Evaluating Waste Management in Selected Hospitals of Isfahan City in 2016

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ABSTRACT

Objective: Hospital wastes have a special sensitivity due to containing dangerous, toxicant and pathogenic factors such as pathologic, infectious, medicinal, chemical and radioactive wastes. This study was conducted with the aim of examining the rate of observance of safety actions by personnel responsible of collecting hospital wastes in governmental hospitals affiliated to Tehran University of Medical Sciences and examining reasons of observance or non-observance of safety during collecting wastes by personnel in the studied hospitals.

Materials and methods: The present study is descriptive- analytical and of cross-sectional type which was performed in 2016 on 3 selected hospitals of Esfahan city (governmental, private and social security). For collecting data, survey method was utilized and data collecting tool was questionnaire. In this study, based on frequency distribution, total score of individuals safety was divided to three groups of weak (score less than 26), medium (score between 26 to 30) and good (score more than 30). Data was analyzed using SPSS 22 software and statistical t- test and one-way variance analysis and regression.

Findings: findings showed that in respect of safety of hospital wastes, governmental and social security hospitals had good safety status (average above 30) and private hospitals had medium safety status. Also, between the studied hospitals, in respect of safety status score average, a statistically significant relation was obtained. Also, findings of this study showed the statistically significant relation between personnel education level, age, work background and training personnel with their safety status score average.

Conclusion: implementing current national standards and regulations and obviating shortages, correct planning, using young personnel alongside more experienced personnel, more training courses, respecting and greatening service personnel and attending them could help safety improvement in collecting hospital wastes.

Keywords: safety of hospital wastes, selected hospitals, Esfahan city

INTRODUCTION

Background and objective: One of fundamental issues of management in hospital is quality of collecting, transferring and temporal upkeep and final detrusion of wastes and observing safety points in all of these stages so that ordinary people are not threated by any risk. Beside the risk hospital wastes impose on personnel and patients who deal with these wastes, are considered a threat for the environment and people general health. For scientific and safe management of these wastes in each organization (especially hospitals), controlling, separating, perishing, disinfecting, conditions and place of keeping, transportation and final exertion are considered among key steps in this ground(El-Salam, 2010, Mohseni, 2001). Hospital wastes are referred to all solid and semi-solid materials produced in all treatment and non-treatment units and wards of a hospital. Increasing growth of population has caused considerable development of hospitals which has led to increasing of service and finally proliferation of hospital wastes (Fazelinia, 2009; Jalilzadeh,

Ashrafi, Seyed, & Mahmoudian Mohammad, 2009).

Yearly, 23 million people in the world countries catch infectious diseases due to contact with hospital wastes that 21 million cases are relating to Hepatitis B (32% of new infections), 2 million relating to hepatitis C (40 % of new infection cases) and 260 thousand cased relating to HIV (5% of new infection cases) which are transferred through sharp and cutting wastes of hospital wastes (Khalaf, 2009). The performed studies in United States have shown that the rate of yearly injuries has been different from 180 to 200 in every 1000 worker in health sector (collectors of waste). Some indexes like considerable increase of hospital infection rate and increasing of organisms' resistance against a wide range of antibiotics show that weak management of hospital wastes could have a negative impact on performance of healthcare institutes (Arab, Ravangard, Omrani, & Mahmoodi, 2010).

In Iran, also, this matter has been multiply examined. Studies in Golestan province have shown that processes of waste management have a relatively good condition but due to non-use of advanced techniques and equipment, threat of risks relating to hospital wastes exist in this province (Shahriari & Nooshin, 2006). In another study which was performed by Arab et.al (2015), it was specified that more than 60% of governmental hospitals are in weak to medium status in respect of safe management of waste and there are some weaknesses in the field of improving hospital waste process which should be resolved by optimal policy making (Arab, Safari, Zandian, & Nodeh, 2016). In another study by Arab et.al (2006), it was specified that among reasons of weakness in correct management of hospital wastes in Iran, we could mention factors like lack of required rules and instructions about various aspects of waste management, lack of correct training for personnel, lack of designating enough budget, lack of enough control and supervision (Arab et.al, 2010). Nkonge et.al in 2012 performed a study with the aim of examining the rate of knowledge, attitude and measurements relating to hospital waste management and risks relating to them in two training hospitals in Kenya. Based on the results of this study, method of observing health and safety in management of hospital wastes was not included in training plan of studied group (including nurses, laboratory personnel). Also, according to the results of this study, personnel's training is effective on their tendency to vaccinate against Hepatitis B and using safety equipment for collecting hospital wastes (Njagi, Oloo, Kithinji, & Kithinji, 2012). In this Khalaf et.al study (2009),

they evaluated hospital waste management among hospitals of Jenin region of Lebanon hospitals and in their results stated that implementing safe and secure management strategies requires participation and cooperation of all people in the hospital, existence of a system securing safety and health during hospital waste control and personnel training before and after work (Fazelinia, 2009). Lack of control and inattention to correct management of hospital wastes, concerning limitation of resources especially in Iran health system, besides serious threating of the society and environment health causes loss of high costs and as a result increasing of financial pressure to health system (Al-Khatib, Eleyan& Garfield, 2016; Arab et al., 2010; Mohamed, Ebrahim, & Al-Thukair, 2009, Mostafavi et al, Zandian, Ghiasvand, & Nasimidoost, 2012).

The main aim of this study is to examine the status of observing hospital waste safety by personnel responsible for collecting wastes in selected governmental, private and social security hospitals of Esfahan city and examining the reasons of observance or non-observance of safety during collecting wastes by service personnel in studied hospitals. Also, the relation between demographic variables with average score of safety status and also the relation between training personnel with average score of safety status were examined and comparing safety status among wards and studied hospitals was among secondary aims of the present study.

MATERIALS AND METHODS

The present study is descriptive – analytical and of cross-sectional type which was performed in 2016 on three hospitals of Esfahan city. Hospitals were classified to three groups of governmental, private and social security regarding type of ownership and from each group in Esfahan city, one hospital was randomly selected and studied. From each hospital, equally 50 personnel working in radiology, laboratory, hospitalization ward and surgery room were selected and totally s sample with volume of 150 people from three hospitals of Esfahan city was studied. Checklist of Khalaf et.al (2009) was the basis of preparing checklist for collecting data for the present study (Khalaf 2009). This questionnaire included two sections of general questions and appropriative questions. General questions include age, gender, service background, marital status, type of department, working shift and employment status. But, appropriative questions are based on aim and topic of research including questions relating to studied variables. Scoring to questions was in this way that for calculating safety score of each worker to two-

option questions, in case of correct answer (the answer which is completely considered by the researcher) score 1 and otherwise 0 is designated. About three- option questions, in case of complete answer (the answer which is completely considered by the researcher) score 1 and wrong answer (the answer not considered by the researcher) zero score was given. Then, from total scores, the complete score was calculated. Then, based on frequency distribution, the individuals total safety score was divided to three groups of weak (score less than 26), medium (score between 26 to 30) and good (score more than 30). The questionnaire validity was confirmed with consultation of experts and professors of health and treatment management and for assessing internal reliability, Cronbach alpha was used that was estimated 83%. Also, for assessing external reliability for 20 precipitants, the questionnaire was completed randomly in two turns with 14 days interval and after survey, it had correlation of .089. This questionnaire includes 26 questions. After collecting the completed questionnaire, data was analyzed using SPSS 22 statistical software, t-test statistical tests, one-way variance analysis and regression.

Findings: In table1, the average score obtained by each variable and the relation between the average score obtained by personnel with the considered variable using t-test has been shown.

Findings in table 1 show that average score of safety observance status in people who work in governmental and social security hospitals is more than people who work in private hospitals but regarding that p-value =0.271 was obtained , no significance difference was observed between three groups in the ground of safety status . Also, findings show that average score of safety status in men is a little more than women but regarding that p-value= 0.311, as to safety status, there is no statically different between two genders. Based on the results of average score safety status in people who had educations of associate diploma and higher was more than people whose education was below diploma or diploma and regarding that P-value= 0.001, in the respect of safety status, there is a significant difference between three educational groups. The results showed that average score of safety status in people who work in the hospital for 8 hours or less a day is almost equal to those who work more than 8 hours and there is no statistically significant difference between these two groups in the field of safety status. Also, average score of safety status in day shift people is more than night shift, but in the ground of safety status no statistically difference was obtained (p-value= 0.112). finally, findings showed that average score of safety status in married people is a bit more than

single people that regarding that p-value =0.404 was obtained, no statistically significant difference was observed between two groups, in the last part, the results show that average score of safety status in people who work officially is more than those who are contractual and regarding that p-value= 0.211, no significant difference was obtained between two groups in the ground of safety status.

In the section 1 of table 2, findings show that the average score of safety status in personnel who work in hospitals above 200 beds is more than others but regarding that P-value= 0.203 was obtained, no statistically significant difference was observed between these three groups in the ground of safety status. In section 2, the results show that people who are less than 30 years old , the average score of their safety status is more than two other groups and the more is the age of people, the less is their safety average score and regarding that P-value=0.021 was obtained, there was a statistically significant difference between three age groups. In section 3 of this table, findings show that the average safety score of people who have work background between 1 to 5 years old is more than two other groups and in the ground of safety status there is a statistically significant difference between three above groups (p-value= 0.001).

In the last section of table 2, findings show that the average score of safety status in personnel from high to low is respectively in surgery room, laboratory, radiology and hospitalization but regarding that P-value=0.33 was obtained, in the ground of safety status there is no statistically significant difference between considered wards of the hospital. Regarding the obtained score, wards of radiology, laboratory and hospitalization have medium safety status (score between 26-30) and surgery room has good safety status (score more than 30).

In a section of the resent study, the relation and impact of training on personnel average safety score was examined that the results show that there is significant and positive relation between these two variables (r =0.281, p< 0.001).

Finally, findings of table 4 show that how is the average score of safety status in each studied hospital and if there is a significant relation between studied hospitals in respect of safety status that the results are presented here. As, findings of table 4 show that governmental and social security hospitals regarding the average score of safety status have good status and private hospitals have medium safety status. For comparing safety status average score among various hospitals, one-way variance analysis was used and regarding that p-value= 0.001, average score of safety status in three

studied hospitals is not equal and there is a statically significant difference in the ground of safety status. Totally, findings of this table show that total average score of safety status in examined hospitals is 31.23 which shows that the examined hospitals have good status (score between 30 to 35).

DISCUSSION

The results of the present study showed that among examined demographic features, work background and education status are among effective and significant factors on safety status of personnel responsible of collecting hospital waste. The relation of these variables with safety status is statistically significant (p-value= 0.001 and p-value= 0.001). This means that the more is work background and education level of service personnel, the more is the possibility of observing safety points during collecting hospital wastes and as a result the rate of damages imposed on them and patients and finally the hospital general status will be reduced. The results of the present study are consistent with study of Abubakar Umar et.al which was performed in 2009 on groups (physicians, nurses, service personnel) working in hospitals of Katrina state in Nigeria (Umar & Yaro, 2009). In this study, it has been declared that the awareness rate of service personnel of rules and principles of hospital waste management and their educations have a significant impact in the relating fields relating on safe collection of hospital wastes. Also, in this study, it was specified that there is no significant relation between average score of safety status and type of employment of service personnel (p-value=0.144), but generally, findings showed that the safety status score of personnel who work officially is more than those who are contractual. It seems that official personnel due to receiving more financial benefits and job security have more motivation for correct collection of hospital wastes and observing safety points. On the other hand, since it takes a long time till people employed contractually become official, so the experiences acquired during these years causes these personnel to more observe safety points in collecting wastes and less expose themselves to risks due to these wastes. No statistically significant relation was obtained between safety status average and working shift (p-value= 0.472). But findings showed that safety status average score of day shift people is more than night shifts. Perhaps, one of mentionable reasons for this is fatigue and little sleep of personnel in night shift. Among other reasons, we can point to lack of sufficient supervision in night hours on collecting hospital waste. No study has been performed in this field. There is no significant relation between safety

status score and the number of beds in studied hospitals. The results of the performed study by Arab et.al (2016) are an emphasis on this general finding. In this study, the obtained results indicate that there is no statistically significant relation between the hospitals general specifications and method of separating and collecting wastes. In the hospitals above 200 beds, a more suitable status exists that this could be due to presence of more personnel in these hospitals and as a result, suitable working load distribution and their less fatigue and correct management of these hospitals personnel.

There was no statistically significant relation between studied hospitals wards but here surgery room with average 30.34 % has had good safety, while the results of Arab et.al study (2010) showed that wastes management status in wards of radiology, laboratory, hospitalization and in some cases surgery room in hospitals of Tehran University of Medical sciences has not been so desirable. They consider optimization of work process and giving required and enough training to personnel among important stages. Perhaps, one reason of more average of surgery room is distinction of this section significance for personnel that they know infection transfer in this ward may occur easily due to high operations and may seriously harm all individuals. As findings showed three wards of studied wards (radiology, laboratory and hospitalization) have medium status that it seems that required trainings and also reflecting significance of infection transfer in these wards to personnel may help betterment of these wards status. Also, the results of study conducted by A. Nkonge Njagi and Njagi et.al (2012) showed that in the field of hospital waste in laboratory has a desirable status.

Findings of this study showed a statistically significant relation between safety status score and personnel training. It seems that the reason of this is inclusion of concepts relating to waste safety in content and in-service training plans of hospital personnel and attention of hospital managers and authorities to observing safety measurements during collecting wastes in the hospital by personnel. The results of the performed studies by Khalaf (2009), A. Nkonge Njagi and Mohamed et.al (2009) showed that training improves of service personnel awareness about diseases transferred by hospital wastes like Hepatitis B. also, they stated that training plans on management of risks due to hospital wastes should be among main plans of hospitals. Also, in Arab et.al (2016) study, the obtained results showed that there was a statistically significant relation between some features of personnel like training status and their awareness rate about method of separating hospital

wastes, but this relation was not statistically significant. Therefore, in Arab study, it was specified that we can't sate having enough training and awareness of personnel is effective on their performance about each stage of hospital waste management. As this study's findings show in Esfahan city, studied governmental and social security hospitals have good safety status and private hospitals have medium safety status. Also, it was specified that there is a relation between studied hospitals in respect of safety status average score and this relation is statistically significant. Two hospitals had good safety status that this may be due to accurate utilizing of rules relating to wastes in hospitals or correct training of personnel about wastes. In researcher view, on of factors which may cause improvement of safety status is attention and greatening service personnel in the hospital. If hospital management and other personnel signify the job of service personnel and they know that they are noteworthy, they will be motivated and this motivation causes better performance of their work and as a result betterment of safety status. As Irannejad Parizi & Sasangohar (2004) studies showed that if people are noticed in their workplace, this causes increase of their spirit and as a result their job status improvement. Other reasons may cause improvement of safety status, among which we can point to high education level of personnel and their work background.

In one of studies which have been recently conducted by Arab et.al (2016), the results showed that hospital wastes management in studied hospitals is not in a desirable status, some reasons of which are lack of wastes separation in wards and also unsuitable means of collecting wastes.

In another study which was performed by Shahriari and Nooshin (2006) in Golestan province hospitals, the results showed that in Golestan province hospitals, wastes management has good conditions but due to non-use of advanced techniques and equipment, there is threat of risks relating to hospital wastes in this province.

CONCLUSION

Totally, the present study showed that most studied hospitals have medium safety status and personnel observe some main points about management of hospital wastes. Implementing current national standards and rules and obviating shortages , correct planning, using young personnel alongside more experienced personnel, more training courses, greatening and respecting personnel and attending them could help personnel to more observe safety points that these conditions causes betterment of hospital wastes safety status.

Table1- Determining the relation between safety status score and considered variable type using T-Test

P-value	standard deviation	average score	percent of people	number of people	subscale	main variable
0.311	29.59	3.44	78.5	110	man	1-gender
	28.48	3.67	21.5	30	woman	
0.00	28.84	3.70	72.1	101	below diploma	2-education degree
	30.88	2.29	17.1	24	diploma	
	33.56	3.11	10.8	10	associate degree & higher	
0.112	29.02	3.71	56.2	79	less than 8 hours	3- working hours during the day
	29.77	3.20	43.8	61	more than 6 years	
0.343	29.46	3.42	79.2	111	day shift	4- shift type
	28.92	3.83	20.8	29	night shift	
0.404	28.83	4.25	13.3	19	single	5- marital status

					6- type of employment
	29.43	3.39	86.7	121	married
0.211	30.56	2.80	11.8	12	official
	29.19	3.57	88.2	128	contractual

table 2- Determining the relation between safety status score and considered variable type using one way variance analysis

P-value	standard deviation	average score	percent of people	the number of people		name of variable
0.203	4.37	28.29	31.4	44	below 150 beds	
	3.18	29.36	35	49	between 150 to 200 beds	1- THE NUMBER OF BED
	2.89	30.14	33.6	47	above 200 beds	
0.021	2.39	30.85	20.0	28	less than 30 years old	
	3.74	29.08	33.3	47	between 30 to 40 years old	2- age
	3.61	28.90	46.7	65	above 40 years old	
0.00	3.31	30.69	24.4	34	between 1 to 5 years	
	3.62	28.40	55.6	78	between 6 to 19 years	3-wrok background
	2.57	30.37	20.0	28	more than 19 years	
	3.81	28.88	13.3	19	radiology	
0.330	3.57	29.42	20.7	29	laboratory	4- type of ward
	2.96	30.34	28.1	39	surgery room	
	3.67	28.74	37.9	53	hospitalization	

table 3-Determining the relation between average score of safety status and after training to personnel in studied hospitals

P-value	correlation coefficient	the number of personnel
0.000	0.281	140

TABLE 4- COMPARING AVERAGE SCORE OF SAFETY STATUS BETWEEN STUDIED HOPSITALS

TEST RESULT	STANDRAD DEVIATION	MEAN	NAME OF HOSPITALS
5.74=F	3.01	3.01	1
0.001<P-value	2.87	2.87	2
	3.92	3.92	3
	3.51	31.23	TOTAL

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