



## Current status of dental waste management in Lebanon<sup>☆</sup>



Maha Hani Daou<sup>a</sup>, Rita Karam<sup>b,c</sup>, Samar Khalil<sup>d</sup>, Darine Mawla<sup>d,\*</sup>

<sup>a</sup> Saint Joseph University, Faculty of Dental Medicine, Campus des Sciences Médicales, Rue de Damas, B.P. 11-5076 – Riad El Solh, Beirut 1107 2180, Lebanon

<sup>b</sup> Saint Joseph University, Faculty of Sciences, Campus des Sciences et Technologies, Mar Roukos, B.P. 11-514 – Riad El Solh, Beirut 1107 2050, Lebanon

<sup>c</sup> Ministry of Public Health, Museum Street, Mathaf Square, Mansour Bldg., Beirut, Lebanon

<sup>d</sup> GEF Healthcare Waste Project, Ministry of Environment/United Nations Development Programme, Lazarieh Bldg., P.O. Box 11-2727, Beirut, Lebanon

### ARTICLE INFO

#### Article history:

Received 19 June 2014

Received in revised form 30 March 2015

Accepted 5 April 2015

#### Keywords:

Healthcare waste  
Amalgam  
Dental waste  
Occupational health  
Waste management

### ABSTRACT

Improved access to dental care has resulted in an increase in waste generation, which became a main concern for national and international authorities from an environment and public health perspectives. Lebanon supports the Global Health Care Waste Project and aims to develop guidelines and policies to alert dental healthcare professionals and improve waste management in dental clinics. This study provides an overview of the existing waste management situation in dental clinics in Lebanon. A survey of waste management practices in 242 randomly chosen dental clinics was conducted during the Annual Congress of The Lebanese Dental Association in 2011 in Beirut. The majority of dentists (90%) acknowledged a lack of written procedures for waste management. The absence of waste segregation at the source was reported by 71% of the surveyed dentists: most of the waste, including amalgam and infectious waste, is manipulated without precaution and ends up in municipal waste. About two thirds of the surveyed dental clinics do not work according to local practices and around half of them do not provide protective clothing or immunisation against hepatitis B virus or tetanus. This survey highlights the need for capacity building for dental clinic staff and adoption of effective measures to encourage efficient and responsible dental waste management in Lebanon.

© 2015 The Authors. Published by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

### 1. Introduction

Healthcare waste includes all waste generated within healthcare facilities, research centres and laboratories related to medical procedures (European Union, 2000). Between 75 and 90% of the waste produced by healthcare providers is non-hazardous or general waste. The remaining 10–25% qualify as hazardous waste and is categorised as sharp, infectious (i.e. waste contaminated with blood or other body fluid), pathological, pharmaceutical, chemical (i.e. film developer, disinfectant, material with high content of heavy metal etc.) and radioactive waste. Inadequate management of healthcare waste represents immediate risks for healthcare professionals and patients (contamination, cross-infection) and leads to land, water and air pollution (Al-Khatib and Darwish, 2004). Improper incineration of this waste, when disposed of with municipal waste, results in emission of pollutants which indirectly

contributes to the worsening of climate change and global warming issues (Bokhoree et al., 2014; Pan et al., 2013). The United Nations Environment Programme estimated that by end of the 20th century as many as 5.2 million people, including 4 million children less than 5 years of age, die each year from waste-related diseases. In Lebanon, according to recent research done by the Ministry of Environment, more than 50% of healthcare waste is not treated despite the Lebanese Decree 13389 which presents guidelines for hospitals in Lebanon on waste management (MoE, 2004). It has therefore, become urgent to investigate healthcare waste management and put appropriate measures in place to ensure its improvement.

Even minor sources of healthcare wastes, such as dentistry, should be involved in this movement. Dental waste includes swabs, plastic, latex, glass, needles and other waste materials which are often contaminated with body fluids as well as small amounts of chemical hazardous waste (mainly X-ray and amalgam-derived products, such as mercury, lead and silver). According to the Lebanese Decree 13389, these types of waste are respectively classified as infectious, and hazardous non-infectious wastes. Waste handling and management should focus on reducing the risks due to two issues: spread of infectious diseases and environmental pollution.

The spread of infectious diseases can arise from routine procedures (frequently causing exposure to blood, saliva and aerosol),

<sup>☆</sup> Contribution of authors was equal and that list is in alphabetical order.

\* Corresponding author at: Solid Waste Management Program, Office of the Minister of State for Administrative Reform, STARCO Center, Omar Daouk Street, Minet El hosn District 2020 3313, Beirut, Lebanon. Tel.: +961 3682147; fax: +961 371599.

E-mail addresses: [dado.m3@hotmail.com](mailto:dado.m3@hotmail.com), [dmawla@omsar.gov.lb](mailto:dmawla@omsar.gov.lb) (D. Mawla).

**Table 1**  
Number of surveyed dentists, number of LDA registered dentists and percent coverage of surveyed dentists out of the LDA registered dentists by Lebanese region.

Geographical region of Lebanon	Surveyed dentist (%)	LDA registered dentists	Percent coverage of surveyed dentist out of the LDA registered dentist
Beirut	80 (33)	983	8
Mount Lebanon	76 (31)	2065	4
Bekaa	42 (17)	310	14
South Lebanon	31 (13)	347	9
North Lebanon	8 (3)	21	38
Nabatiyeh	5 (2)	79	6

puncture by contaminated sharps and inadequate disinfection between patients. Special attention is given to hepatitis B and C, HIV and more recently tuberculosis (Ayatollahi et al., 2012). In 1990, the United States Agency for Toxic Substances and Diseases Registry (ATSDR) estimated the annual number of people injured by sharps outside hospital facilities in the United States of America to be between 100 and 300 for dentists, between 2600 and 3900 for dental assistants, and between 500 and 7300 for waste workers (ATSDR, 1990; World Health Organization, 2014 and references therein). The same report indicates that the number of resulting HBV infections by injury outside hospital facilities was estimated at less than one for dentists, between 5 and 8 for dental assistants, and between 1 and 5 for waste workers (World Health Organization, 2014).

Amalgam is a preparation of mercury, silver and tin with small amounts of copper and zinc and is well known in dentistry since the early 1800s (Mackey et al., 2014; Ferracane, 2001). The European Waste Catalogue lists as “hazardous” amalgam waste from dental care (European Union, 2000). The mercury in amalgam can be released in the air, in water and as a solid. Mercury is known to be neurotoxic and nephrotoxic (Akbal et al., 2014; Hörsted-Bindslev, 2004). Dental professionals are exposed to mercury vapour, and studies in this population have shown the presence of elevated levels of mercury in the urine as well as occurrence of neurological symptoms, respiratory disorders and other symptoms of intoxication (Neghab et al., 2011; Moen et al., 2008). Dental amalgam particles used during placement or removal of amalgam fillings are often disposed of in sewers or with municipal waste, and contaminate water and soil (Mackey et al., 2014; Hörsted-Bindslev, 2004). When incinerated, mercury is released into the atmosphere (Pan et al., 2013). Elementary mercury which ends up in the wastewater is converted by natural process to methylmercury (UNEP, 2013) which is the most toxic form of mercury (Hörsted-Bindslev, 2004). Mercury and methyl mercury are then accumulated through the food chain (especially in predatory fish) resulting in human exposure (UNEP, 2013; Clarkson et al., 2003; Chin et al., 2000). Overall, amalgam waste from dentistry is estimated to be responsible for less than 1% of the total amount of mercury released each year into the environment through anthropogenic activities (Jokstad and Fan, 2006). However, dentists still have a responsibility to properly manage amalgam waste, and the pressure to ban its use in dental fillings is increasing (World Health Organization, 2011).

Several studies highlight the fact that best practice for cross-infection prevention and dental waste management are still not being followed, especially in developing regions of the world (Yüzbasioğlu et al., 2009; Koolivand et al., 2012; Mumtaz et al., 2010; Singh et al., 2012; Sudhakar and Chandrashekar, 2008; Al-Khatib and Darwish, 2004; Treasure and Treasure, 1997) and their introduction into general practice may be some years away. However, dentists are being increasingly encouraged to adhere to universal occupational health and safety requirements (e.g. vaccination, use of protective clothing, correct handling of healthcare waste) and environmental and public health recommendations for segregation, treatment and disposal of hazardous waste. Following an international movement which led to the adop-

tion of regulatory measures (World Health Organization, 1999), Lebanon worked on the development of a legal framework to regulate healthcare waste management which included dental waste and resulted in MoE decree 13389 in 2004. Some initiatives have already been undertaken in hospital facilities but the process is still in its early stages and should be extended to all types of healthcare facilities (UNDP/GEF/MoE, 2013).

To be able to define and put in place appropriate and effective guidelines, laws and regulations, it is important to have a clear idea of the quantity and nature of healthcare waste generated by Lebanese dental clinics and how it is managed. The objective of this study is to provide an overview of the current situation in Lebanon.

## 2. Material and methods

A survey of 32 questions designed to provide an overview of current practices for handling, treatment and disposal of dental waste in Lebanese registered dental clinics was carried out during the Annual Congress of the Lebanese Dental Association (LDA) in 2011 in Beirut, Lebanon. The survey was conducted among 242 randomly chosen dentists out of the 2400 attending the congress, i.e. about 10% of the conference's participants and about 6% of the total number of dentists registered with the LDA (3805 in 2011).

Each interview lasted 15–25 min. The questionnaire consisted of several parts which referred to organisation, policy, training plans, occupational health and safety policies, planning for waste management, waste classification and segregation, collection and disposal handling, and methods of recycling and treatment of contaminated material for each category of waste. Questions regarding amalgam focused on the type of amalgam used in the clinic and on the mean number of old removed and newly placed amalgam fillings per week. Dentists were also asked about methods of amalgam disposal and procedures for dealing with amalgam/mercury spills.

Microsoft Excel, was used to determine the statistical means from the raw data and to generate column and pie charts for better visualization of the results.

## 3. Results

Surveyed dentists worked in 215 private clinics and 26 polyclinics (one respondent did not provide information on the type of clinic). More than 60% of respondents worked in Beirut (33%) and Mount Lebanon regions (31%) (Table 1). Comparison of the geographical distribution of surveyed dentists and of all LDA registered dentists showed the highest representation for North Lebanon and Bekaa (38% and 14%, respectively, Table 1). Surveyed dentists reported treating a mean of 10 patients per day (range 2–50 patients).

### 3.1. Organisation, planning, policies, occupational health and training

90% of surveyed clinics (219 respondents) confirmed the absence of general written plans and procedures for healthcare waste management. 109 of the 242 surveyed dental clinics (45%)

Download English Version:

<https://daneshyari.com/en/article/4424199>

Download Persian Version:

<https://daneshyari.com/article/4424199>

[Daneshyari.com](https://daneshyari.com)