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Original Article

A study to assess the knowledge and practice on bio-medical waste management among the health care providers working in PHCs of Bagepalli Taluk with the view to prepare informational booklet

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ABSTRACT

Background: Proper handling and disposal of bio-medical waste is very essential. Unfortunately, laxity and lack of adequate knowledge and practice on bio-medical waste disposal leads to staid health and environment apprehension. **Aim**: To assess the knowledge and practice of bio-medical waste management among the health care providers working in primary health centres (PHCs) of Bagepalli Taluk with the view to prepare informational booklet. **Methods**: In the present study, health care providers are categorized into four; Senior Health Workers (SHW), Junior Health Workers (JHW), Laboratory Technicians and Pharmacists. Periodical visits were made to analyse knowledge and practice about bio-medical waste management among health care providers of all PHCs in Bagepalli Taluk using questionnaires. **Results**: 29% were between the age of 21-30 years and 41-50 years, 26% were between the age group of 31-40 years and 16% were ≥ 51 years. 77 (64%) were females. 85% of were multi-purpose branch health worker/auxiliary nurse midwives (MPBHW/ANM), 8% were laboratory technicians, and 7% were pharmacists. 39 (33%) had 0-5 years of experience, 28 (23%) had 6-10 years of experience, 18 (15%) had 11-15 years of experience, and 35 (29%) had ≥ 16 years of experience. 99 (83%) did not have any in-service education and 21 (17%) had attended in-service education regarding bio-medical waste management. **Conclusion:** Findings from this study revealed the lack of knowledge and awareness of bio-medical waste management even among health workers. This has led to the poor practice of biomedical waste handling and management, hence exposing themselves and the public in general to health and environment hazards.

Key words: Bio-medical waste, waste management, knowledge, practice, health care providers, primary health centers

INTRODUCTION

Unwanted materials generated during diagnosis, treatment, operation, immunization or in research activities including production of biologicals is termed as biomedical waste. Day to day activities in health institutions generate a lot of waste which is biological in nature and are potential sources of infection transmission, especially hepatitis B and C, HIV, and tetanus. Approximately 1.45 kg waste is generated per patient per day in Indian hospitals it is as high as 4.5 kg in developed countries.[1] According to western figures, approximately 15-20% of this total waste is hazardous,[1] whereas, it would be much higher in India because proper waste segregation and waste disposal methods either does not exist or not practiced. Many Indian newspapers and magazines have reported that re-use of disposable syringes, needles, catheters, bags, drug vials, bottles, and intravenous drip sets are picked up by rag pickers and purchased by duplicators, recycled, replaced without proper treatment.[2] Highly infected human tissues are just thrown in municipal dustbins, further disposed at landfill site, which contribute to air pollution. The incinerators used by some of the hospitals pollute the environment because of improper segregation of the wastes used in incinerators.[3] Such practices of waste management are posing serious threat of diseases to the close by residence.

To protect the environment and health of the community, the Ministry of Environment and Forestry has notified 'Bio-medical waste (management and handling) Rules 1998'. All hospitals, clinics, nursing homes, community health centers, primary health centers, slaughter houses and laboratories have to ensure safe disposal and environmentally sound management of waste produced by them as specified in the rules for proper disposal of bio-medical waste. It is the responsibility of head of the health care facility to safeguard the health of workers involved in handling, transportation, and disposal of bio-medical waste besides ensuring safety to the community and environment. Any violation of the rules by any person is punishable with fine or imprisonment under the Environment protection Act 1986.[2]

A comparative study was conducted to assess the practices of medical waste disposal in some hospitals in Alexandria.[4] The results revealed that the most common problems associated with health care wastes are the absence of waste management, lack of awareness about their health hazards, insufficient financial and human resources for proper management and poor control of waste disposal.[4] The usual methods for disposal such as burning, land filling or burial.[5,6] With this view, it is assumed that the health care providers may be having adequate knowledge, but the practices are inappropriate due to lack of proper facilities, interest of the individual or inadequate knowledge. Due to the present state of biomedical waste management in the country, it was imperative to evaluate the knowledge and practice on bio-medical waste management among the health care providers working in Primary Health Centers (PHCs) of Bagepalli Taluk with the view to prepare Informational booklet. Therefore, the current status of health care providers' awareness regarding bio-medical waste management will help the authorities to develop the strategy for improving the situation in future.[5,7,8]

METHODOLOGY

A quantitative descriptive survey design was used in the study.[9,10,11,12] The present study was conducted in the all PHCs of Bagepalli Taluk namely Billur, Gulur, Chakivel, Chelur, Pathapalya, Mittemarri, Joolapalya, Thimmampalli, Somanathapura, and Sadhili. A prior written permission was obtained from the District Health Officer and Family Welfare Officer (DHO and FWO) for study. A study was conducted between 09/02/2012 to 09/03/2012 after due consent was obtained.

Statistical analysis

The data obtained were analyzed as per the objectives stated for the study using descriptive and inferential statistics.[13-16]

RESULTS

The data presented in the Table-1 that the majority of the subjects 35 (29%) each belonged to age group 21-30 years and 41-50 years. Maximum number of subjects 77 (64%) were females. Majority of the subjects 101 (85%) were qualified as a MPBHW/ANM, and 89 (75%) were Junior Health Worker. The maximum number of subjects 39 (33%) were having 0-5 years of experience.

Table 2 shows the distribution of knowledge and practice scores. The knowledge was distributed with a mean of 15.25, median 15, S.D. 3.47 and range was 12. Practice with mean of 14.01, median 15.5, S.D. 4.39 and range was 14.

The table 3 shows that the majority of subjects 79 (65%) had average knowledge and 29 (24%) had good knowledge. Table 4 shows that the majority of subjects 63 (53%) had average practice and 42 (35%) had good practice.

Table 1: Distribution of health care providers according to their socio-demographic variables

Demographic variables	Frequency (f)	Percentage (%)
Age (in yrs)		
21-30	35	29
31-40	31	26
41-50	35	29
≥51	19	16
Gender		
Male	43	36
Female	77	64
Qualification		
MPBHW/ ANM	101	85
DMLTC	10	8
D.Pharm	09	7
Position		
Senior Health Worker	12	10
Junior Health Worker	89	75
Laboratory Technician	10	8
Pharmacist	09	7
Total years of experience		
0-5	39	33
6-10	28	23
11-15	18	15
≥16	35	29

Table 2: Distribution of mean, median, standard deviation and range scores of knowledge, practice scores

Overall scores	Mean	Median	S.D	Range
Knowledge	15.25	15	3.47	12
Practice	14.01	15.5	4.39	14

Table 3: Distribution of knowledge scores of subjects regarding bio-medical waste management

Level of knowledge	Score range	Frequency	Percentage
Good	19-21	29	24%
Average	11-18	79	65%
Poor	09-10	12	10%

Table 4: Distribution of practice scores of subjects regarding bio-medical waste management

Level of practice	Score range	Frequency	Percentage
Good	18-21	42	35%
Average	10-17	63	53%
Poor	07-09	15	12%

Table 5: Area wise analysis of knowledge and practice scores of health care providers regarding bio-medical waste management

Content area	Total score		Test score		Mean %	
	K	P	K	P	K	P
Definition	600	120	315	105	53%	87%
Waste generation	360	120	237	96	66%	80%
Classification of bio-medical waste management and color coding	480	120	215	99	45%	82%
Methods of transportation and disposal of bio-medical waste management	960	1320	550	889	57%	67%
Safety measures	720	840	513	494	71%	59%

Table 6: Association between knowledge scores and selected demographic variables

Demographic variables	Good	Average	Poor	Chi-square	
				Calculated	Tabulated
Age (in years)					
21-30	09	22	04	3.255	12.592
31-40	05	24	02		
41-50	10	22	03		
≥51	05	11	03		
Gender					
Male	11	28	04	0.089	5.991
Female	18	51	08		
Qualification					
MPBHW/ANM	21	69	11	6.034	9.488
DMLTC	03	06	01		
D.Pharm	05	04	00		
Designation					
Senior Health Worker	01	09	02	7.454	12.592
Junior Health Worker	20	60	09		
Laboratory Technician	03	06	01		
Pharmacist	05	04	00		
Total year of experience					
0-5	10	25	04	11.24	12.592
6-10	07	19	02		
11-15	03	14	01		
≥16	09	21	05		

Table 7: Association between practice scores and selected demographic variables

Demographic variables	Good	Average	Poor	Chi-square	
				Calculated	Tabulated
Age (in years)					
21-30	10	22	03	6.463	12.592
31-40	09	15	07		
41-50	14	18	03		
≥51	09	08	02		
Gender					
Male	16	21	06	0.374	5.991
Female	26	42	09		
Qualification					
MPBHW/ANM	33	54	14		
DMLTC	04	06	00	3.478	9.488
D.Pharm	05	03	01		
Designation					
Senior Health Worker	06	05	01		
Junior Health Worker	27	49	13	5.339	12.592
Laboratory Technicians	04	06	00		
Pharmacist	05	03	01		
Total year of experience					
0-5	12	24	03		
6-10	04	17	07	16.865	12.592
11-15	06	09	03		
≥16	20	13	02		

The table 5 depicts that the mean percentage of knowledge and practice in definition is 53% and 87% respectively, knowledge and practice regarding waste generation is 66% and 80% respectively, knowledge and practice regarding classification and color coding is 45% and 82% respectively, knowledge and practice regarding transportation and disposal is 57% and 67% respectively, knowledge and practice regarding safety measures is 71% and 59% respectively.

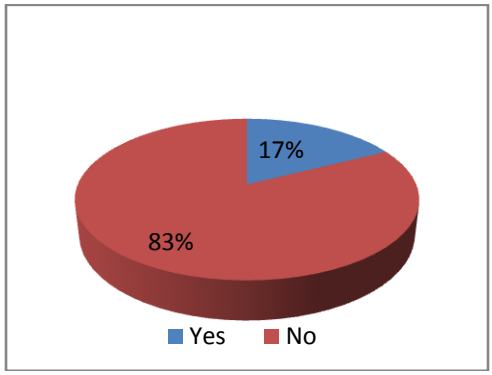

Figure 1: Distribution of respondents according to their in-service education

Table 6 shows that the calculated chi-square values were less than table values for all socio-demographic variables. Hence, there is no significant association found for any of the selected socio-demographic variables as stated in the objective.

Table 7 shows that the calculated chi square values for age, gender, education, and designation were less than table values hence there was no significant association found for any of the socio-demographic variables. However the calculated chi-square value for the total year of experience 16.865 was more than tabulated value, hence there is significant association between practice and total year of experience.

DISCUSSION

Maximum number of health care providers 29% were between the age group of 21-30 years and 41-50 years, 26% were between the age group of 31-40 years and 16% were 51 years and above. Majority of health care providers were females and 36% were males. As far departmental qualification of these health care providers, 85% were MPBHW, 8% were DMLTC and 7% were

D.Pharm. 85% of these were MPBHW, 75% were JHW, and 10% were SHW. The findings of the study indicated that 39 (33%) had 0-5 years of experience, 35 (29%) had 16 years and above experience, 28 (23%) had 6-10 years of experience and 18 (15%) had 11-15 years of experience. The study also revealed that majority of health care providers 99 (83%) did not undergo any in-service education regarding bio-medical waste management.

The assessment of knowledge of health care providers regarding bio-medical waste management revealed that majority 79 (65%) had an overall average level of knowledge, while 29 (24%) respondents had a good knowledge. Area wise mean percentage knowledge levels indicated that, in the area of safety measures was 71%, waste generation 66%, transportation and disposal 57%, classification and color coding of bio-medical waste management was 45%. The assessment of practice of health care providers regarding bio-medical waste management revealed that majority 63 (53%) had an overall average level of practice, while 42 (35%) respondents had a good practice. Area wise mean percentage practice levels indicated that, in the area of definition was 87%, classification and color coding 82%, waste generation 80%, transportation and disposal of bio-medical waste management was 67%.

The correlation between knowledge and practice were analyzed by Spearman's Rank correlation method, and it was found that there was positive correlation between knowledge and practice (r=0.44) at $P<0.012$. This indicated that the practices of health care providers on bio-medical waste management were influenced by their level of knowledge. The calculated chi-square values at $P<0.05$ between knowledge and demographic variables like age, gender, education, designation and years of experience were less than tabulated values, hence there is no significant association was found between knowledge of bio-medical waste management with any of the demographic variables. This infers that the knowledge, what health care providers had was not dependent on any of the socio-demographic variables.
The calculated value for age (6.46), for gender (0.374), for education (3.478), and for designation (5.339) were less than tabulated values, hence there is no significant association was found with these demographic variables. However the calculated chi-square value (16.865) for total year of experience was more than tabulated value, Hence there is significant association between practice and total year of experience. This finding indicated that the practices of health care providers were dependent on years of experience they had, as experience increased the safer wore the practices.

CONCLUSION

The following conclusions are drawn on the basis of the findings of the study:
1. 29% were between the age group of 21-30 years and 41-50 years, 26% were between the age group of 31-40 years and 16% were 51 years and above.
2. Majority of health care providers, 77 (64%), were females. 85% of health care providers were MPBHW/ANM, 8% were Lab technician, and 7% were Pharmacist.
3. The study indicate that 39 (33%) had 0-5 years of experience, 28 (23%) had 6-10 years of experience, 18 (15%) had 11-15 years of experience, and 35 (29%) had ≥16 years of experience..
4. The study revealed that majority of health care providers 99 (83%) did not have any in-service education and 21 (17%) had attended in-service education regarding bio-medical waste management. It is important that all health care providers should have proper knowledge to practice bio-medical waste management in better way to protect self, the community and more importantly the environment.

The findings of the study have implications for nursing education, service, administration and research. Knowledge retention has its limit and practices are dependent on knowledge, hence periodical in service education is the solution to the proper bio-medical waste management. It equips health care providers with essential knowledge, skill and attitude for the protection of self from the infectious or non infectious waste while working in the health centers. It also helps the health care providers to protect the community from hazardous waste. Care givers and support personnel, housekeepers and transport personnel must have periodic educational updates on bio-medical waste management.

Nursing protocol should be made for handling infectious as well as non-infectious wastes. Adequate supplies and equipments should be available in all the departments to take care of waste properly. Nurses play a vital role in

imparting health services in all level viz, protection, prevention, promotion and treatment. Active participation in educating health workers and housekeepers by providing instructions and knowledge regarding bio-medical waste management should be encouraged. As health workers and housekeepers are more frequently coming in contact with infectious or non-infectious waste and disposing waste products it is necessary to protect their health as well as community.

Nurse administrator can encourage nursing personnel to make active contribution towards the proper bio-medical waste management. Nurse administrator can help prepare skilled nurse's, health workers and housekeeping employees in handling and disposing of the biomedical waste products from the health centers which can effectively minimize the risk of spread of hazardous diseases.

Various research activities have to be undertaken to know the hazards of improper bio-medical waste management and its prevention among health care providers. The researcher provides information, which helps to focus on health hazards and lays foundation upon new knowledge which is based on the nursing research**.** Though there were many studies done on bio-medical waste management researcher found scarcity in effective practices of it. So, investigator recommends periodic research on bio-medical waste management and role of nurses.

However, from this study, no broad generalization could be made due to the small size of sample and limited area of setting. A similar study should be conducted for health care providers of the whole district to make a generalized conclusion. Also, comparative studies can be done in private and public sectors of health care providers regarding bio-medical waste management. Comparative study may be done in different categories of health care providers. Finally, studies to evaluate the effectiveness of informational booklet should be done.

It is thus recommended that for effective and proper disposal of bio-medical waste generated at PHCs and sub-centres to protect the health of the health care providers and community at large, formation of bio-medical waste management control committee to monitor the activities is pertinent. Also, intensified in-service education on bio-medical waste management should be encouraged.

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