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CLINICAL APPROACH OF BIO-MEDICAL WASTE MANAGEMENT IN INDIA DURING COVID 19 PANDEMIC BREAKOUT- A CROSS SECTIONAL STUDY

Dr Sudharani B Banappagoudar[1], Dr. Vasanthakumari Sundararajan[2], Dr. Ponnu Kangeswari[3]
Dr Anasuya pattanayak[4], V. Revathy[5]

Professor[1], Associate Professor[2], Principal[3], Professor[4] ,Assistant Professor[5]
School of Nursing Science[1], Pediatric Nursing[2, 5], Medical Surgical Nursing[3]
Community health nursing[4], Theresa, MTPG&RIHS[5]
ITM University, Gwalior (MP)[1], Institute of Health Sciences, Wollega University, Ethiopia[2],
DRIEMS School& College of Nursing, Cuttack, Odisha[3], Kalinga Institute ofNursing Science, Kalinga Institute of Industrial Technology Deemedto Be University, Odisha[4],
Mother Teresa Post Graduate and Research Institute of Health Sciences - [MTIHS], Puducherry[5]
sudharani.sons@itmuniversity.ac.in[1]vasanhar@yahoo.com[2]sivaramajaya@gmail.com[3]
anasuyagautam@gmail.com[4]revapediatric@gmail.com[5]
https://orcid.org/0000-0002-7259-769X

Background: India is grappling with a slew of health-care issues. With the growth of health-care institutions, there is a rising worry about medical waste dangers. The pandemic of Coronavirus 19 (COVID 19) has contributed to the problem. Because health care professionals are at the heart of medical waste management, their understanding of proper medical waste disposal is critical. In light of this, we performed research during COVID-19 to analyse the knowledge, and practice of medical waste management among staff nurses working in hospitals.

Aim- The present study aimed to assess the knowledge and practice of staff nurses related to Bio Medical waste management in hospitals

Methods: This was a hospital-based online descriptive research survey done in the months of May andJune2021 during the second COVID wave on the staff nurses working in various hospitals. Before collection of the data from the participants permission was obtained,pre-defined questionnaire was created to assess the knowledge and practices of Bio medical waste management. The participants were chosen through purposive sampling.

The questionnaire-based research included a total of 120 participants various hospitals of the country which was collected through the online google forms survey through social media platforms. Nearly two-thirds(66%) of the participants in the research had knowledge bio medical waste management used correct waste disposal practice techniques. However, there were 1/3rd(33.33%) participantshad knowledge,and practice deficiencies

Conclusion: The was significant corelation between nurses' knowledge and practice regarding Bio medical waste management.

Recommendations-Biomedical regulations must be properly enforced in all health-care institutions. All health personnel should be subjected to frequent orientation programs. Medical waste, Health-care professionals, COVID 19 are some of the terms that come to mind when thinking about medical waste.

Key Words- Medical Waste, Bio Medical Waste, Hospital Waste, Staff Nurses, Health Care

Introduction

"Medical waste" or BMW, as defined by India's Medical Waste (Management and Handling) Rules, is any waste created during the diagnosis, treatment, or vaccination of humans or animals, or during related research activities, or in the manufacturing or testing of biologicals.[1] According to the WHO, around 85 percent of hospital waste is non-hazardous, while the remainder is toxic. Out of the dangerous group, 10% are infective and 5% are non-infectious. Managing infectious waste in tertiary care facilities is a big concern. They may be a possible danger issue for health care workers (HCW), the community, and the environment if they are not adequately handled. [2] In many developing nations, like as India, effective BMW management is still the exception rather than the norm. Despite improved knowledge of such threats among health care workers and repeated teaching of effective management measures, the degree of awareness concerning BMW in India has been found to be poor. [3] Health-care workers who handle hospital trash are at a significant risk of contracting deadly infections such as hepatitis B and C, as well as HIV, via infected needles and other waste sharps. As a result, health-care professionals must be aware of the numerous risks associated with needle-stick injuries. They should also have a favourable attitude about garbage disposal and put it into practice. [4] The introduction of COVID-19 has resulted in a rise in medical waste, necessitating the urgent need for effective waste management. The increased use of personal protective equipment (PPEs) such as face masks, hand gloves, rubber boots and white gowns, hand sanitizers, and other medically used gears such as syringes, test kits,

plastic containers, bandages, tissues, and so on has resulted in a significant increase in waste volume. [5] Knowledge, attitude, and practice (KAP) surveys are widely used in health-related research. They don't need a significant budget, generally target a small population, and look basic and uncomplicated enough to be carried out by students and other researchers with little theoretical and practical knowledge. [6] Medical waste management standards have been in place in India for 23 years, however the outcomes have been unsatisfactory. This suggests that we should examine HCWs' KAP so that we can intervene. However, in this portion of India, study in this field is quite restricted. As a result, the current research aims to analyse health care professionals' knowledge, attitude, and practice (KAP) of bio-medical waste management during COVID-19 in an Indian tertiary care hospital.

Materials and Procedures

A cross sectional online descriptive research was conducted during the months of May and June 2021 through the social media using the google forms and was sent to the staff nurses working in hospital. Purposive sampling technique was adapted for the current study for collecting the research participants. A pre-determined structured questionnaire was prepared which consisted of three sections socio demographic data, knowledge and practice related questions. A prior consent was taken prior to fill the form from the study participants.

The study included 120 staff nurses working in the various hospitals of the country. Those who were not willing to participate in the study were excluded. The participants were chosen through purposive sampling, which included various departments of the hospital's. The information was gathered from the research participants using the 'online survey.'All of the structured knowledge questions consisted of 39 items related to health care background, Classification of waste, Bio medical Waste hazards, Bio medical waste segregation, Collection of Bio medical waste, storage, transportation , occupational health and safety measures and universal precautions each correct answer was scored 1 for the correct and Zero for the wrong 60% and more was considered as adequate and less than 60% was inadequate. The practice questions consisted of segregation of hazardous waste, Nursing trolley,Sharps disposal, Chemical waste disposal, Coloured bags identification of each correct answer was given one mark and zero for the wrong a score of 60% above was considered as adequate and less than 60% was considered as inadequate. The information was gathered on forms and then scrutinized for logical flaws, skip patterns, and missing values. After that, the information was coded and put into Microsoft Excel. The data was then transferred to SPSS version 24,. For data analysis, descriptive and inferential statistics were used. The percentages are shown together with their 95% confidence intervals. The p value was used to construct the Z test of proportion.

Results

The majority of the 120 research participants were between the ages of 20 and 30. (55.8 percent). Males made up 51.6 percent of the participants, while females made up 48.4%. Highest number of staff nurses were qualified with GNM 81 (67.5%) and 39(32.5%) staff nurses were qualified with BSC/PBBSC. When it came to job experience, the majority 79 (65.83%) had 1 to 5 years of experience, while 41 (34.16 %) had more than 5 years

(Table 1). Percentage distribution of Socio demographic Characteristics

	No	%
Age:		
20-30	67	55.8
30-40	46	38.4
Gender:		
Male	62	51.6
Female	58	48.4
Nursing qualification:		
GNM	81	67.5
BSc/PBBSC	39	32.5

Experience years (total):		
1-5	79	65.83
>5	41	34.16
Department:		
Emergency CCU	25	20.83
ICU	15	12.5
Operation room	21	17.5
Medical	9	7.5
Surgical	20	16.66
	30	25
Attending training program in waste management:		
Yes	27	22.5
No	93	77.5

Table (2): Percentage distribution of studied nurses knowledge related to health care waste management(n=120)

Satisfactory knowledge > 60 %		
Waste management elements knowledge:	**No**	**%**
Background of waste management	40	33.33
Waste classification	74	61.66
Waste hazards	80	66.66
Waste segregation	89	74.16
Waste collection	80	66.66
Waste storage	88	73.33
Waste transportation	80	66.66
Occupational safety measures	70	58.33
Universal precautions	90	75.0
Total knowledge:		
Satisfactory	80	80.0
Unsatisfactory	40	20.0

The above table clarifies total knowledge related to health care waste management as reported by the studied nurses. As the table shows that 90(75%) staff nurses had knowledge about universal precautions and, while 40(33.33%)of them had knowledge about health care waste management background. Also, the majority of nurses (80.0%) had satisfactory knowledge related to waste management

Table (3): Percentage distribution of studied nurses practice related to health care waste management(n=120)

Waste management practice area: Adequate practice (60%+) :	Practice percent	
	Yes	%
Segregation of hazardous waste according to Color coded bins	80	66.6
Totalpractice:		
Adequate	68	56.66
Inadequate	52	43.33

The above Table (3): illustrates the total practice related to health care waste management as observed among the studied nurses. It is noticed that, 80(66.66%) staff nurses did adequate segregation. Also the table indicated that, the majority of nurses had adequatepractice.

Table (4): Relation between nurses' knowledge of health care waste management and their socio-demographic characteristics (n=120)

Socio demographic characteristics	Knowledge score				X^2 test	p-value
	Unsatisfactory		Satisfactory			
	No.	%	No.	%		
Age:						
20-30	27	22.5	40	23.33		
30+	12	14.3	41	34.16	3.93	0.047*
Gender:						
Male	30	25	32	26.66		
Female	28	23.3	30	25	1.42	0.63
Nursing qualification:						
GNM	41	25.9	40	74.1		
BSC/PBBSC	28	23.3	30	25	6.74	0.01*
Experience years (total):						
1-5						
>5	39	32.5	40	74.1		
	11	9.16	30	25	4.05	0.04*
Department:						
Emergency CCU	9	7.5	16	13.33		
ICU	0	00	15	12.5		
Operation room	2	1.6	19	15.83		
Medical	0	00	9	7.5		
Surgical	8	6.66	15	12.5		
	5	4.16	25	20.83	21.48	0.003*

P = 0.05

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The above table (4): illustrates the relation between nurses' knowledge of health care waste management and their personal and job characteristics. As the table indicates, staff nurses who had satisfactory knowledge had age more than 30 years, were female,hadadiploma,hadexperienceinnursingfieldmorethan 5 years. Also the table revealed that there are statistically significant relations between nurse's knowledge and the nurse's age, nursing qualification, total experience anddepartment

Table (5): Relation between nurses' practice of health care waste management and their socio-demographic characteristics (n=120)

Socio demographic characteristics	Practice score				X^2 test	p-value
	Adequate		Inadequate			
	No.	%	No.	%		
Age:						
20-30	57	47.5	10	8.33		
30+	38	31.66	8	6.66	0.79	0.37
Gender:						
Male	32	26.66	30	25		
Female	35	29.16	23	19.16	0.58	0.61
Nursing qualification:						
GNM	65	54.16	16	13.33		
BSC/PBBSC	25	20.83	14	11.66	0.51	0.48
Experience years (total):						
1-5	30	25	29	24.16		
>5	28	23.33	13	10.83	3.42	0.06
Department:						
Emergency	9	7.5	16	13.33		
CCU	0	00	15	12.5		
ICU	2	1.6	19	15.83		
Operation Room	0	00	9	7.5		
Medical	8	6.66	15			
Surgical	5	4.16	25			

The above Table (5): reveals the relation between staff nurses' practice level and their personal and job characteristics. As the table indicates, the highest percentage of nurses who had adequate practice had age more than 30 years, were female, had a diploma, had current experience more than 5 years and had total experience more than 5 years. Nonetheless of these relations are statistically significant.

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Table (6): Relation between nurses' total knowledge of health care waste management and their total practice (n=120)

Total knowledge	Total practice				X^2 test	p-value
	Adequate		Inadequate			
	No.	%	No.	%		
Total knowledge:						
Unsatisfactory	14	11.6	18	15		
Satisfactory	76	63.33	12	10	Fisher	0.05*

The above table (6): illustrates the relation between nurses' total knowledge of health care waste management and their total practice. As shown in this table, the highest percent of nurses who had satisfactory knowledge were had adequate practice (63.33%). Also, there was a statistically significant relationship between total knowledge and total practice (p= 0.05).

Discussion

The research was based on a questionnaire that had been developed and evaluated in advance. Various investigations used a similar methodology. [7-10] In contrast to research conducted by Basu et al in West Bengal, our study found that just 82 percent of the survey participants had heard of BMW. This incidence was just 53.2 percent in research conducted by Shafee et al among paramedical professionals in Andhra Pradesh. The disparity in knowledge might be related to the fact that physicians, nurses, and paramedical staff have different literacy levels. [8,11] According to several research, HCW understanding of color-coding ranges from 20% to 95%. [8-14] The majority of HCW believe that BMW is an important health concern, that it is a collaborative effort, and that it does not add to their workload. Previous research has shown similar findings. [12, 15, 16] [12, 15, 16] [12, 15, 16] In terms of safe and reasonable practice in BMW, the majority of participants adhere to best practices. According to numerous surveys, the majority of them properly dispose of BMW according to colourlabelling and dispose of old needles in needle destroyers. [15,17,11] In their investigation, Malini et al discovered that half of the HCWs did not get training in BMW management. [15] However, filling out the incident report for any BMW-related unintentional occurrence yielded dismal results. The majority of them had no idea that there was a formal reporting mechanism in place. When compared to earlier research, the findings strongly suggest that a stronger reporting system for different adverse occurrences at the health institution is required in order to take appropriate action. [18]

Conclusion

Based on the current study findings, it can be concluded that 66% of staff nurses had adequate knowledge regarding bio medical waste management, and 63.33% had adequate practices in most areas of bio medical waste management. There was statistical significant corelation between nurses' knowledge and practice related to biomedical waste management and the was significance relation between the socio demographic variables in age and years of experience with knowledge and practice of bio medical waste management.

This research uncovered an intriguing feature concerning HCWs. Although the participants have a positive attitude about BMW management, their understanding and practice are lacking. This stresses the importance of BMW's different management training programs, which should be done on a regular basis among HCWs.

Recommendations

It is suggested that such programs be organized on a regular basis, and that HCWs be required to attend such programs. Waste management standards should be strictly enforced, and violators should be cautioned and, if necessary, prosecuted. All employees should be made aware of the official mechanism for reporting BMW-related hazards. It should be made mandatory to report such injuries to the right authorities so that appropriate action may be taken.

Limitations

This research relies on self-reporting rather than collecting firsthand data on BMW management methods. As a consequence, it's possible that participants may over-report accurate replies. Although the actual KAP for BMW management is low, owing to social desirability bias, it seems to be high. Another disadvantage of the research was that it could not analyze every component of KAP since it was based on a semi-structured questionnaire. In addition, little information on the difficulties that HCWs encounter and their solutions could be gleaned.

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