

## RESEARCH COMMUNICATION

# Effects of Health Beliefs about Mammography and Breast Cancer and Telephone Reminders on Re-screening in Turkey

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### Abstract

**Objective.** To assess the effect of telephone reminders on repeat screening mammogram completion among women who have already had one or more mammograms. **Methods.** Seven hundred and forty women whose turn came for further mammography and who could be reached by telephone out of 1,372 women registered at a Cancer Screening and Education Center (CSEC) were studied in Erzurum, Turkey, from January to June 2008. **Results.** Before reminders with the telephone, of the 740 women, while only 29 (3.9%) had mammograms, after telephone reminders, approximately half of the women (46.4%) received mammograms by coming to the CSEC. Level of awareness of risk of breast cancer, intention, marital status, perceived mammography barriers were factors impacting on behavior. **Conclusion:** It was found that reminding women registered at the mammography center of their appointments was effective in reinforcing behavior. Health professionals can, through reminder and guidance, reduce the level of perceived barriers related to having a mammography and secure continuity in mammography check-ups.

**Keywords:** Breast cancer awareness - mammography re-screening - telephone reminders - Turkey

*Asian Pacific J Cancer Prev*, 12, 1445-1450

### Introduction

Breast cancer is the most frequently encountered and fatal cancer type in women (Juan et al., 2004). Breast cancer in Turkey is in the first place with 39.1 in 100.000 among the entire cancer incidences seen in women (Cancer Fighting Department of Health Ministry of Turkey, 2006). The most important diagnosis method in reducing breast cancer mortality is mammography (Tuncer, 2007). Mammography reduces the mortality risk of women between 50 and 69 years of age by 20 to 35% and those between 40 and 49 years of age by 15% (Qaseem et al., 2007). As a large portion of breast cancers (25%) are seen between the ages 40 and 50, it is of great importance to detect the cancer at an early stage (American Cancer Society, 2006). The American Cancer Society recommends that asymptomatic women should have mammography every year after 40 years of age (American Cancer Society, 2010).

Due to its cost, the routine program of Turkey for mammography screening is once in two years for 50 to 69 year old women, but 40 to 49 year old women may also have mammography (Health Ministry of Turkey, 2004). With regular mammography, breast cancer is detected at an early stage and women can have the chance of having a long and healthy life. However, most women fail to have their mammography on a regular basis. Some studies revealed that women tend to have lower participation in

mammography after the initial one (Rakowski et al., 1993; Miller and Champion, 1996). In a study by Champion (1992), mammography dependency in women 40 years old and older was determined to be 43%, while this rate was found to be 37% in a study by Rakowski et al. (1993) and in another study looking at women who were 51 years old and older, Zapka et al. (1991) found this rate to be lower (20%).

In a study by Miller et al. (1996) the rate of women getting mammograms was 84.7%, however, this rate dropped to 20.6%, 3 years later and in the same study, the dependency rate on mammograms decreased with increased age. In a study made by Rodriguez et al. (1995) to reveal the factors influencing enrollment and continuation in breast cancer screening programs, the factors that hinder enrollment and continuation in the program were found to be forgetting the invitation, being occupied with family-personal problems, and thinking that such screening is not important. Rakowski et al. (2004) further found that those with lower income and education levels, not having health insurance, being unmarried, having inadequate information on screening intervals, lacking an advice giver, and with lower risk of having breast cancer had lower rates of having their mammography.

In their study involving 625 women at and above the age of 50 who routinely had and did not have their mammography, Carney et al. (2002) found that

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those women who had a negative experience of their previous mammography had lower rates of having their mammography. In their study, where Russell et al. (2006) looked at 602 women who had at least 1 mammogram in the past 5 years, they determined that the perception of susceptibility and benefit was not important in mammogram screening, only the perception of low barrier increased mammograms that were shot. The study of Rutten and Iannotti (2003) revealed that perceived benefit (OR=1.51), susceptibility (OR=1.41) and barriers (OR=0.79) related to mammography were important factors in mammography compliance.

Women's intention to have their mammography increased the number of mammography screening nearly twice as much in the study of Mayne and Earp (2003) and two and a half times in the study of Crane et al. (1998). In the study of Lechner et al. (1997) where they took the Planned Behavior Theory as the basis, it was found that intention increased routine participation in breast cancer screenings twice as much.

Multiple theoretical bases have been proposed in order to explain the change in the health-related behavior. Among these, Health Belief Model, Planned Behavior Model and Development of Health Models refer to cognitive perception factors in promoting and maintaining health promoting behaviors. Of these models, the most frequently use one is the Health Belief Model and it constitutes the theoretical framework of this study. A majority of researchers studying the factors affecting breast cancer screening behaviors, utilized the Health Belief Model in order to explain breast cancer screening behavior (Lee and Vogel 1995; Karayurt and Dramalı 2003; Wu and Yu 2003; Gozum and Aydin 2004; Seckinli and Nahcivan 2004).

Health beliefs and attitudes play a very significant role in women's having their mammography in the recommended intervals (Taylor et al., 1995). In other words, positive or negative knowledge and beliefs related to mammography have an influence on undergoing regular mammography. In order to encourage women who had their initial mammography to repeat it in periodic intervals, it is important to know the reasons why they fail to come for a mammography and to take measures accordingly. It is more difficult for human beings to sustain a behavioral change than to initiate a behavioral change relating to health. Nurses, being important practitioners of medical education, should closely follow the best strategies and the latest developments to have individuals to successfully initiate and maintain their behavioral changes relating to health. Therefore, a simple reminder to be made to the women whose mammography taking time is approaching may be a motivation for them to come for another mammography and may increase the rate of having routine mammography (Partin et al., 2005; Quinley et al., 2004).

It was found in the studies performed that when the screening center phoned women to remind their appointment, this has been effective in encouraging them to regularly have their mammography. Telephone calls have increased mammography compliance by helping women to change their perception of knowledge, risk,

barriers, benefit, etc (Champion et al., 2003; Champion et al., 2007; Valanis et al., 2002;). Healthcare professionals may contribute to initiation and sustained mammography by changing any negative thoughts and feelings towards mammography through education and consultancy.

This study of first aim was to assess the effect of telephone reminders on repeat screening mammogram completion among women who have already had one or more than one mammogram. The second goal of the study is to determine the effects of health beliefs related to breast cancer and mammography on the intent and behavior of getting mammograms again. The main target of this study is to secure the continuation of an acquired health behavior by increasing repeated mammography participation following the initial one.

## Materials and Methods

### *Design and Sample*

This study was carried out in a descriptive and prospective way. Data for the study was gathered in the center of the province of Erzurum between January and June 2008. The population of the study consists of 1372 women who had previously consulted Erzurum Cancer Screening and Education Center and had their mammography, whose telephone numbers were available, and whose second appointments were due as of January 2008. In the study, instead of using the sampling method, among the women who received mammograms since the establishment of Cancer Screening and Education Center (CSEC), 1050 women who were above 50 years old and it had been one year since their first mammogram, and women (n=322) who 40 years or older and it had been two years since their first mammogram, were all included in the study. During the study, a total of 632 people could not be reached due to 415 of them having the wrong telephone number, 185 of them not answering their phone or not volunteering, 29 of them having moved or being out of town and 3 of them having deceased. This study is based on the data from 740 women who could be reached out of the 1372 registered women (54.0%).

Among the 740 women who could be reached, 29 of them got mammograms voluntarily. Mean age of the women was 57.2 (SD=7.8), 86.7% of them were at the age of 51 or over, 40.1% were illiterate, 84.3% were married and 91.9% were not working.

### *Data collection tools*

In obtaining data to be used in the study, a descriptive form, a breast cancer risk assessment form, and the Health Belief Model Scale for Breast Cancer and its Screening were used. The descriptive form consisted of 15 questions and the first 6 questions inquired about the socio-demographic characteristics of the women (age, marital status, education, occupation, income, etc.) and the other questions concerned whether the women were aware of the methods for early detection, whether there was any cancer in the family, the different reasons for undergoing the previous mammography, the date of the last mammography taken and whether they intended to have further mammography.

The “Breast Cancer Risk Assessment Form” which was developed by the American Cancer Society and accepted and recommended to be used in Turkey by the Ministry of Health consists of six sections and 20 items. This objective in the form, which is used to determine the breast cancer risk level, the age, family history of breast cancer, personal history of breast cancer, birth giving age, menstrual history and body structure of women are taken into consideration to classify them as “low”, “moderate”, “high” and “the highest” according to the risk level. Below 200 points is assessed as “low risk”, 201 to 300 points as “moderate risk”, 301 to 400 points as “high risk” and 400 or more points as “the highest risk”( Spence, 2000; National Family Planning Services Guide, 2000; Aslan and Gurkan 2007).

The Champion’s health belief model scale (CHBMS) was developed in 1984 and revised three times (Champion, 1984, 1993, 1999; Champion and Scott, 1997). The latest version of the scale was adapted for Turkish use by Gozum and Aydin (2004) and Karayurt (2003). For this study, the form adapted by Gozum and Aydin (2004) was used. The CHBMS for breast cancer screening is a commonly used instrument to measure the health belief model (HBM) variables of susceptibility, seriousness, benefits, barriers, and health motivation associated with breast cancer screening (Champion and Scott, 1997). Based upon the HBM, Champion developed the revised CHBMS associated with breast cancer, mammography and BSE (Champion, 1984, 1993, 1999; Champion and Scott, 1997). This study used all sub-dimensions except three related to Breast Self Examination (BSE), since BSE was not being used; “susceptibility” (3 item)”, “seriousness (6 item)”, “health motivation” (5 item)”, mamography benefits (5 item),” and” mammography barriers” (11 item). In this study, breast cancer related “susceptibility”, “seriousness”, “health motivation”, mammography related “benefits” and “barriers”, for a total of 5 sub-dimensions (30 items) were used. The scale is a Likert-type tool with the scores ranging from 1 to 5. On this scale, “strongly disagree” response is evaluated as 1 point, “disagree” as 2 points, “neutral” as 3 points, “agree” as 4 points and “strongly agree” as 5 points. An increase in the score, indicate increased susceptibility and care, benefits for benefit perception, barriers for barrier perceptions are perceived to be high. In the study, Cronbach’s Alpha coefficients were found between .72 and .92. (susceptibility .91, seriousness .92, health motivation .72, mamography benefits .75, mammography barriers .79).

Data for the study was compiled by way of telephone interviews. The registered phones of women were called by the investigator and the surveys were collected through the phone. The data was gathered in a 6-month period between January and June 2008 by making an average of 6 calls a day. Each telephone interview lasted 20 minutes on the average and the telephone bill was paid by the investigator. Prior to telephone calls, women’s socio-demographic characteristics and the presence of cancer in the family are obtained from the CSEC records. Additionally, during the phone interviews, all women who were due or overdue for a mammogram were each given an

appointment to come to CSEC for a mammogram, whether or not they had the intention to keep the appointment. During such telephone interviews, appointments were made with the women whose mammography screening time has come or passed to consult the Cancer Screening and Education Center (CSEC). The statuses of women having their mammography after the telephone reminders were compiled from the records of the CSEC.

Data analysis

The statistical analyses of the data were carried out by using the package program called Statistical Package for Social Sciences (SPSS 10.0). The level of significance was accepted to be p<0.05. Cronbach Alpha, percentage and average were used in the study, and the t-test and logistic regression analysis were used in the independent groups.

Results

The majority of the women were found to have low levels of breast cancer risk (89.9%). Examining the reasons why women failed to have routine mamograms following the initial one, it was found that a large portion of them (31.8%) forgot their appointments. The others failed to have their mammography because they did not need or did not have any complaints (15.7%), did not know that mammography should be repeated (11.6%), had other problems besides mammography (9.5%), just neglected it (7.0%), were hurt during mammography (5.1%), did not have time (4.9%), were exposed to radiation (3.6%), were shy (3.5%) or were afraid that cancer would be found (3.4%)(Table 1).

It was found that not the intention to have mammography of women had a lower level of susceptibility and seriousness, health motivation and perceived benefit in relation to breast cancer, and a higher level of perceived barriers in relation to having their mammography. It is observed that the perceived susceptibility and seriousness of women related to breast cancer and their health motivations were higher whereas the perceived barriers towards mammography was higher in women avoiding mammography. The level of perceived health belief in the benefits of mammography was found to be similar in both groups (Table 2).

All the variables (sociodemographic, risk level and

**Table 1. Breakdown of Reasons for Failing to Undergo Mammography after the Initial One in Women**

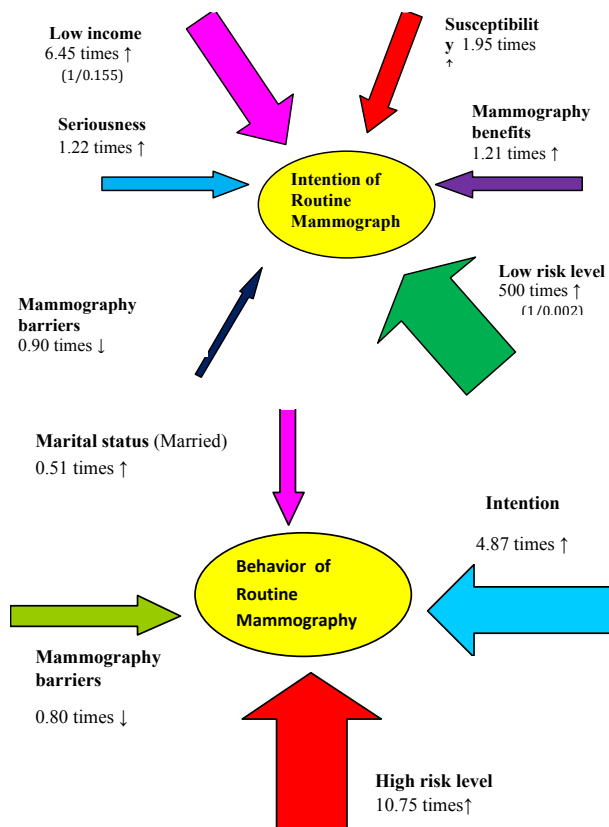
Reasons	n	%
No need, no complaints	116	15.7
I neglected it	52	7.0
I forgot about it	235	31.8
I was afraid to have cancer	25	3.4
I am not knowledgeable enough	86	11.6
I have other problems	70	9.5
I do not have time	36	4.9
I did not want to be exposed to radiation	27	3.6
Mammography screening hurts me	38	5.1
I was shy	26	3.5

More than one answer given and 29 women who have routine mammography not included

**Table 2. Effect of Health Beliefs of Women Relating to Breast Cancer and Mammography on their Intention and Behavior of Having their Mammography\***

Sub-dimensions	Intention		t	P	Having mammography		t	P
	Yes (N:625)	No (N:86)			Yes (N:330)	No (N:381)		
Susceptibility	8.64±2.52	5.74±1.75	-10.307	0.000	8.96±2.56	7.80±2.60	-6.079	0.000
Seriousness	21.25±5.03	13.53±4.60	-13.468	0.000	21.80±4.88	19.16±5.83	-6.651	0.000
Health motiv.	20.17±2.32	17.61±3.22	-9.071	0.000	20.50±2.33	19.37±2.68	-6.104	0.000
M. benefits	19.42±1.61	18.83±2.32	-2.973	0.003	19.43±1.68	19.25±1.73	-1.854	0.064
M. barriers	29.05±4.08	31.06±5.31	4.120	0.000	27.49±4.04	30.90±3.93	11.622	0.000

\*Reminded by telephone before the 29 women who have routine mammography is not included.



**Figure 1. Factors Affecting a) Intention and b) Behaviour of Women to have Routine Mammography**

health beliefs) in the study were put through regression analysis. According to the logistic regression analysis that was carried out the intention to have mammography is increased 1.95 times by perceived susceptibility, 1.22 times by perceived seriousness and 1.21 times by perceived benefit of mammography, and is reduced 0.90 times by perceived barriers of mammography (Figure 1 a). The logistic regression analysis shows that, from the health beliefs relating to breast cancer and mammography, the perceived barriers to mammography alone is a significant factor influencing undergoing a mammography. A high level of perceived barriers to mammography was found to reduce mammography screening 0.80 times. Behavior of having a mammography was affected 10.5 times by a high level of breast cancer risk, 4.8 times by intention, and 0.5 times by marital status (Figure 1b).

**Discussion**

The effects of sociodemographic characteristics and health beliefs of women on the intent and behavior of

obtaining mammograms are discussed together. Although it is notable in this study that the behavior of having mammography was less in women aged 60 and over and in those with lower education, the results of the logistic regression analysis reveals that age, education and employment are not significant variables.

It was observed in the study that married women had more behavior of having mammography than those who lost or divorced their spouses, lived away from them or never got married. Being single or living alone affects negatively the behavior of having a mammography. Although, in their study, Juon et al. (2002) state that the marital status of women did not influence them getting mammograms, in many other studies, the rate of mammograms were lower in single women, the married ones were determined to receive more mammograms with social support from their spouse and family (Crane et al., 1998; Duport et al., 2008; Rodriguez et al., 1995;). This result shows that women living away from their spouses for some reason need more support for mammography screening.

It was found in this study that women who accepted that breast cancer was a serious problem (perceived seriousness they themselves had the possibility of having breast cancer (perceived susceptibility) and mammography was effective in detecting breast cancer at an early stage (perceived benefits of mammography) had greater intention of having a mammography. Perceived barriers to mammography, besides being a factor accounting for both the intention of having a mammography and the behavior of having a mammography, is the sole factor from the health beliefs that affect the behavior of having a mammography.

According to the Health Belief Model theory, a high level of perceived barriers has a negative impact on the behavior (Health Belief Model, 2008). It was found in many studies that women who failed to have a mammography had a higher perceived barriers than those who had their mammography; in other words, women who had their mammography on a regular basis had a lower level of perceived impediment (Miller and Champion 1996; Secginli and Nahcivan, 2006; Avci and Kurt, 2008) and such perceived barriers was further decreased by education and guidance (Akçay et al., 2005, Gözüm et al., 2010). Although in many studies mammogram benefit, susceptibility, seriousness perceptions were found to be important factors in adherence to mammography (Champion et al., 2000; Rutten and Iannotti 2003), they were not found to be significant in this study. Similar to this study, in a study where Russell et al. (2006) looked

at 602 women who received at least 1 mammogram in the last 5 years, susceptibility and benefit perception were not important in routine mammogram screenings, only low barrier perception increased mammograms. It was found that the level of breast cancer risk was a factor determining both the intention of women to have a mammography and the behavior of having a mammography. Women with high risk of breast cancer have a lower intention of having a mammography but the number of times they actually had their mammography is more. This situation may be the result of the fact that women who find themselves at risk of having breast cancer have already passed the stage of intention that is followed by behavior. In fact, the rate of those with high risk in having their mammography after a telephone reminder is approximately 11 times as much as those with low and moderate risk. Although we have not encountered any study in literature about the effect of breast cancer risk level on the intention of having a mammography, there are a large number of studies (Gross 2000; Rakowski et al., 2004; Taylor et al 1995) showing that women with high level of perceived risk have their mammography on a more regular basis as also shown in this study. Similarly, it was underlined in Taylor et al's study (1995) that a high level of personal risk perception affected undergoing a mammography 1.8 times and a family history of breast cancer affected it 1.1 times. It is important to identify individuals with high risk of breast cancer so that they can be diagnosed and treated at an early stage. Since individuals' consciousness of being at risk influences positively their participation in screening programs, health professionals should, during their individual educations, determine women's risk level and share the result with them.

The intention of having a mammography was found to be a significant factor (OR=4.8) determining the behavior in this study (Table 6). Women's intention to have their mammography increased the rate of undergoing mammography nearly twice as much in the study of Mayne and Earp (2003) and two and a half times in the study of Crane et al. (1998). In the study of Lechner et al. (1997) where they took the Planned Behavior Theory as the basis, it was found that intention increased routine participation in breast cancer screenings twice as much. While a great majority of the women included in the study (87.9%) expressed their intention to have further mammography, almost none of the asymptomatic women made any attempt to have routine mammography before they were called by phone.

In the study of Champion et al. (2000), reminders by telephone (OR=2.1) and in person (OR=2.8) changed perceived susceptibility, benefit and barriers in women increasing their compliance with mammography.

Based on the research results, among the women called with the telephone, while 87.9% of them had intentions of receiving a mammogram again, approximately half (46.4%) got routine mammograms. In women, the likelihood of getting a mammogram increased 5 times.

While the intention of receiving a mammogram in women was affected by breast cancer risk level, income status, susceptibility, mammography benefit and mammography barrier perception; breast cancer risk level,

intent, mammography barrier perception and marital status affected the behavior of getting a mammogram. Intent should be considered as an important factor influencing behavior, and in women who have the intention of receiving a mammogram, reminders should be used to ensure the continuation of mammographs.

The result of our study; indicates that before reminders with the telephone, of the 740 women, while only 29 (3.9%) had mammograms, after telephone reminders, approximately half of the women (46.4%) received mammograms by coming to CSEC, which shows the effectiveness of mammography reminders. Reminding women registered at the mammography center of their appointments may increase mammography compliance. Telephone may be used by screening centers for this purpose.

## Acknowledgements

This manuscript is based on master thesis of first author under supervision second author. This study was presented two international congress, "12th World Congress on Public Health April 27-May-1 2009, İstanbul" and "The 17th International Meeting of the European Society of the Gynaecological Oncology (ESGO), September 11-14, 2011, Milan, Italy" None of the authors have any conflicts of interests.

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