Factors Associated with Mammography Screening Behaviors: A Cross-Sectional Descriptive Study of Egyptian Women

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Abstract—Breast cancer is considered as a substantial health concern and practicing mammography screening [MS] is important in minimizing its related morbidity. So it is essential to have a better understanding of breast cancer screening behaviors of women and factors that influence utilization of them. The aim of this study is to identify the factors that are linked to MS behaviors among the Egyptian women. A cross-sectional descriptive design was carried out to provide a snapshot of the factors that are linked to MS behaviors. A convenience sample of 311 women was utilized and all eligible participants admitted to the Women Imaging Unit who are 40 years of age or above, coming for mammography assessment, not pregnant or breast feeding and who accepted to participate in the study were included. A structured questionnaire was developed by the researchers and contains three parts; Socio-demographic data; Motivating factors associated with MS; and association between MS and model of behavior change. The analyzed data indicated that most of the participated women (66.6%) belonged to the age group of 40-49. A high proportion of participants (58.1%) of group having previous MS influenced by their neighbors to practice MS, whereas 32.7 % in group not having previous MS were influenced by family members which indicated significant differences ($P < 0.05$). Doctors and media shown to be the least influence of others to practice MS. Women with intention to have a future mammogram had higher OR (1.404) for practicing MS compared with women with no intention. Further studies are needed to examine the relation between Transtheoretical Model [TTM] and practicing MS.

Keywords—Breast cancer, mammography, screening behaviors.

I. INTRODUCTION

BREAST cancer incidence is increasing in parallel with rising mortality in some countries and declining in others [1]. In 2008 nearly 1.4 million cases of breast cancer were detected across the world. This represents 11% of all new cancer cases and 23% of all female cancers. It was estimated that the number of cases with breast cancer will rise to 2.1 million by 2030 [2].

In 2005 statistical figures in Egypt showed that breast cancer represents 35.1% of all females' cancer [3]. This gave alarm to the Egyptian Ministry of Health to announce the first Egyptian National screening program "Women Health Outreach Program" (WHOP) on October 30th, 2007 to February 9th 2009 that offers free mammography for all Egyptian Women above 45 years and positively detected cases are offered the option of free management [1]. Although WHOP has become available for every woman in Egypt, the incidence of breast cancer is still increasing. In 2013, breast cancer increased to be 37% of all female cancers. So incidence in terms of crude incidence and age standardized rate relatively high for a low income country (37.6/100,000 and 49.6/100,000 respectively) [4]. This could be due to detection of breast cancer at an advanced stage as more that 80-90% of cases present with stage three and four. It also could be due to the lack of women's awareness to seek medical attention and early MS [1].

A. Breast Cancer Screening Rates

In relation to the breast cancer-screening rates, American study was carried out in 2010 and showed that the rate of mammography uptake was 72.8% in the previous 2 years among women aged 50-74 years [5]. In addition, another study conducted in Europe and indicated that the rate of MS was 84.1% over the previous 2 years among women aged 50-69 years. Within Egypt little is known about the factors that influence MS behaviors and screening rates among women. One study was conducted on a small sample of Egyptian women, has reported that the rate of performing mammogram was 12.5% [4]. Thus Egyptian women have a significantly lower mammography rate than those in the United States and Europe.

B. Definition of Breast Cancer Screening Behaviors

Breast cancer screening behaviors are defined as health improvement activities, such as breast self-examination (BSE), mammography and clinical breast examination (CBE), which can facilitate early detection of breast cancer [6]. Although BSE is an economical, simple and non-invasive screening modality for early detection of breast cancer, Turkish Association for Cancer Control 2005 has reported that BSE alone is not an effective method for detecting breast cancer. So, the more objective and effective screening method for early detection of breast cancer is mammography [7].

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C. Benefits of MS

Researchers have been stated that mammography can find 85 to 90% of breast cancer in women over 50 and can discover a lump up to two years before it can be felt. So, the benefits of mammography far out weight the risk and inconvenience [8]. Furthermore the American Cancer Society found that data of meta-analysis of breast cancer screening trials from breast cancer mortality reported 24% reduction of mortality rate associated with invitation to MS among women aged 40 and older [7].

Many studies have shown that early detection of breast cancer through mammography can save many thousands of lives each year, and that many more lives could be saved if even more women are engaged and took advantages of the screening procedure [9]. So it is important to have a better understanding of breast cancer screening behavior of women and factors that influence utilization of them. Also it is necessary for health care professionals, especially nurses who have most contact with women to have knowledge about the factors that affect the use of breast cancer screening behavior.

D. Motivating Factors of MS

Studies have shown that high risk cancer groups, with a family history of breast cancer and those receiving estrogen therapies all contribute to the facilitation of regular mammography [10], [11]. Furthermore another study conducted in Greek stated that advice from primary care provider can enhance MS [12]. In addition a broadcast medium that disseminates via telecommunications facilitate engagement in MS and has been reported as having important role in motivating women to undergo the procedures of mammography [13]. Also, personal communication with health care providers and other women such as friends having a significant role that enhance women to undergo MS [14]. Furthermore, high socioeconomic status is considered as an important factor that influences women behavior toward MS [4]. Also higher educational level is contributed to women participation in MS. On the other hand, it is important for the health care providers to understand the barriers to MS in order to help women to overcome them.

E. Barriers to MS

Several factors contribute to nonparticipation in MS as reported by previous studies [10]. For example, pain and discomfort due to the procedure, cost of screening, fear of inspection process as well lack of reminders, financial problems, fear of cancer and psychological distress, poor interaction with physicians, anxiety, fear of breast cancer diagnosis and long distance from screening were found as barriers to participation in MS [15], [16]. Furthermore, low level of risk perception and worry were identified to hinder women in MS participation [13].

In Egypt, recent studies reported that 99% of Egyptian women are unaware of the dangers of breast cancer [17]. Several factors were found related to barrier to participate in MS among Egyptian women; such as lack of transportation [18], delaying early detection of breast cancer due to far distance from health services, negligence of patient complains, patient poverty and high cost, illiteracy, lack of time and reluctance in seeking medical advice [19]. Lack of knowledge about mammography was associated with not having a MS [20].

Lack of awareness about breast cancer and denying having the disease thinking it was only a simple mass and it will go hinder early detection of breast cancer [19]. In this respect, understanding Egyptian women behaviors about cancer screening will help health care providers in general and professional nurses in particular to find appropriate methods to increase MS practice. Nurses can play a significant role in women health through providing adequate information on breast cancer and MS behaviors in collaboration with multimedia and multidisciplinary team.

F. Conceptual Framework

The conceptual framework of this study relies mainly on the TTM of behaviors change to increase the uptake of MS practice. This model was applied to numerous intentional behaviors including mammography adoption as this model emphasizes that each individual has different needs since he/she belongs to different behavioral stages of his/her effort to change [21], [22]. In the current study behavior stages categorize the women based on their previous background toward MS and their intention to participate it in the future. The model consists of the following six stages. (1) In the first stage woman never had a mammogram and no future intention to practice it (pre-contemplation). (2) The second stage presents woman who had a mammogram in the past; and stopped and had no intention to practice it in the future (relapse). (3) Contemplation is the third stage in which woman never had a mammogram but plan to have one in the future. (4) In the fourth stage, woman had one mammogram and intends to have one in the future (action). (5) In the fifth stage, woman had, at least, two regular mammograms and intends to remain on regular screening practice in the future (maintenance). (6) In this last stage, the relapse risk occurs when women are currently on mammogram, but have no intention to continue [22].

It has been observed that barriers to cancer breast screening using mammography are related to many factors such as cost of screening, poor interaction with physicians, long distance from screening and reluctance of seeking medical advice. Therefore, identification of the factors that are linked to MS behavior among the Egyptian women has become urgently needed.

G. Research Questions

What are the factors associated with MS behaviors in a sample of Egyptian women?

II. MATERIAL AND METHODS

A cross-sectional descriptive design was carried out to provide a snapshot of the factors associated with MS behaviors. The benefit of a cross-sectional design is that it allows the researchers to look at numerous things at once such

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as age, educational level, occupation, income, motivating factors of mammography in relation to screening behaviors. However the design utilized may not provide definite information about the cause and effect relationship. So it provides information only but do not answer why. [23], [24]. The study was conducted through Women Imaging Unit in Radiology department at El-Manial University Hospital Kasr El-Aini, Cairo University in Egypt from July 10 2014 to January 30, 2015. A convenience sample of 311 women who accepted to participate in the study was included. The inclusion criteria were that those involved were 40 years of age or above, not pregnant or breast feeding and were coming for mammography assessment.

A structured questionnaire was developed by the researchers based on extensive literature review. This questionnaire contains three parts; (1) Socio-demographic data; such as age, educational level, occupation, marital status, residential area and family income. (2) The second part has data related to motivating factors associated with MS; such as, reason for MS, family history of breast cancer, reason for mammography and influence of others such as family members, close friends, neighbors, doctors, nurse and media. (3) The third part is related to connection between MS and model of behavior change; such as; participating in MS in the previous two years, having read about MS, intention to have a future mammogram and intention to maintain regular participation in MS. Content validity of this questionnaire was assessed by a panel of experts in the field of oncology, radiology, medical surgical nursing and community health nursing to ensure its suitability for this study. The questionnaire was piloted on 15 women in order to check the clarity of its items.

A. Procedures

Women those met the inclusion criteria were invited to participate in the study. The researcher met the eligible participants before doing the mammography in a private room at radiology department. Then, the purpose and nature of the study were explained in order to get their informed consent. The researchers emphasized to the women that their participation is entirely voluntary. Confidentiality and anonymity of the women's responses and their personal identified data were strictly assured. After informed consent was obtained, the structured interview was conducted for approximately 30 minutes. Once interview disclosed all participated women were provided with a pamphlet on breast cancer and benefits of MS.

An official permission was obtained from the head of radiology department as well as Women Imaging Unit. Informed consent was obtained from the participants prior the interview. Confidentiality was obtained by keeping privacy of all women identified information.

B. Analysis of Data

The data were analyzed using statistical analysis with statistical package for social science for windows (SPSS) version 17. Descriptive and inferential statistics were utilized to answer the research question. The significance level was established at $p < 0.05$.

III. RESULTS

Demographic characteristics of the participated women are presented in Table I. Data showed that most of the participated women (66.6%) belonged to the age group of 40-49, and nearly third of them cannot read and write. High proportion (61.4%) of participated women lives in Cairo, and around half (54.7%) of them are married. The same table indicated that most of women (65.6%) reported that they have inadequate family income.

TABLE I
FREQUENCY AND PERCENTAGE DISTRIBUTION OF SOCIO-DEMOGRAPHIC CHARACTERISTICS AMONG THE STUDY SAMPLE

Variables	No = 311	
	No	%
Age (years)		
40-49	207	66.6
50-59	90	28.9
60+	14	4.5
Level of Education		
Cannot read and write	107	34.4
Primary and preparatory	118	37.9
Secondary and above	86	27.7
Residence		
Cairo	191	61.4
Outside Cairo	120	38.6
Marital Status		
Married	170	54.7
Others (single, divorced, widowed)	141	45.3
Employment		
Working	135	43.4
Not working	176	56.6
Family Income		
Adequate	107	34.1
Inadequate	204	65.6

Table II showed that there was a statistically significant difference in education level between women who have and have not had previous MS ($X^2=12.748$; $P < 0.05$). A high proportion of participants (81.82% and 60.54% respectively) in both groups their age ranged between 40 and 49. The same table showed that most of the study participants were from Cairo (65.91% and 59.64, respectively) among having and not having previous MS. No statistically significant difference was found in relation to family income ($X^2=2.300$; $P =0.146$). In the same table a high proportion of participants (58.1%)of group having previous MS influenced by their neighbors to practice MS, whereas 32.7% in group not having previous MS were influenced by family members to practice MS which indicated significant differences ($P <0.05$). Family history of breast cancer was statistically contributor to participation in MS ($X^2 =23.630$; $P =0.000$).

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TABLE II
BIVARIATE RELATIONSHIPS BETWEEN PARTICIPANTS' CHARACTERISTICS AND HAVING MS* (N=311)

Patients characteristics	Having previous MS (n=88)		Not having previous MS (n=223)		Statistics		
	No.	%	No.	%	X^2	df	*P* value
Age group							
40-49	72	81.82	135	60.54	13.129	2	0.001*
50-59	13	14.77	77	34.53			
60+above	3	3.41	11	4.93			
Marital status							
Married	43	48.86	127	56.95	1.665	1	0.208
Others (Single, divorced, widowed)	45	51.14	96	43.05			
Residence							
From Cairo	58	65.91	133	59.64	1.046	1	0.366
Outside Cairo	30	34.09	90	40.36			
Level of Education							
Cannot read and write	17	19.32	90	40.36	12.748	2	*0.002
Primary and preparatory	43	48.86	75	33.63			
Secondary and above	28	31.82	58	26.01			
Occupation							
Working	32	36.36	103	46.19	2.479	1	0.128
Not working	56	63.64	120	53.81			
Family income							
Adequate	36	40.91	71	31.84	2.300	1	0.146
Inadequate	52	59.09	152	68.16			
Influence of others to practice MS							
Family members	9	20.9	35	32.7	10.823	3	*0.013
Close friends	7	16.3	9	8.4			
Neighbors	25	58.1	41	38.3			
Doctors/ Media	2	4.7	22	20.6			
Family history of breast cancer							
Yes	60	68.18	84	37.67	23.630	1	*0.000
No	28	31.82	139	62.33			
Reason for mammography							
Physician referral	69	78.41	186	83.41	1.068	1	0.327
Self-referral	19	21.59	37	16.59			

MS =mammography screening;* Significant at P < 0.05

The results of logistic regression analysis in Table III indicated three significant odd ratios with TTM variables related with mammography. Women with intention to have a future mammogram were one time more likely to have had mammography than women with no intention (OR=1.404, 95% CI 0.809, 2.436). The same table indicated that women who read about mammography had a higher OR (0.949) compared with women who did not read. Also women practicing MS based on physician referral had a higher OR (1.384) compared with self-referral.

IV. DISCUSSION

Breast cancer is considered as a substantial health concern, which has an enormous diverse effect on the Egyptian woman's health as a result of late detection and late treatment. Breast screening by mammography is inconsiderate among Egyptian women. In Egypt, few researches were conducted to evaluate the factors associated with MS behaviors [4] Therefore it was essential to conduct the current study.

TABLE III
ASSOCIATION BETWEEN HAVING MS AND SELECTED ITEMS RELATED TO BEHAVIOR CHANGE MODEL (TTM) BY USING LOGISTIC ANALYSIS

Variables	LR test		OR	95% CI for OR
	X^2	*P* value		
Intention to have a future mammogram(contemplation phase)				
Yes				
No	1.453	0.228	1.404	(0.809-2.436)
Read about mammography (Preparation)				
Yes				
No	0.043	0.836	0.949	(0.579-1.557)
Reason for mammography(Action)				
Physician referral				
Self referral	1.062	0.303	1.384	(0.746-2.569)
Intention to maintain regular participation in MS(Maintenance phase)				
Yes			.325	(0.088-1.200)
No	4.071	0.131	.283	(0.0782-0.972)
Do not know				

* Significant at P < 0.05
CI=Confidence interval; OR=Odds Ratio; LR= Likelihood Ratio;
MS=Mammography screening; TTM=Trans-theoretical model

Our study's results showed that the majority of participants aged from 40 to 49 years; and there was a significant association detected in relation to practicing MS. This finding is similar to other study that was conducted in countries with limited resources, which reported that the value of mammography for women is beneficial for women aged 40 to 49 years [25]. In a study that carried out among Sirlankan women, it was observed that age above 50 years was associated with screening participation; which is incongruent with our study. Furthermore, in a study conducted in Taiwan was reported that older women have a relatively high probability of undergoing MS [26]. Other researchers conducted study on Chinese American women to assess breast cancer early detection in Philadelphia area reported that women aged 40 and older ever had a mammogram [27]. On the other hand study conducted in USA on Korean immigrants to identify cultural factors as a prediction for mammography behaviors pointed out that women aged 60 to 69 years had higher MS rate than younger women [28]. In the same line a recent study [29] conducted on Asian women stated that older women tends to use mammography services more often. The rate of MS for this study was consistent with previous studies as the rate was somewhat higher that 4% reported by [30] and less than 6% reported by [31]. The reason for low participation in MS may be due to insufficient knowledge of women about breast cancer and related risk age group. In Egypt, MS is not considered as a routine screening procedure for breast cancer and most of doctors described it as a diagnostic procedure particularly for women with low social class when a problem discovered. Several studies [29], [32]-[35] stated that higher education is significantly associated with higher participation in MS. In this current study the researchers found similar finding however, in the present study the higher percentage of participants had a middle educational level not higher and this finding is consistent with previous studies [32], [36], [37] which highlighted that mammography participation decreases with increase educational level.

Our study indicated no significant association between family income and having mammography which is

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incongruent with a study conducted on Korean American elderly women to evaluate breast and cervical cancer screening which found that family income is considered as an important variable associated with participation in MS [38]. On the other hand a study conducted in Turkey examined variables related to breast cancer screening behaviors reported no significant association between family income and having mammography which is similar to our findings [39]. In all social classes the cost of the procedure has been identified as an important factor of mammography use [40]. Therefore health programs are needed especially for women with inadequate income. In Egypt although MS programs are limited, annual MS has recently recommended for women above 40 years of age [19]. As regards marital status and occupation, our findings indicated that there was no significant association with having mammography and these findings similar with other study conducted in Turkey [39]. Other influential factors such as family members, close friends, neighbors, doctors/nurses and media were found to be significantly meaningful and out data indicated that neighbors and family members were the highest influential factors that affect others to practice MS. Neighbors as influential factor to MS has not been examined previously in any other research. So we believe ours is the first study to examine it. As regards family members [41] pointed out that encouragement to have a mammogram by family members was positively meaningful and this finding was similar to our study. In Egyptian community, neighbors used to visit and support each other and these feelings expressed by many participants and observed by the researchers that many of women were attended the unit accompanied by their neighbors and family members. In addition a recent study [42] pointed out that influence arising from interview's interaction with their social networks appeared to be essential importance in relation to MS behaviors. In the same line other researchers [43] have published similar findings. Other researchers [44], [45] have published data related to the role of close friends in the formation of women views in relation to breast screening and reported a significant association which is similar to our study. Our data also demonstrated that media and doctor were found to be the least influential factors of women to practice MS. This finding is consistent with a previous study conducted to identify factors that influence MS behaviors among Greek women which reported that media and doctors appeared not to be of the same importance of social network members such as family members [42]. The same study also added that interaction with personal doctors is considered as an important factor that influences women to practice MS. So applying effective communication with woman that conceives her to practice MS is essential and should be implemented by all doctors in the same field. Therefore, building a trust relationship that encourages women to practice in MS is essential role of health care team. These findings are also supported with a previous study [46] carried out to investigate instrumental versus communicative action.

Our data demonstrated that family history of breast cancer increased in women with having previous mammogram which is similar to a previous study [47]. In the same line a recent study [29] carried out to identify the factors that affect women's choice in participation in MS pointed out similar findings. Other researchers [39] highlighted that no significant association between family history of breast cancer and practicing mammography which is incongruent with our findings. As regards the reason behind practicing mammography or not, the present study showed that physician referral was associated with having mammogram. Other researchers [39] published significant association between physician referral and mammography use. On the other hand [29] reported that self referral for MS is also an important factor in having mammogram. However [37], [40] stated that increased participation of women in MS if recommended by a health care providers which is congruent with our study. This is because an internal motivation to keep healthy may play a key role in self referral and affects the women behaviors. In Egypt performing mammography requires doctors' referral. So, referral is necessary and a low rate of MS is caused as a result of lack of doctors' referral and women come only if the problem occurred. So efforts to educate the health care providers, particularly physicians should emphasize the importance of mammography referral.

In examining the variables related to model of behavior change and practicing MS we found a significant association between read about mammography and practicing MS. This finding is consistent with previous studies [38], [48]. This finding is also supported by previous study [49] stated that knowledge of mammography is important factor of use it. Nurses should provide women with sufficient information on breast cancer screening behaviors and modalities of early detection and one of the important modality is MS because nurses play a significant role in all health programs. Other variables such as intention to have mammography were found to be associated with mammography use. In the same line other researchers indicated that women have intention to be screened if they have sufficient views about an action (such as mammography), and recognize that significant others viewed mammography positively and think that they have control over practicing mammography [50].

Limitation:

Despite the fact that the findings of this study cannot be generalized to all Egyptian women with MS due to the use of convenience and small sample, publication of these findings could help the future studies to use the TTM in a different perspective. A further limitation related to the participants level of education, which could have influenced their reports regarding MS behaviors.

V. CONCLUSION

The aim of this study was to identify factors that are linked to MS behaviors among the Egyptian women. Many factors that influence the uptake of MS were found among Egyptian women; such as age, level of education and family history. Also encouragement to have a mammogram by neighbors and

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family members was reported in this study as a positive factor to have MS.

In order to enhance the role of multidisciplinary team, doctors and nurses should encourage women to participate in early detection of breast cancer through effective screening program such as MS. This could be enhanced by providing sufficient information based on women needs and should be communicated in a simple way. Brochures describing the benefits of MS on reducing the threats to health are prepared and distributed by the researchers to all participated women as well as their neighbors and family members who were attending the unit.

Recommendations:

Based on the results of the current study we recommend that future studies with large sample from different regions of Egypt are required. Also further studies are needed to examine the relation between TTM and mammography use all over the world. So advancement of theories related to behavior change will be more clearly communicated in the literature.

In order to provide women with useful information, the health care team particularly doctors should focus on improving way of communication with women. Future research is recommended to explore physician role regarding women referral to undergo MS especially for those who are above 40 years. Also physicians should be enthusiastic when making women referral. In addition the finding of the current study could form the basis of future research on examining the women to have MS and change their behaviors.

The government should use various media in collaboration with a multidisciplinary team to highlight the importance of MS and women need to be reminded that early detection of breast cancer can reduce the threat of health. Regular and organized events by nurses to deliver educational programs related to early detection of breast cancer is highly recommended.

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