ASSESSMENT OF HEALTH CARE WASTE MANAGEMENT PRACTICES AND KNOWLEDGE AMONG HEALTH CARE WORKERS WORKING AT TERTIARY CARE SETTING OF PAKISTAN

Ramesh Kumar[1, 4], Zulfikar Ali Gorar[1], Jamil Ahmed[1], Zulfiqar Ali[2], Arshad Karim Chandio[1], Muhammad Magan[3], Nousheen Ahmed[3], Babar Tasneem Shaikh[1], Ratana Somrongthong[4]

[1]Health Services Academy, Islamabad, Pakistan
[2]Health Department, Government of Baluchistan, Pakistan
[3]World Health Organization, Islamabad, Pakistan
[4]College of Public Health Sciences, Chulalongkorn University, Bangkok 10330, Thailand

ABSTRACT: Health care waste (HCW) is the second dangerous waste in the world that needs to be properly disposed by trained health care staff. Knowledge and safe practices of medical staff is very imperative while managing this waste. Approximately 1.35 kg/bed/day of waste is produced on average in the Pakistani hospitals which produce about 250,000 tons of HCW per year. HCW comprises of 15-20% of general waste but due to improper segregation by hospital staff resulting in contamination of general waste that emerges of many infectious diseases and other environmental hazards if not disposed properly. General waste disposal mechanism in communities has not been of standards and is subject to many scavengers who collect items such as papers and cause spread of the many components of the trash within the surrounding atmosphere and risking the health of the communities. Therefore, hospitals which do not have comprehensive mechanism for waste disposal within their own system such as lack of incineration can lead to open dumping of human organ waste in the communities. This assessment has been conducted to determine the practices and knowledge regarding healthcare waste management in health care workers working at tertiary care setting of Pakistan. Cross sectional study was conducted in a tertiary care governmental hospital in a metropolitan city of Pakistan. Ten percent from a population of doctors, nurses and paramedical staff who were involved in the management of HCW were selected randomly; finally 98 respondents were interview adopted from World Health Organization. Majority 82% of the doctors and 54% of nursing staff were aware on hospital waste management rules while 83% of the paramedics were not aware about this. About 86% of both had knowledge of waste color coding and segregation of waste except paramedics, they were only 42%. Regarding occupational hazardous due to improper waste management and protocols of infectious disease control were better known to all the doctors and nurses, 75% of paramedics staff had also knowledge about this. Paramedical staff was found to be less knowledgeable and their practices regarding HCW management was found low as compare to doctors and nursing staff. This possible difference observed because of their minimum qualification and experience and exposure. However, extensive trainings may play positive role in increasing their knowledge and practices in this field.

Keywords: Health care workers, Waste management, Health care waste, Pakistan

INTRODUCTION

Globally the HCW is second hazardous waste after radiation waste [1]. Management of HCW is more significant due to its infectious nature and potential threats to cause the diseases. Health workers are only responsible for their proper dispose off therefore, their intensive knowledge in management of HCW is more important and proved significant results in different settings [2]. Statistics shows that the hospitals in Pakistan produce 250,000 tons of waste annually, of which 15 tons of waste is generated daily in the Punjab province. The health care waste comprises only 15 to 20 percent, but when the health care waste is not properly managed and thrown or dumped with the municipal waste, it contaminates the entire lot. Studies from Pakistan show that approximately 1.35 kg/bed/day of waste/bed/day is produced on average in the hospitals [3].The deadly waste produced by

* *Correspondence to: Ratana Somrongthong*
E-mail: ranata.s@chula.ac.th

Table 1 Demographic characteristics of the respondents

Socio-demographic characteristics	Respondents						Total (N=98)
	Doctors (n= 49)		Nurses(n=37)		Paramedics (n= 12)		
	N	%	N	%	N	%	
Age							
<25	14	14%	25	26%	5	5%	44
26-35	23	24%	8	8%	4	4%	35
>36	12	12%	4	4%	3	3%	19
Gender							
Male	30	31%	2	2%	3	3%	35
Female	19	19%	35	36%	9	9%	63
Educational status							
Post graduation	14	14%	12	12%	2	2%	28
Graduation	35	36%	25	26%	8	8%	68
Secondary		-		-	2	2%	2

hospitals comprises the used syringes, bandages, glucose bottles, blood bags, contaminated swabs, human organs and other medical instruments. More infections are posed by the sharp objects that cause injury [4]. This improper disposal of waste is the main source for recycle of the waste by scavengers who collect and reuse that posed higher risk in disease transmission [5]. Health workers are the vulnerable group that are more exposed to develop and spared of the diseases due to the improper waste handling [6]. Their health is directly associated with proper handling and management of HCW, while the visitors and patients are also exposed and may develop the consequences [7]. The janitorial staff, in particular, was found to be involved in selling the used syringes to the open market within a selling price of US$ 0.06-0.2 per syringe [8].

The improper disposal of bio-medical waste, open dumping and uncontrolled burning predispose to gets mixed with other waste, and contaminate whole waste [2]. Proper incineration is better option for the final disposal of waste [9]. A common treatment facility looks to be the most promising option along with other technological options. Private sector involvement may benefit the system [10]. Incineration of certain parts of the bio-medical waste is necessary because this is the only accepted option to treat waste such as organs, tissues or amputated human body parts. Moreover, a technically planned landfill can added support the entire healthcare waste management system but a improper designed and managed landfill can be the lethal cause for ground water contamination [11]. Proper landfills should be constructed and all incinerators working without filters and scrubbers should be immediately shut down. Bio-medical waste is produced during the laboratory procedures used for diagnosis, treatment and immunization of living being should also be treated [12]. Though, there are few studies conducted to assess the knowledge of nursing staff only in our settings while no one focused the knowledge and practices of these entire health workers who are intensively involved in the HCW management. Therefore, it is imperative to know the practices and knowledge regarding healthcare waste management in health care workers working at tertiary care setting of Pakistan while in imposing the proper policy interventions and recommendations.

METHEDOLOGY

A cross sectional study was conducted at the Holy Family Hospital Rawalpindi, Pakistan. The sample was selected randomly by taking convenient sampling from each of the 3 categories of health staff for their equal representation comprising; 490 doctors, 370 nurses and 112 paramedical staff. Included those health staff, who were handling or managing the waste. Those who were on leave and medically not well were excluded. Ninety eight health care workers were approached for interview during the survey. World Health Organization (WHO) validated and reliable structured questionnaire, checklist and direct observations were adopted after, piloted, pretested and translated. On site visits were performed by the principal investigator accompanying with trained data collection team while collecting the data from hospital. Direct observations like practices, handling, risk perception and training on HCW were done. WHO checklist for assessment of knowledge on waste generation, separation, collection, storage, transportation, disposal of medical wastes were made. In addition to provide information on hand knowledge regarding the waste practices, biohazards, safety practices and working environment followed by their present practices. Data was entered and analyzed through SPSS

Table 2 Knowledge of the respondents (N=98)

Items	Knowledge (%)					
	Doctors		Nurses		Paramedics	
	N	%	N	%	N	%
Biosafty rules	80	82%	53	54%	17	17%
Types of waste	98	100%	82	84%	32	33%
Waste bin color coding	84	86%	84	86%	41	42%
Segregation methods	84	86%	84	86%	41	42%
Storage of waste	70	71%	31	32%	17	17%
Methods of waste disposable	60	61%	40	41%	32	33%
Diseases safety	98	100%	98	100%	73	75%
Identify biohazard symbols	60	61%	26	27%	17	17%

version 17 software. All the frequencies percentages and descriptive statistics were measured.

RESULTS

Majority of respondents were doctors (50%), followed by nurses (38%) and paramedics (12%). Demographic information showed that most 64% of the participants were female. The minimum age of the participants in the study was found to be less than 25 years who accounted for 45% of the total sample while 36% of the participants were of middle age between 26 to 35 years. Above two thirds of respondents had qualification of graduation, 28% were postgraduate and only 2% had secondary education that is 15 years of education (Table 1).

Doctors

Above half (61%) of the doctors were have the knowledge regarding biohazards symbols recognition, HWM rules 2005 (82%), proper segregation (86%); the time for waste store not more than 48 hours (71%), regarding waste collection coding and proper disposable (86%); all have known about the kind of waste and diseases related to improper hospital waste handling (Table 2).

Nurses

The nursing staff have more knowledge on health care waste as all nurses knew the types of waste, 86% about waste color codes, 86% on the methods of segregation, 32% the time for waste store not more than 48 hours, 41% regarding methods of waste disposal. The results show that the knowledge of nurses is almost equal to the doctors. Around 54% were known about HWM rules 2005, 27% were capable to recognize biohazard symbol, while all of them were known about the diseases related to improper waste handling (Table 2).

Paramedical staff

The paramedics were less knowledgeable then the nurses due to their limited experience. One third 33% paramedics knew the types of waste and methods of waste disposal, 42% about waste color code and methods of segregation, only 17% could recognize biohazard symbol, the time for waste store not more than 48 hours and on existence of the HWM Rules 2005 and three forth 75% have well known about the diseases spread by improper waste handling (Table 2).

During the observation it was observed that almost all the wards and operation theaters (OT) following the proper HWM rules 2005 except outpatient department (OPD). The availability of needle cutter and their proper use was observed in different wards of the hospitals.

Staff training

Around 70% doctors reported that they were trained in HWM in the past; as compared to 65% nursing staff and 30% paramedic staff, who admitted to have been trained.

Accidental pricks

During this survey, it was observed that the nursing group was more cautious about the accidental pricks during the patient handling. Nurses 86% was found to handle the health care waste while paramedics 76% were found to have the handling of waste.

Health care waste handling assessment

During the study in this hospital, the proper legislation was followed for medical wastes separation as per the groups mentioned. General waste should be collected and transported in the black color coding waste bin while the infectious waste should be collected and transported in red bags and the sharp objects through proper box. Issues were identified during direct observation related to storage of waste that was very near to the ward and small enough to cater the need of hospital. Second issue was related to transport and collection of waste, it was observed that workers are not following the proper guidelines provided by WHO like use of personal protective equipments (PPE). Third issue was the improper segregation due to their poor trainings and lack of awareness.

DISCUSSION

The knowledge and practices of doctors and nursing

staff were seen different; this difference is due to many factors like the level of education, working experience, training and their practical involvement in the hospital waste handling. Doctors were found more knowledgeable as compare to other cadre of health care workers. When we compared the knowledge of the paramedics with nurses that was lower in paramedics. Nurses were more known about the hospital waste handling due their responsibilities in the medical work, while the doctors were found more causal in hospital waste practices. These findings in our study are in agreement with those of an Indian study [13]. During the observations it was noted that the staff practices on HCW were very poor. Many of the health care workers were deficient in knowledge about biohazards safety due to their poor exposure towards the training opportunities. These all issues can only be resolved by allocation a separate budget and proper training to the staff who are intensively involved in the handling of health care waste in the health facility. The level of education with proper training for health care workers is more important for improvement the real and good practices of health care handling in any organization. This all is possible only when there are excellent responsibilities and commitments posed by the heads of their organization [14]. Knowledge was more in those cadres who were trained during different trainings conducted by the hospital administration. Few of the paramedics had been previously participated and trained in the hospital waste practices. Trainings options are better while in improving the practices of health care waste management [15]. Proper use of valid tools and guidelines also positively impacts on the knowledge of health staff [16].

CONCLUSION

Paramedical staff was found to be low level of knowledge about various aspects of waste handling and their poor practices regarding HCW management as compare to doctors and nursing staff. This difference was possible because of their minimum qualification and experience and exposure. Staff refresher trainings and then continuous supervision of their waste management activities is very important for proper handling of waste within hospitals. However before that specific protocols and procedures needs to be established in order to convince the staff to follow. The hospitals will also require proper equipment and resources like PPE, waste bins, trolleys, needle cutters, autoclaves and facility of incineration for the proper disposal of waste and its final dumping which should ensure mixing with the general waste generated from households.

REFERENCES

1. Arab M, Baghbani RA, Tajvar M, Pourreza A, Omrani G, Mahmoudi M. Report: The assessment of hospital waste management:a case study in Tehran. Waste Manag Res. 2008; 26(3): 304-8.
2. Chaerul M, Tanaka M, Shekdar AV. A system dynamics approach for hospital waste management. Waste Manag. 2008; 28(2): 442-9.
3. 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. J Community Health. 2012; 37(6): 1172-7.
4. Mahmood SS, Malik R, Azim W, A study of waste generation, collection and disposal in a tertiary hospital in Pakistan. Pakistan J Med Res 2001; 40(1): 13-7.
5. Akter N. Medical waste management: a review. Bangkok: Environmental Engineering Program, School of Environment, Resources and Development. Asian Institute of Technology, Thailand; 2000.
6. Khan MR, Fareedi F, Rashid B. Techno-economic disposal of hospital wastes in Pakistan. Pak J Med Res 2006; 45(2): 41-5.
7. Ferreira V, Teixeira MR. Healthcare waste management practices and risk perceptions: findings from hospitals in the Algarve region, Portugal. Waste Manag. 2010; 30(12): 2657-63.
8. Mujeeb SA, Adil MM, Altaf A, Hutin Y, Luby S. Recycling of injection equipment in Pakistan. Infect Control Hosp Epidemiol. 2003; 24(2): 145-6.
9. Hoenich NA, Pearce C. Medical waste production and disposal arising from renal replacement therapy. Adv Ren Replace Ther. 2002; 9(1): 57-62.
10. Wassermann D. A decade of change in clinical waste treatment and disposal in Scotland. Health Estate. 1999; 53(10): 6-8, 10-2.
11. Orloff K, Falk H. An international perspective on hazardous waste practices. Int J Hyg Environ Health. 2003; 206(4-5): 291-302.
12. Saini S, Das BK, Kapil A, Nagarajan SS, Sarma RK. The study of bacterial flora of different types in hospital waste: evaluation of waste treatment at Aiims Hospital, New Delhi. Southeast Asian J Trop Med Public Health. 2004; 35(4): 986-9.
13. Saini S, Nagarajan SS, Sarma RK. Knowledge, attitude and practices of bio-medical waste management amongst staff of a tertiary level hospital in India. J Acad Hosp Admin. 2005; 17(2): 1-12.
14. Gupta S, Boojh R, Mishra A, Chandra H. Rules and management of bio-medical waste at Vivekananda Polyclinic: a case study. Waste Manage 2009; 29(2): 812-9.
15. Kumar R, Khan EA, Ahmed J, Khan Z, Magan M, Nousheen, et al. Healthcare waste management (HCWM) in Pakistan: current situation and training options. J Ayub Med Coll Abbottabad. 2010; 22(4): 101-5.
16. Moreira AM, Gunther WM. Assessment of medical waste management at a primary health-care center in Sao Paulo, Brazil. Waste Manag. 2013; 33(1): 162-7.