Study About Awareness and Practices of Health Care Waste Management among Medical Practitioners and Hospital Staff in a Medical College Hospital, Jabalpur

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ABSTRACT
Background: Biomedical waste is any waste, which is generated during the diagnosis, treatment or immunization of human beings or in research activities or in the production or testing of biological products. Biomedical waste can be categorized into non-hazardous and bio-hazardous. Approximately 75-90% of the biomedical waste are non-hazardous and as harmless as any other municipal waste. The remaining 10-25% is hazardous and can be injurious to humans or animals and deleterious to environment. Inadequate and inappropriate knowledge of handling of healthcare waste may have serious health consequences and a significant impact on the environment as well. Hospitals/health care services inevitably create waste that may itself be hazardous to health. The waste produces in the course of health care activities carries a higher potential for injury, infection and pollution due to open burning, than any other type of waste.
Objective: The objective was to assess knowledge, attitude, risk perception and practices of doctors, interns, nurses, laboratory technicians, attenders and housekeeping staff regarding biomedical waste management.
Materials and Methods: This was a cross-sectional study done in a medical college rural hospital. A total of 128 health personal were included in the study with their prior consent. Study subjects include doctors (18), interns (21), nurses (27), laboratory technicians (15), attenders (26) and housekeeping staff (19).
Results: Doctors, nurses have better knowledge than other staff regarding health care waste management. Regarding practices related to health care waste management nurses were better. Knowledge regarding the colour coding and waste segregation at source was found to be better among nurses and laboratory staff.
Conclusion: The importance of training regarding health care waste management needs emphasis; lack of complete knowledge about biomedical waste management impacts practices of appropriate waste disposal. Segregation of waste in our hospital is non-satisfactory. And handling of biomedical waste is still a matter of serious concern for health authorities in India.

INTRODUCTION
The health care services while providing services, curative, promotive or preventive inevitably create waste which itself may be hazardous to health. Inadequate and inappropriate knowledge of handling of healthcare waste may have serious
health consequences and a significant impact on
the environment. It carries a higher potential for
infection and injury than any other type of waste.
It is estimated that annually about 0.33 million
tonnnes of hospital waste is generated in India and,
the waste generation rate ranges from 0.5 to 2.0 kg
per bed per day\(^1\). Wherever, generated, a safe and
reliable method for handling of biomedical waste
is essential. Effective management of biomedical
waste is not only a legal necessity but also a social
responsibility. In developing countries like India
the waste is carried to the outskirts of the
and dumped in the most insanitary way.
The public concern about the medical waste
management has increased largely in the past few
years on a global basis and a significant effort has
been directed toward proper and safe management
of hazardous medical waste\(^2\). However, as there is
not yet clear understanding of the risk, and as
consequence, inadequate management practices
are often implemented. The absence of proper
waste management, lack of awareness about the
health hazards from biomedical wastes, insufficient financial and human resources, and
poor control of waste disposal are the most critical
problems connected with health care waste. The
hospital waste management has diverse
ramifications as it not only affects the health of
the patients but also of health care workers
(doctors, nurses, attenders and housekeeping staff
etc.) and general public. In addition good waste
management in a hospital depends on good
medical waste management team, good adminis-
tration, careful planning, sound organization,
derpinning legislation, adequate financing, and
full participation by trained staff\(^3\).

Waste handling and disposal is often considered
only the job of class IV worker. These workers are rarely provided with pre-
imunization or
training. Adequate knowledge about the health
hazard of hospital waste, proper technique and
methods of handling the waste, and practice of
safety measures can go a long way toward the safe
disposal of hazardous hospital waste. With this
background, this study was conducted with the
main objective of assessing knowledge, attitude,
and practices of doctors, nurses, laboratory
technicians, and other staff regarding health care
waste management.

MATERIALS AND METHODS
After taking approval of ethical committee on 128
subjects this cross-sectional study was carried out
in a medical college hospital in Jabalpur. The
study subjects comprised of interns, doctors,
nurses, laboratory technicians, attenders and
housekeeping staff. The study period was from
October 2016 to January 17. They were
interviewed and observed for health care waste
management practices. These interviews and
observations were conducted on a predesigned and
a pretested questionnaire and checklist. At the end
of the study training was given regarding the
same. The data was collected and analysed using
proportions.

RESULTS
Present study done in a hospital in rural parts of
Jabalpur.
In the present study a total of 128 subjects were
interviewed. The composition was as follows
interns (19%), doctors (12.6%), nurses (21.7%),
laboratory technicians (10%), attenders (21.9%) and
housekeeping staff (14.9%).

| Awareness and knowledge questions | Description | Percentage (%) |
|-----------------------------------|-------------|----------------|
| Do you know about clinical waste management process in the hospital | Yes | 93 |
|                                   | No | 7 |
| Total                             | 100 |
| Can clinical waste cause risks and health hazards to your health when infected | Yes | 99 |
|                                   | No | 1 |
| Total                             | 100 |
| How many categories of clinical waste in hospital | 1 | 4 |
|                                   | 2 | 22 |
| Question                                                                 | Yes | No | Total |
|------------------------------------------------------------------------|-----|----|-------|
| Do you think clinical waste management in the hospital is following the correct procedure? | 81  | 19 | 100   |
| Can clinical waste cause risks and adverse health effects to the environment when not handled properly? | 99  | 1  | 100   |
| Are bags and containers for clinical waste marked with the international symbol? | 92  | 8  | 100   |
| Do you segregate general waste from clinical waste?                    | 99  | 1  | 100   |
| Do you know the correct method of handling clinical waste based on the categories? | 78  | 22 | 100   |
| Are clinical waste containers or bag holder been put in all locations where particular categories of waste may be generated? | 81  | 19 | 100   |
| What is the amount of infectious waste that should be thrown in the container? | Less than ¾ full | More than ¾ full | 77 | 5 |
| Do needle stick and sharp injuries need to be reported?                | 95  | 5  | 100   |
| Are clinical waste collected daily (or as frequently as required) and transported to designated central storage site? | 95  | 5  | 100   |
| Do you use personal protective equipment in handling clinical waste?   | 87  | 3  | 100   |
| Do you know if the hospital uses a wheelie bin or trolley for internal transport? | 94  | 6  | 100   |
| Do you know if the hospital has a set of transport schedule for infectious waste within the organization? | 93  | 7  | 100   |
| Do you know if the hospital must have standard storage room for keeping hospital infectious waste? | 92  | 8  | 100   |
| Do you know if the storage time for infectious waste is 24-48 hours?    | 66  | 34 | 100   |
| Do you know if the hospital storage room has good lighting and ventilation? | 74  | 26 | 100   |
| Do you know where is the location of the storage area of clinical wastes in the hospital? | 78  | 22 | 100   |
| Do you know who is the responsible to manage clinical wastes in the hospital? | 83  | 17 | 100   |
| Do you know if the hospital has an incinerator for treatment and disposal of infectious waste? | 28  | 72 | 100   |
99% of the study subjects agreed that hospital waste should be segregated and needs to be disposed properly. Totally 83% study subjects knew about categories and the treatment of health care waste (HCW) correctly, of which 79.9% were nurses, (76.8%) were doctors, (38.5%) were interns, (28.3%) were technicians and (19.3%) were housekeeping staff. Majority of the study subjects (95.8%) had knowledge about various health problems caused by health care waste, of which 38.8% were nurses. Only 6 (4%) study subjects knew about categories of health care waste. Out of the total 128 subjects 86% agreed it should be segregated at the point of waste generation. Out of the total study subjects 10% thought proper disposal of waste should totally be responsibility of the government. And 9.9% of the study subjects considered it an unnecessary extra work burden on the hospital staff. Majority 95% were aware of the color coding for waste segregation but they did not have any clear idea of what should be disposed in which bin.

It was observed in the present study that the knowledge and practices in doctors and nursing staff was good. The attitude of the study subjects toward separation of infectious and non-infectious waste, proper disposal and implementation of rules was positive. Majority 84% were in favour of implementation. Only 62% study subjects committed that they will co-operate in hospital waste management team. The attitude of attenders and housekeeping staff was found to be almost similar. Most of them thought it is an extra amount of work and were not very keen in implementing and attending training programs. The nurses (91.5%) had a better attitude toward separation of wastes, proper disposal, implementation of rules and co-operation in programs.

### Table 2: Knowledge about the health care waste categories and its treatment

| Study subjects     | Total | Aware (%) |
|--------------------|-------|-----------|
| Doctors            | 56    | (76.8%)   |
| Interns            | 65    | (38.5%)   |
| Nurses             | 83    | (55.57%)  |
| Technicians        | 44    | (28.3%)   |
| Attenders          | 78    | (29.5%)   |
| Housekeeping staff | 57    | (19.3%)   |

**DISCUSSION**

Study conducted using a pretested questionnaire and a cross-sectional study design was selected. Health care waste management needs systemic efforts. It requires and mandates participation of all. The responsibilities should not lie with the civic body alone. The civic body can act as a coordinating agency and provide support. There is a must to be done where the waste is generated. The activities include reduction of waste generated, segregation, decontamination of infected waste, proper containment of waste; secure transportation of the waste, occupation health and safety measures and by creating awareness. Around 52% participants agreed that they have awareness regarding biomedical waste management and handling rules 1998. Knowledge about biomedical waste management rules among the technically qualified personal like the doctors, nurses and laboratory staff was satisfactory but was low among the attenders and housekeeping staff. Similar to the study Suwarna Madhukumar et al., interns were included in the survey. It was surprising that though the interns had knowledge but the attitude and practices was not satisfactory. Knowledge about color coding of containers, and waste segregation which is most important pivotal point and crucial for further waste management, was also found to be better among the doctors and nurses as compared to that of the other staff. Low level of knowledge among others is mainly attributed to poor training facilities and also to relatively low education among staff. Training of both the technical staff and the nontechnical staff is critical for the proper and appropriate management of biomedical waste. Similar findings were found in other studies too. It was also found that in the present study the nurses had significantly positive attitude when compared to the technicians and the housekeeping staff in one of the study, it was found that 98% of the nurses and 79% of the housekeeping staff had a positive attitude while only 59% of the technical staff had a positive attitude. It was found that the nurses...
practiced hospital care waste management better than the technical and housekeeping staff.

At Jhansi it was found that the process of segregation, collection, transport, storage and final disposal of infectious waste was done in compliance with the standard procedure. It was also found that the non-infectious waste was collected separately in different containers and treated as general waste\(^5\).

In Chandigarh, the medical establishments in the rural area and smaller ones in the urban area dispose off their biomedical waste along with municipal solid waste and no waste management system exists\(^7\). In one of the district in Gujarat, there was no effective waste segregation, collection, transportation and disposal system at any hospital\(^5\). In Karachi, it was observed that 25% hospitals were segregating sharps, pathological waste, chemical, infectious, pharmaceutical and pressurized container at source\(^8\).

Similar to Suwarna Madhukumar et al. the practice of reporting injuries resulting from improperly disposed biomedical waste was found to be completely absent among the staff. Stein et al. in their study reported that among doctors and nurses, only 37% reported that they ever suffered needle stick injury\(^9\). Low reporting of injuries may be attributed to the fact that most of the doctors and other technical and nontechnical staff are unaware about a formal system of injury reporting which should be establishes within all the health facilities.

CONCLUSION

Lack of proper and complete knowledge about biomedical waste management impacts practices of appropriate waste disposal. The nurses comparatively were having better knowledge and attitude, and also practiced HCW management better than the housekeeping staff. Regular training of nursing, technical and housekeeping staff should be done and system of monitoring should be evolved. It shall be the duty of every occupier of a health care setting generating biomedical waste which includes a hospital, nursing home, clinic, dispensary, veterinary institution, animal house, pathological laboratory, blood bank to take all steps to ensure that such waste is handled without any adverse effect to human health and the environment.

Following recommendations are proposed:

1) It should be ensured that the injuries happening to the healthcare personnel are reported to the person in-charge of biomedical waste management or to the biomedical waste management committee, and they report it in the prescribed format to the pollution control board.

2) Training of non technical and housekeeping staff should be specially emphasized.

3) Strict implementation biomedical waste management rules

4) It should be made compulsory for health care facilities to get their healthcare personal trained from accredited training centres.

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