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ORIGINAL ARTICLE

Management of Dental Waste by Practitioners in Nairobi, Kenya.

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ABSTRACT

Objective: Dental wastes are material that has been utilized in dental clinics, which are no longer wanted for use and therefore discarded. Improper disposal of these dental wastes can cause harm to the dentist, the people in immediate vicinity of the dentist, waste handlers and general public and the environment through production of toxins or as by products of the destruction process.
This study aims to determine the knowledge, attitudes and practice on management of dental wastes among dental practitioners in Nairobi, Kenya.
Methods: Descriptive cross-sectional study of 70 dental practitioners practicing in Nairobi, Kenya.
Results: A total of 50 dental practitioners were included in the study. Majority had graduated between 1991-1995. 47.5% had only a bachelors degree, 25% had masters 7.5% had PhD and 12.5% had postgraduate diploma. Forty five percent of the respondents indicated they have attended training on management of dental waste while 89.5% had been attending continuous dental education. Forty-two percent of the respondents worked in public institution while the rest were in private practice. Only 48.7% of the practitioners were aware of the existence of waste management guidelines. Only 64% felt it was important to follow the set guidelines, 5% thought it was tedious, 2% said they were not practical and the rest were not interested in the guidelines. Eighty-two percent of the respondents said that amalgam was toxic if disposed improperly with only 10.7% indicating pollution to be a consequence of improper disposal of amalgam. Seventy-seven percent of the respondents did not know the hazardous effects of improper disposal of amalgam. Only half of the respondents stored waste amalgam under water, 25% said they did not know how to dispose amalgam. All (100%) knew about occurrence of cross-infection with improper disposal of bloody waste but only 56.1% said they incinerated bloody body waste while 24.4% disposed off bloody waste with general waste 35.7% of the respondents indicated that sharps were hazardous if improperly disposed. Only 52.4% incinerated their pathological wasted. On expired drugs, 7.3% disposed them off as part of general wastes.
Conclusion: There is need for continuous professional development on waste management among dentists in Kenya.
Key words: Access, Oral health, HIV, Physician, Dental waste.

INTRODUCTION

Dental wastes are materials that have been utilized in dental clinics and are no longer wanted for use and are therefore discarded. Healthcare service units generate wastes that can be classified into: hazardous waste, non hazardous waste, biohazardous waste, sharps and pharmaceutical wastes[1]. Improper

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disposal of dental waste can cause harm to the dentist, the people in the immediate vicinity of the dentist who handle the materials, waste handlers or the general public at large through production of toxins from materials or as by products of destruction of these wastes e.g. through incineration [2]

Biohazardous wastes may lead to cross infection because they may contain pathogenic organisms causing transmission of diseases such as Hepatitis B and HIV especially in the presence of open wounds[3] hazardous wastes are potentially carcinogenic such as chromium. Amalgam is an acute neurotoxin; it's the most toxic non-radioactive element and also the most volatile heavy metal. Mercury can pose a threat due to release of mercury into environment from dental practices and industries due to poor disposal[4] Other materials may contain potential hazards like polystyrenes, barium, strontium which may cause harm if correct use and disposal is not instilled.

Material waste that contains chlorine e.g. gloves, rubberdam, when burnt even by incineration produce dioxin. Dioxin can cause cancer, reproductive and developmental defects other effects include neurotoxic, hormonal and immune system effects[5] Toxic metals used in dentistry and their effects include; lead which in chronic or acute exposures children may suffer neurological disorders and women may experience reproductive problems-probable human carcinogen according to US.EPA. Chromium may cause liver and kidney damage and respiratory disorders. Cadmium is a probable human carcinogen it may cause lung cancer and is also linked to kidney disorders[6].

Previous studies indicate that there is a problem with the knowledge, attitude and practice of dental practitioners towards management of dental waste. Results from a study done in Bangkok indicated few dentists complied with all recommendations for disposal of wastes with most waste being disposed into domestic rubbish stream indicating a need to recommend an alteration in behavior of the practitioners[7]. In New Zealand qualitative interviews with practitioners indicated a lack of concern about disposal of contaminated waste into the general waste with the existence of legislation governing waste disposal not being sufficient to motivate many practitioners to comply with guidelines [8].

As healthcare providers dentists have an ethical responsibility and as per the precautionary that states that "when an activity raises threats of harm to the environment or to human health, precautionary measures should be taken even if some cause and relationships are not fully established scientifically"[9]. The Ministry of health in Kenya formulated a policy in which it aims to establish means of dental waste disposal in dental clinics and training of personnel on appropriate waste disposal methods and provide and sustain the supply of dental waste disposal equipment[10].

The main aim of the study is therefore to find out the knowledge attitude and practice of dentists in Nairobi towards management of dental waste

MATERIAL AND METHODS

A descriptive cross-sectional study was conducted among dentists in Nairobi. These were from both private and public sector. The public hospitals included University of Nairobi Dental hospital,

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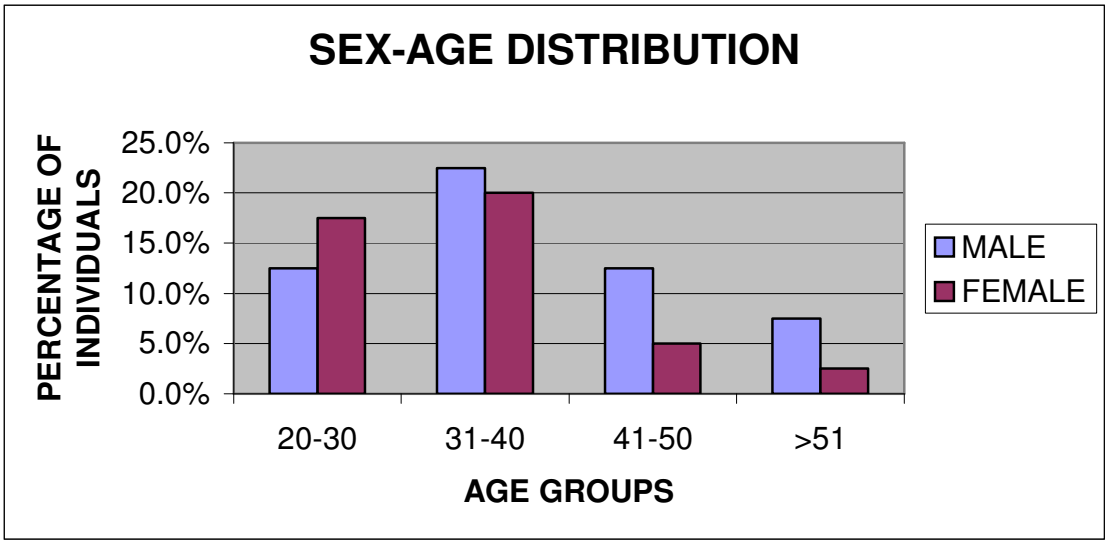
Kenyatta National Hospital, and Lady Northey clinic. A convenient sample of dental practitioners was included in the study. A self-administered questionnaire was designed to record age, sex, type of practice, years of practice, additional training, knowledge attitude and practices on dental waste. Results were presented in form of tables and figures.

RESULTS

FIGURE 1: Age And Sex Distribution of Respondents

A total of 70 questionnaires were distributed. Returns were 50 questionnaires. Of the returns 45% were females while males were 55%. Most of the respondents graduated between the years 1991-1995. Lowest-response rate of 5% was for from the year 2000 above.



Of the 52.5% who reported to have advanced their studies beyond a BDS Degree 26.3% had done a masters Degree in conservation Dentistry, 21.1% reported training in Oral and maxillofacial surgery. A percentage of 26.3% o respondents did not reply to this question with some expressing ethical reasons of bias for not indicating area of specialization

Forty five percent of the respondents indicated to have attended training on management of dental waste while 89.5% had been attending continuous dental education. 42% of the respondents worked in public institution while the rest were in private practice. Only 48.7% of the practitioners were aware of the existence of waste management guidelines. Only 64% felt it was important to follow the set guidelines, 5% thought it was tedious, 2% said they were not practical the rest were not interested in the guidelines. 78% felt it was necessary to pay a reputable company to dispose off the waste, 12% said it was expensive while 5% felt it was not necessary. The respondents indicated that 40% of the waste was made of protective wear, sharps constituted 4.2% of the total waste.

Amalgam

On the hazardous effects of amalgam, 82% of the respondents indicated that amalgam is toxic if disposed improperly however only 10.7% indicated pollution

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as a consequence of improper disposal of amalgam. 77% did not know the hazardous effect of improper disposal of amalgam. 25% said they did not know how to dispose off amalgam. In general there was a discrepancy between knowledge and practice. 30% of the respondents indicated that amalgam should be managed by under water storage. 50% actually stored excess amalgam under water. Other methods included general waste (17.5%), sodium thisulfate (7.5%) and sewage (5%). 12.5% did not indicate how they disposed of waste amalgam (Table1)

Table 1: Knowledge on recommend method and actual practices of amalgam disposal among respondents

Recommended management	%	Actual practiced management	%
Under water	30	Under water	50
Under sodium thiosulfate	12.5	Under sodium thiosulfate	7.5
Under developer	2.5	Under developer	2.5
Burn/ incinerate	5	Burn/ incinerate	5
Special waste disposal site	25	Special waste disposal site	0
Sewage	0	Sewage	5
General waste	0	General waste	17.5
Did not know	25	Did not respond	12.5

Body waste

All the respondents knew the risk of cross-infection with improper disposal of bloody waste. However there was a discrepancy between knowledge and practice. Though 76.2% indicated that incineration was the recommended method of disposal only 56.1% incinerated these materials. 7.1% did not know the recommended method of disposal. 24.4% disposed these waste with general wastes (Table 2).

Table 2: Practice of Waste Disposal Methods

Recommended management	**%**	**Actual practiced management**	**%**
Incineration	76.2	Incineration	56.1
Sterilization	4.8	Sterilization	2.4
Burn	7.1	Burn	7.3
Sewage	4.8	Sewage	2.4
Did not know	7.1	Did not know	4.9
		General waste	24.4
		Light suction evacuation	2.4%

Sharps

Only 35.5% of the respondents indicated that sharps could be hazardous if improperly managed. 64.3% indicated that cross-infection was a possible risk of improper management of sharps. Seventy one percent of the respondents indicated that incineration was the recommended method of managing sharps. However only 61% incinerated sharps. 19.5% disposed of sharps in a sharp container while 4.9% disposed them with general waste. (Table 3)

Protective wear

82.9% of the respondents indicated incineration as the recommend means of managing waste wear. However only 65.1% respondents indicated incinerating protective wear while 18% burnt their waste.

Pathological waste

Eighty two percent of respondents said that cross-infection can be a consequence of improper management of pathological waste. About half of the

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respondents incinerated their pathological waste. More than a quarter of the respondents, 28.6% disposed off pathological waste as general waste

Table 3: Disposal of Pathological Waste

Recommended management	**%**	**Actual practice**	**%**
Incineration	57.1%	Incineration	52.4%
Burn	16.7%	Burn	7.1%
Waste container	9.5%	General waste	28.6%
Disinfect	4.8%	Disinfect	7.1%
Don't know	9.5%	Bury	4.8
Bury	2.4%		

Table 4: Disposal of Hazardous waste

Hazards	**%**	**Recommended practice**	**%**
Pollution	15.6%	Incineration	56.1%
Toxic/allergen	33.3%	Burn	12.2%
Poison	15.6%	General waste	7.3%
Picked up and ingested by people	26.7%	Back to pharmacy	2.4%
Don't know	8.9%	Bury	4.9%
		Don't know	17.0%

Expired drugs

Only 26.7% of the respondents indicating that expired drugs could end up in the wrong hands. About half 56.1% of the respondents incinerated expired drugs while 12.2% burnt the expired drugs.

DISCUSSION

Dentists have an ethical responsibility to the environment. The Kenya National Oral Health Policy and Strategic plan 2002-2012 recognized improper disposal of dental waste as a hazard in the country. Though the policy s suggested that there was need to establish appropriate means of dental waste disposal in dental clinics, studies have found that the existence of legislation governing waste disposal was not sufficient to motivate many practitioners to comply with guidelines[10]. In the current study, about half of the respondents were not aware of existence of guidelines. This could be due to lack of initiative by the dental practitioners on acquiring new knowledge after training or lack of proper training at the dental school. At the same time there is lack of monitoring on waste disposal, which lead to the practitioners being reluctant to learn more. Studies done in other parts have found that only few dentists comply with all recommendation on dental waste disposal. In the current study, only 63.5% of respondents indicated that it was important to follow set guidelines on management of dental waste. Although recommendations could be made to the dental professionals to alter behaviour, real improvement was unlikely without changes to legislation and social policy[7].

In the current study, 76.2% of respondents indicated that according to set guidelines bloody wastes should be incinerated however only 56.1% of respondents actually incinerated the bloody waste while 24.4% disposed bloody waste into general waste This figure is much lower than compared to that in a study done in New Zealand where 56.4% of the dentists disposed off bloody swabs with general waste[7]. This difference could be due to the fact that some of the practitioners interviewed in the current study were mainly from the urban centre and major hospitals in country, which has their own incinerators. However the disposal of bloody waste was still poor. In another study done in Bangkok, rubbish collectors, scavengers had seen dental waste in the general waste papers[6].

There was a difference between knowledge and practices among the practitioners. In sharps management 71.4% of respondents indicated knowing that incineration was the appropriate means of managing sharps as per the set guidelines but only 61% actually incinerated the sharps, 4.9% indicated disposing sharps in the general waste this difference could be due to cost and access to incineration facilities.

Though most dentists were aware of the hazardous effect improper disposal of dental waste. Majority still practiced improper waste disposal. There is need to retrain the practitioners on the importance and new technologies of proper waste disposal.

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