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**Abstract:**

**Aim:** This descriptive type of cross-sectional study was conducted among 105 dental surgeons working in the outpatient departments at some renowned educational institutions and a few private dental clinics in Dhaka city.

**Methods:** The respondents were interviewed using structured questionnaire and their method of practice was noted.

**Results:** Mean period of practice was 9.49±5.936 (1 to 27) years. The mean age in year of the respondents was 33.88±6.18 (24 to 50) years. Highest respondents were from private dental clinics (28.6%) and the rest were from educational institutions.

According to educational qualifications, 65.7% were graduate dental surgeons and the rest were postgraduates. Male were more (63) in numbers than the female respondents (42). Only 9.5% practiced dental chair instrument tray and other exposed area cleaning with disinfectants between patients, 6.7% used to wrap exposed areas and change between different patients and 5.7% practiced air exhausting during dental treatment. Only 27.6% changed gloves for each patient, 71.4% dental surgeons used dental surgeons used face masks, 74.3% not use goggles or eye protecting shields and 3.8% dental surgeons used head caps in their daily dental practice. 5.7% dental surgeons routinely advised their mouth with any antiseptic mouth wash before treatment to minimize dental splatter and aerosol and 3.8% dental surgeons used high-volume suction as a routine practice during all dental treatment procedures.

**Conclusion:** The study reveals the existing practice situation of dental surgeons of Dhaka city about cross infection control especially dental splatter and aerosol. Dental health-care personnel, dental patients and their family members are at a risk to expose to contaminated diseases due to dental splatter and aerosol.

**Key words:** Splatter, aerosol, personal protection equipment, infection control.

**Introduction:**

The production of airborne materials during dental procedures is obvious. This cloud is evident during tooth preparation with a rotary instrument, air abrasion, air-water syringe, ultrasonic scaler and air polishing and from the dental unit waterlines (DUWLs). It is common for the patient to comment on this cloud of material. With the advent of respiratory questions

concerning the potential for the spread of infections from this aerosol may arise.<sup>1</sup> The terms "aerosol" and "splatter" in the dental environment were used by Micik and colleagues.<sup>2-6</sup> Aerosols were defined as particles less than 50 micrometers in diameter. Splatter was defined as airborne particles larger than 50 micrometer in diameter. The consensus has been that the greatest airborne infection threat in Dentistry comes from

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aerosols due to their ability to stay airborne and potential to enter respiratory passages.<sup>7,8</sup> With the resurgence of tuberculosis (TB), however, splatter droplets also must be considered a potential infection threat. The usual method for transmission of TB is through the formation of droplet nuclei.<sup>9</sup> The American Dental Association (ADA) and Center for Disease Control and Prevention (CDC) have recommended that all blood-contaminated aerosols and splatter should be minimized.<sup>18</sup> Occupational Safety and Health Administration regulations states that "all procedures involving blood or other potentially infectious materials shall be performed in such a manner as to minimize splashing, spraying, spattering, and generation of droplets of these substances."<sup>19</sup> The use of rubber dam and High Vacuum Evacuators (HVE) are considered to be "appropriate work practices"-precautions that always should be followed during dental procedures.<sup>20</sup> By following the simple and inexpensive recommendations for controlling aerosols and splatter, dental practitioners would be in compliance with these recommendations and would minimize any legal or regulatory risks that may exist. Although many surveys about biological characteristics of dental splatter and aerosol have been carried out in several countries, there is no report on practice of dental surgeons about dental splatter and aerosol. The aim of this descriptive study was to investigate the practice of dental surgeons about dental splatter and aerosol in Dhaka city.

**Table-1.1: Mean socio-demographic data of the respondents.**

Practice		Age group		Institution		Education	
Practice (years)	Percent (%)	Age group (years)	Percent (%)	Institutional place	Percent (%)	Educational level	Percent (%)
<5	32.4	<30	37.1	Private Clinic	28.6	BDS	65.7
6-10	34.3	31-35	22.9	Bangladesh Dental College	26.7	BDS, DDS	4.8
11-15	20.0	36-40	28.6	BMMU	20.0	BDS, MPH/MPhil	8.6
>15	13.3	>40	11.4	Dhaka Dental College	16.2	BDS, MS	10.5
Total	100.0	Total	100.0	BIRDEM	8.6	BDS, FCPS	3.8
Mean =9.49; SD = ±5.936 Range:1-27		Mean =33.88; SD = ±6.180 Range:24-50		Total	100.0	BDS, DDS, FCPS	2.9
						BDS, DDS, PhD	3.9
						Total	100

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**Materials & Methods:**

**Study design:** Cross-sectional descriptive type study.

**Study population:** Practicing graduate dental surgeons.

**Study place:** Outpatient dental clinics at Bangabandhu Sheikh Mujib Medical University (BSMMU), Bangladesh Institute of Research and Rehabilitation for Diabetes, Endocrine and Metabolic Disorders (BIRDEM), Dhaka Dental College, Bangladesh Dental College and some private dental clinics in Dhaka city.

**Study period:** January to June 2010.

**Sample size:** One hundred and five (105) practicing dental surgeons.

**Sampling technique:** Purposive and willing to response.

**Data collection tools:** Pre-tested structured questionnaire and check list.

**Data collection procedure:** Face to face interview and observation.

**Data analysis:** SPSS version 11.5

**Results:**

Table 1.1 shows the mean period of practice in year of the respondents was 9.49±5.94 years ranging from 1 to 27 years. Highest percentage was found in 6-10 years group (34.3%) followed by less than 5 years group (32.4%), 11-15 years group (20.0%) and

lowest in the above 15 years practicing group (13.3%). Highest percentage of respondents according to their age were in less than 30 years age group (37.1%) followed by 36-40 years age group (28.6%), 31-35 years age group (22.9%) and lowest in the above 40 years age group (11.4%). The mean age in year of the respondents was 33.88±6.18 year ranging from 24 to 50 years. Highest respondents were from private dental clinic (28.6%), followed by Bangladesh Dental College (26.7%), BSMMU (20.0%), Dhaka Dental College (16.2%) and lowest from BIRDEM (8.6%). According to the educational qualifications, 65.7% (69 out of 105) were graduate dental surgeons and the rest were postgraduates. BDS-65.7%, BDS & DDS-4.8%, BDS & MPH/MPhil-8.6%, BDS & MS-10.5%, BDS & FCPS-3.8%, BDS, DDS & FCPS-2.9% and BDS, DDS & PhD-3.9%.

**Table-1.2: Distribution of the respondents by their educational qualification.**

Education qualification	Frequency	Percent (%)
Graduate	69	65.7
Postgraduate	36	34.3
Total	105	100.0

Table 1.2 shows that according to educational qualifications, 65.7% (69 out of 105) were graduate dental surgeons and the rest were postgraduates, where, only BDS were 65.7%, BDS, DDS-4.8%, BDS, MPH/MPhil 8.6%, BDS, MS-10.5%, BDS, FCPS-3.8%, BDS, DDS, FCPS-2.9% and BDS, DDS, PhD were 3.9%.

**Table-1.3: Distribution of the respondents by their Gender.**

Gender	Frequency	Percent (%)
Male	63	60.0
Female	42	40.0
Total	105	100.0

Table 1.3 shows that out of 105 respondents, male respondents were more (63) in numbers than the female respondents (42).

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**Table-2.4: Distribution of the respondents by their exposed areas Wrapping practice.**

Wrapping practice	Frequency	Percent (%)
Did not wrap	98	93.3
Wrapped and changed between patients	7	6.7
Total	105	100.0

Table 2.4 shows that only 7 (6.7%) dental surgeons out of were wrapping exposed areas and changing between different patients.

**Table-2.5: Distribution of the respondents by their Air exhausting practice during dental treatment.**

Air exhausting practice	Frequency	Percent (%)
Did not air exhaust	99	94.3
Exhaust air out side	6	5.7
Total	105	100.0

Table 2.5 shows that only 6 (5.7%) dental surgeons out of practiced air exhausting during dental treatment.

**Table-2.6: Distribution of the respondents by their Gloves using practice.**

Gloves using practice	Frequency	Percent (%)
Did not use	40	38.1
Used	36	34.3
Changed for each patient	29	27.6
Total	105	100.0

Table 2.6 shows that 65 (61.6%) dental surgeons used gloves during treatment, only 29 (27.6%) dental surgeons out of changed gloves for each patient.

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**Table-2.10: Distribution of the respondents by their Head cap using practice.**

Head cap using practice	Frequency	Percent (%)
Did not use	100	95.2
Used	5	4.8
Total	105	100.0

Table-2.10 shows that only 4.8% dental surgeons used head caps during all dental treatment procedures as routine practice.

**Table-2.11: Distribution of the respondents by their patients Mouth rinsing practice before dental treatment.**

Mouth rinsing practice	Frequency	Percent (%)
Not done	99	94.3
Done before treatment	6	5.7
Total	105	100.0

Table-2.11 shows that only 5.7% dental surgeons routinely advised their patients to rinse mouth with any antiseptic mouth wash before treatment to minimize dental splatter and aerosol.

**Table-2.12: Distribution of the respondents by their High-volume suction using practice during dental treatment.**

High-volume suction using	Frequency	Percent (%)
Did not use	101	96.2
Used	4	3.8
Total	105	100.0

Table-2.12 shows that only 3.8% dental surgeons used high-volume suction as a routine practice during all dental treatment procedures.

**Discussion:**

Yuzbasiglu et al. (2009)<sup>21</sup> showed in a study that 63(46.70%) of the Turkish dentist respondents were

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In dental practice, there is evidence that high-volume suction plays an important role in minimizing contamination of the treatment room by micro-particle aerosols that contain significant microbiological load.<sup>29</sup> Al-Rabeah and Mohamed<sup>22</sup> stated that 49.8% of dentists in Saudi Arabia used high-volume suction and according to Emir (YUZBASIOGLU)<sup>21</sup>, 41.60% of dentists used high-volume suction.

Ninety six percent (95.60%) of the participants assumed that all patients are infectious and that the same precautions must be used for all patients. Excluding barrier techniques, simple and effective techniques, such as rubber-dam placement and preoperative use of mouth rinses, were reported by only a small number of dentists; 74.10% of the dentists expressed concern about the risk of cross-infection to themselves and their dental assistants. <sup>21</sup>Only 43% of sample gave a proper definition to "cross-infection".<sup>21</sup>

In another study, Bagieh HN<sup>30</sup> showed that overall application level of regular cross-infection control measures was 90% except for wearing eye glasses, was 35%. Secondly, the level of application of extra precautions measures was also satisfactory. Such measures include vaccination against hepatitis B virus 55%, using sterilization handpiece for each patient was 32%, wearing full gown 11% and using isolation room was 6%. Third, although respondents encountered patients with hepatitis B virus (63%), tuberculosis (15%) and suspected AIDS (6%), the only infections contracted by respondents were only influenza (4%) and eye infection (2.5%).

**Conclusions:**

The aerosols and splatter generated during dental procedures have the potential to spread infection to dental personnel and other people in the dental office. While, as with all infection control procedures, it is impossible to completely eliminate the risk posed by dental aerosols, it is possible to minimize the risk with relatively simple and inexpensive precautions. The study reveals the existing practice situation of dental surgeons of Dhaka city about cross infection control especially dental splatter and aerosol. Dental health-care personnel, dental patients and their family members are at a risk to expose to contaminated diseases due to dental splatter and aerosols.

**Recommendations:**

- Awareness should be made among dental health care personnel and patient.
- Immunization.

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Table 2.7 shows that 75(71.4%), out of 105 dental surgeons used apron and only 3(2.9%) dental surgeons used appropriately designed aprons.

**Table-2.8: Distribution of the respondents by their Mask using practice.**

Mask using practice	Frequency	Percent (%)
Did not use	4	3.8
Used but not appropriately designed	92	87.6
Used appropriate mask	9	8.6
Total	105	100.0

Table 2.8 shows that 101(96.1%) out of 105 dental surgeons used face masks and only 9(8.6%) dental surgeons used appropriately designed face masks.

**Table-2.9: Distribution of the respondents by their Goggles using practice.**

Goggles using practice	Frequency	Percent (%)
Did not use	78	74.3
Used but not appropriately designed	25	23.8
Appropriate goggles used	2	1.9
Total	105	100.0

Table 2.9 shows that 74.3% respondents did not use goggles or eye protecting shields in their daily dental practice, whereas, only 1.9% used appropriate goggles.

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women and 72(53.30%) were men. The mean age of the dentists was 35.7±10.1 years. Nine dentists (6.70%) were specialists and 126(93.30%) were general dentists. The overall practicing was 11.5±9.7 years. As much as 29% of dentists expressed concern about the risk of cross-infection from the patients to themselves and their dental assistants. Forty three percent (43.0%) of the participants were able to define "cross-infection" correctly. The greatest majority (95.60%) of them stated that all patients had to be accepted as being infectious and universal precautions must applied to all of them. Ninety six percent (96.30%) of dentists preferred to use barrier techniques such as gloves, masks and protective spectacles. According to Al-Rabeah and Mohamed, 100% of dentists used gloves and 90% of them used masks while treating their patients.<sup>22</sup> Al Ruhaimi<sup>1</sup> stated that between 2% and 4% of dental professionals in Saudi Arabia never wore gloves when treating patients.<sup>23</sup> In another study, authors showed that about 90% of dentists in Kuwait wore gloves, 75% wore masks and 52% wore protective spectacles.<sup>24</sup> Treasure and Treasure showed that in New Zealand, 42% of dentists wore gloves, 64.8% wore masks and 66.4% wore protective spectacles.<sup>25</sup> McCarthy and MacDonald showed that 91.8% of dentists in Ontario, Canada always wore gloves, 74.8% always wore masks and 83.6% always wore protective spectacles.<sup>26</sup> Ninety two percent (91.90%) and 88% of the participants attributed importance to HIV and Hepatitis B-C viruses, respectively. Dentist participated had inadequate knowledge about microorganisms which were very important for dental practice.<sup>26</sup> In this study, 80% of dentists preferred to clean hand pieces by wiping them with disinfectants but only 17.8% of them stated that they preferred autoclave for sterilize hand pieces.

Some of the others showed that 94% of dentists in Kuwait used autoclave to sterilize handpieces.<sup>24</sup> Kurdy and Fontaine showed that 30% of dentists in Saudi Arabia had sterilized hand pieces with autoclave and 90% of them autoclaved their instruments at the end of the day.<sup>27</sup> Al-Rabeah and Mohamed stated that 37.90% of dentists autoclaved handpieces.<sup>22</sup> According to Miller, the most common reason for not sterilizing hand pieces is the fear of damage to the equipment.<sup>28</sup>

Disposable syringes and needles, scalpel blades and other sharp items must be gathered in appropriate puncture-resistant containers. In previous studies, 72.17%<sup>23</sup> and 56.20%<sup>26</sup> of dentists used puncture-resistant containers and 37.80%<sup>21</sup> of participants reported to use puncture-resistant containers to discard sharp items.

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