

Assessment of knowledge, awareness and practices observed by dental undergraduates regarding the use of masks during covid-19 pandemic – A questionnaire study

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Abstract

The health care sector including the medical and dental health care providers, universities and research institutions around the world are significantly affected by the novel Coronavirus (COVID-19) pandemic. Dental professionals being in close proximity to the patients while conferring treatment are at a high risk of contracting the disease. As the dental students get introduced to the clinical phase of practical education, they are at an increased risk of exposure to the disease. Hence it is mandatory for proper knowledge instillation amongst the students with a standard operating procedure laid out for smooth functioning. A cross-sectional study was conducted among 180 undergraduate dental students in the clinical phase of dentistry (years 3 and 4). A pre-test close ended

questionnaire was constructed to acquire the pre-existing knowledge of the undergraduate students on the awareness and practices regarding the use of masks during the COVID-19 pandemic. Their responses were then collected and assessed, the students were then addressed with an educational presentation about the types, use and correct protocol for mask wearing and disposal, after a period of 7 days the post-test survey questionnaire was given to the students. Their responses were then compared with that of the pre-test to evaluate the change in their awareness and practices regarding the use of masks observed by them. All the analysis was performed using SPSS version 20. A p-value of <0.05 was considered statistically significant. The values were analyzed using McNemar’s Bowker test

to compare the pre and post values of each question. Significant improvement in knowledge, awareness in types of masks, function of respirator, duration of use, donning and doffing, disposal and sterilization of masks was observed. No statistically significant change was seen in relation to change, re-use and type of second mask used. The present study revealed that the knowledge, awareness and compliance of dental students about the usage of masks in the times of pandemic can be improved to meet the novel demands. The study also enhanced the fact that the constant education of the students and timely knowledge instillation and help cope with the demanding times and also prevent any inadvertent consequences.

Keywords: Assessment, COVID-19, Dental Undergraduates, masks.

Introduction

The health care sector including the medical and dental health care providers, universities and research institutions around the world are significantly affected by the novel Coronavirus (COVID-19) pandemic. The first wave of this pandemic affected various countries across the globe in the year 2020. Not only are we currently in the second wave of this pandemic that is affecting the nations across the world at a much higher magnitude and infectivity rate than the first wave, but also a third wave has been predicted in the near future. Dental professionals being in close proximity to the patients while conferring treatment are at a high risk of contracting the disease through direct salivary contact, blood or airborne droplets containing the infective agent or indirectly via contaminated objects during various dental procedures.[1]

To ensure good clinical practice with minimum cross contamination, health professionals should comply with a standard operating protocol to reduce the risk of contracting the infection through the use of protective barriers in each procedure, consisting in the use of scrubs,

gowns, disposable gloves, protective glasses and masks. [2,3]. These masks used must achieve efficient filtration, resistance to fluid and achieve a hermetic seal against the skin, preventing the passage of particles such as aerosols or splashes containing bacteria and viruses. A mask's quality certification for filtration efficiency is checked by qualitative tests for particulate filtration making them mandatory for effective prevention of infectious diseases. [3,4] As the students get introduced to the clinical phase of practical education, they are at an increased risk of exposure to the disease and also a potent source of transmission of the disease. Hence it is mandatory for proper knowledge instillation amongst the students with a standard operating procedure laid out for smooth functioning.[5] It is also of pertinent importance that the students be well prepared to carry out safe dental practice in the ongoing pandemic and also equip the future generation of doctors to confer treatments in the midst of a pandemic. Such surveys to check on the competence and knowledge of the students repeatedly, ingrains in them the same basic skill and expertise required to confront a novel pandemic in the future with ease. The objective of this study was to determine the level of knowledge, awareness and compliance of undergraduate students towards the use of masks in clinical scenarios.

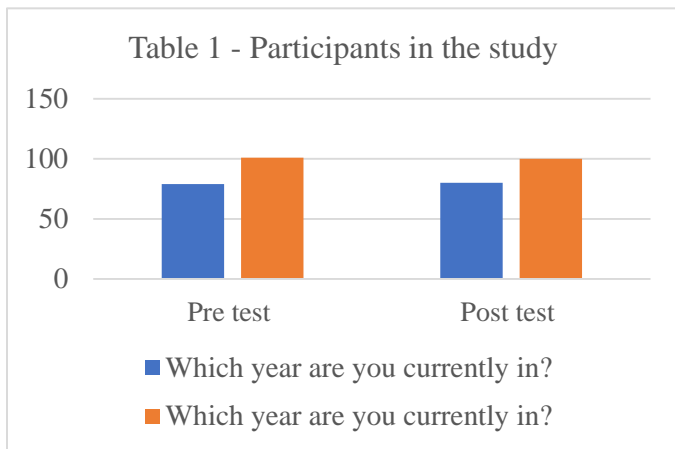
Materials and method

A cross-sectional study was conducted among undergraduate dental students (years 3 and 4) (n=180) to include dental undergraduates of the clinical phase of dentistry. A pre-test questionnaire was constructed to acquire the pre-existing knowledge of the undergraduate students on the awareness and practices regarding the use of masks during the COVID-19 pandemic. The questionnaire consisted of closed and open-ended questions. The responses (Table 1) were kept anonymous, and the identity of participant was not collected. Their

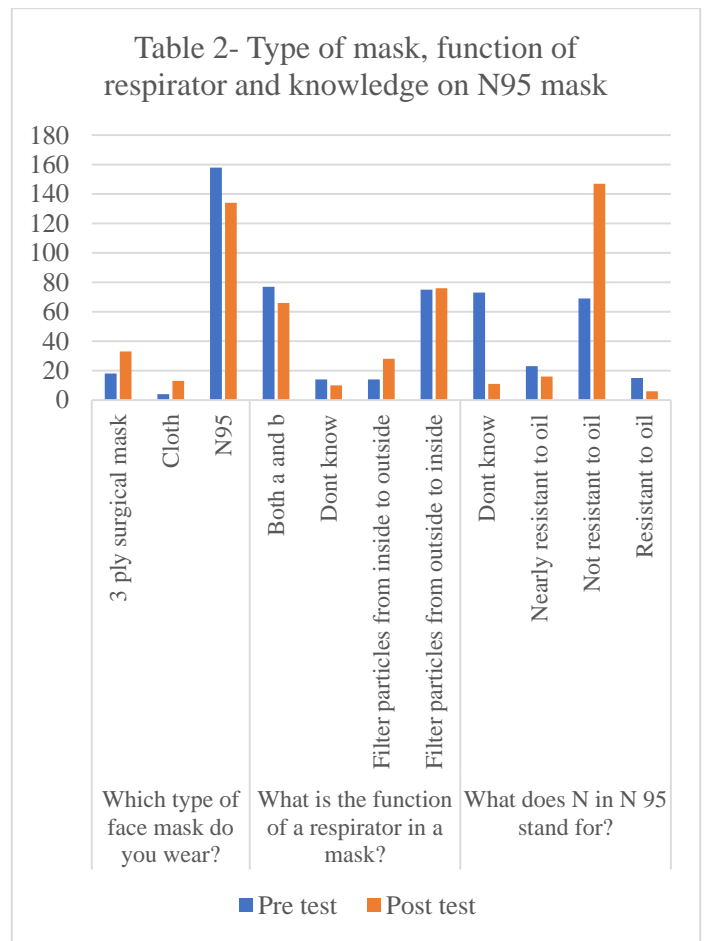
responses were then collected and assessed, the students were then addressed with an educational presentation about the types, use and correct protocol for mask wearing and disposal, after a period of 7 days the post-test survey questionnaire was given to the students. Their responses were then compared with that of the pre-test to evaluate the change in their awareness and practices regarding the use of masks observed by them. All the analysis was performed using SPSS version 20. A p-value of <0.05 was considered statistically significant. The values were analyzed using McNemar's Bowker test to compare the pre and post values of each question.

Results

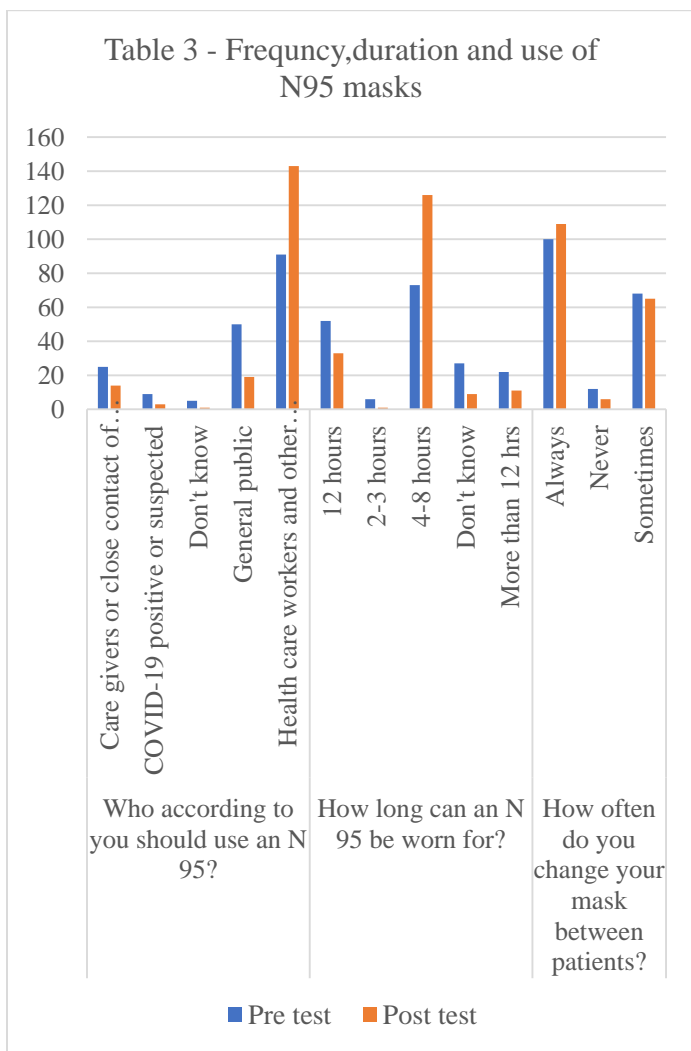
After data analysis using McNemar's Bowker test to compare the pre and post values of each question in SPSS version 20, the following results were obtained from our data



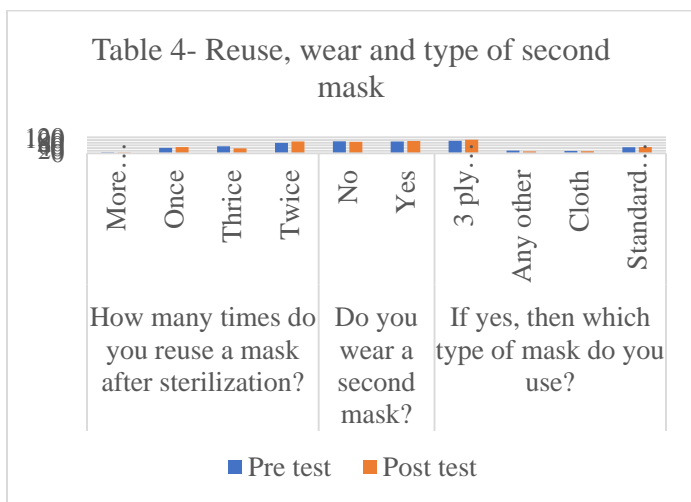
There were a total of 180 participants out of which 100 belonged to third year and 80 to fourth year dental undergraduate students (Table 1)



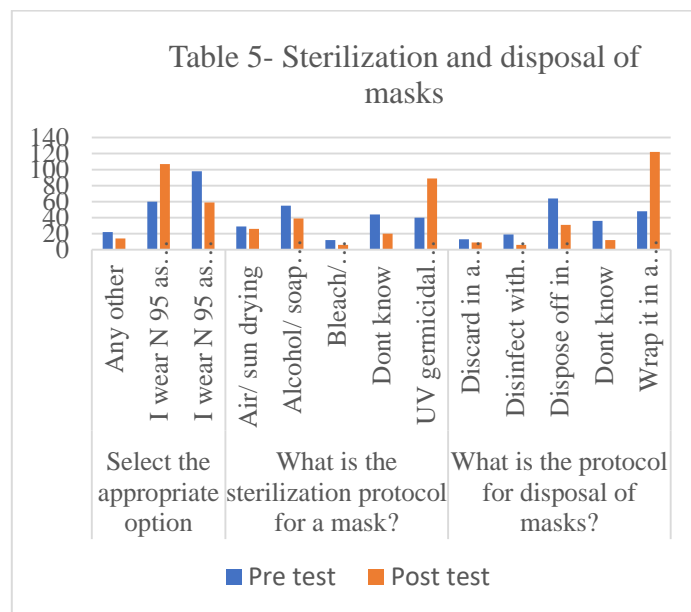
A statistically significant number (p<0.001) of students use an N95 mask as compared to other types of masks that are available. A significant improvement (p<0.001) in the knowledge of the students about the function of a respirator and N95 masks was seen post the intervention. (Table 2)



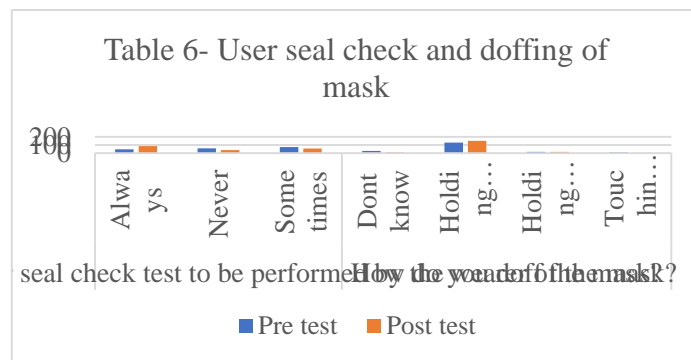
A statistically significant improvement ($p < 0.001$) was seen in the awareness regarding, who should use an N95 mask, duration of use of a N95 mask and the frequency in change of the mask in between patients. (Table 3)



No statistically significant difference seen in the knowledge of the reuse of the mask post sterilization, wearing of a double mask and the type of 2nd mask, among the undergraduate students. (Table 4)

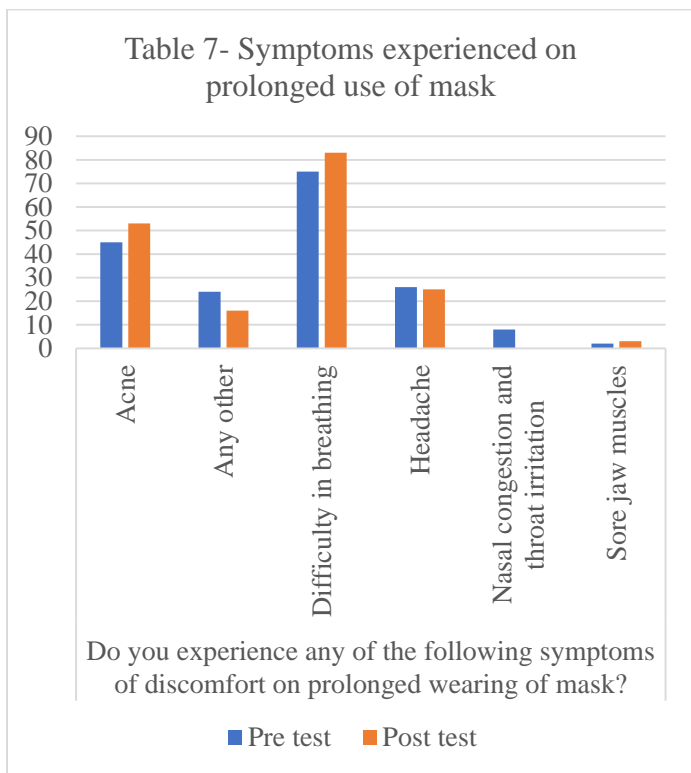


Shows that the students who wore double mask, used N95 as an inner mask. A statistically significant improvement ($p < 0.001$) was seen in the knowledge regarding the sterilization and disposal practice of the masks post our intervention. (Table 5)



A significant number of students were aware about the 'user seal check' of a mask and a statistically significant improvement in number of students who performed the 'user seal check' was seen post the intervention ($p < 0.001$). A statistically significant improvement in number of

students who correctly doff the mask was seen post our intervention ($p=0.002$). (Table 6)



A significant number ($p<0.001$) of students experienced a difficulty in breathing on prolonged wearing of a mask, other symptoms of discomfort were acne and headache. (Table 7)

Discussion

In these times of crisis, dentists have a high risk of contracting COVID-19 due to direct contact with body fluids during patient care. Therefore, the use of PPE is extremely important for the protection of dentists, with masks being an essential part for protection against the virus.

Commercially there are various types of masks available for use however the 3-ply surgical masks and N95 masks are recommended for use by dental health care professionals.

The American Society of Testing Materials (ASTM) rates masks on 3 type categories or levels as N, R and P based on the level of protection against oil aerosols (Not

Resistant, Resistant and Partially Resistant to oil) along with the filtration capacity of these masks as “95”, “99” and “99.7” (filter 95%, 99% and 99.75% of the particles respectively). [6,7]

The filtration capacity of the 3-ply surgical masks on the other hand is 80% which is less as compared to the N95. [6] In our study it is seen that a statistically significant number of students use an N95 mask as compared to a 3-ply surgical mask and are aware about the indication of who should use these N95 masks. A significant improvement in the awareness is seen in the post-test data analysis in the students about different types of masks and their identification.

According to the US Food and Drug Administration (FDA), the function of a respirator in the mask is to filter particles suspended in the air as it is inhaled by the individual. [8] In our study it is seen that there was significant improvement in the knowledge of the students about the function of a respirator post the intervention.

Owing to the global environmental crises and resource crunch in the current COVID-19 pandemic CDC recommends two conservation strategies for respirators which are extended use and limited reuse. [9,10] Surgical and respiratory masks are for single use per patient but however in this pandemic an alternative is the use of masks with multiple patients, [4,11] but keeping in mind the evaluation of mask integrity, seal during use and use of a second surgical mask on the respiratory mask to serve as direct protection against cross-contamination.

The second strategy of limited reuse adheres to the concept of duration for the use of surgical masks should not exceed 4 h and 8 h for FFP masks [11-13]. According to our data it is seen that the students comply to the above recommended CDC strategies and hence no statistically significant difference (p value >0.05) was found in relation to change, reuse, wear and type of second mask.

However, there was a statistically significant improvement ($p < 0.001$) with respect to the duration of use of N95 masks.

Following the appropriate steps in donning and doffing of protective masks is a crucial criterion in personal protection.

Donning includes, firstly secure the ties or elastic bands to the middle of the back of the head and neck, and then adjusting the band to the bridge of the nose, around the face and chin, this followed by checking the fit of the mask by performing a user seal check.

After use, the mask should be carefully doffed and disposed keeping in mind that the front of the mask will be contaminated and so should not be touched. The mask should be held by the ties or elastic bands and then removed upward without touching the front. The used masks are wrapped in a paper or tightly sealed plastic bag and discarded in the yellow/red bag followed by 20 seconds of hand wash. [14,15]

In this study a statistically significant improvement in the knowledge and awareness pertaining to the donning ($p < 0.001$), doffing ($p = 0.002$) and disposal of the masks ($p < 0.001$) was seen post our intervention.

Given the shortage of masks, sterilization and disinfection methods have been determined to prolong the effectiveness and increase the chances of usage of the masks for the prevention of virus transmission. The sterilization treatment should not deteriorate the material of the respiratory mask, which would decrease the filtering power against infectious pathogens is of prime importance. [16]

The CDC has recommended different sterilization and decontamination strategies, such as chemical, radioactive, and physical sterilization and sterilization by exposure to ultraviolet germicidal irradiation (UVGI), ethylene oxide, or vaporized hydrogen peroxide and gamma irradiation

has shown good disinfecting ability by penetration of all the layers of the respirators. According to literature the susceptibility of the virus to gamma irradiation has shown best disinfecting ability among all. [17] In our study it is seen that the knowledge related to the recommended method of sterilization for masks showed a statistically significant improvement ($p < 0.001$) after our intervention.

Also, in our study it was seen that a majority of the students experienced difficulty in breathing followed by acne on prolonged wearing of mask.

Conclusion

The use of N95 or FFP respirators is recommended as part of PPE for dental use during patient care. It is recommended to add a surgical mask together with the use of a face mask to N95 mask to additionally prolong the usage. The present study revealed that the knowledge, awareness and compliance of dental students about the usage of masks in the times of pandemic can be improved to meet the novel demands. The study also enhanced the fact that the constant education of the students and timely knowledge instillation and help cope with the demanding times and also prevent any inadvertent consequences.

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