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A CROSS SECTIONAL STUDY ON KNOWLEDGE, ATTITUDE AND BEHAVIOUR OF BIOMEDICAL WASTE MANAGEMENT AMONG HOUSEKEEPING STAFFS IN A PRIVATE MEDICAL COLLEGE HOSPITAL - CHENGALPATTU DISTRICT, TAMIL NADU, INDIA.

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Abstract

Background: A proper understanding on the concepts of waste segregation and its disposal will help in minimizing healthcare-associated infections and hospital-acquired diseases to a very great extent. It is important for the housekeeping staffs to know the hazards of the biomedical waste, their management and their safe disposal so that the community can be protected from various adverse effects of the hazardous waste. **Materials and Methods:** A cross sectional study conducted among housekeeping staffs of a private medical college hospitals from May 2022 to July 2022 to assess their Knowledge, attitude and Behaviour towards Biomedical waste Management. Sample size was calculated as 120, based on a previous study conducted by Jagdish M et al. Simple random sampling using computerized random numbers were done to select the sample population. Face to face interview was done to collect information using a semi structured questionnaire. Data was analysed using SPSS 22 version software. Bivariate analysis like odds ratio, chi-square was done to find out association between demographic characters and KAB variables. **Result:** In this study, 82.5% of the population had good knowledge towards biomedical waste management and the remaining 17.5% had only fair knowledge. It was also found out that 91.6% had good attitude towards biomedical waste management and 8.3% of the population had only fair attitude. This study reveals that 83.3% of the population had good behaviour towards biomedical waste management, while 14.2% had fair behaviour and 2.5% had poor behaviour towards handling biomedical waste. **Conclusion:** The study concludes that majority of the house keeping staffs had good knowledge, attitude and behaviour towards Biomedical waste management. Such good results must be due to the awareness created by the management by Information Education and Communication activities. It is also vital that all the staffs attends periodical training programmes and awareness programmes to be updated and safe from ill effects of biomedical wastes.

INTRODUCTION

A proper understanding on the concepts of waste segregation and its disposal will help in minimizing healthcare-associated infections and hospital-acquired diseases to a very great extent. There were significant gaps in Knowledge, Attitudes and Behaviours among different categories of health

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care providers which is a matter of serious concern. Inappropriate and inadequate handling of health care wastes will lead to serious public health issues and remarkable influence on the environment. The Practices or techniques that can control or prevent transmission of infections helps to protect patients and health care workers from hospital acquired disease. The concern regarding hospital waste is mainly due to the presence of pathogenic organisms, organic and inorganic substances in hospital solid wastes.[1] Patients in all health care settings are at risk of hospital acquired infection. Fast expansion of medical clinics both in general and private areas to satisfy patient demands has correspondingly expanded the production of biomedical waste. Therefore it is vital to ideally handle biomedical waste carefully and dispose them in a sanitary manner.[2]

Biomedical waste management includes five steps such as segregation at the point of generation, treatment, storage, transportation, and final disposals. Majority of the housekeeping staff who handles and transport hospital waste are uneducated, uninformed and they practically have no information on isolation and removal of biomedical waste. The primary cause for needle stick injury was inappropriately arranged needles.[3,4,5] Though ,there is an increased global awareness among health professionals about hazards and appropriate management techniques, evidence from various parts of India suggests that gaps in knowledge and deficiency in attitudes and practices still exist to a worrying extent among various categories of healthcare professionals.[6] Being in charge of handling biomedical wastes from the point of collection to the point of disposal, housekeeping staff's knowledge and practices need special consideration. In India, the rules have been revised by the health ministry from time to time keeping in view the changing realities, challenges and ensuring better implementation.

During treatment and diagnosis practices, large amounts of cotton, plastic, latex, glass, syringes, dressings, IV sets, blood spillages, vomit, and urine spillages, laboratory wastes are generated. Emergency clinic - obtained contaminations will cause perilous illnesses, so they should be collected, segregated according to the colour code policy given by WHO and ICMR guidelines.[7,8]

The most harmful biomedical wastes that affect the community are carried to the edges of the city and dumped in an extremely unsanitary manner. Health hazards from biomedical wastes may also be due to lack of sufficient financial and human resources.

India, like other developing countries, is battling to implement better biomedical waste management. Biomedical waste management has recently become a significant issue to deal with for hospitals, community health centres, nursing homes, clinics, and the environment.[9]

It is important for the housekeeping staffs to know the hazards of the biomedical waste, their management and their safe disposal so that the community can be protected from various adverse effects of the hazardous waste. Keeping this in mind this study aims to find out the Knowledge, Attitude and Behaviour towards Biomedical waste management among housekeeping staffs and also its association with their demographic variables.

MATERIALS AND METHODS

A cross sectional study was conducted among housekeeping staffs in SRM Medical College Hospital, Kattankulathur, Chengalpattu district, Tamil Nadu during May 2022 to July 2022. Housekeeping staffs who have been employed for more than one year only were included in the study. Based on the prevalence of excellent knowledge on biomedical waste management as 6.38%,[10] the sample size was calculated to be 116 (absolute precision – 5, non-response rate – 20%) which was rounded to 120.There were totally 300 housekeeping staffs working in the private medical college hospital. Simple random sampling technique using computerized random numbers was used to select the sample population. Face to face interview was conducted to collect data. Informed consent was obtained from each participant in written form before starting the interview. A pretested semi-structured questionnaire containing details about sociodemographic characteristics, Knowledge, Attitude and behaviour towards biomedical waste management was used as the study tool to collect data. In the questionnaire there was ten knowledge-based questions, seven attitude based questions and seven behaviour based questions. Scoring was done for each category, and each category was divided into poor, fair and good. Among the knowledge category if the person answers more than seven questions correctly, it will be classified as having good knowledge, answering more than four and less than or equal to seven questions correctly will be classified as having fair knowledge and answering less than or equal to four questions correctly was classified as having poor knowledge. Under the attitude and behaviour category there were seven questions each, answering more than five questions positively will be classified as having good attitude and good behaviour, answering three to five questions positively will be classified under fair attitude and fair behaviour, answering less than three questions positively will be classified under poor attitude or poor behaviour. A pilot study was conducted among a similar group and a small portion of the population, the pilots study's result was not included in the study. The same scoring system was followed and validated. The questionnaire was modified according to the results of the pilot study.

Data analysis was done using spss-22 version software. All variables were expressed in frequency and percentage. Bivariate analysis like chi-square,

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odds ratio was done to find out the strength of association between demographic characteristics and knowledge, attitude, behaviour towards biomedical waste management. Variables were considered significant when two-sided p value is less than 0.05. There was no conflict of interest declared. Ethics approval was obtained from the institutional ethics committee before the commencement of the study.

RESULTS

In the current study 60.8% of the population belonged to the age group of 36-50 years,31.7% of the sample belonged to the age group of 20 -35 years, 7.5% of the population belonged to the age group of 51 – 65 years. In this study, 87% of the population was females and 13% was males. Among the sample population 56.7% of the population was literate and 43.3% was illiterate [Table 1].

[Table 2] shows 93.3% of them had knowledge on hazards associated with biomedical waste, 70% of the population had knowledge on biohazard symbols, 95% of them had knowledge on the importance of biomedical waste segregation , 97% had knowledge on how to segregate biomedical wastes,94.2% of the population had knowledge on post exposure prophylaxis after a needle stick injury, 97 % had knowledge on colour coding segregation of biomedical waste segregation, 80% knew the maximum storage time of biomedical wastes, 94.2% had knowledge on personal protective equipment's, 63.3% knew that post exposure prophylaxis after a needle stick injury prevents disease.

In this study 95% of the population had good attitude on handling biomedical wastes,80.8% of the population had good attitude towards team work in handling biomedical wastes, 96% of the population had good attitude towards public health wellbeing, 97.5% of the population had good attitude towards reporting needle stick injuries,96.7% of the population had good attitude towards colour coded

segregation of biomedical wastes and they dint see it as a burden on their work, 94% of the population had good attitude towards occupational safety in handling biomedical waste.

In this study, 91.7% of the population was wearing Personal protective equipment's when handling biomedical waste, 95% of the population practised segregation of biomedical waste at source, 95% of the population used puncture proof containers in collecting sharp wastes, 98.3% of the population reported injuries while handling biomedical waste, 95% of the population immunized themselves against hepatitis B, 76.7% of the population followed Post exposure prophylaxis after needle stick injury/Percutaneous injury.

[Table 3] shows that 82.5% of the population had good knowledge towards biomedical waste management and the remaining 17.5% had only fair knowledge. It was also found out that 91.6% had good attitude towards biomedical waste management and 8.3% of the population had only fair attitude. This study reveals that 83.3% of the population had good behaviour towards biomedical waste management, while 14.2% had fair behaviour and 2.5% had poor behaviour towards handling biomedical waste.

[Table 4] shows that as the age increases the good attitude towards proper segregation of biomedical waste also increases (OR-0.09,0.15; CI – 0.01-1.19,0.02-1.05), as the age increases the odds of wearing personal protective equipment's while handling biomedical waste also increases (OR – 0.17,0.12; CI – 0.03-1.06,0.02-0.640), as the age of the sample population decreases the odds of good behaviour towards biomedical waste management increases by ten times (OR – 10.63,7.05 ; CI – 1.99-56.66,1.63-30.42), the female gender is at fourteen times increased odds in practising colour coding segregation of biomedical wastes (OR – 14.71 , CI – 1.25 – 173.01), the sample population who are literate are at two times higher odds in having better knowledge on Post exposure prophylaxis (OR – 2.39 , CI – 1.12-5.1).

Table 1: Sociodemographic characters of the study participants (n=120)

S.No	Variables	Frequency	Percentage (%)
1	Age		
	20-35	38	31.7
	36-50	73	60.8
	51-65	9	7.5
2	Gender		
	Male	16	13
	Female	104	87
3	Educational status		
	Literate	68	56.7
	Illiterate	52	43.3

Table 2: Knowledge, Attitude and Behaviour towards Biomedical waste management (n=120)

S.No	Questions asked on	Frequency	Percentage(%)
Knowledge			
1	Knowledge on hazards associated with biomedical waste		
	Yes	112	93.3
	No	8	6.7
2	Knowledge on biohazard symbols		

		Yes	84	70
		No	36	30
3	Knowledge towards importance of biomedical waste segregation			
		Yes	114	95
		No	6	5
2	Knowledge on biomedical waste segregation			
		Yes	117	97
		No	3	3
3	Knowledge on Post exposure prophylaxis after needle stick injury			
		Yes	113	94.2
		No	7	5.8
4.	Knowledge on colour coding of biomedical waste			
		Yes	117	97
		No	3	3
5.	Knowledge on wastes to be put in Yellow bin			
		Yes	106	88.3
		No	14	11.7
6.	Knowledge on wastes to be put in green bin			
		Yes	96	80
		No	24	20
7.	Knowledge on wastes to be put in red bin			
		Yes	109	90.8
		no	11	9.2
8.	Knowledge on storage time of biomedical wastes			
		Yes	96	80
		No	24	20
9.	Knowledge on Personal protective equipments			
		Yes	113	94.2
		No	7	5.8
10	Knowledge that Post exposure prophylaxis prevents diseases			
		Yes	76	63.3
		No	44	36.7
Attitude				
11.	Good attitude on Handling biomedical waste			
		Present	114	95
		Absent	6	5
12.	Good attitude towards Teamwork			
		Present	97	80.8
		Absent	23	19.2
13.	Good attitude towards Public Health			
		Present	115	96
		Absent	5	4
14.	Good attitude to prevent needle stick injuries			
		Present	117	97.5
		Absent	3	2.5
15.	Good attitude towards reporting needle stick injuries			
		Present	119	99.2
		Absent	1	0.8
16.	Good attitude towards colour coded segregation of biomedical waste			
		Present	116	96.7
		Absent	4	3.3
17.	Good attitude towards occupational safety			
		Present	113	94
		Absent	7	6
Behaviour				
18	Wear's Personal protective equipments when handling biomedical waste			
		Yes	110	91.7
		No	10	8.3
19	Segregation of biomedical waste at source			
		Yes	114	95
		No	6	5
20	Use of Puncture Proof Containers in collecting sharps			
		Yes	114	95
		No	6	5
21	Following proper colour coding segregation			
		Yes	117	97
		No	3	3
22	Reporting Injuries while handling biomedical waste			
		Yes	118	98.3
		No	2	1.7
23	Immunized against Hepatitis B			
		Yes	114	95
		No	6	5

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24	Post exposure prophylaxis after needle stick injury/Percutaneous injury		
	Yes	92	76.7
	No	28	23.3

Table 3: Grading of Knowledge, Attitude and Behaviour towards biomedical waste management (n = 120)

S.No	Variable	Grade	Frequency	Percentage (%)
1.	Knowledge	Poor	-	-
		Fair	21	17.5
		Good	99	82.5
2.	Attitude	Poor	-	-
		Fair	10	8.3
		Good	110	91.6
3	Behaviour	Poor	3	2.5
		Fair	17	14.2
		Good	100	83.3

Table 4: Bivariate analysis of the factors influencing Knowledge, attitude and behaviour towards biomedical waste management (n=120)

S.No	Variable	Classification			Chi square	P value	Crude Odds ratio	Confidence interval
		Good attitude towards proper segregation of biomedical waste						
1	Age	Present	Absent		6.190 df-2	0.045*		
	20-35	37	1				0.09	0.01-1.19
	36-50	70	3				0.15	0.02-1.05
	51-65	7	2				1	
		Wears personal protective equipment's while handling biomedical waste						
2	Age	Yes	No		8.152 df-2	0.017*		
	20-35	35	3				0.17	0.03-1.06
	36-50	69	4				0.12	0.02-0.64
	51-65	6	3				1	
		Behaviour towards biomedical waste management						
3	Age	Poor	Fair	Good	14.184 df-4	0.07*		
	20-35	1	3	34			10.63	1.99-56.66
	36-50	2	9	62			7.05	1.63-30.42
	51-65	0	5	4			1	
		Behaviour on colour coding segregation of biomedical waste						
4	Gender	Yes	No		7.574 df-1	0.006*	14.71	1.25-173.01
	Female	103	1					
	Male	14	2					
		Knowledge on Post exposure prophylaxis						
5	Literacy	Yes	No		5.145 df-1	0.023*	2.39	1.12-5.1
	Literate	49	19					
	Illiterate	27	25					

DISCUSSION

In this study, majority of the population 60.8% belonged to the age group of 35-50 years, Similarly in a study aiming to find out the relation between Knowledge and practice in methods of biomedical waste disposal conducted among 65 housekeeping staffs at AIIMS Bhubaneshwar, majority of the population 35% belonged to more than 32 years age category.[11] This similarity could be due to the reason that, at early working stages people try for different jobs and then settle around as a housekeeping staff only when the other options are ruled out, meanwhile they become more than 30 years of age. In this study 87% of the study population were females and 13% were males. In a study conducted by Raghuvanshi et al assessing the knowledge, attitude and practice for biomedical waste management among hospital staff in 5 different hospitals in metro cities, it was found out that 57.3% of the population were males and 42.6% were females.[12] This disparity could be due to the different cultural practises and gender disparities in different cities.

In this study around 97% of the house keeping staff had knowledge on segregation of biomedical wastes, where as in a study which assessed the knowledge, attitude and practice towards biomedical waste management among Paramedical workers which included housekeeping staff, done by Shafee M et al in Karim Nagar, Andhrapradhesh, it was found out that only around 1.6% had knowledge on segregation of biomedical waste.[13] This huge disparity might be due to the difference in the composition of the sample population, the current study includes only housekeeping staff's whose main occupation is to segregate biomedical waste whereas the later study mentioned includes all paramedical workers.

In the current study conducted among housekeeping staffs, it was found out that 82.5% of the respondents were having good knowledge on Biomedical waste management and 83.3% had good behaviour on Biomedical waste management. In a cross sectional study regarding Biomedical

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management across public hospitals in Lagos state Nigeria by Makanjuola JO et al, it was found out that only 17.2% of the respondents had good knowledge of BMW management/legislation and 4.1% had good BMW Management practice.[14] In a study conducted by Deresses et al among health care workers in Northwest Ethiopia, it was found that 56.8%, 66.2%, and 77.4% of the Health care workers had good knowledge, attitude, and practice scores, respectively.[15] Another study conducted by Jalal et al. (2021) during COVID-19 times in Al-Ahsa, Saudi Arabia that evaluated the KAP toward BMW management among healthcare professionals stated that nearly a quarter of healthcare professionals had poor knowledge regarding BMW management.[16] This disparity could be due to difference in the socio demographic characters such as education, literacy and qualification, the disparity could also be due to the difference in the economic status and development between different countries.

In this study it was found out that 93.3% of the house keeping staffs had knowledge on the hazards associated with Biomedical wastes, Where as in a study conducted by Mathur V et al in Allahabad study among health care personnel and sanitary workers only 27% had knowledge on the disease transmitted by Biomedical wastes.[17] In a study conducted by Pandit NB et al in Gujarat, only 43% of the ward boys and aayabens had knowledge on risks associated with biomedical wastes.[18] In a study by Shalini S et al, the awareness of risk involved in biomedical waste handling was found only in 42.59% waste handlers/sweepers.[19] This disparity in the knowledge might be due to the difference in awareness levels between the different states.

In the present study proper colour coding segregation of wastes was done by 97% of the house keeping staffs, In a study conducted in Haryana by Bala S et al colour coding segregation of wastes was not done by 67% of the respondents and was only done by 23% of the respondents.[20] In this study, 97% of the health care workers are having knowledge on colour coding segregation of biomedical wastes. In a study conducted by Patil SP et al in Maharashtra, among 153 health care workers, 72.5% were aware of the colour coded bags for segregation of biomedical wastes.[21] This variation in the practice of colour coding segregation of Bio medical wastes could be due to the difference in awareness about the importance of colour coding segregation and the difference in awareness regarding the legislation on biomedical waste management that is Biomedical waste management rules. In this study, 95% of the house keeping staffs were immunized against hepatitis B. Similarly in a study done in Udupi district of coastal Karnataka by Jha AT et al, 51.9% of the workers were immunized against hepatitis B.[22] This disparity could be due to the difference in the number and types of awareness programmes and vaccination camps between the different regions.

Though the sample size has been calculated by using the correct formula, the sample size is still low. Due to feasibility reasons this study was done in only one medical college hospital, so the findings may not be generalizable to the external population. Reporting bias is also a possibility, and could not have been addressed.

CONCLUSION

The study concludes that majority of the house keeping staffs had good knowledge, attitude and behaviour towards Biomedical waste management. Such good results must be due to the awareness created by the management by Information Education and Communication activities. It is also important that each and every person handling biomedical waste should have good Knowledge, Attitude and Behaviour towards biomedical waste management, so that all are protected against hazards caused by biomedical wastes. This can be achieved by sensitizing the housekeeping staffs by conducting comprehensive training sessions at periodic intervals and these training sessions should be made compulsory for the health care workers to attend.

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