

Original Research Article

Concerns, Experience and Perceptions of Nursing Staff about Dental Health Care Waste Management

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ABSTRACT

Context: Dental Health care waste and its management have not received the due attention it deserves. Research evidence, guidelines and protocols for safe management systems of dental waste is scarce. Most published evidence in the area is limited to ascertainment of knowledge, attitude and practices among dentists and dental students. There is scarcity of literature pertaining to awareness, practices and attitude of nursing staff, who are actively involved in the waste management process.

Aim: To assess the perceptions, concerns and experiences of nursing staff in managing dental health care waste.

Settings and Design: Dental health care establishments and Qualitative research

Materials & Methods: Focus group discussion was conducted among 24 nursing staff using a Focus Group Discussion guide developed for the purpose.

Data analysis: The recorded data was transcribed, translated, anonymised and coded using Qualitative Data Analysis (QDA) miner software. The deductive codes were pertaining to concerns, experience and perceptions, whereas inductive codes were pertaining to suggestions and demands.

Results: We were able to identify the gaps in dental health care, one prominent finding was the unscientific waste management practices the nursing staff followed. Lack of commitment, support, unfavourable attitudes of Dental Health Care Personnel (DHCP) and poor facilities further compounded the problem. Willingness to improve the system was overtly expressed by group by demanding immunization, sufficient supply of Personal Protective Equipment (PPE) and continuous training of all those involved in waste management. None the less, the group suggested that the system could be improved by a committed Head of the Institution.

Conclusions: Task and team member specific implementation strategies at macro and process level can be developed to improve the systems in dental health settings based on the rich evidence obtained.

Key- Words: Nursing staff, dental health care waste, qualitative research, Focus Group Discussion, perceptions and concerns.

INTRODUCTION

The term health care waste includes all the waste generated within

healthcare facilities, research centres and laboratories related to medical procedures.

⁽¹⁾ Supreme Court of India following writ

petition filed by a civilian passed a landmark judgement that resulted in Biomedical waste (Management and Handling Rules) rules 1998 under Ministry of Environment and Forest. Falling within the scope of this rule is also waste generated during dental practice.

Most of the Dental health care settings are providing oral health care services to patients on outpatient basis and generate waste that can be classified as Dental Health Care Waste (DHCW). Component analysis of DHCW has demonstrated heavy metals, extracted teeth with and without amalgam fillings, lead foils, Plaster of paris cast, single use plastics, implants etc. which is categorically and quantitatively different from medical health care waste.

The number of Dental Health Care Facilities (DHCF) is significant in number, distributed across nook and corner of the city. Approximately there are around 1145 dental health care facilities registered with Department of Health and Family Welfare as on 2012, generating significant quantity of hazardous waste every day. ⁽²⁾ Thus the safe management and disposal of dental health care waste is quintessential from human health and environment point of view.

Plethora of reports regarding quantity, category, legal and safety aspects, economics and managerial issues of medical wastes is available, but the same is not true for dental health care settings. It is debatable whether the same evidence may be extrapolated to dental health care waste given the inherent differences in sources of generation, type and nature of dental waste.

Lack of adequate knowledge, legal issues, enforcement problems, lack of favourable attitudes etc. impede the safe management of dental health care waste and pose a constant threat to humans and environment. Life cycle of health care waste involves various stages and it is imperative that the health team possess

adequate knowledge and skills about the process. Nursing staff forms very important member of dental health care workforce who are most often involved at the point of generation of DHCW and their involvement is vital for system functioning. They also have no formal training to serve in a dental setting rather they gain expertise on employment.

They have more risk exposure opportunities while management of waste and least knowledge as per the literature and are also present at source of generation and disposal. ⁽³⁻⁷⁾ Understanding their concerns, perceptions and experience will help us in strengthening interventions to enhance their awareness and practices. Interventions to improve knowledge and practice will be meaningful and effective if it is developed specific to the workforce and based on need assessment. Hence this study was conducted to explore the concerns, experience and perceptions towards dental health care waste management that could enable us to understand the intricate issues and develop specific strategies to improve the system.

MATERIALS AND METHODS

Focus group discussion was conducted in a convenient sample of 24 nursing staff to gain their comprehensive understanding of concerns, perceptions and experiences regarding DHCW management. This understanding would facilitate in planning relevant need based implementation strategies.

Sampling: A situational assessment of dental health care waste management practices among a representative sample of DHCF's in Bangalore was undertaken since 2013. A probability proportional sampling method has been adopted to select the 280 small DHCF's facilities' and 11 out of 16 large DHCF's in the city formed the sample for the research endeavour. This current qualitative research study involves study of a convenient sample of 24 nurses working in the above selected large DHCF's.

A nurse with minimum of one year service duration in at least one department within the DHCF is included for this present study from a finite population of 63 nurses. A minimum criterion of one year was considered, as experts opined that each nurse would accumulate sufficient experience and expertise in waste management and issues surrounding the same. Nurses were selected from DHCFs which have not imparted any formal training to nurses in DHCF and which cater to at least 10 patients per department per day (overall 90 patients per day minimum) and these inclusion criteria would minimise training induced bias in responses provided by the staff regarding issues in dental waste management.

From among the 11 DHCF's involved in the research endeavour only 3 DHCF's qualified for the present study. Hence 9, 7 and 6 nurses were selected from each selected DHCF adopting purposive sampling technique.

Research instrument: A focus group discussion guide was developed by research team, which contained key topics pertaining to perceptions, experiences and concerns regarding dental health care waste handling and management.

The FGD guide consisted of two parts; The first part contained details regarding the team and task description of moderator, observer and note taker. Additionally information on use of audio recorder and the process was also described and consent obtained.

The second part had key questions, transition and probing questions. The guide so developed was subjected to linguistic validation and checked for accuracy. The questions were related to hazards of health care waste and disposal methods, experience in their establishments, handling spillages, sharp injuries etc. (FGD guide).

Research Instrument- Focus Group Discussion Guide

1	Concerns	Are there any problems that you have faced in these areas? Probes: What would you prefer as a solution to this problem?
2	Perceptions	Are there any hazards of improper waste management? Probes: Do you consider waste as potential hazard? Are you aware that improper handling poses risk? Could you describe the nature of the wastes that you have come across? Do you consider it as important to separate these wastes. How do you think it is usually separated as? Waste Disposal (Transition Question) Probe: Is there any standardized method for disposal of different wastes
3	Experiences	Handling of spillage of waste. (Key Question) What do you do in case of spillage of waste in your establishment? Probes: Do you have any specific method for handling spillage? What do you do in case of mercury spillage? Do you think it is necessary to have a specific kit for mercury spillage? Sharp injuries. (Key question) In case of needle sticks injury, what is usually done in your setting for the same? Probe: Do you report every injury?

Ethical clearance was obtained from MS Ramaiah Ethical Review Board with number MSRMC/ERB/2010 dated 11th August 2010. Permission from Head of Institution was obtained for conducting FGD at their institutions. At the start of the process the participants were explained about the study objectives and ground

rules for discussion and assurance of confidentiality was provided. Two dental institutions fulfilling the criteria were selected and participants were recruited adopting purposive sampling method. A letter was sent from the Dean's of DHCF to depute one staff from each department with service duration as per the criteria.

Data collection process: The data collection team consisted of moderator, note taker and observer who were trained in a workshop for Qualitative research and also through mock FGD. The moderator facilitated the discussion, notes were recorded by note taker and an alternate Sony ICD- UX533F, \$GB Voice Recorder. Observer recorded the sociogram and also kept time. Rapport building was facilitated by introduction of the researcher and team, followed by self-introduction of the participants. The discussion rooms were set up for the seating to be either broad U or circle shaped. Refreshments were also arranged during the discussion. Each discussion took about 50- 60 minutes. Care was taken to see that questions do not bias the discussion and leading all participants pointing towards same topics.

Data analysis: Data were transcribed verbatim from tape recorder and same was translated to English which was then anonymised, by removing any identifiers from the transcript to preserve the participant's anonymity. The transcript so prepared was coded using software QDA Miner, version 4.1.9. For the purpose of this analysis the categories were defined as following:

Perception - what the participants apprehend by means of understanding OR

knowledge about hazards, risk associated with poor management of dental health care waste and about different categories of DHCW

Experience - Any particular instances good or bad that the participants have encountered pertaining to DHCW

Concerns- Any particular area or issue that the participants have pertaining to DHCW

Any issue, topic, idea, opinion etc that was evident in the data was identified as codes and as many as possible codes were enumerated. Some of the inductive codes emerged for “demands” and “suggestions” and deductive codes for perception, concern and experience. Consistency was checked by repeating the coding process for small percentage of the data by the researcher and also by research assistant.

Participant's statements were coded until no more codes emerged from data. Coding of data was followed by grouping of codes into segment of data on a particular issue and called as categories and group of categories as themes (Table 1). Illustrative quotations demonstrating important themes which emerged emphatically and which enhanced our understanding of the data were extracted separately.

Table no.1- Example of codes, categories and Theme derivation.

Codes	Categories	Theme
Hand gloves	Categories of Dental health care waste	Perceptions -Awareness pertaining to different categories of waste, segregation practices and hazards of waste
Mask		
Cotton		
Plaster of paris		
Paper waste		
Dental wax		
We will separate the different types of waste	Segregation of waste	
Next day we will only separate the waste		
They will complaint on us that is why we separate		
The waste picker will not pick the waste	Hazards of waste	
Many a times we collect it with paper and then put in bottle- Mercury		
They will put in sink also		
No separate kit madam		
Many a times we experienced sharp injuries		
Needle prick injury, we may get diseases like HIV, Hbs Ag		

RESULTS

Three focus group discussions were conducted at different locations with 9, 7 and 6members in each with median

job experience of ten years. Sociogram revealed good group dynamics i.e. good interaction between participants. All participants were females and thus a

homogenous group by gender and profession. This encouraged them to feel comfortable in sharing their thoughts in the light of few potentially sensitive issues. One staff from each department was included in order to study the specific concerns, experience and perceptions at each department. The themes that emerged out of this FGD are indicated below:

1. Perception- Awareness pertaining to categories, segregation and hazards of waste
2. Concerns pertaining to poor practices and system
3. Experience with needle stick injury and spill management
4. Suggestions and Demands for improving systems

Awareness pertaining to categories, segregation and hazards of waste:

The participants were able to collectively enumerate 25 types of dental health care waste but on the contrary each one could enumerate one to two type of waste only. They were not aware of different waste categories as specified in BMW rules and unable to classify different types of wastes into infectious, recyclable and waste sharp categories and believed to have one bin at each dental unit chair side for segregation of waste as ideal. Most importantly the group collectively perceived that the DHCP at their respective institutions had poor segregation practices which they had witnessed. Awareness pertaining to segregating mercury and tin separately was fair. The verbatim expression of the same was- *“lead foil will be infected with saliva and there is x-ray which has chemical in it. So that’s why we keep it separate and mercury spreads through air and students, working staff and even patients may get affected in case inhaled, so we keep it in*

bottle”. They perceived that improper waste management to be hazardous and it could lead to ill health among DHCP.

Concerns and issues pertaining to Waste management Practices:

The participants raised alarm regarding poor practices followed by students both undergraduate and post graduate and dental assistants (Table no.2) Infections especially HIV and HBV were frequently spoken about by all participants. They had concern over increased chances of getting infection through needle stick injury and therefore insisted on need for testing all patients for HIV and HBV before initiating treatment.

They also expressed concern over no immunisation protection given by the management, no protocol for needle stick injury and maintaining registers for recording incidents such as needle stick injury and accidental spillages. Small bins and bins without lids, non-availability of gloves were few other areas of concern expressed by participants which interfered with proper system functioning. One of the participants discussed about the stress she underwent following needle stick injury. Data also showed concerns raised by participants about, students treating patients without obtaining proper history and relevant investigations. Poor work practices among both under graduate and post graduate students in terms of attending to phone calls while working on patients, use of rusted instruments, picking up of cotton rolls without pick up forceps etc. were few concerns expressed by the group about other DHCP not contributing to safety practices (Table 2).

Table no.2 Poor Practices of Students and Attenders as expressed by Participants

Attenders	<p>a. in surgery attenders don’t wear gloves, will be busy in washing all the time and chances of sharp injuries are high</p> <p>b. no one teaches the attenders. Most of the times they will be doing blindly</p> <p>c. without wearing gloves they wash the instruments.</p> <p>d. Problems means, attenders sometimes wear gloves or sometime they will put their bare hands and they have had injuries.</p>
Students	<p>a. they will not wash also. Some student’s instruments are rusted also.</p> <p>b. These first year students, when they go admitted to the college they don’t know anything. Using gloves only pick the phone and even they will put hand in the mouth</p> <p>c. if we are observing them without notice they will pick cotton from bin. In first year only we should educate them</p> <p>d. Sometimes postgraduates will pick up the x-ray which has fallen on the ground with gloved hands</p> <p>e. They will always recap needles</p>

Experience: Management of blood and mercury spill and needle stick injury

Blood spillage was managed either by wiping it with bare hands using cloth or gauze and disposing it as infected waste and use of hydrogen peroxide by some of the participants. The blood and urine samples were discarded directly into sink without any pre-treatment. Mercury spill was either broomed or disposed into sinks without appropriate PPE. Participants also expressed absence of mercury spill kit and any protocol for management. Blood spill management was another area of concern, as the participants did not wear any PPE while managing. Disinfection of the floor was never practiced which increased the chance for occupational exposure. All participants frequently experienced needle stick injury and their action taken post needle stick injury is shown in Table no.3.

Table no.3 Action taken by participants post needle stick injury

a. Wouldn't give any extra attention to it
b. These thing keeps happening, we will continue working
c. I will wash the finger under running water and squeezing out blood
d. I generally use spirit at times and take TT

Suggestions and Demands:

The participants were of the opinion that there should be training sessions at regular interval of at least once in three months to all team members (DHCP) especially students, focussing on developing favourable attitude towards waste management and attenders as they are at risk. Use of videos as instructional media was preferred to bring about desirable behaviour change among DHCP. They also opined that the faculty should be responsible in sharing the information obtained by attending Continuing Dental Education (CDE) programs or at least to depute nursing staff to CDE programs. Institution should take the responsibility of supplying sterile instruments to students due to non-compliance to infection control protocol. Institution should also have a policy for compulsory immunization to all stake holders even at the cost of deducting

from salary and to have a register to record needle stick injuries. Commitment from Head of the Institution towards waste management was expressed as demand by the participants. Sufficient supply of gloves and mouth mask and screening of all patients for HIV and HBV especially those attending oral surgery, orthodontia and conservative was yet another demand by the participants. Most important suggestion was to recruit nursing staff and attenders to all dental departments to perform the duties appropriately. They were of the opinion that when there are any rules from apex bodies like Dental Council of India and National Assessment and Accreditation Council, there would be some willingness from administrators to implement good systems.

DISCUSSION

Dental health care waste and its management are never given its due importance and there is no reported literature available to arrive at guidelines and protocols to improve systems. Most of the research is focussed on assessment of knowledge, attitude and practice of dentists and students. Hence this research was planned to assess the perceptions, concerns and experiences in managing DHCW among nursing staff as primary objective and to utilise the findings to plan implementation strategies in terms of standard operating procedures, training manual, guidelines etc to improve the systems. As there was no literature available pertaining to our research area a qualitative research was planned as it is recommended to explore unexplored areas. (8, 9) This FGD enabled us to gain insight into concerns and issues faced by the nursing staff which could facilitate in planning strategies to improve the system. DHCF's are classified as very small quantity generators as compared to medical waste with large percentage being hazardous and recyclable. Mercury and lead are the most hazardous waste

generated in a DHCF. ^(10,11) A dental health care facility generates 1.10 to .161 Kgs per day in developed and developing countries consecutively whereas 10.7kg/occupied bed /day is being generated by a metropolitan general hospital in a developed country. ^(1,2) As compared to medical waste, dental waste is characterised by mercury, lead, POP, silver stainless steel etc for which clear information on management is not defined and specified by BMW rules 1998. This could have lead to misinterpretation and may be associated with poor practices. ^(3-6, 12, 13)

Training and capacity building of DHCP are essential to improve the systems; this can lead to competent workforce forming foundation for achieving higher standards in patient care and occupational safety. Nursing staff being the back bone of waste management both in medical and dental facilities, good number of studies have been conducted and published regarding awareness and practices of nurses in medical waste management. ^(14, 15) As evidence regarding dental waste management is limited, studies related to medical waste management will also be used for discussion purpose. Qualitative research has the ability to take into account information about people's perspectives and experiences, focus on depth and richness of data. ^(8,9) The above statement was justified by the Focus Group Discussion conducted which uncovered various facets of the issues by giving deeper insight into the research topic. Nursing staff were selected as they form a very important member of the dental health care team and their experience and attitudes would have impact on system as a whole. Selection criteria adopted ensured that the participants had adequate exposure in dental health care waste management. Our observations reveal that nursing staff, perceived dental health care waste as hazardous and also were aware of HIV,

HBV, mercury and lead associated hazards, a similar finding was reported among nursing staff of medical setting where they demonstrated better awareness. ⁽¹⁰⁾ A contradicting finding was reported which claimed nurses to have extremely poor knowledge about waste management and also legislation. ^(4, 5)

Nurses expressed that they were concerned about health effects due to exposure to various hazardous type of dental waste and this can be linked to the poor practices followed by students and attenders while managing accidental spillage of mercury and blood posing threat to all DHCP in the DHCF. The concern was evident in their discussion especially during their demand for immunisation. Poor injury reporting was evident in the data which was also true among nursing staff of medical setting. ⁽¹⁰⁾ Lack of training and knowledge sharing by other colleagues worsened situation according to them. Concern about their health, other dental health care personnel's health and of patients was evident in their discussion. The demand for immunization, commitment by Dean for improving systems, demonstrates the favourable attitudes of nursing staff and similar finding was reported in Pakistan and by Lakbala et al. ^(14,15) As per the data there are about 63 nursing staff working in dental institutions and not a single training programme was being conducted in the last few years. This observation suggests the need for developing training manual and organising workshops to improve their competence in managing health care waste and also guidelines for immunisation. The statements in Table no.3 indicates the risky practices and also poor compliance to the protocol given by WHO for needle stick injury and blood spill management. ⁽¹⁾ As per the CDC guidelines a needle stick injury should be washed with sufficient water and reported to the concerned and for blood spill management, WHO has given a protocol which includes securing

the area to documenting the spillage. (1, 16)

In either case the Nursing staff reported poor compliance. Need for developing dental health care waste management manual which is comprehensive addressing issues at macro level for adequate infrastructure and process level is indicated and would be possible based on the data obtained and similar conclusions were drawn by Kapoor et al in a systematic review on the area of interest.

(10) The minimum core competencies essential for a nursing staff in a DHCF would be awareness pertaining to different categories of DHCW and its segregation, management of hazardous waste, blood and mercury spillage, needle stick injury. To complement, developing and planning a set of educational charts, manual, intensive training and sensitization sessions can be a prioritised as immediate strategy for improvement in systems. Advocacy efforts for inclusion of parameters pertaining to waste management in the inspection proforma of Accreditation and Apex bodies is yet another strategy for improving systems.

CONCLUSION

The study gave an insight into the areas of concern, perceptions and experiences. The rich data obtained wouldn't have had been possible with any other means of research strategies. Suggestion and demands expressed by participants appear relative to setting and triangulation of data would be beneficial to increase the transferability of findings. The trustworthiness of the data in terms of credibility and transferability of findings is ensured by the inclusion criteria for selecting participants and unit for study. The strength of this research is its methodology which was planned, conducted and analyzed in a systematic and scientific manner by the trained investigators. Future research is needed to evaluate whether these interventions can contribute in improving the system.

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