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Assess the level of knowledge, attitude and practices of biomedical waste management among staff nurses during COVID-19

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Abstract

Medical care is very important to our lives., but the waste generated by medical activities represents the real problem of life and nature. An adequate Knowledge and Practices on Biomedical waste management among nursing staff is the first step for safe disposal of hazardous hospital waste during COVID-19. The best way to prevent hospital acquired infections is to learn more about the Biomedical waste management. The present study aims to assess the Knowledge, Attitude and Practices of Biomedical waste management among staff nurses during COVID-19. A quantitative non-experimental research using descriptive design was conducted among 100 staff nurses. A convenience sampling technique was used to select samples. Self - Structured Questionnaire was used to assess the knowledge and Practices, Likert scale was used to assess the Attitude regarding Biomedical waste management during COVID -19. The study findings revealed that shows that the mean score of knowledge was 14.19 ± 3.01 , the mean score of attitudes was 13.93 ± 2.89 and the mean score of practice was 6.65 ± 1.27 . The calculated Correlation value of $r = 0.440$ between knowledge and attitude, $r = 0.402$ between knowledge and practice and $r = 0.491$ between attitude and practice shows a moderate positive correlation which was found to be statistically significant at $p < 0.001$ level. This clearly interferes that when knowledge on Biomedical waste management among staff nurses increases their attitude and practice level also increases. This indicates that knowledge regarding Biomedical waste management need to be improved among staff nurses during COVID-19.

Keywords: COVID-19, staff nurses, biomedical waste management

Introduction

“Biomedical Waste Management” means any waste which is generated during the diagnosis, treatment or immunization of human beings or animals or in research activities pertaining to there or in the production or testing of biologicals ^[1] Biomedical waste must be properly managed and disposed of to protect the environment, general public, and workers, especially healthcare and sanitation workers who are at risk of exposure to biomedical waste as an occupational hazard ^[2] Improper management of waste generated in health care facilities causes a direct health impact on the community, the health care workers and on the environment ^[3]

Every day, relatively large amount of potentially hazardous waste is generated in the health care hospitals and facilities around the world. Biomedical waste is any kind of waste containing infectious materials. Biomedical waste may be solid or liquid. Biomedical waste consists of 75-85% non – infectious, 10-15% infectious and 5-10% hazardous. A study described that the source of segregation of hazardous hospital care waste would make the transportation process easier for those medical facilities where small quantities of hazardous waste are being produced ^[6] Commonly, the BMW contains about 85% of general non-infectious waste, 10% of infectious hazardous waste, and 5% of radioactive and/or, chemical waste ^[4]

COVID-19 outbreak was declared as pandemic and health emergency were announced by the (WHO)World Health Organization on March 11, 2020. Research studies also revealed that waste materials like cardboard, plastics and steel also are carriers of COVID-19 virus and it can last up to 72 hours on these, reflecting concerns for waste stream workers and recyclers. COVID waste can play a vital role to spread hospital-acquired infections. However, several safety aspects are necessarily required to follow as a part of overall COVID-waste

management^[5] Considering the transmission of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) globally, excessive biomedical waste has become a new major threat to public health and the environment. Improper handling of hospital waste might aggravate the spread of SARS-CoV-2 to medical staff and people who handle waste^[6]

It clearly indicates that COVID-waste (like needles and syringes used for blood samples, surgical facemasks, and PPE) can have a longer persistence of SARS-CoV-2. Virus transmissions from the contaminated dry surfaces have been postulated including self-inoculation of mucous membranes of the eyes, nose, and mouth^[7]

In response to COVID-19, hospitals health care facilities and individuals are producing more waste than usual, including Masks, Gloves, Gowns and other Protective Equipment that could be infected with virus. There is also a large increase in the amount of single use plastics being produced. On the other side, Biomedical Waste whose generation is about 559 TPD (tonnes per day) is also expected to increase with increasing number of COVID-19 patients and will contain COVID-19 Waste as well. Wuhan generated 6times ore Biomedical Waste when compared to pre COVID-19 outbreak.

Each nurse working in a hospital setting can be impacted by health care waste management and they should be provided with training and education on how healthcare waste handling and disposal processes directly impacts infection control. COVID-19 has cost everyone many things, but it has also given us something: a harsh reminder that amplified infection control and Ips (Infection Preventionists) are in great need for future.

Among all health care personnel, Nurses providing more and health services in hospitals. It has been proved that the nurses are more victims of hepatitis B and HIV infection because not handing biomedical waste properly. For the prevention of infection, Nurses should take precautions according to the centre for disease control, prevention with occupational safety and health administration. Universal precaution refers to an infection control system which assumes that any direct contact with patients particularly their body fluid has the potential for transmitting the diseases^[8]

The study was conducted on biomedical waste management during COVID-19 at Bangladesh. According to the government reports, about 50,333 confirmed cases of COVID-19 were reported in the city of Wuhan. The wastes generated from quarantine centers and self-isolation areas were not officially quantified as medical wastes but the wastes generated from potential suspected household and quarantine areas were safely collected and properly disposed of as medical wastes. The report shows that China's national medical waste disposal capacity increased to 6066.8 tons/day as of March 21, 2020, compared to 4902.8 tons/day before the pandemic. In Wuhan city, it was achieved to 265.6 tons/day from 50 tons/day before the pandemic. Larger capacities of mobile facilities should be maintained, particularly during the pandemic, which can be very important for the developing countries where the medical waste disposal facilities are limited^[9]

The comparison of knowledge, with attitude and practice of groups shows that the people with high education, as doctors have better knowledge, attitude and practices of Biomedical Waste management. Although nursing staff have relatively

less knowledge about the Biomedical Waste management rules, but a good percentage of this category has a positive attitude and follow the correct practicing habits. Findings similar to that in our study were observed^[10]

The Nurses spend maximum time with the COVID patients in the ward than any other member of the health team, it increases their exposure and risk to the hazards present in hospital environment, mainly from Biomedical Waste. They need to be well equipped with latest information, skills and practices about proper management of Biomedical Waste to reduce the hospital- acquired infection and to protect their own health.

The several literature reviews reveal that proper handling of biomedical waste management is an important aspect. It plays a major role in the prevention of infectious disease. Incidents of hospital acquired infection related to improper handling and disposal of wastes. The investigator selected the study for her clinical experience. She observed that many staff nurses were handling biomedical waste in daily practices. Hence the investigator interest in assessing the knowledge, attitude and practices of biomedical waste management among staff nurses.

Even though doctors, nurses and paramedical are trained and aware of disposal of Biomedical wastes. The main goal of the current study was to measure the level of knowledge, attitude and practices regarding Biomedical waste management among Staff nurses during COVID-19 and to detect demographic variables related to a satisfactory level of them and to explore knowledge associated with the prevention of related to the occupational exposure of hospital acquired infection during disposal and handling of wastes.

Methods and Materials

A Non-experimental descriptive research design was used for present study to assess the Knowledge, Attitude and Practices of Biomedical Waste Management during COVID-19 among staff nurses. The study was conducted in all wards from 09/01/2021 to 13/01/2021 at Saveetha Medical College and Hospital at Thandalam, Kanchipuram district. After obtaining formal permission, from head of the nursing department concerned, the investigator selected 100 samples using non probability purposive sampling technique. The inclusion criteria for the samples are Staff nurses who can understand English, Staff nurses who are working in the Saveetha Medical College and Hospital and Staff nurses who are working with COVID patients. The exclusion criteria for the samples are Staff nurses who are not willing to participate in this study, Staff nurses who have been working for many years in Saveetha Medical College and Hospital, Staff nurses who have more years of experience in Saveetha Medical College and Hospital. The investigator introduce herself and explained about the purpose of study in detail to all the staff nurses who participated in the study and obtained the written consent from each one of them. A self- structured questionnaire method was used to collect the demographic variables, knowledge, practices on Biomedical Waste Management and Likert scale method was used to collect the attitudes on Biomedical Waste Management among staff nurses and therefore the collected data were tabulated and analyzed by using descriptive statistics.

Results and Discussion

The study findings are discussed based on the objectives as follows:

SECTION A: To assess the demographic variables among staff nurses in Saveetha Medical College and Hospital during covid-19.

Among 100 samples, most of the samples 63(63%) were aged between 17–25 years, 99(99%) were female, 53(53%) were unmarried, 52(52%) were B.Sc. Nursing, 59(59%) were residing in rural area, 55(55%) belonged to nuclear family, 58(58%) earned a monthly income of above 10,000, 93(93%) were non-vegetarian, 52(52%) had 1 – 2 years of experience and 70(70%) received information through books.

Section B: To assess the level of knowledge, attitude and practices of biomedical waste management among staff nurses during covid-19.

Table 1: Frequency and percentage distribution of level of knowledge on biomedical waste management during COVID – 19 among staff nurses. N = 100

Level of Knowledge	No.	%
Inadequate Knowledge ($\leq 50\%$)	12	12.0
Moderate Knowledge (51 – 75%)	47	47.0
Adequate Knowledge ($< 75\%$)	41	41.0

The current study findings revealed that the level of knowledge on biomedical waste management among staff nurses, 47(47%) had moderate knowledge, 41(41%) had adequate knowledge, 12(12%) had inadequate knowledge.

Table 2: Frequency and percentage distribution of level of attitude on biomedical waste management during COVID - 19 among staff nurses. N = 100

Level of Attitude	No.	%
Unfavourable Attitude ($\leq 50\%$)	6	6.0
Moderately Favourable Attitude (51 – 75%)	66	66.0
Favourable Attitude ($< 75\%$)	28	28.0

The current study shows that 66(66%) had moderately favourable attitude, 28(28%) had favourable attitude and 6(6%) had unfavourable attitude on biomedical waste management among staff nurses. The present study was supported by Dinesh Patidar, Ravindra H N, Kevin Christian (2017) conducted a study, pretest depicts that prior to the administration of standard operating procedure majority $< 50\%$ (60) nursing staff had Unfavourable level of Attitude, 51(75%) (40) nursing staff had Moderate level of Attitude and $> 75\%$ (00) nursing staff had Favourable level of Attitude. The posttest depicts that prior to the administration of standard operating procedure majority $> 75\%$ (64.7) nursing staff had favourable level of Attitude, 51–75% (35.3), nursing staff had Moderate level of Attitude and $< 50\%$ (00) nursing staff had Unfavourable level of Attitude^[11]

Table 3: Frequency and percentage distribution of level of practice on biomedical waste management during COVID – 19 among staff nurses. N = 100

Level of Practice	No.	%
Inadequate ($\leq 50\%$)	6	6.0
Moderate (51 – 75%)	71	71.0
Adequate ($< 75\%$)	23	23.0

The current study shows that 71(71%) had moderate practice, 23(23%) had adequate practice and 6(6%) had inadequate practice on biomedical waste management.

The present study was supported by V. Hemavathy, Girija Bhaskaran, Jasmine Kharphuli (2018) and concluded that 17(56.66%) staff nurses were found following correct practices, 7(23.34%) of staff nurses were found following partially correct practices, and 6(20%) were following incorrect practices. The study reveals that some nurses were correctly practicing the various aspects of biomedical waste management but for some who were not found to be completely responsible for biomedical waste management in the hospital; their problems were sort out such as inadequate staff in the ward; less supervision, increase workloads^[12]

Section C: To correlate the level of knowledge and attitude, knowledge and practice, attitude and practice towards biomedical waste management among staff nurses during covid-19.

The current study reveals that the correlation value between knowledge and attitude, knowledge and practice, attitude and practice shows a moderate positive correlation which was found to be statistically significant at $p < 0.001$ level. It clearly shows that when knowledge regarding Biomedical waste management increases their attitude and practices level also increases.

The present study was supported by Md. Asadullah, Karthik G. K. and Dharmappa B. (2019) and revealed that the majority 160(96.4%) of participants were female and mean age of respondents were found to be 28.6 (± 9.04) years. Majority 159(95.8%) of nursing staff had considered the biomedical waste as different from general wastes and 150(90.4%) of respondent were agreed for the segregation of BMW at point of generations. The study showed that 77.51% of study participants had knowledge about various diseases transmission through BMW. The overall knowledge 95.8% regarding BMW among nursing staff of hospital no.1 was significantly ($p < 0.001$) higher than other hospitals. The study concluded that regular training and supervision is necessary for better healthcare waste management and implementation^[13]

Section D: To associate level of knowledge, attitude and practice regarding biomedical waste management among staff nurses with their demographic variable.

The current study reveals that there is a significant association occur between knowledge and practice with the selected demographic variable gender and year of study regarding Biomedical waste management shows at $p < 0.05$ and $p < 0.01$ level respectively and the other demographic variables had not shown statistically significant association with the level of knowledge and practice. There is no significant association between the level of attitude and demographic variables regarding Biomedical waste management.

Conclusion

Findings of the present study revealed that the staff nurses had generally a moderate level of knowledge and shows a positive attitude and performs a good practices and active behaviour of preventive measures regarding Biomedical waste Management during COVID-19. There is a need to improve the knowledge to promote positive attitude and practices related to updated trends in regards to Biomedical

Waste Management to the nurses who had joined newly during pandemic COVID-19 through pamphlet distribution, role play, video assisted learning, conducting classes regularly in the wards as part of their routine ward works.

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None

Conflicts of Interest

The authors declare no conflicts of interest.

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