

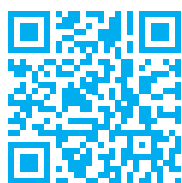
KNOWLEDGE AND PRACTICES ABOUT MOUTH MASKS AMONG DENTAL STUDENTS IN CHENNAI CITY - A CROSS SECTIONAL DESCRIPTIVE STUDY

Dr.Vinita Mary. A, Dr. Kesavan.R , Teenu Lakshmi. V, Thamilazhagi. S, Vaishnavi. K

Department of Public Health Dentistry,
Thai Moogambigai Dental College and Hospital, Chennai, Tamilnadu, India.

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Website: jidam.idamadrass.com



Address for correspondence:

Dr. A. Vinita Mary, MDS,
Professor,
Department of Public Health
Dentistry,
Thai Moogambigai Dental College
and Hospital
Chennai, Tamilnadu, India
E-mail: viniebe@gmail.com

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ABSTRACT

BACKGROUND: A surgical facemask plays an important role in every procedure among dental health care professionals. It acts as a barrier to prevent transmission of pathogens, infected water aerosols and many microorganisms produced in the dental setup. In order to minimize the risk of infection, dental practitioner and clinical auxiliary staff must wear suitable fluid resistance mask. This study was conducted to check the knowledge, attitude and awareness of mouth mask among dental professionals.

MATERIALS AND METHODS: A cross sectional study was conducted between July-Sep 2019 among the postgraduates, interns, undergraduates (3rd and 4th year) of two randomly selected private dental colleges in Chennai. A pilot study was conducted to evaluate their understanding of the questions. Set of 25 closed questioners were given to the participants as a survey form. Data was collected and statistical analysis was done using SPSS.

RESULTS: It was observed that 57.5% (195) had answered correctly that mouth mask should be used with white side facing in; 52.2% (177) had answered correctly that masks have three layers; 26.8% had answered correctly that masks can be used for maximum of 8 hours; 66.7% agreed that wearing mouth masks decreased post-operative wound infections and these findings were statistically significant. When it was asked which layer acts as a filter media barrier, 64.3% (218) had answered correctly i.e. middle. When it was asked what type of mask they preferred in dental setting, only 30.1% (102) had answered correctly as 95% BFE and PFE.

CONCLUSION: The risk of health care associated infections and its transmission not only involved the people who are in direct contact with the patients but also those who work in such environment. Thus, it is necessary to improve awareness among dental professionals regarding its proper usage.

KEYWORDS: Mouth mask, infection control, survey, dental professionals, pathogens.

INTRODUCTION:

In dentistry, there is constant exposure to various blood borne and upper respiratory pathogens through blood, saliva and various other body fluids. Microorganisms can easily spread in closed spaces such as dental operatories, where every procedure performed in the oral cavity of a patient contaminates not only the instruments used in the treatment but also the hands of the dentist, objects and surfaces of the dental unit. The main route for infection is by aerosols and splatter production, which are produced by use of airtors, micromotor hand pieces, air water syringes, and ultrasonic scalers. It can also be transmitted indirectly either through contaminated needle stick injury or improper handling and contact with unsterilized instruments. Exposure to blood borne pathogens can be from patients suffering from HIV (Human immune deficiency virus), hepatitis B, hepatitis C, HSV (Herpes simplex virus), tuberculosis, SARS (Severe acute respiratory syndrome), type I and II streptococcus, staphylococcus and other infectious agents^{1,2}.

The guidelines related to infection control measures in dental set up have been regularly updated and latest was made available by the Centers of Disease Control (CDC) in March 2016. According to these guiding principles of CDC, it is mandatory to wear face masks, eyewear, gloves, properly disinfected clothes as well as use adequate high-speed suction while using high and low speed rotary instruments².

In order to minimize the risk, dental operating personnel are required to follow accepted infection control practices. One of the infection control measure is the routine use of face masks. Therefore, dental practitioners and clinical auxiliary staff must wear suitable fluid resistant mask that block particles of 3 microns or less in size. Most masks feature pleats/folds, commonly three pleats are used allowing the user to expand the mask, so that it covers from nose to chin. However, there is evidence which shows that the DHCPs (Dental Health Care Professionals) have an inadequate knowledge, negative attitude and poor practice regarding the infection control measures³.

The purpose of this study was to investigate knowledge and awareness about mouth mask among faculty members, postgraduates, interns and undergraduates (III and IV year) students. The new

evidence will provide educational interventions to improve the attitude and practices among DHCPs.

MATERIALS AND METHODS:

A descriptive cross-sectional study was conducted between July-Sep 2019 among the undergraduates (3rd and 4th year), interns and postgraduate students of two randomly selected private dental colleges in Chennai. All the study subjects present on the day of data collection were included in the study. Those who were absent on that day were excluded from the study. Initially the questionnaire was distributed to a group of ten dental students as a pilot study to evaluate their understanding of the questions. After student's feedback, amendments were made to the questionnaire. The students were approached after obtaining the necessary permission from the head of the institution. The nature and purpose of the study was explained to them and informed written consent was obtained prior to the inception of the study. All the participants in the study completed a paper-based questionnaire consisting of 25 closed ended questions. First part of the questionnaire consisted of demographic details of the subject, their academic year and specialization (if any). The second part of the questionnaire assessed their knowledge and awareness about mouth mask. The information obtained during the data collection was strictly kept confidential.

Data was collected and statistical analysis was done using SPSS. Descriptive statistics with frequency, percentage, means and standard deviation was computed.

RESULTS:

The age of participants ranged from 20 to 30 years with the mean value of 22.79 ± 1.84 . One twenty-seven participants (37.5%) were male and two hundred and twelve participants (62.5) were female. 46 participants (13.6%) were 3rd year students, 100 participants (29.5%) were 4th year students, 132 participants (38.9%) were interns and 61 participants (18.1%) were the postgraduate students.

Table 1: Knowledge and Practices regarding mouth mask use among study participants

Question	Options	Frequency	%	p value
Which is the correct way of using mouth mask by a dentist	White side facing out	144	42.5	0.006*
	White side facing in	195	57.5	
How many layers are there in a mask	Two	87	25.7	0.000*
	Three	177	52.2	
	Four	45	13.3	
	Don't know	30	8.8	
Which layer acts as filter media barrier	First layer	75	22.1	0.000*
	Middle layer	218	64.3	
	Last layer	46	13.6	
What type of mask is preferred in dental setting	95%Bacterial Filtration Efficiency (BFE)and Particulate Filtration Efficiency(PFE)	102	30.1	0.000*
	97%BFE and PFE	124	36.6	
	91%BFE and PFE	63	18.6	
	99%BFE and PFE	50	14.7	
How long can you wear a surgical mask	Maximum 8hr	91	26.8	0.000*
	Maximum 4hr	163	48.1	
	Maximum 2hr	60	17.7	
	Maximum 1hr	25	7.4	
Do you think surgical facemasks used in dentistry are certified respirators	Yes	181	53.4	0.212
	No	158	46.6	
Which level of mask you should wear during hand instrumentation	Level 1 mask	131	38.6	0.000*
	Level 2 mask	164	48.4	
	Level 3 mask	44	13	
Which level of mask you should wear while exposing radiographs	Level 1 mask	79	23.3	0.000*
	Level 2 mask	164	48.4	
	Level 3 mask	96	28.3	
Which level of mask you should wear during ultrasonic scaling	Level 1 mask	53	23.3	0.000*
	Level 2 mask	137	48.4	
	Level 3 mask	149	28.3	
Level 3 mask should be used for	Sealants	38	11.2	0.000*
	Surgical procedures	236	69.6	
	Brief examination	65	19.2	
Do you think wearing surgical mask decreases post-operative wound infections	Yes	226	66.7	0.000*
	No	113	33.3	
How much are you concerned about contact infections during treatment	Not concerned	60	17.7	0.000*
	Somewhat concerned	152	44.8	
	Very concerned	127	37.5	
Are you aware of contact dermatitis caused by surgical mask	Yes	199	58.7	0.001*
	No	140	41.3	

During which procedure you do not like to wear mouth mask	During examination	95	58.7	0.000*
	On exposing radiographs	147	41.3	
	Impression making	75	22.1	
	Any other (please mention)	22	6.5	
Which type of mask do you prefer	Disposable with rubber bands	171	50.4	0.000*
	Disposable with long ties	154	45.4	
	Washable or reusable	14	4.1	
Do you prefer wearing mouth mask in public places	Yes	182	53.7	0.175
	No	157	46.3	
Do you feel comfortable wearing mouth mask for long hours	Yes	136	40.1	0.000*
	No	203	59.9	
Do you prefer changing your mouth mask for every patient	Yes	209	61.7	0.000*
	No	130	38.3	
Do you prefer wearing colorful masks for attracting pediatric patients	Yes	227	67	0.000*
	No	112	33	
During dental procedure, if there is a need to talk to the patient, will you remove your mask	Yes, I will remove and change my mask	90	26.5	0.000*
	Yes, I will remove but I will not change my mask	178	52.5	
	No, I will not remove my mask	71	20.9	
Do you feel difficulty in breathing while wearing a mouth mask	Yes	196	57.8	0.004*
	No	143	42.2	
Do you immediately dispose your mask after completing the treatment	Yes	119	35.1	0.325
	No, after an hour	120	35.4	
	No, at the end of the day	100	29.5	
In which color bag will you dispose your mask	Red plastic bag	62	18.3	0.000*
	Yellow plastic bag	174	51.3	
	Blue plastic bag	66	19.5	
	Black plastic bag	37	10.9	
For how long do you wear a mask	Maximum 1 hour	107	31.6	0.000*
	Maximum 2 hours	167	49.3	
	More than 2 hours	65	19.2	
To which extent of your nose do you wear the mouth mask	1/3 of your nose	73	21.5	0.000*
	2/3 of your nose	164	48.4	
	Covering the full nose	91	26.8	
	I don't cover my nose at all	11	3.2	

* Highly Significant
Pearson's Chi-Square Test

When the study population was asked about the right way of using mouth mask, 57.5% (195) had answered correctly i.e. white side facing in and it was significant statistically ($p=0.006$). When it was asked about the number layers in the mask 52.2% (177) has answered correctly i.e. three layers in a mask and it was significant statistically ($p=0.000$). When it was asked which layer acts as a filter media barrier, 64.3% (218) had answered correctly i.e. middle. When it was asked what type of mask they preferred in dental setting, only 30.1% (102) had answered correctly as 95% BFE and PFE. When the question was asked about how long can you wear a surgical mask, only 26.8% (91) had answered correctly i.e. maximum 8 hours, while the rest had answered incorrectly and it was significant statistically ($p=0.000$). When it was asked whether the surgical facemask used in dentistry were certified respirators, 46.6% (158) had answered correctly i.e. no and it was not significant statistically ($p=0.212$). When asked about which level of mask you should wear while exposing radiographs 23.3% (79) had answered correctly, level 1 mask. When the study population was asked about which level of mask you should wear during hand instrumentation, 48.4% (164) had answered correctly i.e. level 2 masks. When it was asked about which level of mask you should wear during ultrasonic scaling 44% (149) had answered correctly, level 3 mask and when asked for what procedure level 3 mask should be used for, 69.6% (236) had answered correctly, surgical procedures. The study population was asked whether they think wearing surgical mask decreases post-operative wound infections 66.7% (226) had answered correctly, and it was significant statistically ($p=0.000$).

When the study population was asked how much are they concerned about contact infections during treatment 37.5% (127) were very concerned, 17.7% (60) were not concerned. When it was asked that are you aware of contact dermatitis caused by surgical mask, 58.7% (199) were aware of contact dermatitis. When the study population was asked during which procedure you do not like to wear mouth mask 28% (95) had said during examination, 43.4% (147) had said while exposing radiographs, 22.15% (75) while making impressions, 6.5% (22) other procedures, and it was significant statistically ($p=0.000$). When it was asked which type of mask they prefer, 50.4% (171) preferred disposable with rubber bands, 45.4% (154) preferred disposable with long ties, 4.1% (14)

preferred washable or reusable.

When it was asked, do they prefer wearing mouth masks in public places, 53.7% (182) had said yes and it was not significant statistically ($p=0.175$). When the study population was asked do they feel comfortable wearing mouth mask for a long time, rest 59.1% (203) answered no. When the study population was asked, do they prefer changing mouth mask for every patient 61.7% (209) said yes. When the study population was asked do, they prefer wearing colorful mask for attracting pediatric patients 67% (227) said yes and it was significant statistically ($p=0.000$). When the study population was asked during dental procedures, if there is a need to talk to the patient, will they remove their mask 26.5% (90) said yes, they will remove and change the mask, 52.5% (178) said yes, they will remove but they will not change the mask, 20.9% (71) said no. When it was asked, do they feel difficulty in breathing while wearing the mouth mask, 57.8% (196) said yes and it was significant statistically ($p=0.004$). When asked do they immediately dispose the mask after completing the treatment, 35.1% (119) said yes, 35.4% (120) said no, after an hour, 29.5% (100) said no, and it was not significant statistically ($p=0.325$). When asked about the disposal of mouth mask 51.3% (174) had answered correctly, yellow plastic bag, and it was significant statistically ($p=0.000$). When the study population was asked for how long do, they wear a mask, 31.6% (107) said maximum 1 hour, 49.3% (167) said maximum 2 hours, 19.2% (65) said more than 2 hours and it was significant statistically ($p=0.000$). When the study population was asked to which extent of the nose they wear their mouth mask, 21.5% (73) said till 1/3rd of their nose, 48.4% (164) said till 2/3rd of their nose, 26.8% (91) said covering their full nose, 3.2% (11) said that they don't cover their nose at all and it was significant statistically ($p=0.000$).

DISCUSSION:

A descriptive cross-sectional study was conducted to assess the knowledge and awareness about mouth masks among dental students in Chennai. In the present study 57.5% were aware of the correct way of using mouth mask which was almost similar compared to the study done by St. Paul 3M occupational health and environmental safety division, in which it was 56.1%⁷. Also, the knowledge

about layer acting as filter media barrier was similar among both the populations being 64.3% in the present study and 63.7% by St. Paul 3M occupational health and environmental safety division⁷. In this study we also asked about the different levels of mouth mask and its applications during dental procedures, 23.3% had answered correctly that level 1 mask should be worn while exposing radiographs, 48.4% had answered correctly that level 2 mask should be worn during hand instrumentation, 44% had answered correctly that level 3 mask should be worn during ultra-sonic scaling and 69.6% had answered that level 3 mask should be used for surgical procedures which was almost similar when compared to the study done by Kandis V Garland¹ in 2018 about what level of mask should dental hygienists use? In the study by Faisal M Al Badri about current allergy and clinical immunology in the year 2017, 59.6% were aware of contact dermatitis caused by surgical mask which is similar to the present study; 58.7%. On comparing both the studies the difference was only 1%; even after two years of contact dermatitis survey, 40% were still not aware of it. This shows that epidemiology of occupational skin diseases due to masks is not well documented and studies addressing these topics are rare^{6,14}.

However, there was marked difference in knowledge regarding the number of layers viz. 52.2% in the present study population and 70.1% in the study by St. Paul 3M occupational health and environmental safety division⁷ and the type of mask preferred in dental setting i.e. one with 95% Bacterial Filtration Efficiency (BFE) and Particulate Filtration Efficiency (PFE) viz. 30.1% in the present study population and 71.2% in the study by St. Paul 3M occupational health and environmental safety division⁷. The difference may be due to lack of exposure to theoretical knowledge about the specifications of masks in the present population. Thus according to Adrian Wong⁵, dental practitioners are required to enhance their knowledge about the bacterial efficiency of the mask. Furthermore, the present study populations' knowledge regarding the maximum time duration for wearing a mask (i.e. 8 hours) was markedly low when compared to a study by Bageshri Gogate³ viz. 26.8% and 52.1%, respectively. Also, only 46.6% had answered correctly that face masks used in dentistry were not certified respirators and were inefficient to prevent

transmission of viruses.

The present study showed 66.7% were aware that wearing surgical mask decreased post-operative wound infections, which was much more when compared to the study done by Allyson Lipp in the year 2005 about disposable surgical face mask which was 30%⁴. This shows that knowledge and awareness about wearing surgical mask has increased in these many years by the dentists. When the participants were asked about in which color bag, they dispose their mouth mask 51.3% had answered correctly that they dispose their mouth mask in yellow-non chlorinated plastic bags.¹¹

In this study, questions were asked about their attitude towards the mouth mask, 48.4% had said that they covered their mask only till 2/3 of their nose, whereas the 3.2% didn't cover their nose. Only 26.8% covered their full nose with the mouth mask and thus it should be brought into the practice of every dentist to wear their mask covering the full nose, along with the infection control of the patients, the dentists should also be in a good state to prevent themselves from infections.⁴ Majority of the participants (49.3%) had said that they wore their mouth mask for maximum 2 hours and then disposed it, but still there were 19.2% who used their mask for more than two hours; wearing a mask for more than two hours may cause infection to the dentists as well as to the patient; so more studies and awareness should be imparted to the dentists to prevent transmission of diseases. In this study 29.5% had answered no to the question that they do not immediately dispose the mask after completing a patient. They said only at the end of the day they disposed their mask, whereas 35.1% had the habit of disposing the mask immediately after completing a patient. Immediate disposal of mouth mask will reduce the spread of infection to the patient as well as to the dentist; these practices should be practiced by every dentist in clinical practice that they should dispose the mask immediately after completing a patient².

When the question was asked whether they felt difficulty in breathing while wearing mouth mask, 57.8% had problem in breathing while wearing the mouth mask, which might be due to thick barriers provided by the manufacturing companies; the

manufacturing companies may further research to reduce the thickness of the layers of the mask, may be after doing so the dentist might feel comfortable in wearing a mouth mask. During dental procedures, if the dentist has a need to talk to the patient, 52.5% had answered that they removed their mask and talked and again wore the same mask, whereas only 26.5% had said that they removed and talked and disposed it immediately, but 20.9% had no habit of removing their mask while talking to the patient; this attitude should be changed that the mask should be removed by the dentist while talking to the patient, this would reduce the risk of infection from the patient to the dentist and also from the dentist to the patient³. In the case of pediatric patients, 67% of dentists used colorful masks to attract the pediatric patients and to make them cooperative, whereas the rest 33% has answered that they didn't use any colorful mask to attract the pediatric patients. Usually kids are attracted by colorful things and toys and thus mouth mask could play an important role as during the treatment the pediatric patients usually sees what the dentists is wearing and wearing a colorful mask will not only attract them but also sometimes it may make them cooperative towards the dental treatment¹².

In this study, 61.7% of the population had answered that they usually changed their mouth mask after every patient, but still there were nearly 40% who didn't change their mouth mask after completing a patient. A step towards to protect themselves from infection should always be a part of their practice and it should be changed because there are chances for the next patient to get infected by the previously used mouth mask for a patient and not only the patients but also the dentist could get infected. So, these kinds of practice should soon be implemented by all the practitioners to dispose the mask after completing every patient³. Most of the dentist and dental students had answered that they didn't feel comfortable wearing the mouth mask for a long period of time (59.9%). This issue can be sorted out only when the manufacture provides a thinner layer for the mask, or after every two hours of the treatment the dentist takes time to relax for about five to ten minutes and can change the mouth mask according to their comfort⁹. When the question was asked do the participants, whether they preferred wearing the mouth mask in the public places, like in polluted areas or in traffic, 53.7% has answered that they preferred wearing a mouth mask in such area to

prevent themselves from the smoke and the pollution. This habit can be practiced by every individual to protect themselves from the pollution which may lead to infections and respiratory problems and also government should take initiative in such activities^{10,8}.

Half of the participants of this study had answered that they preferred disposable mouth masks with rubber bands, whereas 45.4% had answered disposable mouth masks with long ties. The preference for disposable mouth masks with rubber band might be because they were easy to wear and easy to dispose and also, these were dependent on individual concerns and comfort¹³. In this study when the question was asked during which procedure they didn't prefer wearing a mouth mask, 43.4% had answered that while exposing radiographs they didn't feel it is necessary to wear a mouth mask and 28% answered while examination they didn't prefer using a mouth mask, 22.1% had answered while making an impression they didn't like to wear a mouth mask, whereas the remaining 6.5% has answered that there were other treatments during which they didn't feel it's necessary to wear a mask like during hand scaling and restorations. It is recommended that the mouth mask should be worn by the dentist for every treatment procedure and during every treatment¹⁵.

CONCLUSION:

The current results have important implications for public health as wearing face masks has become common protective measure. In the present day, the risk of health care associated infections and its transmission not only involved the people who are in direct contact with the patients but also those who work in such environment.⁸ Use of personal protective wear and its disposal must be followed by all those who work in dental environment. The fundamental reason for directing the wearing of face masks is to protect dental professionals from airborne pathogens and microorganisms.³ It is essential to study the degree of protection facemask provided to dental health care professionals which has been used as a preventive measure that defense against airborne pathogen transmissions.

Possible factors related to the protective efficiencies observed with face mask include the efficiency of penetration and fabrication materials having a characteristic particle loading. Face masks design and the performance can be enhanced by analytical models.

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CONFLICTS OF INTEREST:

There are no conflicts of interest.

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