A study on knowledge, attitude and practice regarding health care waste management among health care workers in Devdaha Medical College and Research Institute

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ABSTRACT

Introduction: Health care waste is produced by health care activities. It includes needles, body fluids, body parts, pharmaceuticals, radioactive materials, and cytotoxic drugs, which are generated by health care establishments, health-related laboratories, and health research facilities. The aim of the study is to assess the knowledge, attitude, practice and association between knowledge and demographic variables, Practice and demographic variables among health care workers regarding healthcare waste management.

Methods: It is a cross- sectional descriptive study, carried out among 78 health care workers at Devdaha Medical College And Research Institute using semi-structured questionnaire among the health care worker. The questionnaire was divided in 4 sections which included, (I) Demographic data, (II) Knowledge, (III) Practice & (IV) Attitude regarding health care waste management. Descriptive statistic and Chi square/Fisher's exact test were applied, with $p<0.05$ considered significant.

Results: Among the total 78 participants 91% were female 74% were nurses. Only 32% had received formal training. Nearly half (47%) had moderate knowledge, 42% had right knowledge. Most respondents (85%) demonstrated neutral attitude, 85% reported good practices regarding health care management. No statistically significant association was found between knowledge level and demographic variables ($p>0.05$). Practice level showed a statistically significant association with educational qualification ($p<0.001$).

Conclusion: Although health care workers demonstrated good waste management practices, gaps in knowledge and attitude were identified. Regular training, monitoring and reinforcement of institutional guidelines are recommended to strengthen health care waste management service.

Keywords: Attitude, health care waste management, health care worker, knowledge, practice.

INTRODUCTION

Health Care waste management (HCWM) is the responsibility of health workers in the hospitals, where large amount of infectious waste is being produced while providing the healthcare services.[1] Similarly, Nepal's Solid Waste Management Act 2011 defines medical (healthcare) waste as "the hazardous waste produced and discharged from hospitals, clinics, pharmacies, dispensaries, blood banks, pathology laboratories, veterinary institutions, and health research centers."[2]

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Several studies indicate that many health care facilities do not consistently follow safe waste handling, storage and disposal practices, thereby increasing risks to public health and the environment.[2-4] Proper segregation, collection and disposal of health care waste significantly reduce these risks, in response, national policies, law and guidelines on HCWM have been developed in Nepal; however implementation remains inconsistent.[5]

Effective health care waste management requires a systematic, step by step approach that addresses not only technology but also human behavior and attitudes of health care and support staff. Inadequate training, weak enforcement of guidelines and poor monitoring have resulted in improper disposal of medical waste in many

settings.[6] Understanding the need to strengthen HCWM practices at Devdaha Medical College and Research Institute, this study aimed to assess the knowledge, attitude, practice and association between knowledge –demographic variables and practice- demographic variables among its health care workers regarding health care waste management.

METHODS

A cross-sectional study was conducted among health care workers, including nurses, health assistants, auxiliary nurse midwives, pharmacists and laboratory technicians. The study population comprised health care workers employed at Devdaha Medical College & Research Institute (DMCRI). A non-probability purposive sampling technique was used. The sample size was calculated using Slovin's formula [(n) =N/ (1+Ne²)] considering the total number of eligible health care workers in institution.[7] The minimum required sample size was 70; however, 78 healthcare workers were included to compensate for possible non-response. The study was carried out at Devdaha Medical College And Research Institute from December 4, 2023 to January 15, 2024.

Health care workers who were willing to participate, available during the period of data collection and those who had or had not received prior training on health care waste management were included in the study. Health workers who were on long leave (15 days or more) during the data collection period were excluded.

Content validity was ensured through expert review, and tool was pre-tested among 10% of similar participants outside the setting. Ethical approval was obtained from the Institutional Review Committee of DMCRI. Written informed consent was obtained from participants. Data were collected through Google forms via an online platform. The questionnaire consisted of four sections (I) demographic data, (II). Knowledge regarding HCWM, (III) Practice regarding HCWM & (IV) is Attitude regarding HCWM. Knowledge, attitude and practice scores were converted into percentages and interpreted using Modified Bloom's cut-off points: <60% (poor/ low), 60-79% (Average/medium/neutral) and >80% (good/high).[8-10] The collected data were edited, coded and entered into Microsoft excel and analyzed using SPSS version 21. Descriptive statistic (frequency and percentage) were used to summarize the data and chi square/Fisher's exact test were applied to determine associations between study variables. A p-value of <0.05 was considered statistically significant.

RESULTS

To ensure statistical validity and allow the use of Fisher's Exact test approximately, the knowledge variable was dichotomized into: (a) low knowledge and (b) Adequate knowledge (combining moderate and high)

Among the 78 respondents, the majority (67%) were aged 20-30 years. Females constituted 91% of the participants. Most respondents were nurses (74%), followed by laboratory assistants, pharmacists and medical assistants. More than half (58%) had 1-3 years of work experience. Only 32% of respondents had received formal training on health care waste management.

Chi square/Fisher's Exact Test was applied to determine the association between knowledge level and practice with selected demographic variables due to small cell frequencies. The result showed that there was no statistically significant association between knowledge level and demographic variables ($p>0.05$). A statistically association was found between practice level and education qualification ($p<0.001$). Chi-square test was not applicable in some variables due to the presence of zero frequency in one or more cells, which violates the assumption required for the application of chi square test.

Regarding knowledge, 47% of respondents had an average level, 42% had good knowledge and 10% had poor knowledge. Most participants (85%) demonstrated a medium level of positive attitude toward HCWM. Similarly, 85% of respondents reported good practices related to waste management.

Table 1: Association between level of knowledge of HCWM and demographic variables

Variables		Level of knowledge					Chi square / fischer exact value	P-value
		Low		Adequate		Total (N)		
		N	%	N	%			
Age group in years	<20-40 41->50	6 0	7.69 0	71 1	91.03 1.28	77 1	0.759	1.000
	Total	6	7.69	72	92.31	78		
Sex	Female Male	6 0	7.69 0	65 7	83.33 8.97	71 7	0.759	1.000
	Total	6	7.69	72	92.3	78		
Education qualification	Diploma Graduate/PG	4 2	5.13 2.56	54 18	69.23 23.08	58 20	0.641	0.643
	Total	6	7.69	72	92.31	78		
Occupation of respondents	Nurse Lab assistant, pharmacist, (CMA/HA)	3 3	3.85 3.85	55 17	70.52 21.79	58 20	0.155	0.172
	Total	6	7.7	72	92.31	78		
Years of experience	1-5years 6-8<years	5 1	6.41 1.28	48 24	61.54 30.77	53 25	0.348	0.658
	Total	6	7.69	72	92.31	78		
Trained on regarding Health Care Waste Management?	Yes No	3 3	3.85 3.85	22 50	28.21 64.1	25 53	0.348	0.379
	Total	6	7.7	72	92.31	78		

Table 2: Association between level of practice of HCWM and demographic variables

Variables		Level of knowledge					Chi square / fischer exact value	P-value
		Low		Adequate		Total (N)		
		N	%	N	%			
Age group in years	<20-40 41->50	11 0	14.1 0	66 1	84.61 1.28	77 1	0.688	1.000
	Total	11	14.1	67	85.89	78		
Sex	Female Male	0 11	0 14.1	7 60	8.97 76.92	7 71	-	0.584
	Total	11	14.1	67	85.89	78		
Education qualification	Diploma Graduate/PG	0 11	0 14.1	46 21	58.97 26.92	46 32	-	<0.001*
	Total	11	14.1	67	85.89	78		
Occupation of respondents	Nurse Lab assistant, pharmacist, (CMA/HA)	6 4	7.69 6.41	55 16	66.67 19.23	58 20	0.177	0.251
	Total	10	14.1	68	85.9	78		
Years of experience	1-5years 6-8<years	9 2	11.5 3	44 23	56.41 29.48	53 25	0.233	0.487
	Total	11	14.5	67	85.89	78		
Trained on regarding Health Care Waste Management?	Yes No	0 0	0 0	29 49	37.18 62.82	29 49	-	
	Total			78	100	78		

Table 3: Grading of KAP

Knowledge of respondent	Number	Percentage
Low	8	10%
Moderate	37	47%
High	33	42%
Total	**78**	**100%**
Attitude		
Negative attitude	5	6%
Neutral attitude	66	85%
Postitive attitude	7	9%
Total	**78**	**100%**
Practice		
Poor	0	0
Fair	12	15%
Good	66	85%
Total	**78**	**100%**

DISCUSSION

This study assessed the knowledge, attitude and practice regarding health care waste management among health care workers at DMCRI. The findings indicate that although the majority of respondents demonstrated good waste management practices, gaps remain in knowledge and attitude, highlighting the need for continuous education and training.

In this study, nearly half of the respondents had moderate level of knowledge, while a smaller portion demonstrated good knowledge regarding health care waste management. Similar findings have been reported in studies from North India and South Africa, where health care workers exhibited moderate knowledge levels due to inadequate formal training and limited reinforcement of waste management guidelines.[11-13] A study conducted in Nepal by Joshi et. al. also reported insufficient knowledge among health care workers, particularly regarding waste segregation and disposal procedures. Despite the moderate level of knowledge, the majority of respondents in the present study reported good waste management practices. Comparable findings were observed in studies from Ethiopia and India, where acceptable practices were reported even when knowledge levels were not optimal.[11,15]

Most participants demonstrated neutral attitude toward health care waste management. This finding is consistent with studies conducted in South Africa and Nepal, which reported that health care workers generally recognized the importance of safe waste management but may lack strong motivation to comply with recommended practices.[12,13]

A statistically significant association was found between practice level and educational qualification, suggesting that higher education positively influences adherence to proper waste management protocols. Similar associations have been reported in studies, who observed that professional qualification and institutional role influenced compliance with biomedical waste guidelines.[13-15]

Only one third of respondents had received formal training on health care waste management, which represents a critical gap. Previous studies have emphasized that lack of training, inadequate regulatory enforcement and poor monitoring system are major barriers to effective waste management.[16,17] The studies highlights the importance of continuous professional training, clear dissemination of national and institutional guidelines and supportive supervision to improve compliance with health care waste management standards.[18,19] Strengthening awareness of regulatory frameworks and ensuring regular refresher training may enhance not only knowledge but also attitudes, thereby promoting sustainable waste management practice in health care institution.

CONCLUSION

The most of the health care workers at Devdaha Medical College and Research Institute practice appropriate health care waste management, their knowledge and attitudes require further strengthening. Education qualification was significantly associated with practice level, emphasizing the importance of professional education and structure training programs. Regular training, reinforcement of national guidelines and continuous monitoring are recommended to ensure safe and sustainable health care waste management practice.

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