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# Quality of Medical Care in Mammography Divisions: A Report and Review of the Literature

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**Abstract:** The purpose of this study was to evaluate the quality of medical care and the status of radiological practice and equipment performance according to the protocols established by International Atomic Energy Agency (IAEA), in mammography divisions of Shiraz, Iran. In addition, a review of the literature is also presented. Five diagnostic mammography divisions, namely; Namazi, Faghihi, Hafez, Zeinabieh, and MRI were studied. Protocol related to staff and health physicist duties was investigated by arranging a standard questionnaire. Results showed that, approximately 47% of the staff had not passed necessary training in radiation protection and quality assurance radiation program in the beginning of their work. Moreover, about 80% of them had not their licenses renewed by attending the training classes again. More attention should be given to training and protection of the staff and quality control of the mammography machines and equipments.

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## 1. Introduction

Breast cancer is the first cancer leading to death in women in the world [1]. The survival rate of this cancer is stated to be about 56% [2]. Several studies have reported that breast cancer is the most common cancer and principal cause of cancer deaths in women and is therefore a world concern [1]. For example in Brazil, breast cancer is the leading cause of cancer deaths among women [3]. Among Turkish women, breast cancer represents 24.1% of all cancers and is the second leading cause of cancer-related deaths. About 2390 new cases of breast cancer were diagnosed in 1999 in Turkey [4]. Early diagnosis of breast cancer plays a critical role in reducing mortality rates and improving the patient's prognosis [5-7].

Mammography is an extremely useful technique for the detection of breast cancer [1]. An important goal in this imaging modality is to obtain the best diagnostic information by delivering the least radiation [8-11].

Primary randomized controlled trials have shown the importance of mammography in early diagnosis of breast cancer in asymptomatic women and it has been effective in decreasing mortality especially in women aged 50-69 years with reductions of 20% to 35% [12]. However, for the women who know about mammography, the costs involved are still very high which prevents them from going for it [13-17]. Besides the economic issues, other difficulties like fear of irradiation for those who know about it, limited availability of the service, anticipated pain, discomfort and anxiety about mammography also come into play [18]. It has been reported that an annual mammography for women over 50 years of age reduces mortality rate from breast cancer [19]. There is a wealth of literature reporting women's adherence to mammography including their knowledge, behavior and beliefs about breast cancer, knowledge of risk factors, attitudes and mammography [20]. There have been some improvements in encouragement of women to have mammograms [21-23]. Nevertheless, mammography remains underutilized by women although it can be effective in early detection of breast cancer.

Some protocols by International Atomic Energy Agency (IAEA) are involved in the process of optimizing the radiation used for imaging, which are related to the selection of appropriate imaging equipment, evaluation of equipment performance in the context of quality assurance programs, radiation protection principles and education of medical and technical staff on the appropriate imaging procedures and protocols [24, 25]. Considering these protocols, it

is essential to have comprehensive knowledge, attitude and practice of mammography in the divisions, stressing the importance of implementing it as a routine and preventive measure for early diagnosis of breast cancer [1, 26].

The aim of this study was to investigate the quality of medical care according to the radiation protection protocols established by IAEA in mammography division in Shiraz, Iran. In addition, a review of the literature is also presented.

## 2. Materials & methods

A questionnaire-based study was carried out in 5 diagnostic mammography divisions of Shiraz namely Namazi, Faghihi, Hafez, Zeinabieh, and MRI. A total of 30 women staff were interviewed between February 2008 to March 2008. All them were asked to participate in the study. Refusal rate to participate was very low.

The above mentioned questionnaire consisted 6 main categories. First, the audience were asked about radiation dose measurement units. The second part questions were about the Annual Maximum Permissible Dose (AMPD) [8, 9], the necessary training in regards to the procedures and quality assurance and radiation program in the beginning of the work made the third and fourth ones. The fifth part of the questions was about renewing the licenses. Moreover, the last question was about the status of film badge service. Then the questionnaires were reviewed for information quality and legitimacy, and corrections were made as needed. After reviewing the questionnaires, statistical analysis was performed using SPSS software (Version 10) by descriptive statistics.

## 3. Results

We found that in mammography divisions in Shiraz, 47% of the staff had not passed necessary training in regards to the procedures nor quality assurance and radiation program in the beginning of their work. About 80% of personnel had not their licenses renewed by attending the training classes again. Moreover, 80% of the machinery and equipments were not being regulated nor monitored as often as needed (Figure 1). Most of the radiation workers were aware of radiation dose measurement units and AMPD (> 95%). The status of personnel's Satisfaction for film badge service is shown in figure 2. In addition, we found that in 80% of the divisions, there was no special radiation protection shield used for the patients.

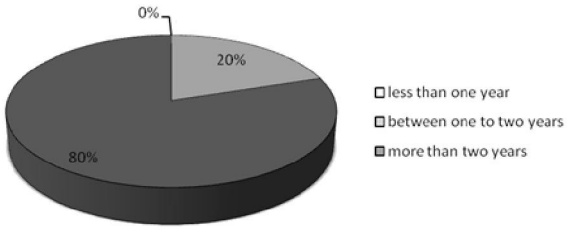


Figure 1. Status of monitoring machines and equipments.

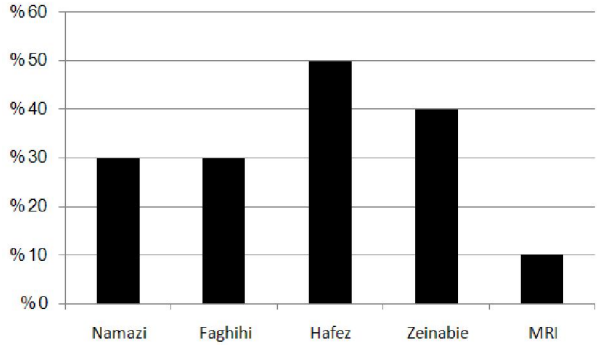


Figure 2. Status of satisfaction of film badge service by personnel.

## 4. Discussion

Breast cancer is the second most common neoplasia and the first leading cause of cancer death among women in the world [27-29]. The primary factors that increase risk of breast cancer in women include certain inherited genetic mutations, a personal or family history of breast cancer, and biopsy-confirmed hyperplasia [30-33]. Other factors that increase breast cancer risks include a long menstrual history, obesity after menopause, recent use of oral contraceptives, postmenopausal hormone therapy, nulliparity or having the first child after age of 30, ethnicity characteristics, exposure to radiation, or consumption of one or more alcoholic beverages per day [34-45]. Factors that decrease breast cancer risks include breastfeeding, physical activity, and the maintenance of a healthy body weight [34]. Unfortunately, many women lack access to all this information [46-52]. Mammography, Clinical breast examination (CBE) and breast self-examination (BSE) are the secondary preventive methods used for investigation in the early detection of breast cancer [53-55]. Cancer detection investigations therefore play a pivotal role in reducing breast cancer related mortalities [56]. The American Cancer Society [30] recommends CBE and mammography in the early detection of breast cancer [57]. According to ACS recommendations, women should know how their breasts normally feel and report any breast changes promptly to their health care providers [58-62]. BSE

is an option for women starting from the early 20s [34]. ACS no longer recommends BSE as there is reliable data that breast cancer detection through BSE does not increase survival rate. However, in a developing and resource-constrained country like Iran, BSE is an important viable optional substitute, where access to CBE and most importantly mammography is extremely difficult and might still detect breast cancer early enough for treatment which can be offered to prolong women´s lives and reduce suffering [1, 63-69]. Women in their 20 s and 30 s should have a CBE as part of a periodic health examination by health professionals preferably every 3 years. After the age of 40, women should have a CBE and a mammogram every year, as recommended by the ACS [30][30][19].

Zincir reported that the percentage of women over the age of 40 having a professional breast investigation every year was 21.1% in the eastern region of Turkey [70]. Annual mammography is considered the most valuable tool for detecting breast cancer in the earliest possible stages, before the cancer has metastasized and when interventions are most effective, least invasive and debilitating [71-74]. The decline in breast cancer mortality has been largely attributed to regular mammography investigations. The rate of undergoing a recommended mammography practice was 12.6 % in Secginli´s study performed in Istanbul [75]. The Health Belief Model (HBM) originally introduced in the 1950s has been widely used in health behavior applications including breast cancer investigations. The model stipulates that health-related behavior is influenced by a person´s perception of the threat posed by a health problem and by the value associated with his or her action to reduce that threat. According to this therefore, a woman who perceives that she is susceptible to breast cancer and that breast cancer is a serious disease would be more likely to perform regular breast examinations.

Despite breast cancer being one of the few cancers that can be detected early before seeing symptoms using mammography, mammography is still only performed on a low proportion of the women population in Iran. Despite the wealth of literature available globally documenting knowledge, attitudes and practices of women about breast cancer and mammography, there is still paucity of literature on the Middle East experience in this area. The aforementioned gaps form the basis of the present study. Hindrances to accessing mammography services not only in Iran or Middle East, but also globally should be identified and then health care authorities should establish strategies to overcome them.

The aim of mammography is to obtain a high-quality image from breast with the least exposure of the patient [8, 9, 76]. Therefore, along with an increase in the diagnostic application of X-ray, more consideration should be given to radiation protection protocols [24, 25, 76, 77].

Results of our study showed that approximately 50% of the staff had not passed necessary training in the beginning of their work. This means increased risk for patients. This study showed that an adequate training of staff in mammography divisions was required to reduce the patient's radiation dose. Implementation of radiation protection courses and education of practical issues, including radiation dose received by patients and radiation safety, during medical education programs could be an effective method to reduce the patient's dose in medical exposures.

In some countries radiological safety courses are offered to staff in order to decrease the patient risk, but it was also demonstrated that these educational courses were not enough [78]. Pre-evaluation of all the requests for mammography is not a practical solution for overburdened radiology departments.

We found that the knowledge about radiation dose measurement units, as well as the AMPD was found to be ideal (> 95%).

To the best of our knowledge, this is the first study in Iran to investigate radiation protection observance in mammography staff, and our findings are similar to other studies in the literature [1, 65, 79]. In Brazil Marinho et al, evaluated knowledge, attitude and practice related to mammography among women users of local health services. Their results showed that only 7.4% of the interviewees had adequate knowledge on mammography, while 97.1% of women had an adequate attitude. In addition, they reported the same value, for the practice of mammography that was adequate in 35.7% of the cases.

In our study, the interviewed staffs were from five different divisions in Shiraz. Therefore, our results may not apply throughout the Iran, but it does seem that most divisions have the same problems. This lack of awareness becomes particularly pertinent when we consider the number of staff who receive inappropriate training. Further investigation in other parishes of Iran is suggested. Combined to the data of the present study, both could provide better understanding of the existing status of radiological practice and equipment performance in mammography divisions [5, 7, 55, 80].

Majority of the women frequently practiced BSE and occasionally sought for CBE, but did not go for mammography. It is thought that BSE makes

women more aware of their breasts which in turn may lead to an earlier diagnosis of breast cancer. The rationale behind extending BSE practice as a screening test is the fact that breast cancer is frequently detected by women themselves without any other symptoms. A meta-analysis of studies investigating the possible benefits of BSE has shown that regular practice increases the probability of detecting breast cancer at an early stage. This study revealed the finding that many participants had practiced BSE. Most of the women in this study were from diverse backgrounds and mainly from lower social status. This means that these women may not have ready access to mammography and CBE. In their study, Siahpush & Singh also reported a similar finding with women from non-metropolitan backgrounds [81]. ACS no longer recommends BSE (30). However, in developing societies like Iran, BSE should still be encouraged because access to CBE and most importantly mammography is extremely limited. Some health facilities are not easily accessible and mammography is very expensive for the majority, yet BSE can still help to some extent.

There may be several reasons for not undergoing mammography. The cost of mammography in Iran and probably globally is high, particularly for a woman who does not have social security like most of the participants in this study. Although some authors have reported factors like mammography-induced pain and discomfort plus the effects of the radiation received during a mammogram, as a barrier, this cannot apply to this study as all the women interviewed had not undergone any single mammogram [14, 82]. This means that there is something more than pain or the fear of radiation that hinders these women from seeking mammography. The lack of information about mammography and the high costs for the few who know about it may be the biggest hindering factors especially in low-resourced settings. Focused educational programs are urgently needed to address this issue. Programs for women, especially those who have low education levels, do not work and spend most of their time at home, should be encouraged. For this purpose, the media (local written and oral, radio, television, soap operas, newspapers etc.) could be used [48, 52, 83]. Through such programs, awareness of breast cancer, the importance of its early diagnosis, and prompt treatment can significantly increase.

## 5. Conclusion

In this study, the existing status of medical care according to the IAEA protocols in mammography divisions was investigated. More regular checks on the subdivisions must be made from the Atomic Energy Organization of Iran and more attention should be given to training the personnel, protection of the personnel and patients, and quality control of the machines.

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