

# Knowledge and Practice of Nursing Staff about Sharp Waste Management in Selected Hospitals of Military (Tehran) and Non-Military (Qom) in 2012

Norouz Mahmoudi<sup>1</sup>, Mojtaba Sepandi<sup>2</sup>, Mohsen Saffari<sup>3</sup>, Nematollah Jonaidi Jafari<sup>4</sup>, Hossein Masoumbeigi<sup>\*5</sup>

1) Student Research Committee and Department of Environmental Health Engineering, Health Faculty, Baqiyatalla University of Medical Sciences, Tehran, Iran.

2) Department of Epidemiology and Biostatistics, Health Faculty, Baqiyatallah University of Medical Sciences, Tehran, Iran.

3) Health Education Department, School of Health, Baqiyatallah University of Medical Sciences, Tehran, Iran.

4) Health Research Center, Baqiyatallah University of Medical Sciences, Tehran, Iran.

5) Department of Environmental Health Engineering, Health Faculty, Baqiyatallah University of Medical Sciences, Tehran, Iran.

\*Author for Correspondence: masoumbeigi@gmail.com

Received: 6 Aug. 2016, Revised: 9 Sep. 2016, Accepted: 22 Nov. 2016

## ABSTRACT

Healthcare wastes are a major challenge in public health and comprise all types of wastes generated by healthcare centers, research facilities, and laboratories. The aim of this study was surveying the knowledge and practice of nursing staff about sharp waste management in selected military (Tehran) and non-military (Qom) hospitals in 2012. This was a descriptive-analytical study on 143 nursing staff in Military and Non-Military hospitals. Data was collected using a self-report questionnaire. Statistical tests such as the student t-test, one-way analysis of variance and Pearson correlation were used to data analysis. The mean age of participants was 32(±6.3) and the majority were female. The mean score of knowledge was 54.7(±14.4) and their knowledge classified on a moderate level. Also, the mean score of practice was 65.44(±11.6) and was classified on a moderate level. The means of these variables were higher among personnel of Military than Non-Military. There were positive correlations between knowledge, practice and age variables (P<0.05). The findings showed that there is a considerable deficiency about knowledge and practice of the participants' in study, from fundamentals of desirable management of sharp waste. As a result, the design and performance of proper educational programs are suggested for them.

**Key words:** Knowledge, Practice, Nursing Staff, Sharp Waste, Hospital Waste Management, Military Hospital

## INTRODUCTION

Medical wastes are a major problem for healthcare staff, public health, ecosystems and environment. These are wastes comprise all types of wastes generated by healthcare centers such as hospitals, clinics, medicine offices, dental, health care in home, research facilities, laboratories [1-3].

Medical Wastes could divide into two categories: hazardous and non-hazardous waste. Non-hazardous wastes can be disposed with municipal wastes. So, good separation of these two parts is extremely important for solid waste management [4].

Knowledge from Medical waste production is the first important step in the ongoing improvement of hospital waste management. This subject can be used as a basis for planning, budgeting, control of cost and waste minimization [5].

Most of waste (75-90%) produced by the healthcare staff is non-hazardous and 10-25% is regarded as

hazardous. The second groups due to infection transmission have a more important role [6-8].

One of the correct methods of waste management, knowledge from classified of hazardous medical waste (Such as: infectious waste, pathological waste, chemical waste, pharmaceutical waste, sharps waste and radioactive waste) and their proper disposal [9-11]. In developing countries, the quantity of healthcare waste because rapid population increase and request for health services has risen in recent years [12]. The ratio for hazardous waste is different in any country [13]. More than 100 tons of medical wastes are produced daily in Tehran [14].

All hospitals waste must be separated directly after production and packed into specific containers for storage and transport with specific tools [11]. knowledge of Inadequate and inappropriate from hospital wastes management, in addition to the serious health risks and environmental pollution can cause dangerous diseases such as AIDS and spread of

nosocomial infections, viral infections, hepatitis B and C and other diseases are transmitted through blood and other body fluids [15-17]. On this issue, sharp wastes are viewpoint of occupational safety the first priority and considered as serious threat for Healthcare personnel [18].

Unfortunately, studies show that a significant percentage of hospital personnel, knowledge and skills necessary have not in relation to the sharp waste management and this Issue may cause exposure of many health care staff and workers [19-24].

Among health care workers in the Hospital, nurses are including the most important people who exposed to such waste. This group because of the type of services and care are one of the main producers of such waste and they have an important role in sharp waste management and transmission of nosocomial infection [25].

Identifying the knowledge level and practice of individuals about sharp waste management and disposal can be considered as an effective step to reduce the risk of transmission of infection. Therefore, this study was done with aim of assess knowledge and practice of nursing staff about sharp waste management in selected hospitals.

## MATERIALS AND METHODS

A descriptive-analytical study to assess the level of knowledge and practice regarding sharp waste management was conducted in selected hospital of military (Tehran) and non-military (Qom) in 2012. The study population, nursing staff in the hospitals, was selected based on availability. This research was performed using a researcher-made questionnaire containing 32 questions to assess knowledge and performance (15 multiple choice questions for knowledge evaluation and 17 questions with two options for practice evaluation). A question was defined as information about hospital waste and its classification, generation, segregation and collection process, transportation procedure and safe disposal. Validity of questionnaire is assessed with suggestions from 5 experts and professionals some of the questions identified as vague and we modify them eventually the content validity was approved. Cronbach's alpha test was used to measure the reliability of the questionnaire (knowledge ( $\alpha$ ): 71.7% and Practice ( $\alpha$ ): 72.2%). For assessing the level of knowledge and practice, mean scores were used and eventually the classification was determined in the following way:

- 1) Weak: <50%)
- 2) Moderate (50 – 74.99 %)
- 3) Good (75 to 100 %).

Required permissions were taken from the authorities of the hospital for the study. The purpose and nature of the study were introduced to the nurses. One hundred and eighty-eight people were participated in this study. Eventually 143 nurse staffs completed the questionnaires. Data was analyzed by SPSS software version 17. To describe the data frequency distribution tables, central indexes and dispersion were used and to assess the mean difference the independent t-tests and one-way analysis of variance (ANOVA) were used. The Pearson correlation test was used to examine the relationships between variables.

## RESULTS

Most of the nurses were female (72%). Mean ( $\pm$ SD) age of the respondents was 32 ( $\pm$ 6.3) years. 81.1% of the respondents had a degree of Bachelor of Science. More than 58% had a working experience (of 6-16 years). Background characteristics are presented in Table 1.

Table 2, shows the Distribution of knowledge and practice about sharp waste management in the hospitals studied. The mean knowledge score ( $\pm$ SD) of the respondents was 54.7 ( $\pm$ 14.4). Mean ( $\pm$ SD) practice score of nurses was 65.4 ( $\pm$ 11.6). Approximately half of nurses had moderate knowledge. More than 66.4% of respondents had moderate practice score. Comparing the level of knowledge and practice showed that in both cases the level of knowledge and practice in the military hospital was better than in Non-Military hospitals. Chi-square test showed that this difference was statistically significant ( $P < 0.0001$ ) (Table 2).

The results showed that as the level of education increases knowledge and practice scores increases. ANOVA test showed that this difference was not statistically significant ( $P = 0.44$ ,  $p = 0.4$ ). The results also show that the average score of knowledge and practice in men is higher than females but independent t-test showed that this difference was not statistically significant ( $P = 0.71$ ,  $P = 0.51$ ) (Table 3).

To evaluate the relationship between knowledge and practice scores and age the Pearson correlation coefficient was used. The correlation coefficient between knowledge and practice was calculated as ( $r = 0.76$ ), indicating a significant relatively strong relationship between them ( $P < 0.0001$ ) (Table 4). There was also a significant correlation between age and knowledge and practice scores with a correlation coefficient ( $r = 0.3$ ), ( $P < 0.0001$ ) and ( $r = 0.27$ ), ( $P = 0.001$ ), respectively.

**Table1:** Frequency distribution by socio-demographic characteristics in respondents

Variable		Military Hospital		Non-Military Hospital		Total	
		n	%	n	%	n	%
Sex	Male Gender	25	30	15	26	40	28
	Female Gender	60	70	43	74	103	72
Age	Less than 30 years	14	16.5	34	58.6	48	33.6
	30 to 40 years	54	63.5	21	36.2	75	52.4
	40 years and over	17	20	3	5.2	20	14
Work History	5 years or less	13	15.3	29	50	42	29.4
	6 to 16 years	58	68.2	26	45	84	58.7
	16 years and over	14	16.5	3	5.2	17	11.9
Educational Level	Diploma	2	2.4	3	5.2	5	3.5
	Associate Degree	15	17.6	2	3.4	17	11.9
	BS	66	77.6	50	86.2	116	81.1
	MS	2	2.4	3	5.2	5	3.5
Ward	operating rooms	19	22.4	3	5.2	22	15.4
	CCU	4	4.7	8	13.8	12	8.4
	ICU	13	15.3	10	17.2	23	16.1
	emergency	9	10.6	10	17.2	19	13.3
	surgery	23	27.1	12	20.7	35	24.5
	internal	10	11.8	9	15.5	19	13.3
	Obstetric	7	8.2	6	10.3	13	9.1

**Table 2:** Distribution of knowledge and practice about sharp waste management in the hospitals studied

Variable		Military Hospital		Non-Military Hospital		Total		P-value
		n	%	n	%	n	%	
Knowledge	Weak	17	20	39	67.2	56	39.2	P<0.0001
	Moderate	56	65.9	19	32.8	75	52.4	
	Good	12	14.1	0	0	12	8.4	
Practice	Weak	2	2.4	11	19	13	9.1	P<0.0001
	Moderate	50	58.8	45	77.6	95	66.4	
	Good	33	38.8	2	3.4	35	24.5	

**Table 3:** Comparison of knowledge and practice about sharp waste management according to education and sex in the studied hospitals

Variable	Educational Level	Knowledge (Mean±SD)	P-value	Practice (Mean±SD)	P-value
Educational	Diploma	45.33	0.44	58.82	0.40
	Associate Degree	57.25		68.51	
	BS	54.88		65.21	
	MS	53.33		67.05	
Gender	Male	55.50	0.71	66.47	0.51
	Female	54.49		65.04	

**Table 4:** Correlation Coefficients between knowledge and practice about sharp waste management and Age in the respondents

Variable	Correlation Coefficient (P- value)	
	Knowledge	Practice
Knowledge	-----	0.76 (P<0.0001)
Practice	0.76(P<0.0001)	-----
Age	0.3(P<0.001)	0.27(P<0.01)

## DISCUSSION

This study is designed to assess the knowledge and practice of nursing staff about hospital waste management in selected hospitals. The results showed that in the majority of nurses, the level of knowledge and practice in both hospitals groups was at a moderate level.

According to the importance of sharp waste management and effects on health of hospitals personnel and other people in the community, the need for more training in these fields is more and more evident.

A similar study was done by Nkonge & *et al.* to determine the level of knowledge, attitude and practice of medical personnel in exposure of the health risks related to the unfavorable waste management. In this study, different groups of personnel including doctors, nurses and lab experts were studied. Results showed that there is no especial health and safety training for waste management in training programs of personnel. Mostly through unofficial channels such as seminars and conferences, some people have received related training. Also; according to the deficiencies available in knowledge,

attitude and practice of personnel in their study, the need to hold unofficial education and relevant for healthcare staff was emphasized [22].

In a study by Jabbari & *et al.* that was conducted recently in Mazandaran, knowledge, attitudes and practices of general and specialist's physicians about hospital waste management were assessed. This study suggests a significant deficiency in knowledge of physician's specialists, compared to general practitioners and nurses [26].

In a study by Mathur & *et al.* in India, the need to train healthcare personnel, particularly for general and specialist physicians has been emphasized. In this study, the mean of knowledge and practice of nurses compared to doctors is estimated as higher [20].

Study of Jabbari & *et al.* showed that the mean scores of knowledge, attitude and practice of teaching and non-teaching hospitals are also significant differences, so that the mean was higher in non-teaching hospital [26]. This finding is consistent with the findings of the present study and in our study; the mean scores of knowledge and practice were higher in military hospitals than Non-Military. Maybe the main reason for such difference; is appropriate formal training and in-service training for nursing staff in military hospitals. Also in this type of hospital due to some restrictions and severity, more opportunities for professional care and safety are provided.

Another finding of our study was a significant positive relationship between knowledge, practice and age of participants that can be due to the important role of work experience and field experience and continuous training in the field of study. Since, knowledge increased in every field, this will move people towards using knowledge in their performance, such as the relationship between knowledge and practice does not seem so surprising. These results had been shown in numerous studies and knowledge variable considered as an important predictor of individual behavior in the field of the similar studies [20,22].

In other words, with increase in age and work experience in nurses, it is expected that more experience in the field of proper management of sharp wastes will be provided. This finding in the study of Prabhakar and Makhija in India which exclusively done on nurses also approves our findings [25].

This study had some limitations that should be considered when interpreting the results. First, this study was conducted only on nursing staff in two hospitals. This problem may reduce generalization power and the comparison is impossible between different groups of healthcare workers. However,

findings can be seen as initial findings for reducing such shortcomings in the future studies.

## CONCLUSION

The current study indicates a considerable gap between knowledge and practice of nursing staff regarding hospital sharp waste management. Therefore, it shows importance of design and implementation of proper educational programs for nurses in this regard. It is recommended to reach a better appraisal of healthcare staff in term of the study variables, a wide range of research on different healthcare personnel should be performed and all governmental, non-governmental, educational, special, general, organizational hospitals are included until the role of professional experiences and environmental factors further will be identified.

## ETHICAL ISSUES

Ethical issues such as plagiarism have been observed by the authors.

## COMPETING OF INTEREST

The authors have no conflicts of interest to declare.

## AUTHORS' CONTRIBUTION

All authors collaborated equally.

## FUNDING/ SUPPORTING

The authors have not received any financial support related to the material of the manuscript.

## ACKNOWLEDGMENT

The authors would like to thank all managers and nursing staff the studied hospitals that provided possibility of collecting data provided by this study.

## REFEENCES

- [1] Makajic-Nikolic D, Petrovic N, Belic A, Rokvic M, Radakovic JA, Tubic V. The fault tree analysis of infectious medical waste management. *Journal of Cleaner Production*. 2016;113:365-73.
- [2] Joseph L, Paul H, Premkumar J, Paul R, Michael J. Biomedical waste management: Study on the awareness and practice among healthcare workers in a tertiary teaching hospital. *Indian journal of medical microbiology*. 2015;33(1):129-31.
- [3] Paudel R, Pradhan B. Health care waste management practice in a hospital. *J Nepal Health Res Counc*. 2010;8(2):86-90.
- [4] Ferdowsi A, Ferdosi M, Mehrani Z, Narenjkar P. Certain hospital waste management practices in isfahan, iran. *International journal of preventive medicine*. 2012;3(Suppl 1):176-85.

- [5] Xin Y. Comparison of hospital medical waste generation rate based on diagnosis-related groups. *Journal of Cleaner Production*. 2015;100:202-07.
- [6] Chudasama RK. Awareness and Practice of Biomedical Waste Management Among Different Health Care Personnel at Tertiary Care Centre, Rajkot, India. *Online Journal of Health and Allied Sciences*. 2014;13(1):1-6
- [7] Nandwani S. Study of biomedical waste management practices in a private hospital and evaluation of the benefits after implementing remedial measures for the same. *The Journal of communicable diseases*. 2010;42(1):39-44.
- [8] Sunil Kumar V, Manjunatha M, Badami V, Pradeep P. Biomedical Waste Management: A Review. *Journal of Oral Health & Community Dentistry*. 2012;6:141-44.
- [9] Abd El-Salam MM. Hospital waste management in El-Beheira Governorate, Egypt. *Journal of Environmental Management*. 2010;91(3):618-29.
- [10] Marinković N, Vitale K, Holcer NJ, Džakula A, Pavić T. Management of hazardous medical waste in Croatia. *Waste Management*. 2008;28(6):1049-56.
- [11] Gai R, Kuroiwa C, Xu L, Wang X, Zhang Y, Li H, *et al*. Hospital medical waste management in Shandong Province, China. *Waste management & research: the journal of the International Solid Wastes and Public Cleansing Association, ISWA*. 2009;27(4):336-42.
- [12] Tesfahun E, Kumie A, Legesse W, Kloos H, Beyene A. Assessment of composition and generation rate of healthcare wastes in selected public and private hospitals of Ethiopia. *Waste Management & Research*. 2014;32(3):215-20.
- [13] Azage M, Kumie A. Healthcare waste generation and its management system: the case of health centers in West Gojjam Zone, Amhara Region, Ethiopia. *Ethiopian Journal of Health Development*. 2010;24(2):119-26.
- [14] pasmand.tehran.ir [homepage on the Internet]. Tehran municipality: Public & International Relations Department. Available from: <http://pasmand.tehran.ir/Default.aspx?tabid=481>.
- [15] Chudasama RK, Rangoonwala M, Sheth A, Misra S, Kadri AM, Patel UV. Biomedical Waste Management: A study of knowledge, attitude and practice among health care personnel at tertiary care hospital in Rajkot. *Journal of Research in Medical and Dental Science*. 2013;1(1):17-22
- [16] Kumari R, Srivastava K, Wakhlu A, Singh A. Establishing biomedical waste management system in Medical University of India – A successful practical approach. *Clinical Epidemiology and Global Health*. 2013;1(3):131-36.
- [17] Saraf Y, Shinde M, Tiwari S. Study of awareness status about hospital waste management among personnel and quantification. *Indian journal of community medicine: official publication of Indian Association of Preventive & Social Medicine*. 2006;31(2):111.
- [18] Chartier Y, Emmanuel J, Pieper U, Prüss A, Rushbrook P, Stringer R, *et al*. Safe management of wastes from health-care activities. . 2 ed: World Health Organization(Department of Public Health, Environmental and Social Determinants of Health); 2014.
- [19] Malini A, Eshwar B. Knowledge, Attitude and Practice of Biomedical waste management among health care personnel in a tertiary care hospital in Puducherry. *International Journal of Biomedical Research*. 2015;6(3):172-76.
- [20] Mathur V, Dwivedi S, Hassan M, Misra R. Knowledge, Attitude, and Practices about Biomedical Waste Management among Healthcare Personnel: A Cross-sectional Study. *Indian journal of community medicine : official publication of Indian Association of Preventive & Social Medicine*. 2011;36(2):143-45.
- [21] Mostafa GMA, Shazly MM, Sherief WI. Development of a waste management protocol based on assessment of knowledge and practice of healthcare personnel in surgical departments. *Waste Management*. 2009;29(1):430-39.
- [22] Nkonge Njagi A, Mayabi Oloo A, Kithinji J, Magambo Kithinji J. Knowledge, attitude and practice of health-care waste management and associated health risks in the two teaching and referral hospitals in Kenya. *Journal of community health*. 2012;37(6):1172-77.
- [23] Pinto VN, Joshi SM, Velankar DH, Mankar MJ, Bakshi H, Nalgundwar A. A comparative study of knowledge and attitudes regarding biomedical waste (BMW) management with a preliminary intervention in an academic hospital. *International Journal of Medicine and Public Health*. 2014;4(1):91-95.
- [24] Sarker MAB, Harun-Or-Rashid M, Hirosawa T, Hai MSBA, Siddique MRF, Sakamoto J, *et al*. Evaluation of Knowledge, Practices, and Possible Barriers Among Healthcare Providers Regarding Medical Waste Management in Dhaka, Bangladesh. *Medical science monitor: international medical journal of experimental and clinical research*. 2014;20:2590-97.
- [25] Prabhakar U, Makhija N. Bio-medical waste management: a study to assess the knowledge of nursing personnel. *The Nursing journal of India*. 2004;95(8):173-74.
- [26] Jabbari H, Farokhfar M, Jafarabadi MA, Taghipour H, Bakhshian F, Rohane S. Personal and organizational predictors of physicians' knowledge, attitudes and practices related to medical waste management in Mazandaran province (northern Iran). *Waste management & research : the journal of the*

International Solid Wastes and Public Cleansing

Association, ISWA. 2012;30(7):738-44.