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Research Article

**KNOWLEDGE, ATTITUDE AND HABITS OF DENTAL PRACTITIONERS IN ISLAMABAD AND RAWALPINDI REGARDING DIFFERENT FACE MASKS DURING THE COVID-19 PANDEMIC**

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**Abstract:**

**Objective:** To assess the knowledge, attitude and practices of dental practitioners relating to different face masks and N 95 respirators.

**Study design and setting:** This cross-sectional study was conducted in the twin cities of Islamabad and Rawalpindi from April to September 2020.

**Methodology:** Dental practitioners whether in Government or private institutes and those in private practices were included in the questionnaire. Data was collected through non-probability, convenient sampling technique. The data was obtained using a self-administered close-ended questionnaire. Frequencies were calculated. The data was analyzed using SPSS version 23.

**Results:** A total of 300 practitioners were included in this study. Among the participants, 64% were male and 36% were female. Participants had insufficient knowledge about the different properties of various face masks. Based on the results, 64% of the respondents were ready to be trained for learning details about the different face masks to be used in different clinical scenarios. Data showed unsatisfactory results as regards adequate knowledge about the properties of different face masks and respirators.

**Conclusion:** Although the overall attitude of the dental practitioners regarding face masks was favorable, yet the level of knowledge as well as practice regarding respirators was found to be inadequate and a large percentage (85%) recognized the need for the introduction of the formal training among dental professionals for this essential personal protection standard.

**Keywords:** Knowledge, Attitude, face masks, habits, respirators, N 95 mask, Dental practitioner, Practice

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**INTRODUCTION:**

A face mask is an equipment that covers one's face and reduces the wearer's exposure from aerosol spray and macro-debris such as splashes and sprays from body fluids and machine lubrication/ irrigants. It also protects others from the wearers' respiratory emissions. Appropriate personal protective equipment should be worn when providing routine care for a patient.<sup>1-3</sup> Concerns have been raised about the possible spread of respiratory infections via aerial route.<sup>1,4-9</sup> Data about the effectiveness of the surgical mask compared with the N95 respirator for protecting dental practitioners against Covid-19 is sparse. Given the fact, that N95 respirators were in short supply during the CoViD-19 pandemic and not available in many countries, yet considered the standard protection, hence knowing the effectiveness of the surgical masks and respirators is of utmost public health importance.

American Society for Testing and Materials (ASTM) classification was used to set the bench mark for various face masks. ASTM International tests products to improve quality and safety. It defines more than 12,500 international standards across a wide variety of services and industries, including barrier protection standards for medical masks.

**METHODOLOGY:**

Dental practitioners whether in Government or private institutes and those in private practices were included in the questionnaire. Data was collected through non-probability, convenient sampling technique. The data was obtained using a self-administered close-ended questionnaire. Frequencies were calculated. The data was analyzed using SPSS version 23. There are the three levels of ASTM barrier protection:

**Level 1** Low barrier protection for general use for low-risk, nonsurgical procedures and exams that do not involve aerosols, sprays and fluids. An ear loop mask is a level 1 mask. ASTM level 1 masks are the general minimum standard for both surgical and procedural use.

**Level 2** Moderate barrier protection for low-to-moderate levels of aerosols, sprays and fluids.

**Level 3** Maximum barrier protection for any situation that has the potential for exposure to heavy levels of aerosols, sprays and fluids. Cardinal Health recommends this level as a best practice for supporting or safety initiatives.

**The "4 F's" of mask selection**

Ms. Angela Maxwell, RN; Senior consultant for clinical operations at Cardinal Health and Tricia L. Boring, RN; Assistant nurse manager of the operating room at Fredericksburg, Va. - based Mary Washington Hospital, discussed American Society for Testing and Materials medical mask protection standards and how to select the right mask based on the following criteria<sup>18</sup>:

1. **Filtration** When smoke is present or when interacting with a tuberculosis-infected patient, use a high filtration mask (N95 respirator).
2. **Fluid resistance:** Choose a fluid-resistant mask when there is any chance of blood or other bodily fluid splatter. ASTM level 3 surgical masks are recommended.
3. **Features:** Always use a level 3 surgical mask with ties in surgical settings. Anti-fog film, foam and tapes reduce fogging issue distractions, and shields and protective eyewear keep eyes clear of blood and splash.
4. **Fit:** Even the correct mask could put clinicians at risk if it is not worn correctly. The nose and mouth must be completely covered and create a seal around the face to prevent gaps that increase the risk of inhalation exposure.



**Fit testing N95 mask with qualitative solution**

A Surgical mask is typically made up of non-woven fabric. It filters out large particles in the air. It may protect others by reducing exposure to the saliva and respiratory secretions of the mask wearer. It is the loose-fitting disposable mask that covers the nose and

mouth of a wearer. Surgical Mask comes in 3PLY resistance ASTM level (1-3), the higher the number the more resistance to penetration my air-borne droplets/ aerosols etc.

During the Covid-19 pandemic, different types of face masks were used due to shortage of surgical masks and N-95 respirators.<sup>1</sup>

**N95 respirator** is composed of melt-blown non-woven fabric. Respirators are tight fitting face coverings that are designed to reduce the wearers exposure to respiratory contaminants. It can filter out both large and small particles when the wearer inhales. As the name indicates, the mask is designed to block 95% of very small particles i.e. 0.3micron-1micron. Valves (if present) make it easier to breathe through.

However, with valved masks, unfiltered air is released when the wearer exhales. As such, this type of mask does not prevent the wearer from spreading the virus if they are infected.

**RESULT:**

Approximately, two hundred and twenty-five (75%) of dental practitioners have recommended N95 masks with valve, forty-five (15%) recommended N95 without valve, fifteen (5%) carbon masks and fifteen (5%) surgical masks.

(36%) were aware of the basic and most important properties of N- 95 masks – (80% or more correct answers).

(42%) got their answers partially right (60-79% right answers)

(22%) got their major answers wrong (1-59% right answers)

Attitude of dental practitioners		
Questions	Answer options	Answer percentages
Interested in learning about different face masks?	Yes	86
	No	14
Training should be given for proper use of respirators and face masks?	Yes	85
	No	15
N-95 respirators should be present in dental offices/ institutes at all times?	Yes	100
	No	Nil
Face masks and respirators should be checked regularly for expiry dates?	Yes	100
	No	Nil
Dentists should hesitate in giving treatment to patients during pandemic	Yes	64
	No	36

Knowledge		Response percentage
Meaning of N 95	Correct answer	40
	Wrong answer	60
Difference between different face masks	Correct answer	33
	Wrong answer	67
Meaning of ASTM and it's purpose	Correct answer	32
	Wrong answer	68
Can N 95 masks be re-used	Correct answer	90
	Wrong answer	10
Are valved masks advantageous over non-valved masks in terms of protection?	Correct answer	34
	Wrong answer	66
Filtration difference between masks	Correct answer	65
	Wrong answer	35
Mask selection criteria	Correct answer	40
	Wrong answer	60
Fit-check for different masks	Correct answer	49

	Wrong answer	51
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**DISCUSSION:**

There was a higher male participation in our study (64%) compared with female participation (36%). This finding can be attributed to the higher percentage of male practitioners practicing dentistry after regular hours (9 to 3) despite more females being enrolled in dental schools. In this study, 64.7% of participants obtained an overall moderate-to-poor score regarding the correct usage of a surgical face mask. This low knowledge and practice may be because of lack of enough education lacking in the scheme of studies at undergraduate level and partially because of the sudden/ emergency nature of the pandemic.




The primary purpose of facemasks is reduce or prevent aerosol cross-contamination. Regular/surgical face-masks have different filtration efficiency; based either on ASTM or Cross-tex guide or such other Internationally approved system. The higher ASTM level masks filter air-borne particles better. Cloth face masks are effective in reducing virus transmission from the wearer to the general public and vice versa when they are fabricated from the optimal material and fitted properly. It is a common mis-conception that valved-masks are better. This is wrong considering that the valve makes breathing easier for the wearer, but in doing so, also provides a portal from air escape and possible cross-contamination from the wearer if they are infected. As such these masks are not recommended in surgical situations or in closed-quarters with-out efficient ventilation or negative-

pressure systems installed. Many factors contribute to the incorrect wearing of face masks; including the design of masks which relies on tight elastic straps [19]. Elastic straps in combination with a tight fit may result in face pain behind the ears or other contact points<sup>19</sup> To relieve such pressure, practitioners can opt for using “ear-saver” clips and/ or facemasks with over-head loops.

The article offers evidence in favor of propagating awareness of proper use of face masks and respirators to reduce community transmission of air-borne diseases. Non-medical masks use materials that obstruct droplets of the necessary size <sup>(10-16)</sup>; non-medical masks have been effective in reducing transmission of influenza; and places and time periods where mask usage is required or widespread have shown substantially lower community transmission. Health care management authorities should also convey clear instructions to the general public as well as medical/ dental practitioners for the manufacture, use, and sanitization or re-use of face masks, as well as consideration for their distribution as stocks permit. Surgical masks have been distributed in a variety of countries (South Korea, Taiwan) since the beginning, while cloth masks are now being distributed to the entire population of Japan, Singapore, and Belgium. Clear and actionable recommendations will aid in enforcement and get communities closer to the target of reducing and eventually eliminating COVID-19 transmission.

## Understanding Mask Types

ADA

	 SURGICAL MASK	 N95 MASK*	 N95 EQUIVALENT MASK KN/KP95, PFF2, P2, DS/DL2, KOREAN SPECIAL 1ST*
<b>Testing and Approval</b>	Cleared by the U.S. Food and Drug Administration (FDA)	Evaluated, tested, and approved by NIOSH as per the requirements in 42 CFR Part 84	FDA Emergency Use Authorization (EUA)
<b>Sizing</b>	No	Yes. The sizing differs with each mask model. Some of the sizing options include small, small/medium, medium, medium/large, and large.	Yes. The sizing differs with each mask model. Some of the sizing options include small, small/medium, medium, medium/large, and large.
<b>Intended Use and Purpose</b>	Fluid resistant and provides the wearer protection against large droplets, splashes, or sprays of bodily or other hazardous fluids. Protects the patient from the wearer’s mask emissions	Reduces wearer’s exposure to particles including small particle aerosols and large droplets (only non-oil aerosols).  OSHA recommends certifying the authenticity of masks to insure they provide the expected protection.	Reduces wearer’s exposure to particles including small particle aerosols and large droplets (non-oil aerosols).  Manufactured in compliance with standards of other countries and considered equivalent to NIOSH approved N95 masks.  Authorized manufacturers are listed at: <a href="https://www.fda.gov/media/136663/download">https://www.fda.gov/media/136663/download</a>

ASTM Minimal Barrier Standard	Level 1	Level 2	Level 3
“Bacterial Filtration Efficiency” (BFE)	≥95	≥98	≥98
Sub-micron “Particle Filtration Efficiency” (PFE)	≥95	≥98	≥98
Differential Pressure	≥4.0	≥5.0	≥5.0
Fluid resistance to penetration pressure by synthetic blood (mm Hg)	80	120	160
Flame spread	Class 1	Class 1	Class 1

MASK ECONOMICS	<<FILTRATION SCALE >>	N 95	<i>Choose the right mask for the job</i>
		Level 3 (ULTRA)	
		Level 2 (PROCEDURAL)	
		Level 1 (ISOFLUID)	
<i>Crosstex Mask Economics® Filtration Guide</i>			

**CONCLUSION:**

The knowledge, attitude, and practice among dentists as regards the use of surgical face masks was found to be inadequate. The participants had a positive attitude but moderate-to-poor level of knowledge and sub-standard practice/ habits regarding the use of surgical face masks and respirators. Health-care workers and general public awareness campaigns regarding the proper use of face mask by utilizing social media and general public notice and formal training of dental practitioners would be helpful during to reduce the spread of this pandemic.

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