Self-Reported Oral Health Outcomes after Mask-Wearing among Inland Empire Adults

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Introduction

Face masks are used to prevent the severe acute respiratory syndrome coronavirus type 2 (SARS-CoV-2) transmission in healthcare facilities and public settings. It has been one of the first recommendations that the Centers for Disease Control and Prevention (CDC) has been advocating in addition to social distancing and COVID-19 vaccination. Despite the strong benefits of mask wearing potential ***health-related side-effects*** have been brought to attention.

Several studies have shown that prolonged wearing of masks may cause,

- ❑ Blood-oxygen depletion and symptoms of fatigue
- ❑ Headache
- ❑ Concentration problems
- ❑ Breathing difficulties
- ❑ Increase in facial skin temperature

The ***potential oral side effects*** caused by face masks have not been extensively studied. A recent study by Kanzow and colleagues reported that the use of face masks increased the perception of dry mouth and halitosis. Pinzan-Vercelino and colleagues showed that with the use of masks, toothbrushing frequency decreased, and people were significantly less concerned about oral hygiene nor inclined to visit the dentist.

Considering the ***limited information*** on the effect of prolonged mask wearing on potential oral side effects, the ***objective*** of this cross-sectional study was to evaluate whether extensive wearing of masks may have potential negative effects such as dry mouth, halitosis, and overall decline in personal daily oral hygiene in adults residing in the Inland Empire of Southern California. Additionally, we aimed to evaluate the effect of time of mask wearing on perceived

We ***hypothesized*** that longer duration of mask wearing would be associated with a statistically significant decrease in personal oral hygiene care, and with an increase in self-perceived halitosis and xerostomia.

The results will be ***significant*** in guiding comprehensive preventive and therapeutic strategies in relation to oral health care in a multidisciplinary approach.

Methods

The study was approved by the Institutional Review Board for a cross-sectional study (#5210429). The survey was developed by the investigators and comprised of a total of 17 questions.

- ❑ Demographics (N=6)
- ❑ Oral healthcare habits (N=3)
- ❑ Duration and types of masks used (N=2)
- ❑ Self-perceived symptoms and dental visit attitudes (N=6)

Responses to questions on self-perceived mouth dryness, bad breath, change in oral health care habits, and inclination to see a dental professional were on a 5-point Likert scale from strongly agree to strongly disagree.

The ***Inland Empire*** in Southern California is comprised of San Bernardino and Riverside County. Investigators recruited adults 18 years and older from Victorville, Ontario, Fontana, Colton, Loma Linda and Redlands. Subjects were contacted in shopping centers and parks and asked whether they would consent to complete the survey. Surveys were distributed as hard copies and data entered into an excel spreadsheet.

The ***Chi-square test*** was used to test the hypotheses and significance level set at α=0.05.

Results

Out of a total of 207 adults that were approached 147 participated in the study (Response rate: 71%).

Demographics

A. Location: Participants were recruited evenly from all six cities (20-24 per city).

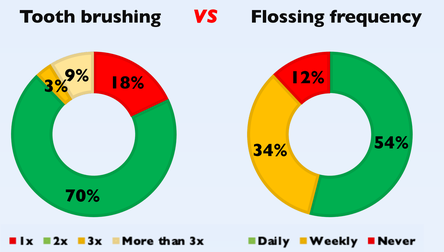
B. Gender: Two thirds of participants were female (N=95) and one third were male (N=52).

C. Age : Age was categorized into four: 18-30 years (N=53); 31-45 years (N=42); 46-59 years (N=19; 60 and above (N=33).

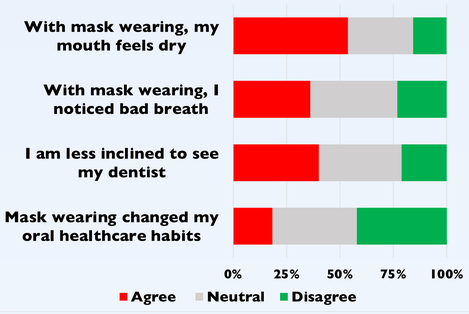
D. Ethnicity: The ethnicity distribution aligned with the distribution of the Inland Empire. Approximately half of the participants were Hispanic/Latino (N=71) followed by White/Caucasian (N=38), Black/African American (N=20), and Asian/Pacific Islander (N=12).

E. Education: The educational level ranged from less than High School to graduate degrees. Many participants responded that they have some college education (N=59).

Oral Healthcare Habits



Perceived symptoms and inclination to dental visits



There was no statistically significant correlation between duration of mask wearing and change in oral hygiene habits (P>0.05). However, rates of perceived dry mouth in this cohort [53.7% (95%CI 45.3-62.0)] were significantly higher than what is reported in the literature. The overall estimated prevalence of dry mouth is 22.0% (95%CI 17.0-26.0%).

There was no statistically significant difference in ***wear time*** (3 hours and less vs more than 3 hours) in the frequency of perceived dry mouth (p=0.287), bad breath (p=0.229), and change in oral hygiene habits (P=0.132).

Discussion

The COVID-19 pandemic has prompted new public health measures, the development of innovative technology to prevent and overcome the disease and has also created many uncertainties.

The dental hygienist plays an integral role in assisting individuals and groups in achieving and maintaining optimal oral health. Dental hygienists provide educational, clinical, and consultative services to individuals and populations of all ages in a variety of settings and capacities. As such, the identification of potential subjective or objective oral health side effects of new protective measures-mask wearing, is ***highly relevant and significant.***

Based on the results, we ***accepted our hypothesis***. The rates of perceived dry mouth was greater than reported in the literature and a high percentage of participants experienced bad breath and were less inclined to see their dentist. Our study results from the Inland Empire are supported by studies that were carried out in Germany (Kanzow's study) and Brazil (Pinzan-Vercelino's study).

It is noteworthy to mention, that the ***mask wearing time*** whether short or prolonged did not affect perceived symptoms of dry mouth, bad breath, and change in oral habits.

Limitations of the study included sample size. A more comprehensive study with a proper sample size calculation will enable regression analysis on factors such as gender, age category, ethnicity, and education level.

The study results are highly significant as they corroborate with other study results and provide solid data for further sample size calculation. It also provides information on how to educate and address patients' concerns on potential oral health side effects of mask wearing and recommend solutions to overcome the symptoms.

Future studies need to analyze whether the use of face masks lead to an ***objectively measurable change*** in dry mouth or bad breath (i.e., by measuring the salivary flow rate and volatile sulphur compounds).

Conclusion

Within the limitations of the study, we conclude that the use of face masks increased the perception of dry mouth and bad breath. It also affected the inclination to visit the dentist in a negative way.

Dental hygienist should be aware of the potential oral side effects and educate and guide patients to maintain and improve their oral health.

References

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