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TEACHING OF BIOMEDICAL WASTE IN INDIA: A MAPPING EXERCISE

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ABSTRACT

Introduction: At a time of heightened expansion of health care facilities, proper disposal of health care waste is of paramount importance. Bio medical waste management in India has undergone a paradigm shift with strict implementation of Biomedical Waste Management (BMWM) Rules and its amendments. Untrained health care auxiliaries is however a concern. Present study aims to identify the available resource for training of health care auxiliaries.

Methodology: To gain the best possible insight into how BMWM is taught a systematic search strategy was adopted for collecting information. First, a thorough search of the Internet was carried out, using search engines such as Google Scholar, and PubMed.

Results: It identified eight such institutes which cater to their need. But this is insufficient considering the large workforce. In the present study, it was reported that teaching of biomedical waste management in nursing, dental, laboratory and other allied health professions is not given much priority. Besides only theoretical knowledge is imparted rather than applied aspects and hands on skill.

Conclusion: This points to development of a more precise and structured course on bio medical waste management in India.

Key words: Biomedical Waste, Management, Health care auxiliaries

INTRODUCTION

Healthcare Industry, one of the fastest growing sectors in India is also a source of life threatening waste and toxins [1]. Owing to the expansion of health care facilities as well as increased trend of using disposals has led to an unprecedented burden of health care related waste. Unregulated handling of healthcare waste is emerging as a serious threat to human health and safety (Delhi, 2014). Recent hepatitis outbreak in Modasa, Gujarat (India) 2009 pointed towards the core issue of poor healthcare waste management in the country [2].

Many countries lack documented government rules related to Bio Medical Waste Management (BMWM). India was one of the first countries to implement BMWM rules. The Ministry of Environment and Forests notified the "Bio-medical Waste Management and Handling Rules", in July 1998 (later amended in 2003 and 2011) under the Environment Protection Act, 1986. Even after a decade of its implementation, most Indian hospitals are yet to achieve the desired standards for BMWM practices [2].

The term health-care waste includes all the waste generated within health-care facilities, research centres and laboratories related to medical procedures. Out of all the health care waste, 75% to 90% of the waste is "non-hazardous". It is only the remaining 10–25% of the waste which is "hazardous" and may pose a variety of environmental and health risks [3].

The large component of non-hazardous health-care waste is similar to municipal waste and should not pose any higher risk than waste produced in households. It is the smaller hazardous health-care waste component that needs to be properly managed so that the health risks from exposure to known hazards can be minimized [3].

BMWM is still in its infancy stage with a lot of confusion existing among the generators, operators, decision makers and general community regarding proper disposal[4]. Improper disposal poses a risk for all individuals coming into close proximity with hazardous health-care waste, including those working within health-care facilities who generate hazardous waste, and those who either handle such waste or are exposed to it as a consequence of careless actions. The main groups of people at risk are doctors, nurses, technicians, washermans, sweepers, hospital visitors, patients, rag pickers and their relatives [5].

Doctors and Nurses are given a brief exposure to BMWM during their undergrad years. It is the health care auxiliaries who are unaware about the correct methods to handle Bio medical waste owing to lack of structured curriculum on BMWM. Therefore, it is essential to train as well as impart hands on skill on BMWM to health care auxiliaries, hospital maintenance personnel, workers in support services as well as those working in waste management facilities. Before undertaking any curricular intervention, it is imperative to first obtain information on the current situation with respect to BMWM, as the person developing the curriculum can use it to design appropriate professional educational activities. However, limited information is available on BMWM education in India and the existing literature relates almost entirely to BMWM rules and regulations. In India, we do not yet know about the content and objectives of the course, the teaching methods of these courses. Against this backdrop, this study set out to determine the extent of teaching of BMWM in public health and related academic programmes in India. First, it made an inventory of courses relating to BMWM and then analysed the teaching in terms of content, duration and mode of delivery. The overarching objective was to facilitate the administrators and educationists involved in drawing up public health curricula to strengthen education in BMWM at the national and local levels.

METHODS

To gain the best possible insight into how BMWM is taught a systematic search strategy was adopted for collecting information. The methodology used was similar to that followed in an earlier study[6]. First, a thorough search of the Internet was carried out, using search engines such as Google Scholar, and PubMed. A set of keywords, consisting of individual and combined terms, was used for the purpose of the search. These included BMWM, medical; nursing; education; courses; teaching; clinical; healthcare; hospital administration; and public health. The websites of the Association of Indian Universities, the Indian Council of Medical Research, the Universities Grants Commission, the Medical Council of India, the Indian Nursing Council, the Ministry of Health and Family Welfare and the All India Institute of Medical Sciences were also searched to find out about the courses offered in BMWM. A similar search was made of the websites of the Indira Gandhi National Open University, WHO and various public health institutes. The search was limited to courses offered in India and collaborations between Indian and foreign institutes, if any. It was not restricted by the duration of the course or the type of degree/certification awarded on the successful completion of the course. Detailed information on the courses was collected from the institutions concerned or from the designated websites of these institutions. In case the information on a website had not been brought up to date, telephonic contact was established with the institute or university concerned to obtain detailed information. Once the search was complete, the next step was to leave out short-term courses and training lasting from a few days to 4-6 weeks. Seminars and workshops were also excluded. The third step was to undertake a systematic review of the curricula of these academic programmes to understand the context and content of BMWM training at the undergraduate and postgraduate levels. The syllabi of community medicine in undergraduate courses of medicine, dentistry, nursing and allied health sciences were analysed to map content related to BMWM. Similarly, masters/diploma courses in public health, hospital administration and management programmes were examined to identify whether BMWM was being taught at all. This study, however, did not review courses in BMWM that are being delivered as a part of clinical research, business management and study programmes in other life sciences.

The courses/modules were analysed for information on any of the following questions: (i) whether BMWM is a part of the teaching curriculum; (ii) what the mode of delivery is; (iii) what the broad content is; (iv) which instructional formats or methods are being employed to teach BMWM; and (v) how the students are selected. The salient characteristics, namely the duration of the courses, institutions, modes of teaching, target groups and themes on which the courses focused, were tabulated.

RESULTS

The study consisted of a descriptive analysis of the academic programmes/courses relating to BMWM in India. At present, BMWM is being taught in the following forms:

There are independent programmes (full-time/ distance learning) focusing on BMWM/Health care waste management.

- BMWM is being taught as a module in Master of Public Health (MPH)/Diploma in Public Health (DPH) and public health management courses.
- Some elements of BMWM are being taught as a part of undergraduate (MBBS) program and while in-depth knowledge is imparted in post-graduate community medicine courses.
- BMWM is a component of undergraduate courses for nursing and allied health professionals (and allied health sciences).
- BMWM is also a component of undergraduate courses for dental students.

Very few institutions are imparting education in BMWM in the form of a distinct educational programme. As can be seen in Table 1, a total of eight programmes are dedicated to the teaching of health care waste management and four of these rely on classroom-based direct learning. However, only two programmes focuses exclusively on BMWM while in the rest BMWM is taught as a part of other major programmes. The primary thrust of six programmes is on hospital administration while the emphasis of another two is on health care management. There is no definite pattern with respect to the teaching of BMWM. Instruction in BMWM has been integrated into the programmes to varying degrees, and the programmes also differ with respect to their focus, approach, contents and duration. The eligibility criteria for the selection of students are mostly uniform, the basic requisite being a background in the life sciences or health sciences.

Table 1: Academic Programmes on BMWM in India

Course	Institute	Mode of teaching	Type of course	Eligibility criteria	Theme	Duration \in years
Master of hospital administration	Andhra University	On campus	Master course	Bachelor's Degree in any discipline	Hospital administration	2
Master of hospital administration/PGDHHA	Kerala University	Distance learning	Master/Diploma	Bachelor's Degree in any discipline	Health and hospital administration	2
PG diploma in hospital administration	Medversity /Apollo hospitals	Distance learning	Diploma	Bachelor's Degree in any discipline	Hospital administration	1
Diploma in hospital management	National Institute of health and family welfare	Distance learning	Diploma	Science graduate	Hospital administration	2
Industry program in healthcare and hospital administration	Bioinformatics Institute of India	Distance learning	Certificate	Science graduate	Hospital administration and management	1
MBA hospital and healthcare management	NIMS	On campus	Master	Science graduate	Hospital management	2
Certificate course in health care waste management	NIMS	On campus	Certificate	10 + 2	Health care management	6 months
Certificate course in health care waste management	IGNOU	Distance learning	Certificate	Science graduate	Health care management	6 months

Currently, National institute of health and family welfare (NIHFW) offer diploma in health administration, Armed Forces Medical College (AFMC), Pune offers diploma in hospital administration and All India Institute of Medical Sciences (AIIMS), Delhi offers PhD in hospital administration. So, only three institutes of national level offers an insight in BMWM. BMWM is taught as a part of curriculum in these programs where issues are covered very briefly. These are the full time courses. There are no programmes where BMWM is taught as a specialisation.

At present, India has 413 medical colleges, which enrol approximately 49,940 students every year. A total of 229 colleges offer MD in community medicine, while 39 institutes offer DPH and six have DCM programmes. Very little stress is laid on BMWM training in the MBBS curriculum. BMWM is covered as a clearly demarcated topic in the syllabi of postgraduate programmes in community medicine. The scenario in the nursing profession is marginally better, with nursing council giving due attention to teaching of BMWM as nurses are the prime person to come in contact with the Bio Medical Waste.

DISCUSSION

Biomedical waste is any waste generated during diagnosis, treatment or immunization of human beings or animals in research activities pertaining to or in the production of or testing of biological, and all other categories waste generated by healthcare activities. It carries a higher risk of injury and infection than any other type of waste. Therefore, it should be properly managed to protect the general public, healthcare and sanitation workers who are regularly exposed to biomedical waste as an occupational hazard[7].

Until recently, biomedical waste management was not given due importance in India. It was the Biomedical Waste (Management and Handling) Rules, 1998 which made it mandatory for healthcare establishments to segregate, disinfect and dispose of their waste in an eco-friendly manner. The rules have legal provisions aimed at mitigating the impact of hazardous and infectious hospital waste on the community[7].

Health care providers like nurses, sanitary attendants, and clinicians spend maximum time with patients leading to an increase exposure as well as risk of the hazards present in a hospital environment, mainly biomedical waste. These stresses the need to well-equipped these health care providers with the latest information, skills and practices for managing waste to reduce hospital-acquired infections. This will not only protect their own health but will also help in preventing risk, due to waste, to the community at large[7]. Hence, through the present study, an effort was made to find out the available teaching courses on biomedical waste management in India.

Currently, biomedical waste management is taught as a part of professional courses like MBBS, Master of Public health, Diploma in public health, Bachelor of Dental studies and General Nursing and Midwifery. In these professional courses, very little stress is given on development of skills for biomedical waste management. These courses have lesser teaching hours for biomedical waste management. Other than undergraduate courses, MD in community medicine program gives an in depth knowledge of biomedical waste management to the postgraduate students[7].

Apart from these professional courses, there are eight courses available in India where biomedical waste management is taught as a part of health/hospital administration programs. As hospital/health administration is a major aspect of this program, little time is devoted for biomedical waste management. Eligibility for admission in this program is science graduate or engineering prospect. These individuals come from non-medical background and they may enter into the hospital environment with little skills and hands on knowledge on biomedical waste management which is detrimental to their health owing to the level of exposure and risk in the form of hazard involved. Taking into consideration the mode of teaching, out of these eight courses, only four courses offers class room teaching; while in the rest the mode of teaching is distance learning mode. Hence, participants get very little opportunity to learn biomedical waste management from this programs and hands on skill for appropriate waste management remains a distant aspiration for the students.

In Undergraduate programs in India, in the existing medical curriculum, the topic of biomedical waste management is taught through didactic lecture on facts related to the aetiology, pathogenesis and control measures. However, there is neither a module which involves practical training of students to acquire skills of waste disposal nor any method to evaluate these skills. Hence, we can conclude that our existing medical curriculum has not accorded sufficient emphasis on applied aspects of biomedical waste management.

Whereas in other developed countries, there are special programs dedicated extensively to biomedical waste management. Like for e.g. in Mauritius there is a two year training course titled MSc in solid waste and resource management dedicated extensively on biomedical waste management. The programme intends to provide an in-depth knowledge of solid waste management with a focus on management systems and treatment methods related to environmental policies. Along with it, principles of solid waste management, design of treatment plants, recycling methods, environmental economics, ecological relevance and sustainable production are also considered. In USA, UK, Scotland, Netherlands, etc. there are full time/part time courses available on biomedical waste management through both classroom mode as well as distant learning mode where eligibility is

either a science graduate or an engineering prospect. This shows how much importance is given to teaching of waste management among allied health professionals in well developed countries.

In the present study, it was reported that teaching of biomedical waste management in nursing, dental, laboratory and other allied health professions is not given much priority. Besides only theoretical knowledge is imparted rather than applied aspects and hands on skill. Nurses, laboratory personnel, sanitary staff and other allied health professionals are constantly exposed to the hazards present in a hospital environment, mainly biomedical waste. They need have latest information; skills and practices to reduce hospital acquired infections, and prevent accidental injuries while handling hazardous wastes. Hence, training of both the technical staff and the nontechnical staff is critical for the proper and appropriate management of biomedical waste.

Henceforth, viewing the grave situation of teaching of biomedical waste management in India, it is the need of the hour to develop a course which consecrate to biomedical waste management. Another important challenge is to develop a course which caters to the need of not only medical prospects but also other allied health professionals like laboratory personnel, nursing, dental, sanitary personnel, etc. This in turn, will help in creating a trained work force which will also lead to increase awareness about biomedical waste management among general population reducing the opportunity to contract hospital acquired infections owing to improper handling of biomedical waste.

CONCLUSION

At present in India, there is no formal mode available for imparting training and hands on skills in BMWM to health care auxiliaries as they form an important and inevitable link in safe handling and disposal of biomedical waste. Looking at the grave importance attached with improper disposal of BMWM, an urgent need has arisen to formulized a standardized course which covers all the aspects of BMWM deliverable to the proposed audience in the most convenient way to upgrade the knowledge of these health care auxiliaries as well as to strengthened the available manpower in order to ensue healthy community and healthy environment by large.

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