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Knowledge on Medical Waste Management Among Health Care Personnel: A Report from Turkey

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Abstract

BACKGROUND/AIMS: The amount of medical waste from hospitals and other health institutions is on the rise which leads to more significant risks for healthcare personnel. This risk can be decreased primarily by increasing health care personnel's knowledge and awareness of this issue. The aim of this study was to determine the level of knowledge among healthcare personnel on medical waste management (MWM) and whether it differs with socio-demographic characteristics, or across different occupational groups, and hospital units.

MATERIALS AND METHODS: This study was conducted on 412 healthcare personnel [98 doctors, 206 nurses and midwives, 56 auxiliary health staff (AHS), and 52 other staff]. A questionnaire consisting of 15 questions was used in order to measure knowledge on MWM. MWM knowledge was evaluated as inadequate (≤5 correct answers), moderate (6-10 correct answers) or adequate (≥11 correct answers).

RESULTS: The average score on the MWM questionnaire was 68.38±15.73% in all participant. The distribution of participants in the MWM knowledge groups of adequate, moderate, inadequate was 48.5%, 47.9%, and 3.6%, respectively. Nurses, AHS and other staff had higher MWM knowledge scores than doctors (71.62±14.51%, 69.88±16.13%, 69.36±16.66% and 60.20±14.75%, respectively, $p<0.01$). Laboratory staff had higher MWM scores than all other professional groups ($p<0.01$). High-school and associate degree graduates had higher MWM scores ($p<0.05$) than master and PhD graduates.

CONCLUSION: Despite a moderate-adequate level of MWM knowledge among healthcare personnel, there is still a lack of knowledge on critical topics. Increasing the knowledge and awareness on MWM needs to be a primary concern for all health personnel, and especially for doctors.

Keywords: Health risks, healthcare workers, knowledge, medical waste management

INTRODUCTION

Medical waste is defined as waste produced during medical procedures in healthcare facilities, research centers, and laboratories, and waste from small or dispersed resources during household medical care. They are categorized into hazardous waste (including infectious, pathologic, pharmaceutic, cytotoxic, chemical, and radioactive wastes) or general waste (including biologic, chemical, radioactive or non-hazardous wastes).[1] Medical waste encompasses harmful viruses such as human immunodeficiency virus and hepatitis B or C, which can potentially affect patients, health workers, and/or the general population, and resistant microorganisms from health institutions that can spread to the environment.[2] Medical waste and their side products can give rise to piercing and cutting injuries; exposure to toxic pharmaceutical products such as antibiotics, cytotoxic drugs, mercury, and dioxin among others during transportation and disposal of medical waste; possible chemical burns during disinfection, sterilization or waste treatment processes; air pollution due to particles occurring during the disposal of medical

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waste; and burns due to medical waste disposal and radiation.[3,4] According to the World Health Organization, 85% of waste generated during health processes is general, non-hazardous waste, and the remaining 15% is infectious, toxic or radioactive hazardous waste.[5] In addition to doctors, nurses, midwives, auxiliary health personnel, and laboratory technicians, all individuals who are exposed to medical and other waste are potentially at risk.[6] Risk can be reduced through regular education of health personnel, thereby increasing their knowledge and awareness on medical waste management (MWM).[7,8]

The basis for this study is the current lack of studies on MWM knowledge levels, as determined after a search in the PubMed database using the keywords "*medical waste management*, *healthcare workers*, *knowledge*, and *Turkey*". The purpose of this work was to determine the MWM knowledge levels of healthcare personnel working in a training and research hospital, and whether the level of knowledge changed with respect to demographic characteristics, occupational groups, education levels, and work units.

MATERIALS AND METHODS

A single center, prospective, descriptive study was conducted on 412 health personnel aged 18 years or above, between February 15th, 2019, and March 15th, 2019 in İstanbul. The written consent of the participants and approval of the İstanbul Medeniyet University, Göztepe Training and Research Hospital Local Ethics Committee were obtained for this study. This study complied with the principles of the Helsinki Declaration.

Sample size: The probability of type 1 error (α) was accepted as 0.05 (95% confidence level), the value of z was found to be 1.96. Standard deviation (SD) values obtained for the MWM knowledge levels of the participants were combined and the SD of the population was estimated to be 10, the margin of error was accepted as 1 unit. According to these calculations, it was found appropriate to include a total of 412 participants to determine a population average with a 95% confidence level with a 1-unit margin of error, also taking into consideration the possibility of 10% data loss.

Inclusion criteria: Health staff aged 18 years or above who agreed to provide written consent to participate in this study.

Exclusion criteria: Health workers who contributed to the design and execution of the study, hospital MWM unit managers, MWM staff and MWM field personnel, and staff involved in the preparation of MWM hospital education programs.

Primary endpoint of this study: Determining the levels of MWM knowledge among health personnel, and investigating whether the level of knowledge differed according to their occupational groups, demographic characteristics, education levels, and work units.

Study design: Participants who gave written consent were randomly included in the study and were categorized according to their occupational groups [doctors, nurses and midwives, auxiliary health staff (AHS), and other staff (administration, data entry, and security personnel)], and also according to their work units [internal medical sciences, surgical medical sciences, intensive care units, laboratories, emergency services and other units (administration and polyclinics)], and according to their educational status (primary/high school; associate degree, bachelor's, and master's degrees; and doctoral graduates). Operating room personnel were not included in this study because face-to-face surveys were not possible for this group.

Survey: Before this study was carried out, the survey was validated by an expert in terms of content and relation to the topic. A dry run was conducted to assure a high acceptance level. A pre-test was administered to 20 health personnel who did not participate in the final study. The survey was carried out by appointment at the participants' own working units during working hours and conducted in a face-to-face method. No time limitation was enforced so that the participants could complete the questions comfortably. Correct answers were provided to the participants after the survey was completed if requested. The three-part survey was conducted by the authors of this article. The questions and participant answers are given in Table 1. The first part consisted of questions on the age and sex, occupational groups, work units, and educational status of the participants. In the second part, five questions relating to MWM training and the general thoughts of the participants were asked. In the third part of the survey, 15 test questions with single correct answers were asked, measuring their knowledge on MWM. These questions were prepared in accordance with the "*Medical Waste Control Regulation*"[9] published by the Ministry of Environment and Urbanization (25.01.2017) in the Official Gazette (number: 29959). The points for correct answers to these 15 MWM questions were calculated and the results were normalized to a scale in the range of 0-100 for statistical purposes. No correct answers were adjusted 0 points, all correct answers to these 15 questions were adjusted to 100 points and an MWM knowledge score was calculated. These scores were then compared according to the demographic characteristics, occupational groups, work units, and educational status of the participants. Additionally, according to the distribution of the correct answers, MWM knowledge levels were classified as inadequate (≤5 correct answers), moderate (6-10 correct answers), or adequate (≥11 correct answers).

Statistical Analysis

The NCSS (Number Cruncher Statistical System) 2007 (Kaysville, Utah, USA) program was used. Descriptive statistical methods (mean, SD, median, frequency, ratio, minimum, maximum) were used to evaluate the study data. The normal distribution of quantitative data was tested using the Kolmogorov-Smirnov and Shapiro-Wilk test and graphical evaluations. Student's t-test was used to compare two groups of quantitative data with normal distribution. The Bonferroni test was used for double comparisons and One-Way analysis of variance was used in triple or more group comparisons with normal distribution. Pearson's chi-square test and the Fisher-Freeman-Halton exact test were used to compare qualitative data. Pearson's correlation analysis was used to evaluate the relationships between variables with normal distribution. Significance was evaluated as $p<0.05$.

Results

A total of 412 participants (127 males, 285 females) participated in the survey. The mean age of the participants was 32.73±8.9 years. Ninety-eight of the participants (23.8%) were doctors, 206 (50%) were nurses and midwives, 56 (13.6%) were AHS, and 52 (12.6%) were other staff. According to their educational status, 8.7% of the participants were primary school graduates, 15.8% were high school graduates, 9% were associate graduates, 39.1% were bachelor graduates, 22.3% master graduates (18.7% of them were medical doctors, 3.6% were other healthcare professionals) and 5.1% were PhD graduates (all medical

Table 1. Questions, correct answers and participant answers of questionnaire

Questions	Options	Answers, n (%)
1. Who is responsible for waste management in the hospital?	a. Chief doctor	4 (1)
	b. Director of administrative and financial services	2 (0.5)
	c. Director of health care services	14 (3.4)
	d. Director of support and quality services	100 (24.3)
	e. ***Environment and Waste Unit Supervisor***	***292 (70.9)***
2. Which of the following does not describe medical waste?	a. Dangerous	60 (14.6)
	b. Bloody	6 (1.5)
	c. Infectious	11 (2.7)
	d. Sick	117 (28.4)
	e. ***Private waste***	***218 (52.9)***
3. Which of these symbols indicates medical waste?	a. 	43 (10.4)
	b. 	12 (2.9)
	c. 	***352 (85.4)***
	d. 	2 (0.5)
	e. 	3 (0.7)
4. Which color is the bag of hazardous waste?	a. Red	141 (34.2)
	b. Blue	3 (0.7)
	c. Orange	28 (6.8)
	d. Black	7 (1.7)
	e. ***Yellow***	***233 (56.6)***
5. Which color is the domestic waste bag?	a. Red	0 (0)
	b. Blue	45 (10.9)
	c. Orange	2 (0.5)
	d. Gray	40 (9.7)
	e. ***Black***	***325 (78.9)***
6. Which color is the recycling waste bag?	a. Red	3 (0.7)
	b. ***Blue***	***377 (91.5)***
	c. Orange	11 (2.7)
	d. Gray	8 81.9)
	e. Black	13 (3.2)
7. Which color is the medical waste bag?	a. ***Red***	***394 (95.6)***
	b. Blue	1 (0.2)
	c. Yellow	14 (3.4)
	d. Gray	1 (0.2)
	e. Black	2 (0.5)
8. Which color do the medical waste personnel wear?	a. Red	40 (9.7)
	b. Blue	1 (0.2)
	c. ***Orange***	***336 (86.4)***
	d. Yellow	13 (3.2)
	e. Black	2 (0.5)
9. Where is the place for temporary waste storage in our hospital?	a. Pathology building	13 (3.2)
	b. Infectious diseases clinic	36 (8.7)
	c. Medical consumable storehouse	46 (11.2)
	d. ***Side area of technical services***	***306 (74.3)***
	e. Central emergency service	11 (2.7)
10. Which organization is responsible for medical and hazardous waste disposal?	a. Ministry of health	58 (14.1)
	b. Ministry of environment and urbanization	176 (42.7)
	c. Ministry of transportation	0 (0)
	d. Ministry of finance	1 (0.2)
	e. ***İSTAÇ İstanbul Metropolitan Municipality***	***177 (43.0)***
11. Which is the right bucket color for disposal of Chemotherapeutic drugs?	a. Red	74 (18.0)
	b. Green	64 (15.5)
	c. ***Yellow***	***226 (54.9)***
	d. Orange	45 (10.9)
	e. Blue	3 (0.7)
12. In which box are the intravenous catheter waste products disposed?	a. ***Medical waste***	***300 (72.8)***
	b. Domestic waste	2 (0.5)
	c. Recycling waste	4 (1.0)
	d. Dangerous waste	102 (24.8)
	e. Pathologic waste	4 (1.0)
13. Which is the correct bucket for glass waste disposal?	a. Medical waste	18 (4.4)
	b. Domestic waste	10 (2.4)
	c. ***Recycling waste***	***231 (56.1)***
	d. Dangerous waste	147 (35.7)
	e. Pathologic waste	6 (1.5)
14. Which of the buckets is for diapers?	a. Medical waste	85 (20.6)
	b. ***Domestic waste***	***310 (75.2)***
	c. Recycling waste	7 (1.7)
	d. Dangerous waste	6 (1.5)
	e. Pathologic waste	4 (1.0)
15. Which of the correct choice for cleaning supply package waste?	a. Medical waste	23 (5.6)
	b. Domestic waste	129 (31.3)
	c. Recycling waste	119 (28.9)
	d. ***Dangerous waste***	***129 (31.3)***
	e. Pathologic waste	12 (2.9)

Correct answers are marked in bold and italic.

doctors). Some 34.2% of the participants worked in internal medical sciences, 25% worked in surgical medical sciences, 8.5% worked in intensive care units, 6.6% worked in laboratories, 12.6% worked in emergency services, and 13.1% worked in other units.

The results of the survey evaluating MWM training status and general considerations are presented in Table 2. The majority (79.6%) stated that they had received training in MWM, 63.3% thought that the education they had received was adequate and sufficiently frequent, 88.1% stated that medical waste was collected regularly, and 74% thought that waste was appropriately separated. The percentage of participants who stated that they were exposed to very low, low, moderate, high or excessive risk during the collection and transportation of medical waste was 14.1%, 18.9%, 36.2%, 26.4%, and 4.4%, respectively. The ratios of MWM-trained nurses, AHS, and other staff was higher than that of doctors (p=0.001). The ratio of MWM-trained nurses was higher than all other staff (p=0.001). The percentage of participants who stated that their MWM training was adequate and sufficiently frequent was higher in nurses, AHS, and other staff when compared to doctors, and also higher in nurses and AHS compared to other staff (p=0.001). The ratio of doctors,

nurses, and AHS who thought that they were exposed to numerous risks during collection and transportation of waste was higher than that of the other personnel (p=0.009). There were more individuals among the doctors, AHS, and other staff with a lack of waste collection knowledge compared with the nurses (p=0.001). The rate of reporting regular waste collection was higher in hospital units with a higher proportion of nurses than in other units with a higher proportion of doctors and AHS (p=0.001).

The average number of correct answers to the questions on MWM was 10.26±2.36, and the average level of knowledge in percentages was 68.38±15.73%. The rates of participants with adequate, moderate, and inadequate MWM knowledge were 48.5%, 47.9%, and 3.6%, respectively. Women had better MWM knowledge than men (69.59±15.37% vs. 65.67±16.22%, p=0.019). There was a statistically significant weak positive correlation between age and MWM knowledge (r=0.128; p=0.009).

The MWM knowledge levels of the nurses, AHS, and other personnel were higher than those of doctors (71.62±14.51%, 69.88±16.13%, 69.36±16.66% vs. 60.20±14.75%, p=0.001, p=0.001, p=0.003, respectively) (Table 3).

The MWM knowledge levels of high school graduates were higher than those of staff with master's and doctoral degrees (p=0.049; p=0.024, respectively). The MWM knowledge of associate graduates was better than master's and PhD graduates (p=0.034, p=0.016, respectively) (Table 4). There was no statistically difference between medical doctors and other healthcare professionals in the master's graduates group in terms of MWM knowledge scores (p=0.006).

The MWM knowledge of laboratory workers was higher than medical ward, intensive care unit, and emergency department staff (p=0.002; p=0.004; p=0.001). Personnel working in the surgical wards and other units had higher knowledge levels than those in the emergency department (p=0.015; p=0.036, respectively) (Table 5).

The participants who had had MWM training had higher MWM knowledge levels than those without previous training (69.88±15.32% vs. 62.54±16.03%, p=0.001).

DISCUSSION

This study shows that the MWM knowledge of healthcare personnel can be ascertained as moderate-to-adequate, and doctors' MWM knowledge levels and MWM training statuses are lower than those of nurses, AHS, and other staff. Also, the level of MWM knowledge is higher among laboratory staff and in high school and associate degree graduates compared to the others.

The amount of medical waste from hospitals and other health institutions in our country is on the rise, which leads to more significant

Table 2. The results of the survey evaluating medical waste management training status and general considerations according to occupational groups

		Occupational groups				p
		Doctors, (n=98)	Nurses, (n=206)	AHS, (n=56)	Others, (n=52)	
		n (%)	n (%)	n (%)	n (%)	
MWM training status	Yes	53 (54.1)	190 (92.2)	47 (83.9)	38 (73.1)	**0.001**
	No	45 (45.9)	16 (7.8)	9 (16.1)	14 (26.9)	-
Considerations about sufficiency and frequency of received MWM training	Yes	35 (35.7)	154 (74.8)	43 (76.8)	29 (55.8)	**0.001**
	No	63 (64.3)	52 (25.2)	13 (23.2)	23 (44.2)	-
Considerations about risk of exposure during waste collection and transportation	Very Low	9 (9.2)	24 (11.7)	11 (19.6)	14 (26.9)	**0.009**
	Low	22 (22.4)	38 (18.4)	10 (17.9)	8 (15.4)	-
	Moderate	39 (39.8)	69 (33.5)	20 (35.7)	21 (40.4)	-
	High	24 (24.5)	68 (33.0)	13 (23.2)	4 (7.7)	-
	Excessive	4 (4.1)	7 (3.4)	2 (3.6)	5 (9.6)	-
Status of frequent waste collection in the assigned unit	Yes	82 (83.7)	191 (92.7)	44 (78.6)	46 (88.5)	**0.001**
	No	2 (2.0)	14 (6.8)	5 (8.9)	3 (5.8)	-
	No Idea	14 (14.3)	1 (0.5)	7 (12.5)	3 (5.8)	-
Status of waste sorting	Yes	71 (72.4)	154 (74.8)	41 (73.2)	39 (75.0)	0.973
	No	27 (27.6)	52 (25.2)	15 (26.8)	13 (25.0)	-

MWM: medical waste management, AHS: auxiliary health staff.

Table 3. Levels of medical waste management knowledge according to occupational groups

		MWM knowledge level (%)			p	Paired comparison
		n	Min.-max. (median)	Mean ± SD		
Duty	[1]Doctor	98	13.3-93.3 (60)	60.20±14.75	**0.001**	p_{1-2}: 0.001 p_{1-3}: 0.001 p_{1-4}: 0.003
	[2]Nurse	206	26.7-100 (73.3)	71.62±14.51		
	[3]AHS	56	33.3-100 (73.3)	69.88±16.13		
	[4]Others	52	20-100 (73.3)	69.36±16.66		

MWM: medical waste management, AHS: auxiliary health staff, min.: minimum, max.: maximum, SD: standard deviation.

Table 4. Levels of medical waste management knowledge according to educational status

		MWM knowledge level (%)			p	Paired comparison
		n	Min-max (median)	Mean ± SD		
Education status	[1]Primary school	36	33.3-93.3 (73.3)	69.26±16.89	**0.028**	p_{2-5}: 0.049 p_{2-6}: 0.024 p_{3-5}: 0.034 p_{3-6}: 0.016
	[2]High school	65	26.7-100 (73.3)	70.77±15.44		
	[3]Associate	37	20-100 (73.3)	72.25±15.91		
	[4]Bachelor's	161	13.3-100 (73.3)	68.65±16.10		
	[5]Master's	92	33.3-93.3 (66.7)	65.80±14.60		
	[6]PhD	21	40-93.3 (60)	61.90±14.01		

MWM: medical waste management, min: minimum, max: maximum, SD: standard deviation.

Table 5. Levels of medical waste management knowledge according to work unit

		MWM knowledge level point (%)			p	Paired comparison
		n	Min-max (median)	Mean ± SD		
Unit	[1]Medical wards	141	20-100 (66.7)	66.71±15.73	***0.001***	p_{1-4}: *0.002* p_{2-5}: *0.015* p_{3-4}: *0.004* p_{4-5}: *0.001* p_{5-6}: *0.036*
	[2]Surgical wards	103	13.3-93.3 (73.3)	70.81±15.48		
	[3]ICU	35	33.3-86.7 (60)	64.57±13.60		
	[4]Laboratory	27	53.3-100 (80)	79.01±13.92		
	[5]Emergency services	52	33.3-93.3 (60)	62.18±14.51		
	[6]Others	54	26.7-100 (73.3)	71.23±15.96		

MWM: medical waste management, ICU: intensive care unit, min: minimum, max: maximum, SD: standard deviation.

risks for health personnel.[10,11] This risk can be decreased primarily by training those health personnel at regular risk of exposure to medical waste and increasing their knowledge and awareness.[12] Our finding that participants with previous MWM training had higher scores than those with no training supports this idea.

There is a lack of literature on the MWM knowledge levels of health personnel in Turkey. A study evaluating MWM knowledge of health personnel in a public hospital in central Sakarya revealed that 69.6% of the health personnel had received training on medical waste. These MWM-trained personnel stated that there was an institutional waste plan (66.9%), that there were special storage areas for medical waste (73.5%), that there were trained personnel assigned to the collection and disposal of medical waste (72.6%), and that waste was classified according to color codes (81.5%).[13]

Studies evaluating MWM knowledge, awareness, positive attitudes and practices are conducted more often in developing countries; however, MWM knowledge scores are generally low. In a study by Deress et al.[14], MWM knowledge, attitudes, and practices of health personnel in Northwest Ethiopia were evaluated. Participants with sufficient knowledge made up 56%, positive attitudes were at a rate of 66.2%, and sufficient practical scores were 77.4%. Moreover, most of the participants had no previous biomedical waste management training.[14] A study by Dehghani and Rahmatinia[15] evaluating biomedical waste management knowledge, attitudes, and practices in Iran showed that general knowledge on MWM was low, activity levels were moderate, and there was no relationship between gender, occupation, or educational levels on knowledge. Only differences in practice were observed.[15] The study conducted by Sarker et al.[16] on the knowledge, practice, and potential barriers of MWM of health personnel in Bangladesh found that one-third of nurses and doctors and two-thirds of cleaning staff had insufficient knowledge. Moreover, 44% of doctors and 56% of cleaning staff had bad practices.[16] A study conducted by Hakim et al.[17] in a university hospital evaluating MWM knowledge, attitude, and practices of health personnel demonstrated that, in terms of waste disposal and hospital policies, management personnel had more knowledge than doctors and nurses; however, in terms of special disposal, they knew less. Furthermore, more nurses had sufficient practical scores than doctors (84% vs. 67.3%).[17] Njiru et al.[18] conducted a study on biomedical waste management awareness and practices of health personnel in a national hospital. The total awareness level was 60%, and among doctors, nurses, and auxiliary personnel, it was 51%, 65%, and 55%, respectively. In practice, general awareness was found to be high; however, doctors had lower scores than the other personnel.[18]

The "*Medical Waste Control Regulation*" published by the Environment and Urbanization Ministry in Turkey aims to provide administrative, technical, legal principles, policies, and programs for the collection, storage, recycling, transportation, and disposal of medical waste produced by health institutions without harming the population or the environment.[9] Compliance with this regulation across the country is high.[19] Our finding that MWM knowledge among health personnel is moderate-adequate might stem from obedience to the national policies and the positive effects of MWM training. Furthermore, the 80% of MWM-trained participants and their higher MWM scores compared with the untrained personnel supports this idea. Information from our hospital's research and development unit shows that personnel are informed on MWM through different communication methods, such as training being offered twice annually to all personnel, and units having one training session every month. Similar to results from other studies, the significantly low scores among doctors on our MWM test is another surprising and thought-provoking finding. The percentage of doctors who received MWM training was significantly lower than among nurses, AHS, and other personnel. This might be a result of an indifference among doctors towards MWM training, which in turn would negatively affect their knowledge levels. This is supported by data from the research and development unit of our hospital showing a low number of MWM-trained doctors.

The reason that MWM knowledge levels were higher in women could be because half of the participants were nurses and midwives, who also received the highest scores. In a study that included 540 nurses from a tertiary hospital in Eastern Turkey, Calikoglu and Aras[20]. reported that nurses had adequate knowledge on medical waste; mean scores of 17.6/20 would equate to 88.2% in our survey. This finding supports the idea that nurses have higher levels of MWM knowledge, similar to the results of our study.

Moreover, compared with master's and PhD graduates, high school and associate graduates had higher MWM scores. Master's and PhD graduates include mainly doctors, whereas high school and associate graduates include mainly nurses, midwives, AHS, and other staff. Therefore, the higher MWM knowledge levels of nurses, midwives, AHS, and other staff compared with doctors is paralleled by the higher knowledge levels of high school and associate graduates. The greater MWM knowledge of laboratory unit personnel is a result of their direct involvement with MWM. The low MWM knowledge level in the emergency service personnel group, which is at increased risk of exposure to medical waste, is another interesting finding of this study.

An intriguing result of our study is the high number of incorrect answers to questions about the disposal of chemotherapeutic drugs, hazardous waste materials, and glass waste. Emphasizing these topics in MWM training will help decrease health risks in connection to medical waste.

Study Limitations

The questions were prepared in accordance with the Medical Waste Control Regulation published by the Ministry of Environment and Urbanization as there is no national, validated reference survey on MWM.[9] A face-to-face survey of the operating room personnel was not possible. Moreover, this study was conducted in only one hospital, making generalizations of the findings problematic.

CONCLUSION

Despite the moderate-adequate level of MWM knowledge among health personnel, there is still a lack of knowledge on critical topics. MWM knowledge levels were higher in women healthcare workers (the vast majority of nurses and midwives), those working in laboratory units, and high school and associate degree graduates. The low level of MWM knowledge among doctors compared to other healthcare professionals might be a result of an indifference among doctors towards MWM training, which in turn would negatively affect their knowledge levels. Increasing the knowledge and awareness of MWM needs to be a primary concern, for all health personnel, especially for doctors. For this purpose, regular monitoring and training are required at all levels.

ETHICS

Ethics Committee Approval: The approval of the İstanbul Medeniyet University, Göztepe Training and Research Hospital Local Ethics Committee were obtained for this study.

Informed Consent: The written consent of the participants obtained for this study.

Peer-review: Internally peer-reviewed

Authorship Contributions

Concept: G.U., M.U., Design: G.U., M.U., Supervision: S.S., A.G., Fundings: F.Ö., A.G., G.U., Materials: G.U., Data Collection and/or Processing: G.U., S.S., Analysis and/or Interpretation: A.G., F.Ö., Literature Search: M.U., Writing: M.U., F.Ö., Critical Review: M.U., S.S.

DISCLOSURES

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