A KAP STUDY TO ASSESS BIOMEDICAL WASTE MANAGEMENT IN A DENTAL COLLEGE IN SOUTH INDIA

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ABSTRACT

Health care waste is defined as the total waste stream from a health care facility. Bio-medical waste (BMW) means any waste generated during the diagnosis, treatment or immunization of human beings or animals or in research activities pertaining thereto or in the production or testing of biologicals, including categories mentioned in Schedule I of BMW Management (BMWM) and Handling Rules 1998. Health care institutions are generating large amount of Bio-Medical Waste (BMW), which needs to be properly segregated and treated. With this concern, a questionnaire based cross-sectional study was done to determine the current status of knowledge, attitude and practices regarding biomedical waste management and areas of deficit in a dental teaching hospital in South India. The study result suggested that there was lack of knowledge among the study participants regarding different aspects of BMWM. Proper management of biomedical waste is a crucial issue for maintaining human health and the environment. The waste generated in the hospitals has the potential for
spreading infections and causing diseases, hence creating awareness regarding proper waste handling is of upmost importance in any healthcare facility.

**KEYWORDS:** Awareness, Biomedical waste management, Hospital waste management, Dental College, Cross-sectional survey, Environment, Pollution, Infectious disease.

**INTRODUCTION**

When patient care activities are carried out in a healthcare setting, certain waste is produced which has the potential to cause harm to human beings and environment. Such waste includes soiled cotton, bandages, hypodermic needles, syringes, tubing such as intravenous sets and urinary catheters etc. Such waste is commonly called as bio-medical waste (BMW) in India, though it is also known by various other names such as clinical waste, medical waste and health-care waste in different parts of world. Such waste constitutes merely 15 to 25% of total waste generated in a hospital, the remaining being general waste such as waste paper, wrapper of drugs, cardboard and left-over food etc.\(^1\)

Inadequate BMW management causes environmental pollution, unpleasant smell, growth and multiplication of vectors such as insects, rodents and worms and may lead to the transmission of diseases like typhoid, cholera, hepatitis and acquired immune deficiency syndrome (AIDS) through injuries from contaminated syringes and needles.\(^2\)

The Government of India (notification, 1998) specifies that Hospital Waste Management is a part of hospital hygiene and maintenance activities. This involves management of range of activities, which are mainly engineering functions, such as collection, transportation, operation or treatment of processing systems and disposal of wastes.\(^3\)

World Health Organization states that 85% of hospital wastes are actually non-hazardous, whereas 10% are infectious and 5% are noninfectious but they are included in hazardous wastes. About 15% to 35% of Hospital waste is regulated as infectious waste. This range is dependent on the total amount of waste generated.\(^4\)

Safe and effective management of waste is not only a legal necessity but also a social responsibility.\(^5\) Inadequate and inappropriate knowledge of handling health care waste may have serious health consequences. An effective communication strategy is imperative, keeping in view the low awareness level among different category of staff in the health care establishments regarding biomedical waste management.\(^6\)
Among the health care providing team, nurses play a crucial role in proper disposal of hospital wastes. They come in very early step in the chain of hospital waste management process. Also, adequate knowledge of nurse about various steps of waste management is very important for the success of any health care waste management program.

With this concern, a questionnaire based cross-sectional study was done to determine the current status of knowledge, attitude and practices regarding biomedical waste management and areas of deficit in a dental teaching hospital in South India.

MATERIALS AND METHODS
The study was conducted at a dental college and hospital in South India. It was a descriptive, hospital based, cross-sectional study. A total of 80 subjects participated in this study which constituted dental nurses and dental interns, who were randomly chosen from various departments of the hospital. The participants were explained about the objective of the study.

A pre-designed, pre-tested, structured proforma consisting of 20 questions in English language was used for data collection from all the study participants after getting their informed consent and confidentiality was assured. Study proforma contains 3 sets of questions concerning the knowledge, attitude and practice on the subject.

During the study period the questionnaire was distributed among study participants and was collected back after they had completed and filed their responses. Data were recorded on a researcher made checklist covering various aspects of BMW management at source of generation of waste. After collecting back the responses they were entered onto Microsoft excel sheet and subjected to descriptive data analysis using SPSS version 16 for Windows.

RESULTS
The study was conducted at a dental college and hospital in South India to determine the current status of knowledge, attitude and practices regarding biomedical waste management among 80 subjects comprising of dental nurses and dental interns.
Table 1: Questions and the correct responses marked by the study participants (given as % values)

<table>
<thead>
<tr>
<th>QUESTIONS</th>
<th>Correct Responses in %</th>
<th>Dental Nurses (n=40)</th>
<th>Dental Interns (n=40)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Are you aware of different categories of biomedical waste generated?</td>
<td></td>
<td>20</td>
<td>80</td>
</tr>
<tr>
<td>2. Are you aware of colour coding for different types of biomedical waste?</td>
<td></td>
<td>30</td>
<td>70</td>
</tr>
<tr>
<td>3. How do you dispose injected needles?</td>
<td></td>
<td>70</td>
<td>70</td>
</tr>
<tr>
<td>4. How do you dispose developer and fixer?</td>
<td></td>
<td>60</td>
<td>70</td>
</tr>
<tr>
<td>5. Do you dispose all kinds of waste into general garbage?</td>
<td></td>
<td>30</td>
<td>70</td>
</tr>
<tr>
<td>6. How do you dispose outdated or expired medicine?</td>
<td></td>
<td>30</td>
<td>70</td>
</tr>
<tr>
<td>7. How do you dispose extracted tooth?</td>
<td></td>
<td>70</td>
<td>70</td>
</tr>
<tr>
<td>8. How do you store excess silver amalgam?</td>
<td></td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>9. Decontamination/disinfection reduces chances of infection</td>
<td></td>
<td>60</td>
<td>90</td>
</tr>
<tr>
<td>10. Sharp wastes should be disposed in?</td>
<td></td>
<td>40</td>
<td>60</td>
</tr>
<tr>
<td>11. Use of colour codes for segregation of waste is a must</td>
<td></td>
<td>30</td>
<td>70</td>
</tr>
<tr>
<td>12. Occupational safety of waste handlers is a must?</td>
<td></td>
<td>60</td>
<td>90</td>
</tr>
<tr>
<td>13. Hepatitis B immunization prevents transmission of hospital acquired infection</td>
<td></td>
<td>30</td>
<td>90</td>
</tr>
<tr>
<td>14. Can any plastic bag be used for waste disposal?</td>
<td></td>
<td>30</td>
<td>80</td>
</tr>
<tr>
<td>15. Are you aware of IMAGE?</td>
<td></td>
<td>20</td>
<td>80</td>
</tr>
<tr>
<td>16. If yes, what does IMAGE stands for?</td>
<td></td>
<td>0</td>
<td>30</td>
</tr>
<tr>
<td>17. According to national guidelines, what is the maximum time for which biomedical waste can be stored?</td>
<td></td>
<td>0</td>
<td>30</td>
</tr>
<tr>
<td>18. Do you think your knowledge regarding biomedical waste management is adequate?</td>
<td></td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>19. Do you feel that biomedical waste management should compulsory be part of dental undergraduate curriculum?</td>
<td></td>
<td>50</td>
<td>60</td>
</tr>
<tr>
<td>20. Do you think you require any further training on biomedical waste management?</td>
<td></td>
<td>80</td>
<td>90</td>
</tr>
</tbody>
</table>

Table 1 shows all the questions that was present in the study questionnaire and the correct responses made in percentage values by both the categories of dental nurses as well as interns.

For the question, are you aware of different categories of biomedical waste generated only 20% of dental nurses gave a correct response compared to 80% of dental interns. And on the question regarding national guidelines for maximum time for which biomedical waste can be stored none of the dental nurses were aware regarding the correct time compared to only 30% dental interns who answered it right.

When asked if their knowledge regarding biomedical waste management is adequate only 50% of the subjects form both the categories gave a positive response. And when they were
asked if they require any further training on biomedical waste management, 80% of the
dental nurses and 90% of the dental interns responded positively suggesting a serious
requirement for the same.

The above results suggests that there is lack of knowledge as well as practices in the area of
biomedical waste management among the subjects and more so among dental nurses that is a
concern which need to be dealt with. This marked lack of knowledge could be attributed to
the lack of training and emphasis regarding proper waste handling techniques.

Segregation of waste is the most crucial step for proper management of BMW as waste
segregated into various color-coded containers is finally taken to different sites for disposal.
Presence of a wrong kind of waste in a particular container will obviously nullify the efforts
of appropriate disposal of waste. Various studies have found poor condition of waste
receptacles for waste disposal. In a 600-bedded super specialty corporate hospital of a South
Indian city, there were only white receptacles for all types of BMW for aesthetic reasons and
since the color of all receptacles or bins was same, following the segregation practices was
difficult.[7] In studies in Irbid city of Jordan[8] and UK[9], waste bins or receptacles were found
to be in poor shape.

The present study findings are in contrast to a similar study done by Girish et al in central
Karnataka,[10] where staff nurses had better level of knowledge then students. Overall,
practice assessment was found to be average in both groups. In a similar study done in
Lucknow,[11] amongst staff of institutional trauma center concluded that 65% of the nurses
were practicing more than 70% of the correct practices as per the norms of the university.

World Health Organization (WHO) has stated that “In unregulated environment, elaborate
enterprises have grown up to divert used syringes from waste stream for reprocessing and
sale back into unsuspecting markets”. [12] It makes it essential to mutilate used recyclables
right after use thus leaving no scope for their unauthorized recirculation and inappropriate
reuse. Providing training is considered an effective tool to increase compliance to guidelines
for waste management[13] and so HCWs especially resident doctors may need to be provided
training in systematic manner so that they may pay more attention to proper management of
BMW.
CONCLUSION

The present study was done to determine the current status of knowledge, attitude and practices regarding biomedical waste management and areas of deficit in a dental teaching hospital in South India. This study revealed that though overall knowledge of study participants was moderate they still require good quality training to improve their current knowledge about BMW. The lower level of awareness about hospital waste handling may have direct impact on the overall process of safe disposal of hospital waste. For this, there is a need for intensive training programs at regular time interval to repeatedly train and retrain all the nursing staff and interns, which may include question raising and problem solving approach.

REFERENCES

