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DENTISTS KNOWLEDGE, ATTITUDE AND PRACTICE TOWARDS DENTAL WASTE MANAGEMENT IN PRIVATE CLINICS - KHARTOUM LOCALITY

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Abstract-
Objectives: To assess Sudanese dentist's knowledge, Attitude and Practice towards dental waste disposal management.
Subjects and Methods: A descriptive cross-sectional study among 200 dentists of whom 51.5% were males and 48.5% were females (general practitioners 68.5% and 31.5% specialists) working in private clinics in Khartoum locality. Self-administered questionnaire including questions about demographic data, years of experience, specialty and questions regarding the knowledge, attitude and practice towards dental waste management. The resulting data were statistically tested using chi-square test for differences between variables with P value ≤ 0.05 indicating level of significance.
Results: Completed questionnaires were returned anonymously. The response rate was 82.5%. The majority (96.4%) knew about the harmful effect of dental waste disposal, 97.6% were aware about the transmissible infectious diseases (HIV/ Hepatitis B&C) and 95.2% said that waste should be segregated into categories. The majority (84.2%) of the respondents would like to attend a program on dental waste management, 17.6% agreed that health care is not an issue, yet 76.4% stated that it's a financial burden on the clinic and 40% stated that it's an extra work burden. There was statistical significant association between practice and gender/specialty (general or specialist) regarding specific waste disposal techniques (P < 0.05). Also statistical significant association was found between attitude and gender/year of experience with P = 0.049 and 0.001 respectively.
Conclusion: Majority of dentists working in private clinics are knowledgeable about dental waste management. The attitude towards dental waste segregation is affected by the financial burden yet there is a need for training programs with an implementation of an annual audit and education within the dental health care centers.

Keywords: biomedical waste, dental waste, dentists, waste disposal, waste segregation.

I. INTRODUCTION:

Hospital waste is often described as any residual matter, solid or liquid that is generated in the diagnosis, treatment or immunization of human beings or animals (Hedge et al., 2007). Dental waste is considered as hospital waste; are dental materials that have been used and are no longer wanted for use and are therefore should be disposed in an appropriate way. It is of two types' liquid waste and solid waste (Darwish et al., 2006). Dental healthcare service units generate wastes that can be classified into: hazardous waste, non hazardous waste, Bio hazardous waste, sharps and pharmaceutical wastes (Nakajima et al., 1996). Biohazardous wastes may lead to cross infection because they may contain pathogenic organisms causing transmission of diseases such as Hepatitis B, C and HIV especially in the presence of open wounds (Farmer et al., 1997; Park et al., 2002). Hazardous waste contains metals that are toxic and never degrade once they reach the environment. It consists of silver, lead, mercury, X-rays films and cleaning solutions (Taiwo & Aderinokun., 2002). Other materials may contain potential carcinogenic hazards such as polystyrenes, barium, strontium and chromium (UN Nairobi., 2003).

Good knowledge and attitude toward dental waste will minimize the risk of transmission of the disease from the hospital and dental clinic to the community. Poor bio-medical management practice constitutes a huge risk to the general public health, patients, and health care workers and contributes to environmental degradation. A study done by (Rudraswamy et al., 2002) concluded that dental staffs have

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good attitude towards waste management, in contrast to another study by (Sharma et al.,2013) which revealed that there are poor levels of knowledge and awareness about biomedical waste generation hazards and management among health care personnel. There is a need to educate the dental practitioners regarding proper waste management practice measures (Sushma et al., 2010). Boghele et al., 2013 developed and implemented a simplified waste segregation protocol for practicing dentists and dental hospitals. In most of the dental institutes the proper dental disposal isn't well provided, either due to lack of knowledge, financial support or other reasons. In Sudan there is an increase in the number of private dental clinics during the past two decades with increased awareness about the dental treatment amongst the public. This leads to an increase in the amount of biomedical waste that increases demand for proper waste management. The information available about this issue in Sudan is scarce and no previous data available.

The main objective of the study was to assess the dentists' knowledge; attitude and practice towards dental waste management, while specific objectives were to determine the relationship between the dentists' knowledge, attitude and practice towards dental waste disposal management and their gender, years of experience, speciality and place of graduation.

MATERIALS AND METHODS:

Study design, area, duration and populations: Descriptive cross-sectional study design among general dental practitioners and dental specialists working within Khartoum locality (one of the seven localities in Khartoum State) excluding house officers, non practicing dentists or dentists with administrative job only. Data was collected during the months of January – May 2014.

Sample size and techniques: A total coverage of dentists working in private clinics in Khartoum locality was involved. A list of all private dental clinics and polyclinics or centers providing dental care was obtained from the directory of Private Sector, Ministry of Health – Khartoum State. The total number was 200 registered and practicing dentists.

Survey tool: A structured, self-administered, close-ended questionnaire with a letter explaining the purpose of the study was distributed by one of the researchers. It was handed to the participants during evening clinics hours. The questionnaire originally developed by (Abubakar Umar & AbdoYaro., 2009) with some modifications. A pilot study was conducted among a sample of 30 dentists to pre-test the questionnaire to insure reliability and comprehensibility. Cronbach's alpha test showed the reliability coefficient of 0.87 and was found satisfactory for conducting the study. The pretested questionnaires were included in the final study.

The questionnaire was formulated into four parts:

Part one: Demographic data consisted of 5 items with 2-4 responses where the participant ticks one appropriate response per item. Gender, year of experiences and place of graduation were asked.

Part two: Assessment of knowledge and practice which consisted of 10 items each item ranged from 2-5 responses where the participant chooses one response per item (yes/no OR tick)

Part three: Dentist Education---- consisted of 3 items with one response per each item either YES or NO.

Part four: Attitude assessment --- consisted of one item, 5 responses with either agrees or disagrees.

Participants answered the questionnaire and returned them to the researcher at the same day or the day after. It took 10 - 15 minutes to answer all questions.

Data analysis: Data was analysed by SPSS Version 17 (SPSS Inc., Chicago, USA). Results were presented in form of tables and figures, comparison between variables assessed using chi square and Pearson correlation tests with the level of statistical significance set at $P \leq 0.05$.

Ethical consideration: Study was approved by the ethical committee of the University of Medical Sciences and Technology- Khartoum – Sudan. Participants were requested to participate voluntary after explanation of the purposes of the study. Informed written consent for their participation was obtained and confidentiality of responses was assured.

RESULTS:

Descriptive statistic of the results showed that; response rate was 82.5% (165), the percentage of males was 51% and females were 49%. The majority (68%) were general practitioners and 32% were specialists, 84% got their bachelor of dentistry degree from inside Sudan while 16% from outside. The majority (67%) had less than five years practice experience, (19%) 5-10 year and (14%) more than ten years.

Regarding practice towards dental waste management (DWM) in relation to gender there is a significant association between gender and accomplishment of an audit during the past three years with P value = .026 . Another significant association was found in relation to practice and gender is the use of specific waste disposal techniques P =.017 where 15.2% of female use safety box for sharps, Table (1).

Table (1): Association between practice of dental waste management and gender

Accomplished dental waste audit during the last three years	Gender		Total	P value
	Male	Female		
Yes	20(12.1%)	31 (18.8%)	51(30.9%)	0.026
No	65(39.4%)	49(29.7%)	114(69.1%)	
Previous training program on dental waste management	Male	Female	Total	
Yes	20(12.1%)	22(13.3%)	42(25.5%)	0.342
No	65(39.4%)	58(35.2%)	123(74.5%)	
Presence of annual education on waste management for employee in clinic/health centre/ministry of health	Male	Female	Total	
Yes	22(13.3%)	21(12.7%)	43(16.1%)	0.549
No	63(38.2%)	59(35.8%)	122(73.9%)	

Years of experiences of dentists under the study have a statistical significant relationship with attitude toward dental waste management as displayed in table (2). Knowledge about the harmful effects of dental waste to the community, the importance of segregation of waste, attitude about the importance of safe management of waste and attending program or training on practice of dental waste management were showed in table (3)

Table (2): Association between Attitude toward DWM and year experience among surveyed dentists

Attitude toward DWM	Year of experiences			
Likelihood of attending a program on dental Waste Management:	< 5year	5-10 year	> 1o year	P value
Agree	97 (58.8%)	20 (12.1%)	22 (13.3%)	0.001
Disagree	13 (7.9%)	12 (7.3%)	1 (0.6%)	
Safe Management of health care waste is not an issue at all. Agree	21 (12.7%)	5 (3%)	3 (1.8%)	0.747
Disagree	89 (53.9%)	27 (16.4%)	20 (20.1%)	
Safe Management of health care waste is the responsibility of government. Agree	85 (51.5%)	19 (11.5%)	18 (10.9%)	0.112
Disagree	25 (15.2%)	13 (7.9%)	5 (3%)	

Table (3) Dentists knowledge, attitude and practice toward dental waste management.

Knowledge, attitude and practice toward DWM	Yes	No
Dental waste harmful to the Dental Health Care Workers and environment if not disposed appropriately	159(96.4%)	6(3.6%)
Segregation of waste should be into different categories	157 (95.2%)	8(4.8%)
Likelihood of attending a program on dental Waste Management	139 (84.2%)	26 (15.8%)
Safe Management of health care waste is not an issue at all	29 (17.6%)	136(82.4%)
Previous training program on dental waste management	42 (26%)	123 (74%)
Accomplishment of dental waste audit (review) in last three years in DHCC	52(31%)	114 (69%)

Barriers preventing dentists from following proper dental waste management was revealed in table (4).

Table (4): Barriers against proper waste disposal management among the dentists.

Barriers that prevent from following proper Waste management	frequency	%
not interested	3	1.8%
not well trained to do that	20	12.1%
It's not my responsibility	6	3.6%
Unavailability of waste disposal equipment and accessory like (safety box)	16	9.7%
No authorities that receive the waste disposal	48	29.1%
ALL of the above	72	43.7%
Total	165	100%

DISCUSSION

It is important to outline the possible limitations before interpreting the finding of the present study. Firstly as a descriptive cross sectional study based on self administered questionnaire the response rate was 82.5% and 35 of the participants; although they received the questionnaires by hand, but they did not respond and their answers may change the results. Secondly the study of this vital issue may be most appropriately designed observationally as what you see in practice may not be the real on the questionnaire. Thirdly the study was limited to one area of large city Khartoum may be biased as this area of the capital of high socioeconomic status and well educated people who can judge the quality of services provided. So it is difficult to generalize the results to the whole state. Inspite of all limitations; the study heightened the importance of waste management by dental practitioners working in private clinics in Sudan.

A large number of questioned dentists are not practicing proper methods of dental waste disposal and many require improvement in their knowledge. Similar result has been reported throughout different countries like Greece (Kontogianni et al., 2008; Palestine (Darwish et al., 2006); Italy (Veronesi et al., 2004); Bangkok and India (Sudhakar et al 2008).

Bio-Medical waste shall not be mixed with other waste and shall be segregated into labeled containers and not be kept untreated more than two days.There was no association between knowledge and practice regarding segregation of waste into different categories, where majority said that waste should be segregated which agreed with Bala & Narwal., 2013, but disagreed with the result obtained by Rudraswamy et al., 2012. Disappointingly unlike the result obtained by Arora et al., 2014, small percentage of our surveyed dentists (25.5%) use safety boxes for sharps and needles. Unfortunately malpractice of disposing of hazardous waste such as syringes, blades and ampoules in dustbins and emptying these into municipal corporation bins was also reported by Singh et al., 2012 study. Inspite of previous knowledge and recommendation for amalgam waste disposal; simply by putting the scrape into a closed containers filled by water, glycerine or X.ray fixer; only a few of the participants (6%) practice this measure; similar to a study done by Osamong et al., 2005 and Arora et al., 2014. Improper segregation and waste management may put garbage collectors in high risk of getting infections. The authoritative bodies in the country should strictly implement and monitor BMW management according to their requirements in a systematic manner with written protocol, annual audits and conduct an educational program for dental staff.

Appropriate guidelines on various aspects have been given by the American Dental Association (ADA, 2003). Almost no one of participant incinerated the dental waste, reflecting poor attitude and practice. 87.2% said harms dentists and population which was not similar to Indian study by (Rudraswamy., 2012), where 61.5% surprisingly disagreed that segregation increases risk on injury. Majority knew about cross infection which was high and very close to Kenyan study results by Osamong et al., 2005.

There is a highly significant association between attitude towards DWM and years of experience, this significance could be explained by enthusiasm of young DHCWs (<5 years) towards their career and loyalty of old DHCWs (>10 years) and tiredness and disappointment of mid experience (5-10 years). Strongest association between attitude towards DWM and degree of qualification illustrated poor attitude by majority of participants who agreed that safe management is the responsibility of the authorities. Internationally at least an annual audit is usually done in DHCCs, results revealed an association between practice towards DWM and gender where majority of 69.1% of which 39.4% males had not done an audit in 3 years, it shows poor practice but not in relation to gender rather in general since audit is authorities requirement, and could be explained by lack of knowledge towards importance of audit and hence implementation. Therefore dental waste is rather inappropriately deposited without records to be referred back to or any authorities to ask for. Safe management of health care waste has come to be recognized as being more of a problem of attitude rather than just providing technology or facilities, as observed in the present study as all the facilities for waste management existed in the Hospital set up but they were not used properly (ADA., 2003).

Again there was a very strong association between practice towards DWM and degree of qualification and previous training, where only few of the respondents had undergone previous training program on DWM dissimilar to (Bala & Narwal., 2013) results. This may show the lack of availability of such training and educational programs in our country. There was no association between Knowledge and four variables mainly year of experience, place of graduation and degree of qualification. This can be justified by sample size not large enough, study concise to private clinics, bias of candidates on answering the questionnaire, non-specific questions, not up to point questions about KAP and DWM protocols.

CONCLUSION:

Knowledge and attitude among Sudanese dentists working in private clinics toward DWM is acceptable. Practice of waste segregation, amalgam waste disposal is poor. No appropriate strategy exists for proper management of dental waste. Effective implementation of rules, close monitoring of guidelines with regular audit and continuous education can improve DWM practice.

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