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The Participation Rate and Contributing Factors of Screening Mammography Among (capitalize) Female Faculty Physicians in Tehran, Iran

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Abstract

Background: Lower rate of mammography in Iranian women was reported compared to the rates reported from developed countries. Therefore, we aimed to evaluate the rate of mammography in female academics of Tehran University of medical sciences (TUMS) and its influential factors according to Champion health belief model questionnaire.
Methods: In this descriptive survey conducted in 2015, the standardized short version of Champion health belief model questionnaire was used to gather information from 99 female academics of TUMS. Further collected data included demographic characteristics of the subjects, past medical history, previous diseases affecting breast and personal knowledge about breast cancer screening.
Results: Among the participants, who were 40 years and older, only 3.7% underwent annual mammography and only 22% of those aged over 45 underwent mammography every three years. Comparison between the two groups according to Champion health belief model revealed significant difference in the mammography benefits and barriers while the scores from susceptibility, severity, breast self-examination (BSE) Barriers, BSE Benefits and BSE Self-Efficacy did not differ significantly between the two groups.
Discussion: Surprisingly, the rate of mammography among attending physicians of TUMS was found to be similar to the rest of Iranian female population and considerably lower than the figures reported in developed countries.

Keywords: Breast Cancer, Cancer Prevention, Cancer Screening, Mammography

1. Background

Breast cancer is the most common cancer among the female population and its prevalence is increasing worldwide (1, 2). Only after lung cancer, it is the most fatal malignancy based on world health organization (WHO) reports (3). Developing countries share a bigger fraction of breast cancer prevalence and mortality compared to higher income western countries (4). Iran is of no exception where Harirchi et al. reported the mean age of developing breast cancer to be 10 years less than the developed countries (5).

The most effective measure to take for decreasing the breast cancer mortality is early diagnosis through routine screening that may increase the 5-year survival up to 95% (6). In their previous guidelines, the American cancer society mentioned three main breast cancer screening methods for women with life-long risk of less than 10% including annual mammography after the age of 40, clinical breast examination (CBE) every three years after the age of 20 and every year after the age of 40 and breast self-examination (BSE) in women 20 years and older (7). However, United States centers for disease control and prevention (CDC) has declared the ineffectiveness of CBE and BSE on mortality rates and recommended mammography as the only screening tool that can decrease the mortality (8). Accordingly, mammography has been established as the most effective screening method for early diagnosis of breast cancer; however, no consensus has been reached regarding its proper frequency.

Despite the importance of screening in early diagnosis of breast cancer, its rate is still very low among Iranian women as little as 4%. Consequently, various surveys tried

to find the reason for such low participation but no comprehensive study has been conducted yet. A number of explanations have been made as a result of these studies including lack of knowledge about mammography benefits or no recommendation from the physicians being the most cited (9, 10).

Regarding the undeniable role of physicians in increasing the rate of breast cancer screening among women and based on the popular quote stating that actions are better than words, we aimed to evaluate the rate of mammography in female academics of Tehran University of medical sciences and its influential factors according to Champion health belief model questionnaire (CHBM).

2. Methods

This descriptive survey was conducted to assess the prevalence of screening mammography and its contributing factors among female physicians working at Tehran University of Medical Sciences in 2015. Thsu the study population was planned to comprise of female physicians working as faculty members with no past medical history of malignant or premalignant breast lesions. The eligible subjects were female physicians working at Tehran University of Medical Sciences excluding those with past medical history of malignant or premalignant breast lesions or those not willing to participate. The study design was confirmed by institutional ethics committee and review board to make sure it is in agreement with the declaration of Helsinki (ethical code: 86100330-110864).

The list of faculty members of Tehran University of Medical Sciences was obtained from the university's due website and the eligible subjects were classified into blocks according to their age and specialty. Subsequently, the sample population was selected through cluster random sampling method. Based on the following formula for sample size calculation, and previous studies that reported the participation probability as 12% (11), a minimum of 83 subjects were required for this survey (α = 0.05 and expected power = 80%). Data were gathered through self-reported questionnaires composed of two main parts: the first consisted of 65 questions designed by the authors in three different sections to gather information on the following subjects: 1) demographic characteristics of the participants; 2) past medical history of breast diseases and other malignancies; and 3) the participants' adhesion to mammography and BSE. The third section of the questionnaire addressed mammography and BSE in the subjects. Regarding the disagreements between the presented guidelines for breast cancer screening (12-16), in order to find whether the subjects were following these protocols, we compared our results with the two ends of the spectrum. Thus, we assumed two hypothetical protocols. The first more strict protocol recommended women to obtain mammograms every year after the age of 40. The second more permissive protocol suggested performing mammography every 3 years in women older than 45 years which is easier than any of the present guidelines, meaning that if a subject is not adhering to this protocol, she is not doing well according to any of these guidelines.

The second part was a standardized modified version of Champion health belief model questionnaire, whose validity and reliability were verified earlier by the authors (17). This part consisted of 28 questions covering eight concepts including susceptibility, severity, BSE benefits, BSE barriers, BSE self-efficacy, health status, mammography benefits and mammography barriers.

Faculty members were contacted and the aims and methods of the survey were thoroughly explained to them. The questionnaires were delivered to the participants, and after a 10-day interval, were collected in enclosed anonymous nontransparent envelopes. Data were extracted from the questionnaire and were coded then inserted into statistical software. We used Chi-squared test and, if needed, Fisher's exact test for qualitative variables along with t-Test and ANOVA test for quantitative variables. The differences at the level of $P < 0.05$ were considered statistically significant. All the analytical tasks were carried out using SPSS statistical package version 20 for windows (IBM corporation, Chicago, IL).

3. Results

Altogether, 104 questionnaires were obtained, 5 of which were not answered. Ultimately, then, 99 physicians had answered the questionnaires completely and formed the study population.

3.1. First Part

3.1.1. Demographic Data

The study population comprised of faculty members with various specialties (Table 1). Due to the low number of physicians in some specialties, for easier analysis, subjects were categorized into four groups of to a higher extent related specialties; 1. gynecology, surgery and anesthesiology with 30 (30.3%) subjects, 2. internal medicine, pediatrics, neurology and cardiology with 51 (51.5%) subjects, 3. pathology, radiology and nuclear medicine with 12 (12.1%) subjects, and 4. the rest 6 (6.1%) of physicians. Accordingly, 63 (63.6%) subjects were assistant professors, 28 (28.3%) were associate professors and 8 (8.1%) were professors.

The mean age of the included physicians was 47.79 $\pm$ 8.19 years (range: 31 - 76). The distribution of subjects based

Table 1. Section 1 of the Questionnaire

	No. (%)
Age Groups	
Under 40	13 (13.1)
40 to 44	18 (18.2)
45 to 49	31 (31.3)
Above 50	37 (37.4)
Specialty	
Gynecologist	22 (22.2)
Radiologist	5 (5.1)
Internist	19 (19.2)
Pediatricians	19 (19.2)
Infectious diseases	8 (8.1)
Pathologist	6 (6.1)
Other	20 (20.1)
Marital Status	
Married	89 (89.9)
Single	6 (6.1)
Widowed	3 (3)
Divorced	1 (1)

Table 2. Section 2 of the Questionnaire

	No. (%)
History of benign breast disease	20 (20.2)
Fibrocyctic changes	10 (10.1)
Fibroadenoma	6 (6.1)
Lipoma	2 (2)
Microcalcification	1 (1.1)
Nonsepecified	1 (1.1)
Breast cancer history in surroundings	38 (38.4)
1st degree relatives	11 (11.1)
2nd degree relatives	19 (19.2)
Close friends	8 (8.1)
History of breast biopsy	
Fibroadenoma	3 (3)
Lipoma	2 (2)
Fibrocystic changes	7 (7.1)
Proliferative changes without atypia	1 (1)

on their age groups and marital status is depicted in Table 1.

The subjects were asked if they were working outside the public hospitals as well. The majority (72 subjects, 72.7%) answered "no", 10 subjects (10.1%) were working at their offices, 2 (2%) were working in a private hospital and 15 (15.2%) in both their office and a private hospital.

Considering their leisure time in a day, the mean figure was 3 ± 1.66 hours (range: 0-8).

3.1.2. Personal and Familial History of Breast Disease

The second section of the questionnaire addressed past medical history of breast diseases, positive familial history of breast cancer, and history of breast biopsy as presented in Table 2.

3.1.3. Participation in Mammography and BSE Screening Programs

In this section, 13 and 31 subjects younger than 40 and 45 years, respectively were excluded from strict and permissive protocols (mentioned in methods section) and analyses were performed on the remaining participants. Answering our first two questions in this section respectively, 15 (17%) and 21 (24.4%) subjects stated that they had regular mammograms or at least a mammogram in the past year, respectively. As our third question, the total number of mammograms was asked from the participants under 50 years old, while the total number of mammograms obtained in the last 10 years was inquired from the subjects older than 50. In order to be able to compare these findings, acquired figures were divided by the total number of mammograms recommended by two hypothetical protocols according to age of the subjects. The calculated ratio being equal or greater than 0.9 was regarded as satisfactory screening and its being less than 0.9 was regarded as non-satisfactory screening by the participant. Among the 86 subjects included in this analysis, only 3 (3.7%) reported the rates that were found to be satisfactory.

Comparison with the second more lenient guideline was performed on the 68 physicians older than 45. Of these subjects, 11 (16.2%) self-assessed their mammography schedules regular and 16 (23.5%) obtained a mammogram during the past year. Further analysis was also carried out similar to the first guideline and 15 (22.1%) physicians were found to have a satisfactory screening plan.

Considering self-assessment about BSE, 47 (47.5%) participants reported their breast self-examinations to be regular.

3.1.4. Knowledge of the Participants on Breast Cancer Screening

The fourth section comprised of 10 questions evaluating the knowledge of the participants about breast cancer screening. When asked about the recommended age for the first mammogram by the guidelines, 66% chose the age

of 40 and 82% chose an age including40 up to 50. In addition, when the subjects were asked about the suggested time interval between two consequent mammograms by the guidelines, 55% answered 1 year and 92% chose a number including 1 up to 3 years.

Responding to further questions, 88% participants believed that mammography can lead to a decrease in breast cancer mortality, 55% chose mammography as the suitable screening tool while 12% selected ultrasonography as the modality of choice for this means and 33% mentioned both mammography and ultrasonography. About 84% stated that mammography can lead to early diagnosis of breast cancer in its primary stages. Moreover, 47% of the physicians correctly believed that precise physical examination of the breast cannot decrease the frequency of mammography and 45% also correctly mentioned the ineffectiveness of ultrasonography on decreasing the frequency of mammography.

In addition, 16% of the subjects stated with certainty that regular mammograms do not increase the risk of breast cancer while a total of 54% agreed to this statement to some extents. 24% declared their definite disagreement with ineffectiveness of mammography on the final outcome while a total of 65% stated their disagreement. 41% of the physicians firmly agreed with recommendation of mammography to asymptomatic women without any family history of breast cancer and a total of 91% agreed to this statement to some extent.

To assess the knowledge of the participants, a total score was calculated by adding 1 point for each correct answer and for Likert questions, 1 point for each definite correct answer and 0.5 for each indefinite correct answer. The mean score was 6.32 $\pm$ 1.73 and nearly 30% of the participants got a score of less than 5.

3.2. Second Part

The second part of our data was gathered via a standardized short version of champion health belief model questionnaire whose validity and reliability was verified in our previous study (17). The scores of the subjects in the fields of susceptibility, severity, BSE benefits, BSE barriers, BSE self-efficacy, health status, mammography benefits and mammography barriers were calculated through the 5-scale Likert questions.

When subjects were classified into two groups of satisfactory screening and non-satisfactory screening according to the first aforementioned guideline, the number of participants in the satisfactory group was very low. So for the analyses to yield reasonable results, categorization of the subjects was based on the second protocol. Accordingly, the scores of the subjects in each concept of the model were compared between the two groups. Using independent samples t-Test, it was noted that only the differences observed between the mean scores of perceived mammography benefits and mammography barriers were statistically significant (Table 3).

Table 3. Differences Between the Two Groups Regarding Champion's Health Belief Model Constructs[a]

Screening Situation According to the Second Protocol	Satisfactory	Non Satisfactory	P Value (T. Test)
	15#	53#	
Susceptibility	1.9 ($\pm$ 0.986)	2.198 ($\pm$ 0.845)	0.249
Severity	2.6 ($\pm$ 1.168)	2.896 ($\pm$ 0.937)	0.31
BSE Benefits	3.756 ($\pm$ 0.859)	3.604 ($\pm$ 0.535)	0.524
BSE Barriers	1.983 ($\pm$ 0.729)	2.349 ($\pm$ 0.587)	0.052
BSE Self Efficacy	3.689 ($\pm$ 1.137)	3.252 ($\pm$ 1.103)	0.183
Health Status	3.833 ($\pm$ 0.805)	3.392 ($\pm$ 0.915)	0.095
Mammography Benefits	4.033 ($\pm$ 0.611)	3.528 ($\pm$ 0.648)	0.009
Mammography Barriers	2.28 ($\pm$ 0.632)	2.717 ($\pm$ 0.559)	0.012

[a]Values are expressed as mean $\pm$ SD.

The differences between the two groups regarding age, free time and knowledge score of the subjects were also evaluated (Table 4). As can be seen in only the difference in knowledge score was found to be statistically significant and physicians with satisfactory screening plans had considerably higher scores.

Table 4. Differences Between the Two Groups Regarding Age, Free Time and Knowledge Score[a]

Screening Situation According to the Second Protocol	Satisfactory	Non Satisfactory	P Value (T Test)
	15#	53#	
Age	51.87 ($\pm$ 5.222)	51.81 ($\pm$ 6.291)	0.975
Free Time	2.6 ($\pm$ 1.056)	3.183 ($\pm$ 1.636)	0.198
Knowledge Score	7.333 ($\pm$ 1.496)	6.057 ($\pm$ 1.82)	0.015

[a]Values are expressed as mean $\pm$ SD.

Other variables were also compared between the two groups. As presented in Table 5, physicians with a specialty categorized as internist had significantly higher rates of satisfactory screening plans (P = 0.026). Subjects with a

positive history of a benign breast disease ($P < 0.001$) and a positive history of breast biopsy ($P = 0.020$) had also significantly higher rates of satisfactory screening plans. On the other hand, scientific grading of the physicians, their private working, family history of breast cancer and performing regular breast self-examinations had no meaningful impact on the subjects adhering to a satisfactory breast cancer screening protocol.

Finally, the multivariate logistic regression analysis showed that none of the variables could independently affect the participation rate in routine screening mammography (Table 6).

4. Discussion

This study showed an unfavorable situation of breast cancer screening among Iranian physicians working in TUMS. Since breast cancer is the most prevalent cancer among female populations all around the world and regarding the established benefits of screening in its early diagnosis and treatment, major attention has been paid to various breast cancer screening methods, their efficacy and the extent to which people submit to them.

Unfortunately, no nationally representative data is available on the rate of breast cancer screening by mammography among Iranian women. Only few limited regional surveys have been conducted on this matter, which have presented disparate results. However, many of these studies have mentioned the role of physicians' not recommending routine mammography as a major obstacle to higher participation. Hence, we aimed to assess the rate of mammography in female faculty members of Tehran University of Medical Sciences in 2015 to get a glimpse of the status among educated populations.

According to the findings of this study, only 3.7% of the subjects over 40 years were undergoing annual mammography. Moreover, 78% of the participants aged over 45 years did not even obtain a mammogram every three years.

In this regard, Alavi et al. conducted a survey to evaluate the prevalence of cervical and breast cancer screening programs among 136 gynecologists participating in a conference in 2010 (11). They found that only 11.8% of these physicians obtained annual mammograms and 4.8% adhered to both screening programs. The difference observed between the two surveys might have been due to the fact that Alavi et al. evaluated the prevalence of screening based on self-assessment of the subjects and their declarations were not verified by the authors.

Moodi et al. in 2012 evaluated the rate of screening mammography using CHBM instrument among 384 participants, of whom 44.3% had performed at least one mammogram in their lifetime. Interestingly, only 14.3% of the above figure had their mammogram done in the last 2 years. In multivariate analysis to hear/read about breast cancer, to get menopause at lower ages and previous history of breast problem were independent factors of undergoing mammography (18). Aflakseir et al. in 2012 reported the rate of mammography among women working in Shiraz University to be 20%, but these authors had similarly evaluated self-assessment of the participants and no objective evaluation was performed (19).

Among 441 female health workers including 88 physicians, Shiryazdi et al. used CHBM to evaluate the rate and affecting factors of BSE and mammography in 2014. This study in Yazd province revealed that about 15% and 10% of subjects had undergone regular BSE and at least one mammogram, respectively. Of different CHBM subscales, only perceived susceptibility and benefits were significantly related to performance of BSE and mammography (9).

reported from other cities of Iran were quite similar to these results but the statistics presented by developed countries are significantly different. In a survey conducted in 2009 in England, 45 to 74 year-old women were invited to participate in a screening program with mammograms every three years. Accordingly, 73% of the invited subjects took part in this national screening program (20). Based on the reports presented by the department of health and human services in the United States of America in 2013, 65.7% of the women over 40 had obtained mammograms in the past two years. This figure was reported to be 29% in 1987 and has increased continuously during these years. The rate was 59% in 40 to 49 year-old women, 71% in 50 to 64 year-old women and 67% in subjects aged over 64 (14). In the report presented by American cancer society in 2013 as breast cancer facts and figures, 67% of women aged over 40 were found to have obtained mammograms in the past two years and 50% had done it in the last year (1).

It seems that the rate of mammography among Iranian physicians is quite similar to that of the normal population, but significantly lower than the rates reported by developed countries.

Additional qualitative studies among physicians regarding their beliefs comparing those performed in normal population (21) could help detection of these sources of variation.

The participants' knowledge about the recommended starting age for mammography and the suggested frequency according to breast cancer screening guidelines were found to be quite acceptable. Their knowledge on advantages of mammography was also found to be adequate. However, when asked about the role of ultrasonography in breast cancer screening, a great number of participants gave incorrect answers. So emphasizing on the fact that mammography is the only acceptable imaging modality

Table 5. Differences Between the Two Groups Regarding Demographic Characteristics of the Subject

Screening Situation According to the Second Protocol	Satisfactory 15#	Non Satisfactory 53#	P Value (T Test)
Scientific Grading			
Assistant P.	7	25	0.977
Associate P.	6	22	
Full P.	2	26	
Specialty Grouping			
Surgeons	1	22	0.026
Internist	10	25	
Paraclinician	3	2	
Other	1	4	
Private Working			
None	8	34	0.052
Office	1	9	
P. Hospital	2	0	
Both	4	10	
Benign Breast Disease			
Yes	8	5	0.001
No	7	48	
FH of Breast Cancer			
Yes	10	21	0.059
No	5	32	
History of Breast Biopsy			
Yes	5	4	0.020
No	10	49	
Performing Regular BSE			
Yes	5	10	0.197
No	10	43	

for breast cancer, screening seems to be of utmost importance. Although in specific cases, American Cancer Society has recommended MRI as an alternative for mammography, but in no cases ultrasonography has been suggested as an imaging modality of choice (1).

As for the Champion's health belief model concepts, the mean score of mammography benefits and mammography barriers was found to be significantly higher among the subjects with satisfactory screening adherence compared to subjects with non-satisfactory screening plans. On the other hand, the differences regarding other evaluated constructs were not statistically significant. These findings were congruent with the results of the survey conducted by Abbaszadeh et al. (22). Aflakseir et al. also found mammography barriers and physician's recommendation to be the sole factors significantly different between the two groups of participants with the physician's recommendation to have the strongest relation (OR = 5.1) (19).

On the contrary, Noroozi et al. found health motivation to be the only effective factor on adherence to screening by mammography (23). In the meta-analysis on 21 related articles by Azami-Aghdash et al., the most important reported barriers by women included lack of knowledge, access barriers (financial, geographical, cultural), fear (of results and pain), performance of service providers, women's beliefs, procrastination of screening, embarrassment, language problems, and previous negative experiences (24).

Correspondingly, accentuating the advantages of

Table 6. Multivariate Logistic Regression Analysis

	B	Wald	Sig.
Knowledge Score	0.489	3.05	0.081
Specialty Group			
Surgeon	-2.373	1.087	0.297
Internist	0.71	0.119	0.73
Paraclinic	3.456	1.892	0.169
Other	0b		
Private Sector Occupation			
No	-2.024	3.226	0.072
Office	-1.977	1.603	0.205
Hospital	18.41		
Both	0b		
History of Benign Disease			
Yes	2.2	2.99	0.084
No	0b		
Familial History of Breast Cancer			
Yes	1.185	1.182	0.277
No	0b		
History of Breast Biopsy with Benign Pathology			
Yes	-0.036	0.001	0.976
No	0b		

mammography and trying to resolve its barriers can lead to higher rates of breast cancer screening via this modality while other measures might not be as effective.

Scientific grading of the participants and their working at private section did not significantly affect the rate of mammography. The amount of free time was also reported to be ineffective so lack of free time might not be an acceptable excuse for women who do not undergo mammography. The specialty of the physician, positive history of a benign breast disease and a history of breast biopsy were found to influence the rate of mammography significantly but a family history of breast cancer and BSE were reported to be ineffective.

Moodi et al. found a significant relation between history of a benign breast disease and information about breast cancer with the rate of mammography (25). This suggests that a benign breast disease can increase the patients' awareness about breast health and can lead to a better adherence to screening protocols.

Finally, we aimed to assess the rate of mammography in female faculty members of Tehran University of Medical Sciences in 2015 and according to the findings of this survey, the rate of mammography among Iranian physicians is quite similar to the normal population and seems to be lower than expected. Development and influence of breast cancer screening programs would be very difficult unless a comprehensive protocol is established upon screening strategies and priorities. The importance of mammography as the only recommended screening method for breast cancer should also be emphasized in all the national meetings and conferences.

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Footnotes

Author's Contribution: Mohammad Saadat was responsible for idea formation, study designing and performing it and analysis of the data, as well as reviewing the article. Reza Ghaletaki was responsible for drafting and reviewing the article. Masoud Baikpour was responsible for

data gathering and contribute in analysis and drafting the article. Dorsay Sadeghian were responsible for data gathering and critical review and editing the manuscript. Alipasha Meysamie had significant contribution in revision of the article and design of study. Ahmad Kaviani was supervisor of project and contributed in design of study and performing it and critical editing and revision. All authors read and approved the final manuscript.

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