barrier of BC pre and post implementation of HBM based educational program; the current study revealed that there was a marked improvement in the posttest HBM compare with the pretest toward perceiving barrier of BC with highly statistically significant difference.

This finding agreed with **El-kest et al., (2021),** who found that there was highly statistically significant difference between perceived barrier regarding BC beliefs.

From the researcher point of view this finding may be due to addressing common misconception and fears about screening or lifestyle changes can help reduce perceived barriers, making participants more likely to engage in preventive actions.

Fifthly; regarding the studied female worker's cues to action; the current study revealed that there was a marked improvement in the posttest HBM based educational program compare with the pretest toward cues to action of BC with differences that are very statistically significant

This finding agreed with **Wondmu et al., (2022),** who discovered that, both before and after the intervention, there was a highly statistically significant difference between the intervention group and the control group in terms of breast cancer cues to action and breast self-examination using HBM.

From the researcher point of view this

finding might be due to educational materials providing brochures, videos and workshops can serve as tangible reminders to encourage participants to engage in screening, seeking necessary health services and preventive behaviors.

Sixly; concerning self- efficacy; the present study illustrated that there was a marked improvement in the posttest HBM compare with the pretest toward self -efficacy regarding BC with highly statistically significant difference.

This finding was congruent with **Elsawy et al., (2023),** who proved that there was highly statistically significant difference between perceived benefits regarding BC& BSE behavior.

Also, this finding was supported with **Mahmoud et al., (2020)**, who claimed that, in comparison to the scores prior to model deployment, there was a highly significant increase after the model. From the researcher point of view this finding may be related to the program often include skills training and resources, boosting participant's confidence in their ability to perform preventive behaviors, such as self-examination or seeking medical advice.

In relation to female worker's total perceived beliefs about breast cancer and it's preventive measures according to HBM; the current study revealed that there was a significant improvement in the female worker's beliefs regarding breast cancer and its preventive measures after the HBM based health education program as, pre-implementation more than half of them had negative beliefs while decreased to less than one-tenth after the HBM based health education program, also, less than one-tenth of them has positive beliefs regarding breast cancer, breast self-examination and breast cancer preventive measures pre implementation and increased to less than two-thirds post HBM based health education implementation.

This finding parallel to **Khorsandi et al.,(2020)**, who found that there was marked improvement in post HBM implementation compared to pre HBM.

From the researcher point of view by

targeting these subscales, the program effectively modified participants 'health beliefs, leading to positive behavior changes regarding breast cancer prevention.

Concerning breast cancer preventive measures; the current study presented that, the practices of female employees with relation to breast cancer prevention measures have improved during posttest in all items comparing to pretest as noticed that, about almost one-third and more of females had inadequate practice regarding preventive measures of breast cancer in pretest while after intervention the majority of them had adequate practice, respectively.

This finding was in the same line with **Alameer et al., (2018**), who illustrated that At six weeks and three months after the intervention, the intervention group demonstrated a statistically significant increase in knowledge items pertaining to BC detection, screening methods, and prevention as compared to the control group.

From the researcher point of view this may be related to the program cover all measures that can be followed to decrease risk of breast cancer and increase their knowledge.

Regarding the studied female workers' total preventive measures level; the current study revealed that Following program execution, there was a noticeable improvement in the overall preventive measures taken by female employees as less than one-fifth of the female workers have adequate practice pretest compared to the majority of them had adequate practice in posttest.

This finding similar to **Pereira et al., (2020),** who found that there was marked improvement in participants' total preventive measures level after intervention from more than half of participant have adequate practice with pretest to the majority have adequate practice with posttest.

According to the researcher, this finding can be ascribed to women's increased knowledge about breast cancer prevention, which influences their attitudes and behaviors. Knowledge can result in a positive attitude, which in turn leads to good behaviors. Additionally, the well-prepared

booklet with a colorful illustrated photo and the simple, attractive way of illustrating the preventive guideline element.

Regarding practice of BSE; the current study announced that, there was a extremely significant statistical impact of health education program on practice of breast self-examination in post program implementation compare with the pretest with the all items of reported practice regarding BSE.

The finding was in the same line with **Akarsu & Andsoy, (2022),** who explained how the post-test scores for the BSE steps following the intervention showed notable improvements after training, one month, and three months.

From the researcher's perspective, this may be related to how information affects practice because more knowledge is linked to increased self-confidence, which enables the woman to practice more accurately.

Also, this finding was supported with **Nema Ram, (2020)**, who showed that there was highly significant improvement in the practice of all steps of BSE after educational programme. From the researcher point of view, this finding may be related to the impact of the educational program on the improvement of female's knowledge and practices regarding BSE and increase awareness of women about importance of BSE in early detection and prevention of BC.

Regarding the overall level of breast self-examination practices among the female employees under study, both before and after the program was implemented; the current study shows that there was a noticeable improvement in overall practice following program implementation. This is because the majority of the female employees had adequate practice following HBM implementation, while the minority had adequate practice prior to program implementation.

This finding agreed with **Ibitoye et al., (2021)**, They demonstrated that, following the introduction of a health education program, over one-third of the women under study had satisfactory practice on the BSE pretest, and this number rose to over three-quarters of the posttest.

Also, this finding similar to **Eittah et al., (2014),** who stated that there was marked improvement in post student practice regarding BSE practice.

From the researcher point of view this finding due to increase knowledge and awareness of female about breast cancer and importance of breast self-examination which available, applicable and performed monthly at home without any effort or equipment as a method of lifestyle modifications for prevention of breast cancer.

Regarding relationship between the studied female's total knowledge score with their demographic characteristics (pre & postproram); the current study revealed that that there was no statistically significant relationship between age and total knowledge score in both pre and posttest. However, there is an improvement in in women's total knowledge for all age categories. In which the minority of female their age from 30 to less than 40 years had good knowledge pretest which improved to around one-third during posttest.

This finding supported with **Ahmed et al., (2019)**, who discovered that, both before and after the intervention, there was no statistically significant correlation between the total knowledge score of the women under study and their age.

Conversely, this finding in contrary with **Kumarasamy et al., (2017,** who announced that the age of the ladies and their level of expertise were significantly correlated

From the perspective of the researcher, this might be because women are overworked and overwhelmed with household duties as they age.

Additionally, the total knowledge score of the female employees under study and their educational level on the pretest showed a highly statistically significant link, whereas the posttest showed no statistically significant relationship. This illustrates the impact of the program whatever women's educational level. The minority of female who had intermediate education had good knowledge before program which increases to nearly one-quarter after program. This finding similar to **El-kest et al.,**

(2021), who demonstrated a strong positive correlation between the studied group's overall knowledge scores and educational attainment.

From the researcher point of view, female who had intermediate education didn't have enough information and knowledge before the program, but after the end of the educational program, they had enough information which indicate the success of the educational guidance program based on HBM

Related to place of residence; there was a highly statistically significant relationship between the studied female workers total knowledge score pretest while there is no statistically significant relationship during posttest. In which less than one-tenth of female that live in urban area had good knowledge before program which increase to around one-half after program. This finding in accordance with **Al-Mousa et al., (2020),** they demonstrated that, in comparison to those who lived in rural areas, those who lived in urban areas knew a great deal more about the symptoms and indicators of breast cancer.

From the researcher point of view, women who live in urban area had a greater chance to get information easily and quickly than women who live in rural area.

Concerning marital status; there was a statistically significant relationship between the studied female workers total knowledge score and the marital status pre & posttest. In which the minority of married female had good knowledge pretest which increased to more than one-half during posttest. This finding in the same line with **Al-Qazaz et al.,(2020)**, who mentioned that there was significant association of knowledge level and marital status of the ladies.

Conversely, this finding different with **Ahmed et al., (2018),** who observed that marital status were not associated with a higher level of knowledge.

From the researcher point of view, married women exposed frequently for recurrent investigation during pregnancy and childbirth that increase their knowledge about any disease which can affect their health.

In relation to monthly income of family; there was no statistically significant relationship with total knowledge score pretest but there was a statistically significant relationship during posttest. In which less than one-tenth of female workers who had enough monthly income of family had good knowledge which improved to more than half during posttest.

On the other hand, this finding in contrast with **Heena et al., (2019)**, They demonstrated that there was no correlation between social features and knowledge scores. This finding also runs counter to that of **Isara & Ojedokun (2011),** who found no statistically significant correlation between respondents' socio-demographic traits and their understanding of breast cancer.

From the researcher point of view, this may be due to women who had enough monthly income of family directed all their attention in regard to their health and didn't pay money for unnecessary things.

Regarding relationship between socio-demographic characteristics of the studied female workers and their total beliefs about breast cancer, breast self-examination and breast cancer preventive measures as measured by health belief model; The present study demonstrated a very statistically significant correlation between the age of the female employees under study and their total beliefs as shown by their health belief model level (pretest) score, but no statistically significant correlation was found between the two variables after the posttest. In which the minority of female workers age from 30 to less than 40 years had positive beliefs before program which improved to around one-third after program.

This finding accepted with **Mohamed et al., (2023)**, who stated that there was a highly statistically significant relationship between the studied patients' total HBM score with their age. This finding also supported with **Kalliguddi et al., (2019),** who showed that a significant relationship was found between the beliefs and age of the health workers.

On the other hand, this finding contradict with **Alenezi et al., (2022),** who assessed "female healthcare workers' knowledge, attitude towards breast cancer, and perceived barriers

towards mammogram screening: a multicenter study in north Saudi Arabia" and showed that there was no significant relationship between age of women and their health believes toward breast cancer.

From the researcher point of view this finding might be attributed to increase age and life experience may affect health belief of women and because of the increased degree of awareness and practices that can influence breast cancer-related behaviors.

In relation to educational level; there was no statistically significant relationship between the studied female workers total beliefs score with their educational level pre & posttest. In which the minority of female who had intermediate education had positive beliefs before program which improved to more than one-quarter after educational program.

Conversely, This finding disagreed with **Yılmaz et al., (2018),**who found that there was a significant relationship among the level of education of women and all aspects of HBM.

Also, this finding disagreed with **Kalliguddi et al.,(2019),** who showed that a significant relationship was found between the beliefs and the university degree of the health workers.

Also, this finding in contrary with **George et al., (2019),** who proved that there was significant relationship between level of education and beliefs toward breast cancer

From the researcher point of view, the improvement in knowledge for female who had intermediate education lead to change in health beliefs regarding breast cancer and how to deal with it after educational program.

Regarding marital status; there was a highly statistically significant relationship between the studied female workers total beliefs as measured by health belief model level (pretest) score with their marital status pretest but no statistically significant relationship posttest. In which the minority of married women had positive beliefs before program which increase to almost one-half after program.

This finding also supported with **Marinho et al., (2008),** who clarified that there was an

association between beliefs and the status of being married.

Also, this finding supported with **George et al., (2019),** who proved that there was significant relationship between marital status and beliefs toward breast cancer.

Conversely, this finding different with **Alenezi et al., (2022),** who showed that there was no significant relationship between marital status of women and their health believes toward breast cancer.

From the researcher point of view this finding may be related to the education level improved the knowledge that strengthened the beliefs of the studied female and confirming the incorrect belief that breast cancer is a disease of married.

Additionally, there was no statistically significant relationship between the studied female workers total beliefs score with their place of residence pre & posttest. In which the minority of female who live in urban area had positive beliefs before program which improved to less than one-half after program implementation. Also, there was statistically significant relationship with their monthly income of family from their point of view pretest but no statistically significant relationship posttest. In which the minority of female who had enough monthly income have positive beliefs before program which increases to more than one-half after educational program.

From the researcher point of view, women living in urban area had the ability to receive information and change perception and beliefs about breast cancer. Which show the impact of the educational program in changing their concepts about breast cancer

Regarding the relationship between the socio-demographic traits of the female employees under study and their overall level of breast cancer prevention, the current study shows that there was no statistically significant correlation between the subjects' total score for breast cancer prevention measures and their age pre & posttest. In which more than one-tenth of female workers age 30 to less than 40 years had adequate practice regarding preventive measures

before program which increase to around one-half after program.

From the researcher point of view, breast cancer preventive measures considered daily habits of life style which become clearly understandable after educational program and not related to specific age.

Concerning educational level; there was a statistically significant relationship between the studied female workers total preventive measures level against breast cancer (pretest) score with their educational level but no statistically significant relationship in posttest. In which less than one-tenth of female who had university education have adequate practice regarding preventive measures before program which improved to around one-half after educational program.

This finding agreed with **Shakor et al., (2019),** who proved that there was statistically significant relationship between educational level with breast cancer prevention methods.

Also, this finding supported with **Rohlfs et al., (1999),** who clarified that there was significant relationship between educational level and age and practice of preventive measures.

Additionally, there was a statistically significant relationship between the studied female workers total preventive measures level against breast cancer (pretest) score with their marital status level but no statistically significant relationship in posttest. In which the minority of married women have adequate practice regarding preventive measures before program which improved to around three-quarters after program implementation.

This result agreed with **Osborne et al., (2005),** who revealed that there was significant association between marital status and breast cancer prevention.

From the researcher point of view this may be due to most breast cancer preventive measures considered daily habits which can follow and applied easily.

Regarding place of residence; there was a statistically significant relationship between the studied female workers total preventive measures level against breast cancer (pretest) score with their place of residence but no statistically significant relationship in posttest. In which the minority of female who live in urban area have adequate practice regarding preventive measures before program which improved to nearly two- thirds after program.

Additionally, there was no link that is statistically significant between the studied female workers total preventive measures score with their monthly income of family pre & posttest. In which the minority of female who had enough monthly income of family had adequate practice regarding preventive measures before program which improved to more than three-quarters after program.

This finding agreed with **Shakor et al., (2019),** who proved that there was statistically significant relationship between places of residence with breast cancer prevention methods.

From the researcher point of view, female who live in urban area have greater chance and means that help them in following preventive measures of breast cancer which help them to maintain health.

The present study shows a statistically significant positive correlation between the total knowledge (pre and posttest), total beliefs as measured by the health belief model, breast cancer preventive measures, and breast self-examination of the female participants. This correlation pertained to the female participants' total knowledge, health belief model, breast cancer preventive measures, and breast self-examination. Total beliefs as determined by the health belief model (pre and posttest), breast cancer prevention strategies, and breast self-examination showed a statistically significant positive link. Additionally, there was a statistically significant positive link between breast self-examination and the overall number of breast cancer preventative actions (before and posttest).

This finding congruent with **El-kest et al., (2021),** who discovered a favorable relationship between the women's total believe score and their entire knowledge.

According to the researcher, this suggests

that raising awareness has a favorable correlation with raising attitude. Also, this finding agreed with **Ishtiak et al., (2022),** who proved that Practice of BSE was positively associated with level of knowledge regarding BSE.

Also, this finding supported with **Dewi et al., (2019),** who show a substantial correlation between BSE practice and the HBM factors. This result is also consistent with that of **Elbasuony et al. (2020),** who discovered that there were substantial statistical differences between BSE and total knowledge before and after the preventive guideline was put into place.

Additionally, this finding in accordance with **Godfrey et al., (2016),** who proved that the poor BSE practices observed among the students, may be related to inadequate knowledge of breast cancer symptoms, risk factors as well as inadequate skills in performing BSE. Also, these results agreed with **Kalliguddi et al., (2019),** who shown a positive relationship between knowledge and BSE practice as well as between HBM and BSE practice. Disagreed with this conclusion and demonstrated the lack of a relationship between attitude and knowledge.

Conversely, this finding disagreed with **Meilina et al., (2024),** who shown that beliefs and BES practice did not significantly correlate.

From the perspective of the researcher and in light of the current study's findings, As knowledge is the foundation of practices that have a positive impact on beliefs and behavior, it was found that the health belief model had considerably improved health practices, raised health beliefs, and improved knowledge about breast cancer detection among the female employees under study.

5. CONCLUSION

Based on the study's findings, the following conclusions can be drawn: The study's findings confirmed the hypothesis that, in comparison to before the program's implementation, the knowledge, health beliefs, and practices of the female employees under investigation regarding breast cancer significantly improved, thereby increasing their active participation in Egypt's 2030 strategy. In terms of their overall degree of breast cancer

knowledge, female employees showed a statistical improvement. Additionally, female employees' overall HBM level for breast cancer improved in a very statistically meaningful way. Additionally, during the posttest, there was a highly statistically significant improvement in the practices of female employees with regard to breast cancer prevention measures. Moreover, the practice of female employees regarding breast self-examination improved in a very statistically significant way.

6. RECOMMENDATIONS

Based on the finding of the current study the following recommendations were proposed:

➢ Additional research on large samples of high risk women to assess their perception for the prevention and early detection of BC.

➢ Comparative studies could be constructed to assess the impact of different educational models on breast cancer prevention. For instance, the HBM can be compared with other behavioral models, such as theory of planned behavior to determine which framework yields the best outcomes in terms of increasing preventive behaviors.

➢ Work together with medical experts to lead screenings and informational sessions, stressing the value of early detection and consistent follow-up.

➢ Perform qualitative research to acquire detailed information on female employees' personal experiences and opinions regarding breast cancer prevention.

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