Nursing Intervention Program for Early Detection and Prevention of Breast Cancer among Working Women

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Abstract: Aim: of the study was to assess the impact of a nursing intervention program leading to health decisions for breast cancer screening among working women with the hypothesis that the intervention will improve women knowledge, modify their attitude, and empower them to take informed health decisions for breast cancer screening. Design: This quasi-experimental design Setting: was conducted in 2 pharmaceutical companies, 2 food processing industries, and a textile factory Sample: a convenience sample 520 women working previous settings, Tools: used for data collection included a self-administered assessment questionnaire assessing knowledge, a health beliefs assessment rating scale, an attitude rating scale, a breast self-examination observation checklist, and a mammography card. A nursing intervention program was designed by the researchers based on the results obtained from the study tools and findings of similar research. Results: The mean age of studied women was 43.2 years, and 56.7% of them had secondary education. Only 5.4% of the women had satisfactory knowledge at the pretest. After program implementation, statistically significant improvements were revealed in women's knowledge about breast cancer and early detection methods, as well as in their related health beliefs and attitudes .Also,73.3% and 72.9% women successfully perform BSE at the post and follow-up phases ($p<0.001$). The practice of mammogram increased from 4.2% at the pre-intervention to 17.7% at the follow-up ($p> 0.001$). The highest practices were among women working in pharmaceutical companies, those with age 45 of older, and those with positive family history of breast cancer. Conclusion: Working women had deficient knowledge, and negative perceptions related to breast cancer and its early detection; their practice of breast self-examination and mammography was very low. The intervention program had a positive effect on women's knowledge, practice health beliefs and attitude. Recommendations: Continuous workplace educational health programs are recommended. With supportive health insurance. Further research studies with broader range of occupational setting are suggested.
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1. Introduction:

Breast cancer is a serious disease with potential high morbidity and mortality. It is the commonest malignancy in women. Approximately one million new cases of breast cancer are diagnosed each year worldwide (Nevidjon and Sawers, 2000; Mahmoud, 2002). In Alexandria, Egypt, out of 9,587 female cancer cases registered in the last 10 years by the Alexandria Cancer Registry, 3250 (33%) had breast cancer (Bedwani et al., 2001).

Although breast cancer cannot be prevented, its early detection offers more treatment options, and a great chance of cure. However, it is usually diagnosed at advanced stages and the survival rate is poor. The use of mammography to screen asymptomatic women 40 years of age and over for early detection of breast cancer has been shown to reduce mortality rates by 20-30% (Aziz and George, 2002).

However, although mammography is established as a screening modality for breast cancer, it is out of reach of many socially disadvantaged women in Egypt, and another approach has to be considered for the early detection of breast cancer (Boulos, 2002). It is therefore, important to promote awareness about early diagnosis of breast cancer and to evaluate the role of screening, recognizing that resources are not available to permit the introduction of mass mammography screening. Hence, physical assessment of the breast should be part of periodic health maintenance examinations, and teaching the client to perform monthly breast self-examination were suggested (Altman, 2004). Clinical breast examination is performed not only to evaluate the patient's specific symptoms but also to identify any other abnormalities of the breast or regional lymphatic basin (Mehata, 2004). The American Cancer Society (2006) issued guidelines with instructions on performing breast self-examination.

Decisions about health and health care are made daily at all levels. There is a growing recognition that consumers want to participate in clinical decisions about their health (Gainer, et al, 2003). Taking an active role in achieving and

maintaining good health depends on certain personal factors. These include perceived susceptibility, level of motivation, sense of control, and perceived value of behavior. People are motivated to take action if they feel that a sufficient thereat to their health exists and the consequences of changing the behavior are worthwhile (Alters and Schiff 2000). The Health Belief Model was designed to predict which people would and would not use preventive measures and to suggest interventions that might reduce client reluctance to use health care (Bensley and Fisher, 2003).

Work sites are an important venue for efforts to reduce cancer morbidity and mortality. Through worksites, it is possible to influence the health behaviors of large proportions of the population based on providing educational risk reduction message targeting individual behavior changes, promotion of environmental supports, and use of natural social network structures (Mary et al, 2003). In breast cancer screening (Hanser, 2005) the nurse has the roles of educator, health promoter, advocate, researcher, consultant, and direct care provider. The preventive services delivered by nurses in the form of health assessment, screening, and counseling can be integrated into comprehensive health promotion and protection activities at the community level, including worksites (Chernecky and End, 2009).

Aim of the study

This study aim is to assess the effect of a nursing intervention program leading to health decisions for breast cancer screening among working women. The specific objectives included:

1. Assessing knowledge, attitude, practices, and health beliefs regarding breast cancer screening;
2. Planning, implementing, and evaluating a structured nursing intervention meeting identified needs and beliefs.

It was hypothesized that the educational nursing intervention program will improve women knowledge, modify their attitude, and empower them to take informed health decisions for breast cancer screening.

2. Subjects and Methods:

Study design

A quasi-experimental design, with pre-post assessment was utilized to conduct the study.

Setting

The study was conducted in three types of work places. These included two pharmaceutical companies, two food processing industries, and a textile factory.

Sample

A convenience sample of working women in the previously mentioned settings at the time of the study was recruited. The only inclusion criterion was being at age 35 years and above. Their total was 520 women.

Tools of data collection

The data collection tools included a self-administered assessment questionnaire, health beliefs assessment rating scale, attitude rating scale, Breast self-examination observation checklist, and mammography card. Face and content validity of the tools were ascertained by a panel of experts in community health nursing, medical-surgical nursing, radiation oncology, and nuclear medicine who revised the tools for clarity, relevance, applicability, comprehensiveness, and ease for implementation. According to their opinion, minor modifications were applied.

Five tools were used for data collection.

Self-administered knowledge assessment questionnaire was developed by the researchers in an arabic language, based on literature review and experts' opinions. It covered woman's personal and job characteristics, menstrual and obstetric history, previous breast disease, family cancer history, previous practice of breast self-examination and mammography. It also included a section of 20 multiple choice questions for assessment of woman's knowledge regarding breast cancer, incidence, symptoms, risk factors, methods of early detection, and methods of prevention.

Health beliefs assessment rating scale modified from Attia et al (1997) by the researchers. It included four items, namely perceived susceptibility, perceived health benefits, barriers to practice, and misconceptions regarding breast self-examination. It consisted of 16 statements on a two-point scale: agree and disagree.

Attitude rating scale to assess woman's attitude towards mammogram screening. It was modified from El-Hadad (1995) by the researchers. The scale consisted of 16 statements on a 3-point Likert scale: agree, uncertain, and disagree.

Breast self-examination observation checklist developed by Long et al (1993) it was used for assessing women's practice of breast self-examination. It involved 10 steps marked as not done, done incorrectly, and done correctly.

Mammography card designed by the researchers for recording woman's attendance to mammography center. It contains the title of the program, name of the woman, name of the workplace, and name of the center.

The knowledge, attitude, health belief, and breast self-examination were used for assessment of the effect of the intervention through pre-post testing.

Scoring

Knowledge: For the knowledge items, a correct response was scored 1 and the incorrect zero. For each area of knowledge, the scores of the items were summed-up and the total divided by the number of the items, giving a mean score for the part. These scores were converted into a percent score. Knowledge was considered satisfactory if the percent score was 50% or more and unsatisfactory if less than 50%.

Health belief scale: A two-point scale was used, agree and disagree, scored 1 and 0 respectively. For each area of knowledge, the scores of the items were summed-up and the total divided by the number of the items, giving a mean score for the part. These scores were converted into a percent score. More than 60% was considered positive heath belief, and less than 60% was considered negative heath belief.

Attitude scale: Each statement has 3 levels of answers: “agree”, “uncertain”, and “disagree.” These were respectively scored 3, 2, and 1. The scores of the items were summed-up and the total divided by the number of the items, giving a mean score. These scores were converted into a percent score. The attitude was considered positive if 60% or higher, and negative if less.

Observation checklist of breast self examination: A three-point scale were used: not done=0, done incorrectly=1 and done correctly=2. The total score of practice was 20 points. For successful performance of breast self examination, the women must get 20 points.

Pilot study

A pilot study was carried out on 52 working women (10% of the total sample) from the pharmaceutical industries whom were not included later in the study sample. The aim of the pilot study was to test clarity and simplicity of the tools. Necessary modifications were carried out based on the findings of the pilot study and expert's opinion to develop the final form of the tools.

Intervention program

The nursing intervention program was designed by the researchers based on the results obtained from the study tools and findings of similar research. Its aim was to provide accurate knowledge about breast cancer, early detection and screening measures, in addition to acquiring practice skills, and modifying related misconceptions. It was revised and modified to fit cultural and socio-demographic aspects of the study sample. It covered knowledge, beliefs, attitude and practice. This program was reviewed by experts in community health nursing, medical-surgical nursing, radiation oncology, and nuclear medicine to ascertain its content validity. An illustrated Arabic language booklet was constructed as an educational reference during program implementation and self-learning reference afterwards.

Field work

After securing official permissions to carry out the study, the researchers met with the working women in their workplaces. The aim of the study was explained to them and their informed consent was secured before collecting data. The field work was carried out along a period of 11 months starting from March 2008 to February 2009, five days weekly. The assessment phase lasted for three months. The implementation phase of the program and post-test took eight months.

Program implementation was in the form of small group sessions, the program content has been sequenced through 13 sessions (2 session for pre-test, 9 session for program implementation, 3 session for theory and 6 session for practice and 2 session for post test and observation check list). Group consisted of 30 women chosen from different departments according to work conditions. The lists of participants were prepared and provided to the administration office for agreement, and then printed and distributed to all departments. Sessions were conducted in conference rooms in each workplace. Different educational methods and media were used. Post-tests were conducted at the end of the program, and at two-month follow-up.

Ethical considerations

At the initial interview, each potential subject was informed about the nature, purpose, and benefits of the study, and informed that her participation is voluntary. Confidentiality and anonymity of the subjects were also assured through coding of all data. The researcher assured that the data collected and information will be confidential and would be used only to improve their health and for the purpose of the study.

Statistical analysis

Data entry and statistical analysis were done using SPSS 14.0 statistical software package. Data were presented using descriptive statistics in the form of frequencies and percentages for qualitative variables, and means and standard deviations for quantitative variables. Qualitative categorical variables were compared using chi-square test.

Statistical significance was considered at p-value <0.05.

Limitations of the study

The researchers were faced with many logistic problems and spent much effort to convince and promote the objectives of the study. They were faced with refusals from workplaces, and also from working women due to culturally related fears, pessimism, and wrong beliefs. Also, it was difficult to gather all women at the same time for program implementation, and thus the program had to be repeated several times in the same setting.

3. Results

Table 1 show that the mean age of studied women was 43.2±6.3 years. The majority of women were married (93.1%), and more than half of them had secondary education (56.7%). About two thirds (64.2%) were working in pharmaceutical companies, and less than half (47.3%) of them were exposed to chemical substances at workplace; of these, 66.7% reported using personal protective equipment (PPE). Concerning obstetric history, table 2 indicates about half of the married women in the study sample were Para 3-4 (48.2%). Breast feeding was practiced fully by about two thirds of them (66.3%). The majority (81.1%) of women used contraceptive methods. Previous breast problems were experienced by 14.2% of the women, and about one-tenth of them (9.8%) gave a positive family history of breast cancer. The practice of breast self-examination and clinical breast examination was very low, 4.6% and 6.3%, respectively.

As Table 3 illustrates, slightly less than half (48.8%) of the women reported having heard about early detection of breast cancer. The main source of information was radio and TV (55.5%), followed by physicians (21.3%); none of them mentioned nurses. As for the barriers to practice early detection measures, nearly half of them reported lack of knowledge (51.2%) and fear of diagnosis (49.4%).Meanwhile, 3.7% of them mentioned that there were no barriers.

Table 4 points to statistically significant improvements in women's knowledge about breast cancer and early detection methods after implementation of the intervention program. This improvement continued throughout the follow-up phase. The lowest percentage of satisfactory knowledge before the intervention was related to breast cancer risk factors (0.8%). Overall, 5.4% of the women had total satisfactory knowledge at the pre-test. This increased to 99.6% and 98.7% at the post and follow-up tests, respectively.

Statistically significant improvements were revealed in women's health beliefs and attitudes towards early detection of breast cancer. As Table 5 shows, the perceived health benefits of BSE increased from 26.5% at the pre-intervention phase, to 99.8% at the post phase, and 98.5% at the follow-up phase. Similar improvements were noticed regarding perception of susceptibility, barriers, and misconceptions. The same table indicates an improvement in positive attitudes towards early detection of breast cancer, from 10.4% at the pre-intervention phase, to 98.7% at the post phase, and 97.1% at the follow-up phase.

Table 6 indicates that about three-fourth of studied women were observed to successfully perform BSE at the post (73.3%) and follow-up (72.9%) phases of the intervention, compared to none at the pre-test, and the differences were statistically significant (p<0.001). Also, the practice of mammogram increased from 4.2% at the pre-intervention to 17.7% at the follow-up (p<0.001).

Table (1): Personal and job characteristics of women in the study sample (n=520)

	Frequency	%
Age (years):		
35-	183	35.1
40-	149	28.7
45-	82	15.8
50+	106	20.4
Mean±SD	43.2±6.3	
Educational level		
Basic education	37	7.2
Secondary education	295	56.7
Higher education	188	36.1
Marital status:		
Married	484	93.1
Unmarried (single/divorced/widow)	36	6.9
Industry:		
Pharmacy	334	64.2
Food	114	21.9
Textile	72	13.9
Chemical exposure:		
Yes	246	47.3
No	274	52.7
Use of PPE (n=246):		
Yes	164	66.7
No	82	33.3

Concerning the factors related to women's practice of mammography at the follow-up phase, Table 7 points to statistically significant associations with workplace (p=0.009), age (p<0.001), and family history of breast cancer (p<0.001). It is evident that the highest practices were among women working in

pharmaceutical companies, those with age 45 of older, and those with positive family history of breast cancer.

Table (2): Obstetric, medical and family history of women in the study sample (n=520)

	Frequency	%
Parity (n=500):		
0	25	5
1-2	217	43.4
3-4	241	48.2
>4	17	3.4
Breast fed (n = 475):		
Yes all children	315	66.3
Yes some of the children	136	28.6
Never breast fed	24	5.1
Use of contraception (n = 475):		
Yes	385	81.1
No	90	18.9
History of:		
Previous breast problems	74	14.2
Family history of breast cancer:	51	9.8
Practice of breast self examination	24	4.6
Practice of clinical breast examination	33	6.3

4. Discussion:

Breast cancer is the most common type of cancer in women and ranks second only to lung cancer as a cause of cancer related deaths. Recent studies have shown that deaths from breast cancer for women in their forties can be reduced by 17 percent and by at least 30 percent for women ages 50-69, if they follow breast cancer screening recommendations, including routine mammography, regular examinations by a physician, and monthly breast self exams (Hoffman, 2004). Thus, the best way to fight breast cancer is through early detection, and women who find breast cancer lumps early on are far more likely to successfully defeat the disease (Smith, 2006). The present study aim was to assess the impact of a nursing intervention leading to health decisions for breast cancer screening among working women.

Most of the present study women were in the age group 35 to less than 45, which is the age of rise of breast cancer risk. In this regard, Hoskin and Makin (2003) stated that age was by far the most important risk factor for breast cancer, and that the risk increases tenfolds between 30 and 50 years. This doubles again by the age of 70 to 1:300. Also, Largent et al (2005) mentioned that 94% of new cases of breast cancer reported during 1996-2000 occurred in women age 40 and older. The risk of a positive family history has been confirmed previously by Yipch et al, 2008 who mentioned that breast cancer risk was higher among women whose close blood relatives have this disease.

The obstetric data of the present study women indicate that most of cases are at low risk of developing breast cancer. The majority were porous, mostly multiparous, and breastfed their infants, either all or some. Also, the family history of breast cancer was less than 10%. In line with this, Manetta (2004) claimed that the risk of breast cancer increased among women who have had no children. As for breast feeding, the American Cancer Society (2008) reported that it might slightly lower breast cancer risk, especially if breast feeding is continued for 1.5 to 2 years.

On the other hand, the majority of women in the present study reported the use of contraception. This would constitute a risk factor for breast cancer if hormonal methods are used. The association between the use of oral contraceptives and the development of breast cancer has been documented previously (Suzanne et al, 2006).

Table (3): Sources of information about early detection of breast cancer and related barriers as reported by women in the study sample (n=520)

	Frequency	%
Heard about methods of early detection:		
Yes	254	48.8
No	266	51.2
Sources of information (n=254):@		
Radio and TV	141	55.5
Physician	54	21.3
Newspapers	42	16.5
Relative or friends	23	9.1
Nurse	0	0.0
Barriers to practice of early detection measures: @		
Lack of knowledge	266	51.2
Fear of diagnosis	257	49.4
Feel not susceptible	111	21.3
Lack of time	99	19.0
Fatalistic attitude (dependence on Allah)	61	11.7
Cost of diagnostic procedures	61	11.7
Embarrassment	59	11.3
Possibility of errors of doctors and mammogram	32	6.2
No barrier / should do it	19	3.7

(@) Not mutually exclusive

Table (4): Women's had satisfactory knowledge about breast cancer and early detection throughout program phases

Satisfactory Knowledge About:	Program phase						X^2 Test (p-value) Pre-post	X^2 Test (p-value) Pre-FU
	Pre (n=520)		Post (n=520)		FU (n=520)			
	No.	%	No.	%	No.	%		
Breast cancer:								
Definition	200	38.5	520	100.0	517	99.4	462.2 <0.001*	451.26 <0.001*
Incidence	119	22.9	500	96.2	517	99.4	579.31 <0.001*	641.15 <0.001*
Symptoms	64	12.3	508	97.7	513	98.7	765.87 <0.001*	784.82 <0.001*
Risk Factors	4	0.8	517	99.4	489	94.0	1012.19 <0.001*	907.16 <0.001*
Prevention	38	7.3	518	99.6	511	98.3	890.42 <0.001*	863.18 <0.001*
Total	8	1.5	517	99.4	507	97.5	996.56 <0.001*	957.78 <0.001*
Early detection:								
Methods	39	7.5	518	99.6	517	99.4	886.96 <0.001*	883.02 <0.001*
Breast self exam	80	15.4	520	100.0	520	100.0	762.67 <0.001*	762.67 <0.001*
Clinical breast exam	137	26.3	520	100.0	520	100.0	606.27 <0.001*	606.27 <0.001*
Mammogram	79	15.2	520	100.0	520	100.0	765.68 <0.001*	765.68 <0.001*
Total	48	9.2	520	100.0	520	100.0	864.23 <0.001*	864.23 <0.001*
Total knowledge	28	5.4	518	99.6	513	98.7	925.78 <0.001*	906.19 <0.001*

(*) Statistically significant at p<0.05

Table (5): Women's beliefs and attitudes towards early detection of breast cancer throughout program phases

	Program phase						X^2 Test (p-value) Pre-post	X^2 Test (p-value) Pre-FU
	Pre (n=520)		Post (n=520)		FU (n=520)			
	No.	%	No.	%	No.	%		
Positive perception of:								
Susceptibility	244	46.9	519	99.8	511	98.3	372.13 <0.001*	344.56 <0.001*
Health benefits	138	26.5	519	99.8	512	98.5	599.96 <0.001*	573.85 <0.001*
Barriers to practice	67	12.9	519	99.8	513	98.7	798.65 <0.001*	775.38 <0.001*
Misconceptions	137	26.3	520	100.0	520	100.0	606.27 <0.001*	606.27 <0.001*
Total attitude Positive	54	10.4	513	98.7	505	97.1	816.99 <0.001*	786.74 <0.001*

(*) Statistically significant at p<0.05

Table (6): Women's practices of early detection measures of breast cancer throughout program phases

	Frequency	%
Observed adequate practice of breast self exam:		
Pre	0	0.0
Post	381	73.3
Follow-up	379	72.9
X^2 (p-value): pre-post	601.27 (<0.001*)	
X^2 (p-value): pre-FU	596.31 (<0.001*)	
Practice of mammogram:		
Pre	22	4.2
Follow-up	92	17.7
X^2 (p-value): pre-FU	48.27 (<0.001*)	

(*) Statistically significant at p<0.05

Table (7): Relation between women's practice of mammography at follow-up phase and some personal and job characteristics

personal and job characteristics	Mammography				X^2 Test	p-value
	Done (n=92)		Not done (n=428)			
	No.	%	No.	%		
Workplace:						
Pharmaceutical	69	20.7	265	79.3		
Food	19	16.7	95	83.3	9.38	0.009*
Textile	4	5.6	68	94.4		
Age:						
35-	4	2.2	179	97.8		
40-	28	18.8	121	81.2		
45-	31	37.8	51	62.2	59.92	<0.001*
50+	29	27.4	77	72.6		
Marital status:						
Married	83	17.1	401	82.9		
Unmarried	9	25.0	27	75.0	1.42	0.23
Educational level:						
Basic education	3	8.1	34	91.9		
Secondary education	51	17.3	244	82.7	3.19	0.20
Higher education	38	20.2	150	79.8		
Family history of breast cancer:						
Positive	23	45.1	28	54.9		
Negative	69	14.7	400	85.3	29.16	<0.001*

(*) Statistically significant at p<0.05

Added to this risk is the occupational exposure, where about two thirds of the present study women were working in pharmaceutical industries, and about half reported chemical exposure at workplace, with minor use of personal protective equipment. Although these exposures, besides the lack of personal protection, would pose significant risks on working women, still occupational exposures have not been studied thoroughly in relation to breast cancer (Susan et al, 2003).

Slightly less than half of the present study women heard about early detection of breast cancer.

However, only less than 5% of them reported practicing breast self examination (BSE). This deficient practice could be explained by fear of women from diagnosis of breast cancer, lack of knowledge of its significance, or related misconceptions. Other studies reported higher rates of practice. Warner et al (2003) reported that 34% of studied women practice BSE monthly and 16% practiced it anytime. Also, in Jenny and Cielito (2002) study, 38.3% of the sample reported ever performing BSE. The discrepancy between these studies and the present one could be attributed to women higher health awareness, supporting health campaigns, and health insurance for screening measures and early detection in developed countries.

According to the present study, slightly more than half of the women reported that their source of information for breast cancer and early detection was the radio and TV. Physicians were mentioned by about one-fifth of them, while none of them mentioned nurses. The finding is alarming and points to deficiency in health care providers' educational roles. In contradiction with these results, Sief and Aziz (2000) reported that the main source of information among studied women was peers (47.8%) while media as TV, radio, and news papers came second in rank (30.4%). But still the two studies agree on the deficient role of healthcare providers.

As regards the barriers to practice early detection measures, more than half of the present study women reported lack of knowledge and fear of the consequences. This lack of knowledge was quite evident at the pre-test, where only 1.5% of them had satisfactory knowledge about breast cancer, and 9.2% had satisfactory knowledge about early detection. However, there were statistically significant improvements in knowledge at the post and follow-up phases of the intervention. These findings are in congruence with Abdulbari et al (2002) who reported participants' knowledge was mostly low and unsatisfactory. bEl-Hossiny (2002) reported slightly better results regarding definition of cancer breast, its signs and symptoms, and diagnostic methods.

Concerning health beliefs related to early detection, the present study showed that before the program only less than half of the women perceived susceptibility to breast cancer, and only about one-fourth perceived the health benefits of early detection. Altogether perceived susceptibility is a significant variable influencing public awareness and participation in more preventive actions. Women's perception of susceptibility, health benefits, and positive look at barriers and misconceptions that would discourage them from seeking screening and treatment demonstrated statistically significant improvements at the post and follow-up tests. In contradiction with these findings, Attia et al (1997) reported little improvement in students' perceived susceptibility, perceived health benefits and perceived barriers to practice after viewing a BSE educational film. The difference with the present study implies that perceived barriers may be positively modified if suitable learning strategies are chosen.

The present study intervention involved training participating women in the practice of breast self examination. Although a few of them reported practicing it, none had an adequate practice in the pre-intervention phase. Meanwhile, statistically significant improvements were revealed at the post and follow-up phases, with about three-fourth of them having adequate practice. This result is in congruence with Leight et al 2003) who stated that individual training in BSE with guided practice improved both the depth of palpation and the search duration of BSE. On the same line, Jane (2005) reported that an intervention program significantly increased both BSE frequency and accuracy among women in the experimental group.

Concerning actual practice of mammography, only 4.2% of the present study women reported that they had it before the intervention program. This increased to about one-fifth at the follow-up phase, with a statistically significant difference. This finding points to success of the intervention in helping participating women in decision-making regarding their health, and in having a positive impact on their health behavior. However, despite this improvement, still more than four-fifth of the women did not decide to take the test. This could be due to lack of time, or due to the costs of this test. Therefore, Abdulbari et al., 2002) recommended the provision of comfortable, supportive settings for screening that positively alter women's fears and concerns.

As for the characteristics of the women who reported practicing mammography at the follow-up phase, the present study revealed statistically significant relations with workplace, age, and family history of breast cancer. More women working in pharmaceutical industries, with age 45 or older, and with positive family history reported having the test. All these three variables reflect higher risk of breast cancer. Therefore, women having known these risk factors through the intervention program were encouraged to take the test. In agreement with this finding, Murabito et al., 2001) found that women with a family breast cancer history reported higher practice of mammography compared to other women. On the other hand, the present study could not reveal any relation of statistical significance between the

practice of mammography and woman's educational level. This finding is incongruent with Abdel-Fattah (2000) who stated that practice of early detection was positively associated with educational level. The lack of association in the present study could be attributed to the fact that the majority of the sample had secondary or higher level of education.

5. Conclusion and Recommendations

The results of this study demonstrated that working women had deficient knowledge, and negative perceptions related to breast cancer and its early detection. Their practice of breast self-examination and mammography was very low. The nursing intervention program had a positive effect on women's knowledge, practice, health beliefs and attitude towards breast cancer screening and early detection; it empowered about one fifth of women to take informed health decision for having mammography as a screening measure for breast cancer.

In the light of these findings, continuous and comprehensive workplace educational health programs are recommended to provide working women sound information about risk factors, breast cancer screening and early detection methods. Supportive health insurance should be provided for working women to encourage and empower them to practicing screening procedures. Training programs should be provided to nurses in order to have an active role in empowering women to take informed health decision related to breast cancer screening and early detection. Further research studies with broader range of occupational settings are suggested.

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