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Temporomandibular joint symptoms associated with mouth mask usage and its effect on existing headache

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Abstract

Aim: To evaluate the effect of mouth mask usage on existing headache and/or temporomandibular joint symptoms and de-novo headache and/or temporomandibular joint symptoms associated with mouth mask usage, based on clinical evaluation.

Objectives: To determine the factors associated with the development of de novo headaches and TMJ pain associated with mouth mask usage as well as the perceived impact of these headaches and TMJ pain on their personal health and work performance. The impact of covid-19 on pre-existing headache disorders was also investigated.

Materials and methods: In a dental institution, dental professionals and students are participating in a cross-sectional clinical study. The study included 155 (n=155) dentistry students, professionals, and support personnel. All subjects completed a self-administered questionnaire and were observed for any temporomandibular joint complaints or headaches following mouth mask wear for varied time periods. To eliminate confounding factors like asthma and COPD, the questionnaire asked about demographic information, habits, and medical history. any prior history of headaches, such as migraines or trigeminal neuralgia. The type of mouth mask utilised and the frequency of use were noted in the mouth mask usage pattern information. The temporomandibular joint underwent a thorough evaluation for any signs of pain, tenderness, or sound.

Results: The questionnaire received responses from 155 dental professionals and students in total. The N95 mask type was most frequently utilised (95.5%). 62% of people reported having headaches from PPE in general. In 32.9% of cases, it was a De Novo occurrence, while in 29% of cases, it was a worsening of an earlier headache. A correlation between De novo headache and

using facemasks for longer than 8 hours was found (p = 0.008). A worsening headache was associated with dental professionals who worked shifts longer than 12 hours (p = 0.02, p = 0.023). The use of PPE, in their opinion, slightly hindered their professional per formance.

Conclusions: Dental practitioners are suffering from headaches either as a result of the COVID-19 outbreak's increased use of PPE, particularly high filtration masks, or as a result of the aggravation of pre-existing headaches. These headaches are more likely to be caused by working conditions than by any pre-existing ailment. These results ought to be taken into account by medical experts to improve the efficacy and observance of preventive measures during pandemics.

Keywords: Covid-19, WHO, TMD, Pandemic

Introduction

Clusters of patients with severe acute respiratory syndrome emerged from the city of Wuhan, China during late December 2019(1).Soon the disease was declared as pandemic by WHO. It spread like a fire throughout the world. Based on the researches this disease was called as ‘Corona virus disease’ caused by Novel coronavirus. It is said to be infectious disease with airborne transmission. It’s been two years since then and new variants of the same virus has emerged. After many experiments vaccine was discovered and now, due to vaccines spread of this virus is more or less contained. But before vaccines many guidelines were published to contain the virus by many organization and usage of facemask (2,3) was one of them. For Dental and Medical professionals wearing facemask is no new thing, but as a result of COVID-19, hours of wearing facemask has increased for Dental professionals. And for general population, it has been a challenge to wear facemask and other protective gear during the pandemic.(4,5)

Problems like headache from compression of peri cranial tissues by tight bands or straps around head has been reported in literature. Apart from headache, effects like difficulty in breathing has also been reported. But literature related to facemask related headaches and TMD symptoms among Dental professionals are very few if at all documented. Previous study related to headaches among participant was documented in 2020 and prior to that in 2003 during SARS epidemic in Singapore. This documentation reported pain and discomfort arising from tight fitting face masks and head straps.(6–8)

Current outbreak has provided opportunity to study the association of headache and TMD with usage of N-95 and other facemask. We hypothesized that increased duration of facemask usage has lead to the development of De-novo headaches and TMD symptoms and also leading to increased intensity of pre-existing headaches if any. This cross-sectional study evaluates the prevalence of De-novo headaches and TMD symptoms (9,10) associated with continuous facemask usage. In addition to that, it evaluates effects of facemask usage on pre-existing headaches or TMD symptoms. aim?

Materials and methods

Data collection

During the 2021 Covid-19 wave, an online survey was distributed to all participants at our institution in order to collect the data for this study. Six sections made up the online questionnaire, the first of which provided a brief overview of the study and a portion requesting participants' agreement before they could begin.

Statistical analysis

Software SPSS (version 20) was used for data analysis (IBM Corp., Armonk, NY). For qualitative variables, the baseline characteristic distributions were expressed as frequencies (percentages), and for continuous variables,

as means (standard deviations). The chi-square test Fisher's exact test was used to evaluate the differences. Two-tailed P-values less than 0.05 were regarded as statistically significant.

Results

The survey received responses from 155 people in total. With 107 (69%) respondents and 48 (31%), the majority of respondents were female. Participants' ages ranged from 18 to 64, with a mean age of 24 (+/-9.32 SD). The majority of respondents—102 participants, or 65.8%—were doctors, followed by 46 participants, or 29.7%, dental students, and 7 participants, or 4.5%, dental assistants. The demographics, comorbidities, and harmful behaviors of the study population are summarized in Table. Rhinitis and asthma were the two most common com orbidities, each affecting 37 (23.9%) and 19 (12.3%) respondents, respectively. Previous chronic headaches were reported by 81 (52.3%) res ponders, with migraines being the most common form in 47 (30.3%) participants.

Table 1: Demographic characteristics and comorbidities among participants in our study;

	Number (%); n = 155
Age (mean +/- SD)	32.03 +/- 9.3
Gender	
M	48 (31)
F	107 (69)
Marital status	
Single	82 (52.9)
Married	68 (43.9)
Divorced	5 (3.2)
Profession	
Dental professionals	102 (65.8)
Dental students	46 (29.7)
Dental assistant	7 (4.5%)
Comorbidities	
Chronic or occasional headache	81 (52.3)
Migraine	47 (30.3)

Tension headache	28 (18.1)
Stroke	6 (3.9)
Hypertension	3 (1.9)
Insulin dependent Diabetes	1 (0.6)
Non-insulin dependent Diabetes	1 (0.6)
Sinusitis	6 (3.9)
Rhinitis	37 (23.9)
Cardiac disease	6 (3.9)
Asthma	19 (12.3)

Table 2: Personal protective equipment usage pattern during COVID-19 pandemic

	Number (%); n= 155
Type of masks	
N95	148 (95.5)
Surgical	7 (4.5)
Eyes Protective equipment	
No	60 (38.7)
Yes	95 (61.3)
Glasses	61 (39.4)
Goggles	7 (4.5)
Face shield	53 (34.2)
Number of hours wearing masks	
<4 hours	6 (3.9)
>4 hours	149 (96.1)

Table 3: Type and frequency of headache generated by wearing PPE

	Number, n = 155 (%)
PPE generated headache	
Yes	96 (62)
No	59 (38)
Type of PPE generated Headache	
De Novo	51 (32.9)
Aggravated chronic Headache	45 (29)
Frequency per weeks	
1 per 2 weeks	25 (26.05)
1 per week	35 (34.5)
2 per week	18 (18.7)
> 3 per week	18 (18.7)

Table 4: Study of correlation between demographic characteristics, working conditions, types of PPE used, duration of use and aggravated chronic headache by the use of PPE.

	Without Aggravated Headache, n= 110	With Aggravated Headache, n= 45	p-value
Gender			0.34
M	37	11	
F	73	34	
Age			0.72
< 30	56	25	
> 30	54	20	
Profession			0.02
Dental professionals	66	36	

Dental students	44	9	
Previous Headache			0.00001
No	73	1	
Yes	37	44	
Number of regular Working Hours			1.0
< 8h	56	23	
> 8h	54	22	
Type of Mask used			0.41
FFP2, FFP3, N95	106	42	
Surgical masks	4	3	

Discussion

In this study, we described participant demo graphics, com orbidities, and working conditions during the second COVID-19 pandemic strike. Participants primarily used N95(ffp2) or ffp3 high filtration masks, along with supplementary eye and face personal protection equipment. They were donning masks for an extended period of time (96.1% of respondents reported donning masks for more than four hours).

During the pandemic, work circumstances had changed to include longer workdays and the requirement to wear specialized PPE in accordance with set protocols. We labeled headaches brought on by the usage of personal protective equipment as either "De Novo" when they were previously undiagnosed or "aggravated headaches" when they were already present but made worse by the PPE.

Our findings indicate that 62% of participants in our study experienced headaches related to the usage of PPE, with 32.9% experiencing de novo migraines and 29% experiencing worsened headaches. During the COVID-19 pandemic, we discovered a correlation between working more than 8 hours per shift and participants developing a de novo headache and a correlation between working more than 12 hours per shift and participants' pre-existing chronic headaches getting worse. Additionally, wearing eye protection together with masks for longer than four hours, being a doctor, and having a pre-existing chronic headache are all associated with participants' chronic pre-existing headaches getting worse.

According to the International Classification of Head ache Disorders, Third Edition (ICDH-3) (11), 2018, the majority of respondents reported that their headaches began about 60 minutes after donning PPE and ended 60 minutes after removing it. The headaches were primarily felt in the frontal (58,3%) and temporal (40,8%) areas and met the criteria for external compressive headache.

Aside from mechanical causes like hypoxia, hypercarbia, and stress, several ideas attempt to explain the pathophysiology of headache due to the prolonged usage of masks and other PPE. On some physiologic parameters and subjective symptoms, however, wearing a N95 for the entire 12-hour period produced statistically significant adverse consequences.

In the Ong et al. study There was a noticeable rise in PPE use among the 158 frontline participants in Singapore's COVID-19 pandemic. When N95 masks and protective glasses were worn in this series, de novo headaches were prevalent (81% of the time). The headache met the criteria for a compressive headache because it was bilateral in nature and had a time of start and resolution after wearing/removing PPE of less than 60 minutes. Additionally, study participants who worked in emergency rooms and had a history of primary headaches were more likely to experience headaches brought on by De Novo PPE.

Participants who use PPE for more than four hours, whether it be N95 or eye protection, or both, and who have a main headache diagnosis already have a higher risk of developing PPE-associated De novo headache. These traits were discovered to be independently related to the emergence of a de novo headache. With an under lying pre-existing headache diagnosis, 91.3% of respondents in the Ong et al study claimed that their background headache had gotten worse in terms of frequency and length of attack, which is also consistent with our findings.

We discovered fewer headaches caused by De Novo PPE in comparison to our study. Sixty-two percent of participants—96—reported having headaches as a result of wearing personal protective equipment. 51 respondents (32.9%) classified this headache as a "De Novo headache," while 45 (29%) said it was a worsening of an earlier headache. This is most likely connected to the various working circumstances and weekly shift rotations in our hospital. In our investigation, some particular work place factors appeared to be connected to the onset or exacerbation of headache. In fact, working more than eight hours per shift was associated with De-Novo headache, whereas working longer than 12 hours per shift was associated with the aggravated pre-existing headaches in health professionals.

Lim et al. examined the risk variables for headache in participants using N95 masks exclusively without eye protection during the 2003 severe acute respiratory distress syndrome (SARS) epidemic. Only 37.3% of respondents said that wearing the N95 Mask caused them headaches. They discovered that wearing masks for longer than four hours and having an existing headache were linked to mask-generated headache. High filtration masks and other protective gear seem to increase the likelihood of headache and discomfort.

Participants in our study reported mild respiratory difficulty, according to our findings. Participants said that their focus was slightly impaired, their vision was slightly clouded, and finally, their focus and technical performance were slightly affected.(16)This effect on quality of life at work could be a barrier to professionals adhering to the recommended PPE usage. Loibner et al. investigated the limiting variables for wearing PPE during six working hours on the first day and four working hours on the second day at various temperatures in a study including 19 volunteers who were randomly assigned to wear PPE suits in hospital contexts. Reduced dexterity, blurred vision, and back pain brought on by the completely ventilated suit's respirators were the most common limiting problems. These elements did not, however, have a negative effect on performance.

Our research has several limitations, as do our findings. Primarily, since it's a monocentric study with a limited sample size, generalizing our findings should be done with caution. Additionally, because it's an electronic questionnaire, not enough research has been done on some components of discomfort and how they affect technical jobs and patient care. Further research should assess another potential exacerbating factor for headaches connected to the lack of food, water, and sleep during the longer working hours.

Conclusions

The increasing usage of PPE, particularly high-filtration masks, during the COVID-19 outbreak is to blame for participants developing headaches either for the first time or aggravating previous ones. These headaches are more likely to be caused by working conditions than by any comorbidities or pre-existing illnesses. These findings should be taken into account in order to accommodate health professionals, either by limiting the number of working hours and possibly by establishing regular breaks to allow health professionals to correctly don masks and other PPE. In times of pandemic, when security and protection of healthcare workers is one of the biggest concerns of health authorities, these accommodations may lower the incidence of headaches and pain and increase the adherence to PPE among healthcare workers.

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