Knowledge and Awareness of Bio-Medical Waste Management among Senior Undergraduate and Specialist Dental Students: Cross-Sectional Study

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Abstract

Background: There has been a universal rising in knowledge and awareness regarding the bio-medical waste management and the hazards related to it. **Purpose**: aims to determine and asses the knowledge as well as the awareness towards the management of bio-medical waste among senior undergraduate and specialist dental students in the Faculty of Dental Medicine, Universitas Airlangga, Surabaya - Indonesia. **Materials and Method:** The study was carried out by using a close-ended survey. The Population of the study consisted of 743 students. However, the taken sample was based on Lemeshow method that includes 130 senior undergraduate and 62 specialist students making a total of 192 participants. Statistical analysis was performed via descriptive statistical analysis and chi-square test. **Results:** This survey was shown that around 192 questionnaires were distributed of which (86%) returned and analyzed. It was seen that (58.7%) of senior undergraduate students and (87.1%) of specialist students, were having average knowledge of bio-medical waste management system in dental clinics. According to the Chi-square test analysis, it was seen there is a statistically significant P-value (p≤0.05). **Conclusion:** Within the limitation of this study, we affirmed that there is a good level of knowledge and awareness of bio-medical waste management. In this present study, highly needed for continuing education and training programs to be conducted in dental teaching curricula in the Faculty of Dental Medicine.

Keywords: awareness, dental students, knowledge, waste management.

Introduction

Nowadays, Bio-medical waste is a universal issue[1]. "Bio-medical waste means any waste, which is generated during the diagnosis, treatment or immunization of human beings or animals or research activities pertaining thereto or in the production or testing of biological or in health camps"[2]. Healthcare waste (HCW) was defined by World Health Organization (WHO) as the materials that are not treated and discarded from activities health care on human being or animal, having the possibility of transmitting contagious agents to human[3].

With the development of science and research work domain[4,5], the amount of waste, with bio-hazardous products, is also rising at an alarming rate, leading to instability of the ecosystem[6,7]. To reduce health problems and eradicate potential risks to people's health, the services of health care undoubtedly produce a massive amount of bio-medical waste, which creates elevated potentials for infection and injury[8]. Inconvenient and inappropriate treatment of this waste could have critical public health consequences and a noticeable impact on environment[9,10]. Due to the random disposal of health- care waste, it has been felt globally in concern about the bio-medical waste in conjunction with the high rise of fatal infections like Hepatitis-B, Acquired Immunodeficiency syndrome (AIDS). As it is not

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managed properly, it has been taken into consideration that most of it is hazardous even though only 10–20% is contagious in nature[11].

Waste generated in clinics and hospitals of dental teaching is analogous to that generated by other hospitals which include a large component of general waste and a junior proportion of hazardous waste[12]. Several hazardous wastes that are utilized in dental clinics and hospitals including used disposable items, sharps, mercury-containing wastes, contagious waste (gauze, blood-soaked cotton, etc.), lead-containing waste and chemical waste (spent film fixers, developers, and disinfectants) cause damage to the environment if not managed appropriately. The source of these metals come from the procedures of amalgam filling restoration or removal and the disposal of x-ray fixer solution[13]. Dental wastes that are generated from several clinical procedures have the possibility to be thrown into the sewage, whilst the majority of the solid type wastes are disposed into landfills and the local trashes sites without the recycling process and separation process[14].

The bio-medical and health care waste management is not the same as household and industrial waste management[15]. Bio-medical waste management is one of the present considerable defies due to the relation to the health of human being[16]. Knowledge deficiency of information about bio-medical waste will lead the dental specialists to contribute to several environmental deteriorations[17]. Knowledge is the fundamental criterion that lets for one to allocate between the correct and incorrect, it is a combination of perception, trials, practice, acumen, and skills[18,19]. The aim of this present study was been to determine and asses the knowledge and awareness of senior undergraduate (BDS) and specialist dental students (SPDS) about bio-medical waste management.

Materials and Methods

Study Type: This study is cross-sectional[20]. It is based on a questionnaire survey performed at the Faculty of Dental Medicine, Universitas Airlangga, Surabaya - Indonesia. The self-administered questionnaire was a modification of the work done by Sanjeev et al [18] and Chopra et al[21]. These questions were categorized into two parts, the first category contained questions on personal and occupational data comprising gender, age, educational qualification, and experience. The second category consists of 13 close-ended questions regarding the assessment of the knowledge, awareness concerning bio-medical waste management. **Sample Size**: The population of our study consisted of 743 students in the Faculty of Dental Medicine, however, the taken sample was based on the Lemeshow method that includes 130 BDS and 62 SPDS making a total of 192 participants in the sample. **Sampling Methodology**: The selection of the sample was according to random sampling techniques (simple random). **Study Duration:** October 2019. The respondents were given sufficient time to fill in the questionnaire and return it on the same day or the next day. **Data Analysis**: All answered questionnaires were coded and descriptively analyzed. The results were displayed in forms of numbers and then each question results were analyzed in percentage forms by the chi-square test also utilized.

Results

A total of 192 questionnaires were distributed of which (86%) were received back. The details of participants based on the gender, age, educational qualification and years of experience are shown in. Out of the 166 students, (72.9%) were females and (27.1%) males. The findings show that most of the individuals were undergoing their undergraduate in dental medicine (62.7%) while the specialists were (37.3%). Most of the subjects fell under the group of age 19-23 years (51.2 %). Most of the subjects had 0-3 years of working experience (61.4%).

It had been seen many of the participants (69.3%) had good knowledge about the bio-medical waste management system in dental clinics. P-value were (0.004), (0.000) and (0.010) had been noticed statistically significant in this question within the age, educational qualification, and experience respectively but the gander variable had not statistically significant (0.490). The highest percentage from the whole statistical analysis has been related to the knowledge of important health care waste generation, hazards, and legislations with (98.8%) had been noticed, however, the P-values are not statistically significant in all variables, for instance (94.6%) of the students want the bio-medical waste management to be practiced in faculty dental clinic. However, P-value statistically significant in educational qualification variables (0.025). Also (94.6%) of dental students who need more to know about the management of bio-medical waste, nonetheless P-value had not statistically significant in all variables.

Regarding the answers of the participants, it was found that (94 %) of the students know about the importance of dental charts in the dental clinic that helps in guiding disposal of the bio-medical waste, however, the P-value is not significant in all variables. It was noted that regarding the method of how bio-medical waste should be disposed of, (90.4%) of the students' answers were to be delivered to a bio-medical waste management agency, while (7.8) was throw directly into garbage bins and (1.8%) don't have the knowledge for waste disposal method. whereas the P-value is not statistically significant in all variables. Nearly, (71.7%) of the students had been aware of color-coding segregation of health care waste. However, the P-value (0.007), (0.050) was statistically significant in the educational qualification, and experience respectively.

P-values are not statistically significant in all variables in related questions that the inappropriate waste disposal can cause health hazards with the result that about (94.6%) of participants knew about it. The related question of the student's knowledge of the use of puncture-proof Container to discard the needle is available with a percentage of (89.8%). The level of knowledge about destroying the needle before being collected was assessed concerning the qualification of participants, has been shown that (51.6%) in SPDS and (39.4%) in BDS, with no statistically significant P-value in all variable. The lowest percentage was related to the awareness of dental wastewater treatment in a dental clinic (40.4%). Whereas the p-value was been statistically significant (0.038), (0.000) and (0.000) in gender, age, and educational qualification respectively.

Discussion

This study aims to assess the knowledge and awareness of the management of bio-medical waste for BDS and SPDS (Faculty of Dental Medicine, University of Airlangga, Indonesia). The strength of this study is that it made use of a self-administered questionnaire, the coordination pattern of the formatting of the questions, the content of the questions, the analysis, and the response rate. The questions had been designed as close-ended, making the study questions very simple to analyze with quicker response rate, in order to avoid any recall bias. This was assisted by plenty of participants who were covered in a short time [22].

Interestingly, the participants involved in this study displayed that the knowledge and awareness about the management of bio-medical waste were satisfying. To illustrate, a high percentage of BDS and SPDS (69.3%) had the knowledge and awareness of bio-medical waste management. This supports Saini et al [23] result which showed that the overall awareness of students was high as per the knowledge regarding information of the bio-medical waste management and awareness toward its practice.

This study revealed that (92.8%) of the students were aware of regarding the method of segregation into different categories as compared to Charania and Ingle[24], Bansal et al.[25] and Sudhir,[26] in which (89%), (86%), and (85%), of dental practitioners, respectively were also aware of the categories of the bio-medical waste.

In the present study, about (71.7%) of the students were aware of the correct color-coding segregation of health care waste. Similar studies conducted by Charania and Ingle[24] and Sudhir[26], in which about (72%) of their participants had information about the color-coding systems.

It is a remarkable observation that about (98.8%) of the participants know the important health care waste generation, hazards, and legislation. These findings are similar to the study done by Pichika et al[27] in which the percentage was (88.8%).

It was reassuring to note that in the present study about (94.6%) of the participants felt that they need the dental college to regulate lectures and a continuing education program to improve existent knowledge about the management of bio-medical waste. A similar study to this one regarded the need for methods to improve the existing knowledge of bio-medical waste management, observation of (97%) of the respondents felt the compulsory need for separate classes and lectures[27].

It is a significant challenge for deciding the utilization of the resource including methods for diminishing the waste at source and recycling [27]. Consequently, the researchers recommend that there should be a suitable training and concentrated training programs concerning the awareness and practices of waste dumping for the whole staff of the health care and students (BDS and SPDS) with continuous supervision at regular periods. It is mandatory that subjects or lessons about Bio-medical waste management in the curriculum of the faculty of dental medicine should be applied[16].

Conclusion

Our study revealed that the knowledge and awareness level of bio-medical waste management was good and adequate among senior undergraduate and specialist dental students in the Faculty of Dental Medicine, Universitas Airlangga, Surabaya - Indonesia. Furthermore, the study indicated that there is a need for creating more awareness among dental students regarding bio-medical waste management. Thus, the topic should compulsorily be made as a part of the dental undergraduate curriculum in faculty.

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