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Knowledge, attitude and practice about bio-medical waste management among personnel of a tertiary health care institute in Dakshina Kannada, Karnataka

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Abstract: *Introduction:* The waste generated during the delivery of health care services carries a high potential of infection and injury than any other type of waste. Previous studies in India show that the awareness and practices on bio-medical waste management among health care personnel was dismal and hence studies are required to know the current status. *Objectives:* To assess the knowledge, attitude and practice about bio-medical waste management among health care personnel working in KVG Medical College. *Methodology:* It was a cross-sectional study conducted in KVG Medical College, Sullia, India. Using convenient sampling method, a total of 120 health care personnel were selected which consisted of 4 groups with 30 each of doctors, nurses, lab-technicians and class-IV waste handlers. Data was collected using a pre-tested, semi-structured questionnaire. Data compilation and analysis was done using SPSS 17. *Results:* The study revealed that knowledge regarding colour coding and risks of handling bio-medical waste was poor across all the 4 groups especially among class-IV waste handlers. Majority of the study participants had never undergone any training on bio-medical waste management and there was a felt need for the same. A meagre 36% doctors, 43% nurses, 30% lab-technicians and 13% class-IV waste handlers were discarding the bio-medical waste according to colour code. Among the class-IV waste handlers 67% reported needle stick injury. *Conclusion:* As the knowledge and practice regarding bio-medical waste management was poor there is a need to conduct periodic training and retraining workshops with special focus on proper use of personal protective gear.

Keywords: Bio-medical waste; knowledge; practice; hospital; needle stick injury

Introduction

Bio-medical waste (BMW) is defined as any waste, which is generated during the diagnosis, treatment or immunization of human beings or animals or in research activities pertaining thereto or in the production or testing of biologicals [1]. The waste generated during the delivery of health care services carries a high potential of infection and injury than any other type of waste.

In developing countries like India an estimated 0.1 to 4.5 kg's of waste is generated per bed each day [2-4]. This range varies widely depending on per bed waste generation and the method of estimation used. In Karnataka around 80,000 kg's of bio-medical waste is produced each day and about 1 kg of bio-medical waste is produced per bed [5]. It is estimated that 10-25% of health care waste is hazardous, and if it is not properly segregated the entire 100% will be converted into

hazardous [6]. Bio-medical waste collection and proper disposal has become a significant concern for both the medical and the general community [7].

Under the Bio-medical Waste Rules 1998, it is imperative that the concerned health care personnel should have a proper knowledge and practice of handling and disposal of bio-medical waste. But due to laxity in implementation of the rules and inadequate training of health care personnel, there is indiscriminate disposal of bio-medical waste. This will seriously jeopardize the health of the community and have a significant impact on the environment. Studies carried out in India showed that the awareness and practices on bio-medical waste management among health care personnel is far below the acceptable level [8-16].

Knowledge, attitude and practice studies on bio-medical waste management are scarce in India and studies are required to know the current awareness and practices. Hence this study was undertaken to assess the knowledge, attitude and practice about bio-medical waste management among health care personnel working in KVG Medical College, Sullia.

Material and Methods

It was a cross-sectional study conducted among health care personnel working in KVG Medical College, Sullia, Karnataka, India. The study period was from May 2012 to August 2012. 391 health care personnel working in three shifts on rotation basis in KVG Medical College formed the sampling frame. Using convenient sampling method, a total of 120 health care personnel were selected from the sampling frame, which consisted of 4 groups with 30 each of doctors, nurses, lab-technicians and class-IV waste handlers.

A pilot study was carried out on 30 health care personnel and necessary modifications were made in the questionnaire. The study data was collected using this pre-tested, semi-structured questionnaire and it was collected simultaneously from all the wards, outpatient departments and laboratory by the primary investigator under supervision of senior faculty of department of

community medicine. Inclusion criteria were individuals selected by sampling method with work experience of more than 6 months in the current institution. Individuals who were not willing to participate in the study were excluded. Informed consent was taken from the study participants and ethical clearance was taken from institutional ethical committee. Data compilation and analysis was done using SPSS software version 17. Percentage and proportion were applied to interpret the result.

Results

The study revealed that knowledge regarding bio-medical waste management was poor among all the 4 groups i.e. doctors, nurses, lab-technicians and class-IV waste handlers (Table 1). Among doctors only 47% had adequate knowledge about colour coding of bio-medical waste. Only a small fraction of study participants were aware of the fact that infectious waste constituted less than 25% of the total hospital waste. Most of the doctors (98%) and nurses (70%) were aware that segregation of bio-medical waste has to be done at the point of generation. Correct knowledge regarding the risk of diseases transmission through bio-medical waste was adequate in all the groups except class-IV waste handlers.

Table-1: Knowledge regarding bio-medical waste among the health care workers

Correct knowledge regarding bio-medical waste	Doctors	Nurses	Lab-technicians	Class-IV waste handlers
	n=30 (%)	n=30 (%)	n=30 (%)	n=30 (%)
-Legislation for BMW management in India	3 (10)	1 (3.33)	0 (0)	0 (0)
-Colour coding for waste disposal	14 (46.67)	13 (43.33)	9 (30)	5 (16.67)
-Percentage of infectious waste among the total hospital waste generated	8 (26.67)	6 (20)	4 (13.33)	4 (13.33)
-Segregation at source of BMW	28 (98.33)	21 (70)	14 (46.67)	11 (36.33)
-Disinfection of BMW waste before disposal	30 (100)	25 (83.33)	27 (90)	8 (26.67)
-Diseases transmitted through BMW	29 (96.67)	22 (73.33)	21 (70)	3 (10)
-Methods for personal protection against hazards of BMW	25 (83.33)	20 (66.67)	22 (73.33)	13 (43.33)
-Storage of bio-medical waste	11 (36.67)	21 (70)	6 (20)	9 (30)
-Treatment and final disposal of BMW	14 (46.67)	7 (23)	5 (16.67)	0 (0)
-Identification of bio-hazard symbol	23 (76.67)	9 (30)	19 (63.33)	7 (23.33)

Table-2: Attitude regarding bio-medical waste among the health care workers				
Favourable Attitude Regarding bio-medical waste	Doctors	Nurses	Lab-technicians	Class-IV waste handlers
	n=30 (%)	n=30 (%)	n=30 (%)	n=30 (%)
-Proper segregation and disposal of BMW part of your responsibility	28 (98.33)	30 (100)	27 (90)	23 (76.67)
-Involvement of private sector in BMW disposal	27 (90)	21 (70)	19 (63.33)	21 (70)
-Need for strict implementation of BMW management rules	28 (98.33)	29 (96.67)	23 (76.67)	20 (66.67)
-Requirement of training on BMW management	23 (76.67)	18 (60)	19 (63.33)	27 (90)

More than 90% of the study participants believed that proper disposal of bio-medical waste that was generated by them was part of their responsibility. Two thirds of the study participants were of the opinion that the private sector should fully participate with the government sector in proper disposal of bio-medical waste. None of the lab-technicians and class-IV waste handlers had undergone training on bio-medical waste management and there was a felt need for training from most of the study participants (Table 2).

Regarding practices about bio-medical waste management, it was found that only 36% doctors, 43% nurses, 30% lab-technicians and 13% class-IV waste handlers were discarding the bio-medical waste according to colour code (Table 3). Less than two third of the study participants were disposing sharps in puncture proof bags/containers. Use of personal protective device was only 30% among class-IV waste handlers. There was history of multiple needle stick injury in 67% of class-IV waste handlers and none of them were treated adequately.

Table-3: Practice regarding bio-medical waste among the health care workers				
Correct Practices Regarding Bio-medical waste	Doctors	Nurses	Lab-technicians	Class-IV waste handlers
	n=30 (%)	n=30 (%)	n=30 (%)	n=30 (%)
-Disposal of BMW done according to colour code	11 (36.33)	13 (43.33)	9 (30)	4 (13.33)
-Disposal of sharps in puncture proof containers	19 (63.33)	23 (76.67)	21 (70)	8 (26.67)
-Proper disinfection of BMW before final disposal	16 (53)	16 (53)	18 (60)	7 (23)
-Use of personal protective gear	20 (66.67)	25 (83.33)	19 (63.33)	9 (30)
-History of needle stick injury in the past	11 (36.33)	7 (23.33)	6 (20)	20 (66.67)
-Adequate treatment of those needle stick injuries	5 (45.45)	1 (14.28)	0 (0)	0 (0)
-Reporting of those needle stick injuries to seniors	8 (72.72)	4 (57.14)	3 (50)	10 (50)
-Vaccinated against tetanus	27 (90)	28 (93.33)	15 (50)	8 (26.67)
-Vaccinated against hepatitis B	29 (96.67)	14 (46.67)	9 (30)	0 (0)

Discussion

Knowledge regarding bio-medical waste management was inadequate across all the groups especially among class-IV bio-medical waste handlers. 90% of the doctors were unaware of the bio-medical waste management rules that governs proper disposal of bio-medical waste. This was due to lack of training and laxity in implementation of bio-medical waste management rules. Correct knowledge regarding colour coding of bio-medical waste was dismal across all 4 groups. This was unlike the findings of a study done by Mathur V et al. [8] in Lucknow which reported 91%, 92%, 85%, 27% for doctors, nurses, lab-technicians and sanitary staff respectively. Knowledge regarding appropriate disinfection of bio-medical waste before final disposal was satisfactory among all the groups. Awareness regarding the risk of handling bio-medical waste was poor among the class-IV waste handlers (10%). Similar findings were seen in other studies conducted by Mathur V et al. 27% [8], Bansal M et al. 43% [9] and Pandit N B et al. 43% [10]. As a result of lack of awareness, 70% of class-IV waste handlers in the current study were not using any personal protective gear.

A positive finding of the study was that majority of the study participants considered that it was their responsibility to segregate and discard the waste generated by them. Most of the study population were of the opinion that there should be strict implementation of bio-medical waste management rules as there is laxity in its implementation. Currently there is no training given to these health care personnel and hence vast majority are untrained and there is a felt need for a periodic training on bio-medical waste management in this institution.

Proper disposal of bio-medical waste following the colour coded system was practised by less than one third of the study participants. This was due to lack of knowledge and unavailability of colour coded waste collecting bins in all the wards and OPD's. Among the class-IV waste handlers 67% had history of multiple needle stick injury in the past one year which was unacceptably high. This was unlike the study done by Sharma S et al. [11] in Agra which showed that history of needle stick among Class

IV waste handlers was only 19%. The needle stick injuries among class-IV waste handlers were mainly due to lack of personal protective devices and carelessness on part of handlers. None of these needle stick injuries were adequately treated. This was because of lack of reporting to seniors and also inadequate treatment of the reported injuries.

Vaccination against Tetanus was high among doctors (90%) and nurses (93%) as compared to lab-technicians (50%) and class-IV waste handlers (27%). Apart from doctors Hepatitis B vaccination was very low among nurses (47%), lab-technicians (30%) and class-IV waste handlers (0%). The low vaccination coverage of hepatitis B vaccine was due to the high cost and lack of awareness that there is an effective vaccine which can prevent the disease.

Conclusion and Recommendation

Knowledge regarding colour coding and risks of handling bio-medical waste was very poor especially among class-IV waste handlers hence there is a need to conduct training and retraining workshops on bio-medical waste management.

As there was history of multiple needle stick injuries among the class-IV waste handlers it is imperative to provide them personal protective gear like mask, gloves and shoes and educate them to use it and report immediately to their seniors in case of any injury. The reporting and treatment of needle stick injuries was found to be inadequate therefore all wards must display the name and number of the person to be contacted in case of needle stick injury. All the health care personnel should be vaccinated against Tetanus and Hepatitis B; this can be done by the employer by charging minimal amount for vaccination.

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