ORIGINAL ARTICLE

EFFECT OF MEDICAL WASTE MANAGEMENT TRAININGS ON BEHAVIOR CHANGE AMONG DOCTORS *VERSUS* NURSES AND PARAMEDICAL STAFF IN PAKISTAN

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Background: Healthcare waste management is a neglected issue in hospitals of developing countries due to poor practices among health staff. This study was aimed to determine the differences in knowledge, attitude and practices of physicians versus nursing and paramedical staff about standard health care waste management (HCWM). **Method:** This quasi-experimental study was conducted among healthcare workers of the two tertiary care hospitals in Rawalpindi. A total of 138 hospital workers in intervention and 137 in control hospital were given training on HCWM. Subjects were followed up at one year and after 18 months of the intervention. **Results:** We found that nursing and paramedical staff was more knowledgeable and compliant with the HCWM standards, knowledge and practices as compared to physicians. A higher proportion of nursing and paramedical staff was able to retain more of high level of knowledge but more of the doctors had achieved and retained positive attitudes towards HCWM standards after the training. More of nursing and paramedical staff also had good HCWM practices; both at first as well as second follow up. **Conclusion:** As nursing and paramedical staff was more knowledgeable and practiced optimum standards they needed to be rewarded adequately and given further regular trainings to help them maintain their knowledge and best practices about HCWM. As HCWM and patient safety standards keep on changing regularly, the hospital workers especially doctors need to be focused to comply with the standard practices in hospitals.

Keywords: Hospital workers; Waste management; Knowledge attitude and practice; Intervention

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INTRODUCTION

Healthcare waste management is the responsibility of health workers in hospitals, where large amount of infectious waste is being produced while providing the healthcare services to needy patients. However, this special waste needs special attention for proper disposal. Improper HCWM has posed major environmental threats and is now being reported as a serious public health concern worldwide.[1] Highly populated countries like; Pakistan, India, China, Nigeria and Bangladesh have reported an improper HCWM practices in their healthcare facilities that result in occupational and environmental health hazards for the general population.[2] These healthcare settings produce a huge amount of infectious waste that might cause more infections and accidental injuries among waste handlers and other related persons. Mismanagement of medical waste due to low knowledge among healthcare workers (HCWs) may have serious health effects on the environment in terms of air, water and land pollution. It has been reported that the health care waste generation rate ranges from 0.5–2.0 kg per bed per day globally.[3] Medical waste is categorized in non-infectious and infectious waste. Mainly, 75–90% of medical waste is non-infectious, while 10–25% is the infectious waste that needs proper disposal. General waste consists of normal domestic thrash that do not have any potentially harmful effects on health and do not need any special disposal measures. However, Infectious waste contain harmful items such as sharps, syringes, needles, blades, human parts, waste contaminated with blood, body tissue, body secretion and vomitus of the patients and other contagious and infectious items that need to be disposed properly by the trained personnel.[4] Reuse of the plastic syringes is known public health issue worldwide, resulting in potential hazards to the general public. Needle prick injuries, especially among the HCWs who handle the waste, is a major challenge.[5] Microorganisms and chemical substances present in medical waste is responsible cause severe health problems.[6] So much so that about 12,000 million injections were used every year and constitute about 1% of sharp waste globally. Studies have shown that around 52% of doctors working in Pakistani hospitals have reported the needle prick injuries while handling patients.[7]

Majority (85.5%) of janitorial staff in Pakistan are aware that the medical waste handling is harmful; however, they have to continue jobs for economic reasons and the situation is so drastic that they do not comply with protective behaviour such as

using personal protective equipment; due to various reasons including, unavailability of such equipment and policies or lack of knowledge about HCWM on the part of hospital administration and workers.[8] Poor practices among healthcare workers in tertiary care hospitals of Pakistan include poor segregation approaches, storage arrangements, and collection and disposal systems. Hence, no proper training and management regarding awareness and practices of waste disposal is usually observed; since most private sector hospitals are not regularized and public sector hospital suffer from lack of strict administrative oversight.[7] Practices among HCW regarding medical waste management could be improved through continuous and dedicated trainings in hospitals.[9–12] Knowledge about the segregation of medical waste has been reported poor among the sanitary workers as compared to the HCW and has been shown to be significantly improved after the trainings.[13] Poor knowledge of the HCW is possibly due to the lack of information and their educational level.[14] Poor knowledge among health professional regarding the waste management has been associated risks and is known to be the highly contributing reason to poor disposal practices. Hospital workers' awareness about proper infectious waste disposal in Cameroon has also been reported below standard.[15] Paramedical staff has poor knowledge on proper segregation on colour coding with in the hospital as compare to their auxiliary staff.[16] Hospitals in developing countries have similar kind of issues among HCW with poor skills, knowledge and attitude to efficiently handle the medical waste at their work place.[17–19]

Capacity building of health workers is mandatory while in improving their practices and behaviour towards HCWM.[10] Effectiveness of training model was checked after intervention and was proved to be effective.[13] However, the studies on comparison of differences in behaviour change of medical doctors versus nursing and paramedical staff are scares; therefore this study article is aimed to determine the differences in knowledge, attitude and practices of these two categories of hospital workers about standard waste management in Pakistan.

MATERIAL AND METHODS

Quasi-experimental study design was used by taking one hospital as intervention and another similar size hospital was taken as a control. Detailed methodology for the research is explained elsewhere.[9,10] In brief, for the current study we analysed the same data after 18 months of intervention to assess the differences within groups of healthcare workers in both hospitals of Pakistan. We used chi square test to measure the statistical differences between Knowledge, attitude and practice (KAP) of the physician and nursing and paramedical staff in the study with regard to grouped variables. Study was approved by the Intuitional review board of Health Services Academy; Pakistan (F.No.3-107/2013-IERC/HSA); while written consent was also taken from participants. Knowledge, attitude and practices of HCWs means to assess the capacity of health workers through training model intervention and to strengthen their practices regarding health care waste through their behaviour change. We used Chi square test to cross tabulate and measure statistical significance of knowledge, attitude and practices of doctors and nursing and paramedical staff at baseline and first and second follow up

RESULTS

Results were available for 80 doctors and 142 nursing and paramedical staff at the baseline; but at second and final follow up they were available for 73 and 135 and 68 and 135 doctors and nursing and paramedical staff, respectively. Table-1 shows the cross tabulation of Knowledge doctors and nursing and paramedical staff at the baseline and at the follow-ups. At baseline, the doctors' knowledge about waste management and infection prevention practices was negligible; though, nursing and paramedical workers had some level of knowledge but both the group of health workers had almost same level of intermediate and high level of knowledge. Later, at first follow up, we found that though a higher proportion of doctors achieved intermediate level of knowledge; more of the nursing and paramedical staff achieved high level of knowledge. Similarly, at final follow-up the level of knowledge in both the groups was statistically significantly different and 69% of doctors as compared to 52.6% of nursing and paramedical staff achieved intermediate level of knowledge scores but more of nursing and paramedical staff retained high level of knowledge (p=<0.05).

More doctors had positive attitudes towards their involvement in and managing their hospital waste at baseline; and this trend persisted after the intervention as shown by the first and final follow up measurement of scores (p= <0.05). However the overall positive attitude proportion dropped in subsequent follow up measurements showing that it did not retain longer in the both groups of the workers (Table-2).

Practices of the doctors and nursing and paramedical staff differed statistically significantly at baseline, first and final follow up (p=<0.05). At baseline most of the doctors and half of the nursing and paramedical staff had bad practices; however, these practices worsened even after the intervention and more of the nursing and paramedical staff than the doctors had retained good practices with respect to hospital waste management (Table-3).

Table-1: Knowledge of doctors and nursing and paramedical staff about hospital waste management at the baseline, first and final follow up

Measurements	Findings	Healthcare workers		
		Doctors n (%)	Nursing and Paramedical staff n (%)	*p*-Value
Baseline	Low	0 (0)	16 (11.3)	0.007
	Intermediate	76 (95.0)	118 (83.1)	
	High	4 (5.0)	8 (5.6)	
Fist follow up	Low	0 (0)	8 (5.9)	0.022
	Intermediate	50 (68.5)	71 (52.6)	
	High	23 (31.5)	56 (41.5)	
Final follow up	Low	0 (0)	8 (5.9)	0.024
	Intermediate	47 (69.1)	71 (52.6)	
	High	21 (30.9)	56 (41.5)	

Table 2: Attitude of doctors and nursing and paramedical staff about hospital waste management at the baseline, first and final follow up

Measurements	Findings	Healthcare workers		
		Doctors n (%)	Nursing and Paramedical staff n (%)	*p*-Value
Baseline	Positive	76 (63.3)	46 (32.4)	<0.001
	Negative	4 (50.0)	96 (67.6)	
First follow up	Positive	38 (52.1)	40 (29.6)	0.001
	Negative	35 (47.9)	95 (70.4)	
Final follow-up	Positive	35 (51.5)	41(30.4)	0.003
	Negative	33 (48.5)	94 (69.6)	

Table 3: Practices of doctors and nursing and paramedical staff about hospital waste management at the baseline, first and final follow up

Measurements	Findings	Healthcare workers		
		Doctors n (%)	Nursing and Paramedical staff n (%)	*p*-Value
Baseline	Good	12 (15.0)	74 (52.1)	<0.001
	Bad	68 (85.0)	68 (47.9)	
First follow up	Good	6 (8.2)	46 (34.1)	<0.001
	Bad	67 (91.8)	89 (65.9)	
Final follow-up	Good	6 (8.8)	46 (34.1)	<0.001
	Bad	62 (91.2)	89 (65.9)	

DISCUSSION

The study found that more of nursing and paramedical staff as compared to doctors were able to retain more of high level of knowledge but more of the doctors had achieved and retained positive attitudes towards HCWM standards after the training. More of nursing and paramedical staff also had good HCWM practices; both at first as well as second follow up. Overall, therefore, we found that nursing and paramedical staff was more knowledgeable and compliant with the HCWM standards, knowledge and practices. Further, such as difference in knowledge and practice was found to be regardless of the years of experience of these health workers.

Our results are consistent with other studies from the developing world which also concluded that, after the health education, nursing staff achieves better knowledge about HCWM standards and then uses this knowledge to improve their practices within health care settings and while handling patients. The effect of such an improved knowledge and practice level is higher than the other health care workers such as sanitary workers.[20] Other similar intervention studies also found a significantly higher proportion of health care workers becoming knowledgeable and obliging to the practices such as using post-exposure prophylaxis and colour coded bins.[21]

Our results are also consistent with yet another study from a regional country which showed that a larger proportion of nurses achieved satisfactory practice than did their doctor counterparts.[22] However other studies have shown lower knowledge level and less consistent practices and attitudes among nursing staff. In one study such a group of healthcare workers were not mindful of their own safety; for instance, most had not received vaccination for hepatitis B, and only a quarter had gone through HIV testing ever, which made them vulnerable to these highly communicable diseases through needle stick injury or body fluid exposure.[23]

The reasons for more nursing and midwifery staff being knowledgeable than the physicians could be that later are more involved in direct patient care consisting of shifting patients, changing cloths, taking blood samples, cleaning body fluids, discarding syringes or empty bottles of drips and blood transfusions and they may have been practicing the standards more routinely than the physicians. However the physicians practicing the patient care based on the HCWM

guidelines is equally more important as it is for nursing and auxiliary staff. The quasi experimental study design was the strength of this study which included randomization of the subjects into the intervention and control group. We lost 20 subjects and they could not be followed up for various reasons; which is a weakness in our study; nevertheless, the sample was sufficient to calculate the effect size.

CONCLUSION

Although nursing and midwifery staff was more knowledgeable and practiced optimum standards they need to be given regular trainings to update themselves about the standards. As HCWM and patient safety standards keep on changing regularly, the hospital workers especially doctors need to be focused for them to comply with the standard practices in hospitals. Results of this study also suggest that similar intervention can be replicated as strategies to upscale the HCWM best practices within other health care settings within country and outside in order to improve the patient safety and prevent infections as well improve cure rates in hospitals.

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AUTHORS' CONTRIBUTION

RK conceived the study, designed methodology and drafted initial manuscript. RS supervised the study design development, data collection and contributed to all subsequent drafts. JA suggested on write up, syntax, revision of drafts and finalization of manuscript.

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