Original Article

Assessing the Knowledge, Attitude and Practice of Mammography Staffs about the Principles of Protection against Ionizing Radiation

Mohammad Pursamimi [1,2], Hadi Hasanzadeh [2,3,*], Majid Jadidi [2], Majid Mirmohammadkhani [4], Ahmad Bitarafan-Rajabi [5,6], Alireza Emadi [7], Mitra Bokharaeian [1,2], Fatemeh Shabani [1,2], Hamed Masoumi [8], Danial Seifi [1,2], Tahereh Khani [1,2], Shima Moshfegh [1,2], Athar Ehtiati [1,2]

[1] Student Research Committee, Semnan University of Medical Sciences, Semnan, Iran

[2] Department of Medical Physics, Semnan University of Medical Sciences, Semnan, Iran

[3] Cancer Research Center, Semnan University of Medical Sciences, Semnan, Iran

[4] Social Determinants of Health Research Center, Semnan University of Medical Sciences, Semnan, Iran

[5] Cardiovascular Interventional Research Center, Rajaie Cardiovascular Medical and Research Center, Iran University of Medical Sciences, Tehran, Iran

[6] Echocardiography Research Center, Rajaie Cardiovascular Medical and Research Center, Iran University of Medical Sciences, Tehran, Iran

[7] Deputy of Research and Technology, Semnan University of Medical Sciences, Semnan, Iran

[8] Department of Medical Physics and Radiology, Faculty of Medicine, Gonabad University of Medical Sciences, Gonabad, Iran

Received: 07 July 2018

Accepted: 15 October 2018

http://FBT.tums.ac.ir

Keywords:
Mammography;
Radiation Protection;
Knowledge;
Attitude;
Practice.

Abstract

Purpose: Radiographers' Knowledge, Attitude and Practice and their implementation in their daily routines, play a significant role in radiation protection. The aim of the current study was to evaluate the radiographers' Knowledge, Attitude and Practice (KAP) about radiation protection.

Materials and Methods: This study was conducted in 10 provinces of Iran in 2014-2015 and respondents in this study were 172 personnel of mammography departments. A validated questionnaire was designed to be used in a descriptive, cross-sectional study to examine radiographers' Knowledge, Attitude and Practice about radiation protection in selected imaging centers in Iran in 2014-2015. Data gathered via the questionnaire involved some demographic information consisting of the specialty, job title, expertise in years, time passed since graduation, gender, type of centers, including educational, non-educational and private.

Results: The results indicate no significant difference between two genders (p-value=0.067), educational age (p-value=0.862) and practice age (p-value=0.415). Moreover, there was no significant difference in type of hospital (Educational, Non educational and Private clinic) (p-value=0.159), but it was indicated that there was significant difference between regions (Capital, Center, East, North and West) (p-value=0.003).

Conclusion: Our study showed that knowledge, practice and attitude of mammography personnel were not enough. Therefore, continuous and complete educational programs, including principles of radiation protection is required for radiology staffs and the importance of these programs should be considered differently around the country. The findings of this study can help to develop educational policies in order to balance the status of knowledge concerning radiation protection and its potential hazards in different regions of Iran.

Corresponding Author:
Hadi Hasanzadeh, PhD
Department of Medical Physics, Semnan University of Medical Sciences, Semnan, Iran
Tel: (+98) 2333451336 , (+98)9123339428
Email: Hasanzadeh.h@semums.ac.ir

1. Intruduction

Nowadays, radiology has a critical role in diagnosis of several cancers [1, 2]. Among different types of cancer, breast cancer is the first leading cause of death among women in the world [1]. Over the past 25 years, there has been an increase in the quantity of diagnostic x-ray examinations and as a result, "an increase up to 50% is estimated in public yearly" [3]. An estimated rate of 4-10% of increase in cancer recurrence annually in the US is due to the occupational exposure [4]. The gold standard for screening breast cancer is mammography which might induce secondary cancers [5, 6]. Although the radiation absorbed dose from current mammographic techniques is extremely low (0.1-0.8 rad as mean glandular dose for a two–view examination), the possibility of risk from such studies has been raised because of the increased physicians orders for mammography which cause an increase in breast cancer incidence among female population exposed to considerably higher doses (100-2000 rad) [6]. Due to the importance of reducing population dose which is both subjective and objective [5, 7-9], in this study we investigated the knowledge, attitude and practice of mammography personnel in several regions of Iran. Finally, the collected data were analyzed and the output of this study aimed to suggest educational policies for balancing the level of knowledge, practice and attitude of radiation workers by including syllabuses in continuous training courses to improve the current status.

2. Materials and Methods

This study was conducted in 10 provinces of Iran in 2014-2015 and respondents were 172 mammography personnel (18). A detailed descriptive questionnaire was designed and validated to be used in this study to examine personnel's Knowledge, Attitude and Practice concerning radiation protection in mammography departments. The gathered data involved some demographic information, including specialty, job title, expertise in years, time passed since graduation, gender , type of centers (educational, non-educational and private) distributed in several regions of Iran. The collected data were plugged into Microsoft Excel and SPSS software and then analyzed using One-way ANOVA ($P<0.05$ was considered to be significant).

3. Results

Among the participants, 91.86% were female and 8.13% were male. Tables 1-3 show the output of questionnaires classified by gender, educational age, practice age, type of hospital and region (Capital, Center, East, North and West) of mammography personnel to investigate the knowledge, attitude and practice of personnel, respectively. According to table 1, the mean score for knowledge of personnel was 55.55 and for female was 57.85% and a significant difference exist between two genders (p-value=0.044). In addition, for the time passed since graduation parameter there was no significant difference between groups of ≤15 years and >15 years (p-value=0.396). Besides, for the practice age (p-value=0.577) and type of hospitals (p-value =0.753), there was not any significant difference in protection knowledge so as for geographical region (p-value =0.144).

Table 1. Radiation protection knowledge level among personnel in mammography section

Characteristic		Mean	SD	P-Value
Gender	Male	55.55	17.88	0.044
	Female	57.85	14.40	
Educational age	≤15	58.72	13.68	0.396
	≥15	56.27	16.40	
Practice age	≤15	58.61	13.98	0.577
	≥15	56.83	19.00	
Type of hospital	Educational	57.52	13.64	0.145
	Non Educational	64.70	8.31	
	Private Clinic	57.16	16.14	
Geographical Region	Capital	59.85	13.15	0.114
	Center	52.88	20.48	
	East	53.53	15.16	
	North	56.97	14.09	
	West	62.96	11.27	

Table 2 shows the practice level of personnel. In Table 2, the mean scores for male and female personnel were 74.46 and 74.24, respectively. There was no significant difference between male and female (p-value=0.778) and there was not any significant difference between two educational age groups as ≤15 years and >15 years (p-value=0.184) and also, for practice age (p-value=0.063). But for the type of hospital (Educational, Non educational, Private clinic), there was a significant difference (p-value=0.002). Moreover, for the

geographical regions (Capital, Center, East, North and West) there was a significant difference (p-value=0.010).

Table 2. Radiation protection practice level among personnel of mammography section

Characteristic		Mean	SD	P-Value
Gender	Male	74.46	7.63	0.778
	Female	74.24	8.41	
Educational age	≤15	73.46	8.89	0.184
	≥15	75.75	6.82	
Practice age	≤15	73.88	8.50	0.063
	≥15	77.20	7.00	
Type of hospital	Educational	76.50	7.21	0.002
	Non Educational	68.70	10.37	
	Private Clinic	73.97	8.12	
Geographical Region	Capital	72.50	9.32	0.010
	Center	77.14	8.42	
	East	78.64	3.17	
	North	73.53	7.04	
	West	77.82	6.00	

Table 3 shows the attitude level for male and female personnel whose mean scores were 78.54 and 77.96 for male and female groups, respectively. There was no significant difference between male and female (p-value=0.967), and also for the educational age groups (age≤15 and age>15), (p-value=0.821) and practice age (p-value=0.105). The analyses showed that for types of hospital (Educational, Non educational and Private clinic) there was no significant difference (p-value=0.108) but for the geographical region (Capital, Center, East, North, West) there was a significant difference (p-value=0.005).

Table 3. Radiation protection attitude level among personnel in mammography section

Characteristic		Mean	SD	P-Value
Gender	Male	78.54	9.22	0.967
	Female	77.96	13.83	
Educational age	≤15	78.40	14.56	0.821
	≥15	77.77	9.97	
Practice age	≤15	78.55	13.38	0.105
	≥15	73.86	14.13	
Type of hospital	Educational	76.22	10.50	0.108
	Non Educational	83.98	6.67	
	Private Clinic	77.91	15.71	
Geographical Region	Capital	80.32	10.02	0.005
	Center	69.85	24.28	
	East	75.25	6.10	
	North	80.49	10.04	
	West	74.48	11.22	

We also performed an analysis on the total level of knowledge, attitude and practice abbreviated as KAP, which is showed in Table 4. As it is obvious from this table, there was a significant difference between male and female groups (p-value=0.067). For the educational age (p-value=0.862) and practice age (p-value=0.415) there was not any significant difference. Moreover, for the types of hospital (Educational, Non educational and Private clinic), there was no significant difference (p-value=0.159) but there was a significant difference in the geographical regions (Capital, Center, East, North and West) (p-value=0.003).

Table 4. Radiation protection total KAP level among personnel in mammography section

Characteristic		Mean	SD	P-Value
Gender	Male	69.52	5.94	0.067
	Female	69.97	5.61	
Educational age	≤15	70.13	5.74	0.862
	≥15	69.93	5.55	
Practice age	≤15	70.29	5.61	0.415
	≥15	69.30	6.28	
Types of hospital	Educational	70.08	4.08	0.159
	Non Educational	72.46	2.97	
	Private Clinic	69.59	6.76	
Geographical Region	Capital	70.89	4.19	0.003
	Center	66.12	10.97	
	East	69.14	4.31	
	North	70.33	4.66	
	West	71.75	3.53	

4. Discussion

Working in diagnostic departments and exposure to x-ray should be performed carefully in order to protect from radiation induced injuries. Our study aimed to estimate the level of knowledge, practice and attitude of mammography staffs about radiation protection. The study of M. Alhasan *et al.* showed lack of knowledge about radiation hazards [1]. Dehghani *et al.* found a significant difference between genders in radiation awareness [10] and also Rassin *et al.* showed that there was a significant difference between male and female in terms of knowledge [11]. In investigating the knowledge of staffs about radiation protection, we found that knowledge of male participants (55.55) were lower than female ones (57.85). The study of Fatahi-Asl *et al*. showed that staffs' knowledge was not adequate [12]. In our study, the staffs' knowledge in mammography section had no significant difference for types of hospital (p-value=0.145) and geographical

regions (Capital, Center, East, North, West) (p-value=0.114). Several studies have been conducted on the attitude, knowledge and practice of radiographers [5, 7-9, 13-15]. We showed that there was not any significant difference for the educational age (p-value=0.396) (≤15 and >15) and practice age (p-value=0.577) (≤15 and >15) for practice and knowledge factors. The mean scores of knowledge in the educational age (≤15 and >15) were 58.72 and 56.27 and also for practice age (≤15 and >15) were 58.61 and 56.83, respectively. Furthermore, the mean scores of practice for the educational age parameter (≤15 and >15) were 73.46 and 75.75 and practice age (≤15 and >15) were 73.88 and 77.20, respectively. Awosan *et al.* showed that the staffs who were graduated more than 10 years ago have less knowledge about technique and principle of radiation protection [16]. In our study, the mean level of knowledge for gradational age of ≤15 and practice age of ≤15, showed better results. Fatahi *et al.* showed that there was no significant difference in the mean scores of protection performance between male and female participants [12]. We showed that there was no significant difference in the level of practice between male and female participants (p-value=0.778). Soylemez *et al.* compared personnel according to their knowledge and attitude about radiation protection and found no difference in their working years [17]. Sanaei Nasab *et al.* showed no significant difference between type of medical and level of medical practitioner to range of attitude median [18]. In our study, according to the Table 3, there was no significant difference for attitude for educational age (p-value=0.821) and also, there was no significant difference for practice age (p-value=0.105). Chan *et al.* showed that there was a significant difference between male and female for KAP (p-value<0.001), but there was no significant difference for working experience in the operating room (p-value=0.276) [19]. According to the Table 4, for the KAP we found no significant difference between male and female groups (p-value=0.067) and also there was no significant difference (p-value=0.415) for the practice age. In the study of Tok *et al.*, on several participants, including private hospital (12.6%), state hospital (15%), training and research hospital (40.9%) and university hospital (31.5%) [20], the mean scores of KAP in type of hospital for governmental clinic, non-educational and private clinic were 70.08, 72.46 and 69.59, respectively and there was not any significant difference (p-value=0.159). In our study for the region parameter, the scores for capital were 70.89, center 66.12, east 69.14, north 70.33 and west 71.75 which differ significantly (p-value=0.003).

5. Conclusion

In conclusion, our study showed that knowledge, practice and attitude of mammography personnel were not enough. One of the reasons of discrepancy between results of such studies might be due to the statistical population considered in each study; we tried to select our respondents randomly from different regions and center types in the country to reach the real conditions while the selected population in similar works is restricted to a department or city or only one kind of center. Therefore, continuous and complete educational programs about principles of radiation protection are required for radiology staff and the importance of these programs should differently be taken into considerations around the country. The findings of this study can help to develop educational policies in order to balance the status of knowledge concerning radiation protection and its potential hazards in different regions of Iran.

Acknowledgements

We would like to thank the Clinical Research Development Unit of Kowsar Educational and Research and Therapeutic Center of Semnan University of Medical Sciences for providing facilities to this work.

References

1- M. Alhasan, M. Abdelrahman, H. Alewaidat, and Y. Khader, "Radiation dose awareness of radiologic technologists in major Jordanian hospitals," *INTERNATIONAL JOURNAL OF RADIATION RESEARCH*, vol. 14, no. 2, pp. 133-138, 2016.

2- M. Mojiri and A. Moghimbeigi, "Awareness and attitude of radiographers towards radiation protection," *Journal of Paramedical Sciences*, vol. 2, no. 4, 2011.

3- E. S. Amis *et al.*, "American College of Radiology white paper on radiation dose in medicine," *Journal of the american college of radiology*, vol. 4, no. 5, pp. 272-284, 2007.

4- J. Leonard, *Attitudes and Practices of Perioperative Nurses Effecting the Election of Wearing Protection from Occupational Radiation Exposure*. Gardner-Webb University, 2012.

5- Z. Siavashpour, S. Mehdizadeh, A. Farshadi, and M. Baradaran-Ghahfarokhi, "Radiation Protection Principles Observance in Mammography Divisions in Shiraz," *Iranian Red Crescent Medical Journal,* vol. 14, no. 12, p. 840, 2012.

6- S. A. Feig, "Radiation risk from mammography: is it clinically significant?," *American journal of roentgenology,* vol. 143, no. 3, pp. 469-475, 1984.

7- F. Shabani *et al.*, "Radiation Protection Knowledge, Attitude, and Practice (KAP) in Interventional Radiology," (in eng), *Oman Med J,* vol. 33, no. 2, pp. 141-147, Mar 2018.

8- Hamed Masoumi *et al.*, "A Survey on the Radiation Protection Status among Radiology Staff," *Iranian Journal of Medical Physics,* vol. 15, no. 3, pp. 176-181, 2018.

9- Tahereh Khani *et al.*, "Assessment Radiation Protection Knowledge, Attitude and Practice in Dental Radiography Staff," *Frontiers in Biomedical Technologies,* vol. 4, no. 3-4, pp. 84-89, 2018.

10- A. Dehghani, M. Ranjbarian, A. Mohammadi, M. Soleiman-Zade, and A. Dadashpour-Ahangar, "Radiation Safety Awareness amongst Staff and Patients in the Hospitals," *International Journal of Occupational Hygiene,* vol. 6, no. 3, pp. 114-119, 2015.

11- M. Rassin, P. Granat, M. Berger, and D. Silner, "Attitude and knowledge of physicians and nurses about ionizing radiation," *Journal of Radiology Nursing,* vol. 24, no. 2, pp. 26-30, 2005.

12- F. Asl, M. Tahmasebi, and V. Karami, "The protection knowledge and performance of Radiographers in some hospitals of Ahvaz County," *Jentashapir Journal of Health Research,* vol. 4, no. 5, pp. 405-412, 2014.

13- S. Y. Opoku, M. Benwell, and J. Yarney, "Knowledge, attitudes, beliefs, behaviour and breast cancer screening practices in Ghana, West Africa," *Pan African Medical Journal,* vol. 11, no. 1, 2012.

14- L. C. Friedman, N. E. Neff, J. A. Webb, and C. K. Latham, "Age-related differences in mammography use and in breast cancer knowledge, attitudes, and behaviors," *Journal of Cancer Education,* vol. 13, no. 1, pp. 26-30, 1998.

15- P. E. Dündar *et al.*, "The knowledge and attitudes of breast self-examination and mammography in a group of women in a rural area in western Turkey," *BMC cancer,* vol. 6, no. 1, p. 43, 2006.

16- K. Awosan *et al.*, "Knowledge of Radiation Hazards, Radiation Protection Practices and Clinical Profile of Health Workers in a Teaching Hospital in Northern Nigeria," *Journal of Clinical and Diagnostic Research: JCDR,* vol. 10, no. 8, p. LC07, 2016.

17- H. Söylemez *et al.*, "Knowledge and attitude of European urology residents about ionizing radiation," *Urology,* vol. 81, no. 1, pp. 30-36, 2013.

18- H. S. Nasab, R. Tavakoli, F. Ghofranipour, A. Kazemnejad, and A. Khavanin, "Evaluation of knowledge, attitude and behavior of workers towards occupational health and safety," *Iranian Journal of Public Health,* vol. 38, no. 2, pp. 125-129, 2009.

19- M. F. Chan, A. Ho, and M. C. Day, "Investigating the knowledge, attitudes and practice patterns of operating room staff towards standard and transmission-based precautions: results of a cluster analysis," *Journal of clinical nursing,* vol. 17, no. 8, pp. 1051-1062, 2008.

20- A. Tok *et al.*, "Are the urology operating room personnel aware about the ionizing radiation?," *International braz j urol,* vol. 41, no. 5, pp. 982-989, 2015.

