



THE KNOWLEDGE, ATTITUDE AND PRACTICES (KAP) STUDY OF BIOMEDICAL WASTE MANAGEMENT RELATED TO COVID 19 AMONG HEALTH CARE WORKERS IN TERTIARY CARE CENTRE, SOUTHERN HARYANA

Himani Aggarwal	PG student, Department of Microbiology, Shaheed Hasan Khan Mewati Government Medical College SHKM GMC, Nalhar, Nuh, Haryana.
Prakriti Vohra*	Professor, Department of Microbiology, SHKM GMC Nalhar, Nuh, Haryana. *Corresponding Author
Pratibha Mane	Professor & Head, Department of Microbiology, SHKM GMC Nalhar, Nuh, Haryana.

ABSTRACT Biomedical waste Management (BMW) during COVID-19 is very important. **Aim & Objective:** To access the HCWs with respect to management of BMW with special emphasis on COVID-19 and summing up the effect of the training program, which helps in effective management of BMW during COVID-19 pandemic. **Materials And Methods:** An observational prospective study was conducted from February to June 2021 at SHKM, GMC, Nalhar, among 254 HCWs of the hospital. A pre-designed, pre-tested, identical training questionnaire was given before & after the training session. Data was collected and tabulated by using Microsoft Excel 2010. It was analysed by using descriptive statistics. **Results:** The knowledge, attitude and practice aspects were 59.4%, 67.93% and 61.93% & 41.9%, 40.23% and 37.67% respectively among MBBS students & staff nurses. There was improvement in responses of both MBBS students and nurses post training session.

KEYWORDS : KAP, Bio-medical waste, Future physicians & Nurses

INTRODUCTION

According to BMW handling rules 1988, it is defined as waste which is generated during the diagnosis, treatment, research and in the production of biological products for humans and animals. Coronavirus Disease & waste generated during its course of treatment are both equally hazardous. It is a highly contagious disease and the generated waste during the course of this disease is also hazardous.¹

Effective management of covid related BMW is done by proper collection, segregation, storage, transportation, treatment and disposal of waste. There is an 17% increase in BMW between June 2020 - May 10, 2021, during COVID -19 pandemic.² India has produced 45,308 tons of BMW due to diagnostic activities. Treatment of Covid-19 Bio Medical Waste Management (BMWM) is very important and challenging task.^{3,4}

Proper teaching and training about BMWM is necessary to raise an awareness levels among health care workers regarding same.⁵

The study was aimed to evaluate the level of Knowledge, attitude and practices of various Health care workers (HCWs) towards BMWM during COVID-19. The objectives of this study were to access the HCWs with respect to management of BMW with special emphasis on COVID-19 and summing up the effect of the training program, which helps in effective management of BMW during COVID-19 pandemic.

MATERIALS AND METHODS-

The present study was conducted at Shaheed Hasan Khan Mewati Government Medical College SHKM GMC, Nalhar, Nuh Haryana. This study, an observational prospective study was conducted from February 2021 to June 2021 on 254 HCWs (108 MBBS students & 146 nursing staff) with the help of predesigned and pretested questionnaire (27 questions) given both before and after the training session. The questions are of multiple choice questions and were scored, 1 mark for every correct answer with no negative marking. Each correct answer by the participant was given a 1 score. A maximum of 27 score was possible within the parameters of research tool used. Score was calculated by cumulative score of correct responses and was compared between various groups. Data was collected and tabulated by using Microsoft Excel 2010. Results was analysed by using descriptive statistics (percentage method).

RESULTS-

Out of 254 HCWs; females (62.24%) outnumbered males (39.75%) in this study. In the present study it was found that knowledge, attitude and practice aspects in pre- test were 59.4%, 67.93% and 61.93% respectively among future physicians & 41.9%, 40.23% and 37.67% respectively among staff nurses. (Tab.1)

Maximum correct response i.e. about 81% regarding pre-treatment of solid waste (e.g., linen) before disposing it off was noticed among

future physicians. While maximum nurses responded correctly (52%) pertaining to knowledge regarding the official declaration of COVID-19 as a global pandemic by WHO was seen.

Statically Significant difference was noted in both pre & post training session among both nurses & MBBS students. (Tab.2)

Table 1: Scores Of Pre-test Scores Of Both MBBS Students And Staff Nurses (n-254)

KNOWLEDGE, ATTITUDE & PRACTICES	PRE-TEST OF MBBS STUDENTS n=108, n (%)	PRE-TEST OF NURSING STAFF n=146, n (%)
KNOWLEDGE		
Q.1 According to MOHFW, India, PPE includes all except?	65(60%)	80 (55%)
Q.2 Masks having a filtration capacity of -	51(47%)	77 (53%)
Q.3 Declaration of COVID-19 as a global pandemic on?	62(57%)	73 (50%)
Q.4 Masks used by healthy persons, before disposing them do we need to keep it separated & for how long?	70(65%)	88 (60%)
Q.6 General solid waste generated from Covid-19 should be consider as BMW or not?	83(77%)	89 (61%)
Q.7 What % of sodium hypochlorite is used to disinfect linens before disposing it of?	84(78%)	88 (60%)
Q.8 Disposal of infected gloves if BMW disposal facility is not available?	60(56%)	70 (48%)
Q.9 Biomedical waste collection from health care center should be done ideally?	54(50%)	86 (59%)
Q.10 Faeces of Covid-19 pt. Should be considered as a biomedical waste or not?	49(45%)	96 (66%)
ATTITUDE		
Q.11 Disinfection of containers, bins, trolleys, used for storage of Covid-19 waste is disinfected by using?	78(72%)	63(43%)
Q. 12 Wet and dry solid waste from Covid-19 pt. should be disposed off in which coloured bag?	58(54%)	64(44%)

Q. 13 Face mask used by the pt./personnel's not dealing with Covid-19 can reuse the masks or not?	71(66%)	63(43%)
Q.14 Is any pre-treatment of needles required, which are used in Covid-19 pt. before disposing them?	68(63%)	62(42%)
Q.15 Is it necessary to pre-treat solid waste (e.g., linen) before disposing it off?	88(81%)	49(34%)
Q. 16 In quarantine centre's, does the sodium hypochlorite spray needed on solid waste bags?	70(65%)	67(46%)
Q. 17 Masks used by crematorium staff during the cremation of Covid-19 pt. should be considered as?	76(70%)	51(35%)
Q. 18 PPEs doffed crematorium accompanying COVID positive pt., should be treated as BMW?	78(72%)	51(35%)
PRACTICES		
Q.19 According to the covid-19 BMW guidelines, VTM should be disposed of in?	65(60%)	51(35%)
Q. 20 Used PPEs in COVID-19 isolation ward discarded in which bag?	77(71%)	76(52%)
Q. 21 Used masks in Covid-19 pt. should be discarded in which bag?	65(60%)	60(41%)
Q.22 Needles/sharps waste generated from Covid-19 pt. discarded in which coloured box?	68(63%)	61(42%)
Q. 23 Non plastic gowns used in Covid-19 should be disposed in which bag?	62(57%)	43(29%)
Q. 24 Splash proof apron used in Covid-19, should be discarded in which coloured bag?	52(48%)	61(42%)
Q. 25 Wet waste generated from Covid-19 pt. should be discarded in which bags?	72(67%)	65(45%)
Q. 26 In the above if, those PPEs considered as BMW than they need to be collected in which coloured bag?	73(68%)	71(49%)
Q. 27 Masks used by crematorium staff during the cremation of Covid-19 pt. should be considered as?	68(63%)	64(44%)

Table 2: Pre Training And Post Training Assessment Scores Of MBBS Students And Staff Nurses (n-254) *Statistically Significant

RESULTS	Mean (\pm SD) score of MBBS students (n-108, maximum score-27)	Mean (\pm SD) score of staff nurses (n-146, maximum score -27)
Pre training assessment	11.99 (\pm 2.79)	11.97 (\pm 2.77)
Post- training assessment	18.80 (\pm 2.99)	18.50 (\pm 3.29)
P value (Paired t test)	t value = 28.86 p < 0.00001*	t value = 44.60 p < 0.00001*

DISCUSSION-

There is paucity of KAP studies regarding the management of covid-19 related biomedical waste management, in which future physicians and nursing staff have been compared.

In our study, nearly 62.24% were female's outnumbered males 39.75%, which is similar to a study done by Jalal et al.⁶ (67.7%) & dalui et al.⁷ (63.3%).

Differences among male and female in relation to score of their knowledge was found to be significant in this study. Among future

physicians males had better knowledge as compared to females before the analysis and among staff nurses female surpassed males with respect to knowledge before the analysis, similar findings was recorded by Kumar A et al.⁸ Kumar SR et al.⁹

In knowledge section, while future physicians (78%) responded accurately the percentage of sodium hypochlorite used to disinfect linens before disposing it off, nurses (69%) attempted correctly the duration for which surgical mask can be used before disposing it off. Only 45% of MBBS students could answered correctly whether faeces of Covid-19 pt. should be considered as a biomedical waste or not & only 57% of staff nurses Biomedical waste collection from health care centre's should be done daily.

In ATTITUDE section, among MBBS students 81% had positive attitude regarding pre-treatment of solid waste (e.g., linen) before disposing it off. Only 54% of future physicians were in favour of disinfecting the bag in which wet and dry solid waste from Covid-19 pt. was collected before handing it over to authorized waste collector. 46% of staff nurses actually believed in need of spraying sodium hypochlorite on solid waste bags in quarantine centers. However, only 34% of nurses agreed to necessity of pre-treatment of solid waste (e.g., linen) before disposing the same.

In PRACTICES 72% of future physicians were in agreement with the fact that PPE kit doffed by health care workers accompanying diseased dead body of a Covid-19 pt. to crematorium/graveyards should be treated as Bio medical waste. While only 48% of future doctors could decode correct colour coding for discarding splash proof apron used in Covid-19 dedicated areas.

52% of staff nurses knew correctly about colour coding of used PPEs in COVID-19 isolation ward. 41% of staff nurses chose correct colour coding for used masks, tissues, N-95 mask, in Covid-19 pt. In present study knowledge on BMW in pre-test analysis was 59.4%, 41.9% and in post-test analysis 86.9% & 65.4% among future doctors & staff nurses respectively. The above findings are similar to a study conducted by Kumar A et al., Gupta V et al.¹⁰, dalui et al in which the highest knowledge was recorded among the doctors as compared to staff nurses. Also study conducted by Basavaraj T.J. et al.¹¹ concluded that doctors had better knowledge.

In present study Attitude on BMW in pre-test analysis was 67.93%, 40.23% and in post-test analysis 85.9 % & 64% among future doctors & staff nurses respectively. Dalui et al. reported that most of the physicians (91%) & nurses 81% had favorable attitude towards biomedical waste management. Soyam GC et al.¹² reported 98% of staff nurses having good attitude towards biomedical waste management. Repeated training sessions are need of hour to improve the attitude of health care worker towards BMW.

In present study Practices on BMW in pre-test analysis was 61.93%, 37.67% and in post-test analysis 85.4% & 63% among future doctors & staff nurses respectively. A study performed by dalui et al. also concluded that a good practice was followed among the future physicians. Yadannanavar et al.¹³ in Bijapur, has reported good knowledge & practices (97%) regarding BMW among HCWs.

Performance of both MBBS students and nursing staff improvement (statistically significant) after training, therefore regular interventional training programs contribute positively in improvement of COVID-19 related bio-medical waste management in hospitals. These findings relates with the findings of Jalal SM et al. in 2021 they demonstrated that there is a necessity to organize continuous training programs regarding BMW management to spread the awareness among HCW.⁶

CONCLUSION-

Regular & periodic interventional training programs contribute positively in improvement of COVID-19 related bio-medical waste management in hospitals. There is an urgent need to update the knowledge among future doctors and staff nurses so that their attitude and practices also improves towards the covid related of bio waste management. MBBS students performed better as compared to nursing staff in pre-training session. The performance of both MBBS students and nursing staff improved after training.

REFERENCES

- [1] Das AK, Islam MN, Billah MM, Sarker A. COVID-19 pandemic and healthcare solid waste management strategy . COVID-19 pandemic and healthcare solid waste

- management strategy. 2021. *Sci Total Environ.* 2021 Jul 15;778:1S46220.
- [2] Guidelines on Management of Biomedical Waste under Universal Immunization Program. Available from: <https://cpb.nic.in/guidelines>.
- [3] Park K. *Park's Textbook of Preventive and Social Medicine*. 25th Edition. Jabalpur: Banarsidas Bhanot, 2019; 849.
- [4] World Health Organization guidelines- Available from: <https://www.who.int/environmentalhealthemergencies/disease>.
- [5] Agrawal A, Dodamani A S, Vishwakarma P, Agrawal A S. Biomedical waste and COVID-19 in India and the world: are we ready. *International journal of medical reviews.* 2020;7(4):124-30.
- [6] Jalal SM, Akhter F, Abdelhafez AI, Alrajeh AM. Assessment of Knowledge, Practice and Attitude about Biomedical Waste Management among Healthcare Professionals during COVID-19 Crises in Al-Ahsa. *Healthcare (Basel)*. 2021 Jun 18;9(6):747. doi: 10.3390/healthcare9060747.
- [7] Dalui A, Banerjee S, Roy R. Assessment of knowledge, attitude, and practice about biomedical waste management among healthcare workers during COVID-19 pandemic in a health district of West Bengal. *Indian J Public Health* 2021;65:345-51.
- [8] Abhay K, Prakash S J. Evaluation of training program on biomedical waste management among health care workers at a tertiary care hospital, U.P. *International journal of scientific research.* 2020;6(9). DOI : 10.36106/ijsr.
- [9] Kumar SR, Abhinaya NV, Venkatesan A, Natrajan M. Bio-medical waste disposal in India: From paper to practice, what has been effected. *Indian J health sci Biomed res* 2019;12:202-10.
- [10] Gupta V, Mohapatra D. and Kumar V. *International journal of basic and applied Medical sciences* ISSN: 2277-2130 (online) An open access, online International journal available at <http://www.cibtech.org/jms.htm> 2015 Vol. 5 (2) May-August, pp.102-107/Gupta et al.
- [11] Basavaraj T.J., Shashibhushan B.L. & Sreedevi A. To assess the knowledge, attitude and practices in biomedical waste management among health care workers in dedicated COVID hospital in Bangalore. *Egypt J Intern Med* 33, 37 (2021). <https://doi.org/10.1186/s43162-021-00066-9>.
- [12] Soyam GC & Khakse GM. Study of knowledge, attitude and practices of universal precautions among health care workers in rural hospital Delhi. *INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH.* 2017;6(6):7-9.
- [13] Yadavannavar M, Berad AS, Jagirdar P. Biomedical waste management: a study of knowledge, attitude, and practices in a tertiary health care institution in bijapur. *Indian J Community Med.* 2010 Jan;35(1):170-1.