



(RESEARCH ARTICLE)



## Adverse effects of prolonged use of mask among employees at selected departments in Nedumkandam, Idukki, Kerala

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### Abstract

**Introduction:** “The surgical face mask has become a symbol of our times”. In March 17, 2020 this was headline of an article in the New York Times on the role of face mask during the COVID-19 outbreak. This study was undertaken to assess the effects of prolonged use of mask on physical well-being of employees in selected departments of Nedumkandam, Idukki, Kerala

**Method:** The present study was an explorative study of 110 employees working in different sectors in Nedumkandam. Data were collected by using self-structured questionnaire. . There were total 20 questions related to physical effects of prolonged mask usage.. All participants wore either surgical mask or N95 respirators for a minimum of 6 hours per day.

**Result:** Majority of the participants were male (56.3%) and between the age group of 36-45 years. The result indicated that 80.9% (N=89) were uncomfortable with mask usage. Reported side effects include head ache, breathing difficulty, nasal discomfort, skin related problems, Mask related infection. The majority of the respondents (N=89, 80.9%) report one or more of these adverse effect while 19% (N=21) report none of these side effects.

**Conclusion:** The study was concluded that majority of the employees suffering with various physical discomforts including head ache, nose related problem, breathlessness, skin related problems. Employees who wear masks for extended periods reported increased fatigue and a sense of breathlessness.

**Keywords:** Adverse effect; Prolonged usage of mask; Employees; Nedumkandam

### 1. Introduction

The use of face mask was a significant part of COVID 19 preventive protocols. Wearing mask for a prolonged amount of time cause a host of physiologic and psychologic burdens and can decrease work efficiency. Activity cannot be performed as long or as efficiently while wearing masks as compared to when masks are not worn. Additionally, the time frame that an activity can be sustained is decreased when wearing masks. Prolonged use of N95 and surgical masks causes physical adverse effects such as headaches, difficulty breathing, acne, skin breakdown, rashes and impaired cognition. It also interferes with vision, communication and thermal equilibrium <sup>[1]</sup>.

Headache related to prolonged mask use can be attributed to mechanical factors, hypercapnia and hypoxemia. Tight straps and pressure on superficial facial and cervical nerves are mechanical features causing headache. Cervical neck strain from donning PPE, sleep deprivation, irregular meal times and emotional stress are other sources of headache among health care professionals during prolonged mask use.<sup>[2]</sup> Tight fitting masks cause inadequate ventilation and increased level of carbon dioxide (CO<sub>2</sub>) known as hypercapnia. As CO<sub>2</sub> is a known respiratory stimulant, a build of

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exhaled CO<sub>2</sub> between the mask and face will cause in increased lung ventilation and respiratory activity. Symptoms of hypoxemia such as chest discomfort and tachypnea are also noted in health care professionals with prolonged mask use. Exhaled CO<sub>2</sub> builds up between mask and face and increased levels of CO<sub>2</sub> cause confusion, impaired cognition, and disorientation [3,4].

Although using mask for a long time has certain side effects, its usage is very important in the present scenario. If we know the side effects of wearing mask, we can take adequate precautions against it. Based on the above fact, the investigators felt the need to undertake the study on “a study to assess the adverse effects of prolonged use of masks among employers at selected departments in Nedumkandam”

## 2. Material and methods

The study adopted non experimental descriptive design. Samples were 110 employees ( employees of various departments in Nedumkandam). Convenient sampling technique was used for sampling. Employees using either N95 mask or surgical mask for minimum of 6 hours per day was included in the study. Employees with chronic illness and having skin allergy were excluded from the study. A structured questionnaire was developed to assess the effect of prolonged mask usage

## 3. Result

### 3.1. Section 1

**Table 1** Description of samples according to demographic characteristics N=110

Demographic variable	Frequency	Percentage
<b>Gender</b>		
Male	62	56.3%
Female	48	43.7%
<b>Type of mask</b>		
N 95 mask	58	52.7%
Surgical Mask	52	47.2%
<b>Age</b>		
25-35 years	34	30.9%
36-45 years	42	38.2%
46-55 years	34	30.9%

The demographic information of toddlers presented in Table 1 shows that majority are (56.3%) males, 38.2%% in the age group of 36-45 years and majority ( 52.7%) were using N95 masks.

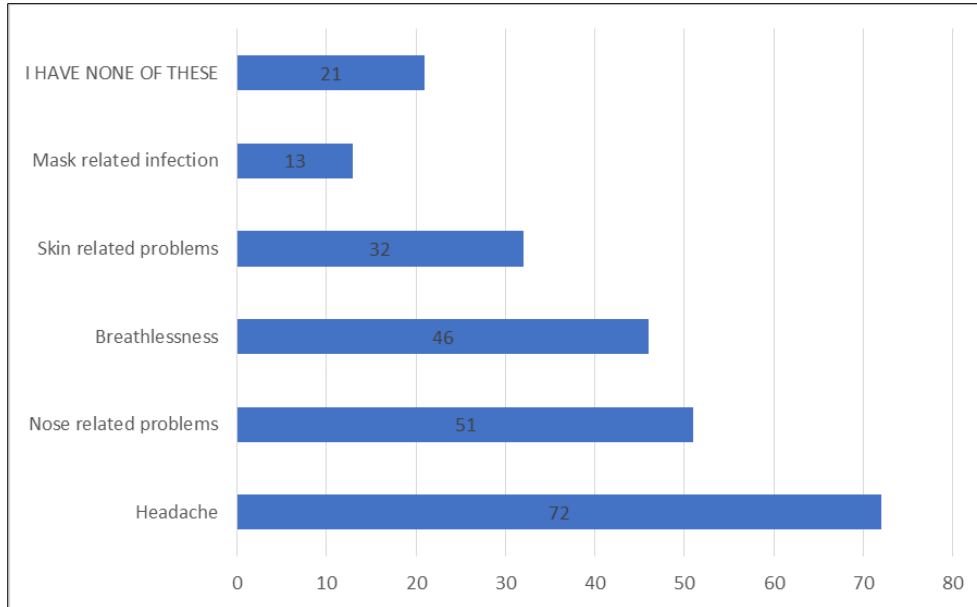
### 3.2. Section 2

A total of 110 participants in the study 80.9% (N=89 ) were uncomfortable with mask usage. Head ache, breathing difficulties, pain behind the ears, fogging of the glasses were the most indicated reason for discomfort.

Reported adverse effects include head ache, breathing difficulty, nasal discomfort, skin related problems, Mask related infection. The majority of the respondents ( N=89, 80.9%) report one or more of these adverse effect while 19% (N=21) report none of these side effects.

The highest reported side effect was headache, of the respondents with 65.4% (N= 72) reporting this adverse effect (p < 0.001) . The majority of the respondents have no prior history of headache. The second reported side effect was nasal problems 46.3% (N=51), which include nasal congestion, nasal irritation, itchy nose, burning sensation around the nose.

41.8% (N=46) employees were reported breathing difficulty, 29% (N=32) were having skin related problems which includes excessive sweating around the mouth, acne and rashes. Least reported side effect was mask related infection 11.8% (N=13).



**Figure 1** Adverse effects after wearing a mask for minimum of 6 hours in a day

### 3.3. Section 3

**Table 2** Association of effect of prolonged use of mask with selected demographic variable N=110

Demographic variable	F	p-value
Age	0.5	0.84
Gender	0.3	0.53
Type of mask	0.2	0.76

The result of the study showed that there is no association with effect of prolonged use of mask with selected demographic variables as the p value is more than 0.05

## 4. Discussion

The aim of the present study was to assess the effect of prolonged mask usage among employees and to associate the findings with selected demographic variables. The result revealed that majority of the participants were uncomfortable with mask usage and having side effects including head ache, nasal problems, breathlessness, skin related problems, and mask related infection. The highest reported side effect was head ache (65.4%). A large number of studies have reported the headache associated with face masks. The pathogenesis behind could be mechanical compression, hypoxia, rebreathing of carbon dioxide etc. The various recommendations to reduce head ache are adequate hydration, frequent reposition of masks to reduce mechanical burden, massaging, and breathing exercise [5].

46.3% of the participants reported nasal problems which include nasal congestion, nasal irritation, itchy nose, burning sensation around the nose. Mask traps heat and moisture behind it and inside nose. Excessive moisture coating the lining of the nose can decrease the sensitivity of air passing through the nasal cavity and leads nasal problems. Breathing difficulty was reported by 41.8% of the employees which could be attributed to hypercapnic hypoxic environment that can cause cardiorespiratory stress[7]. 29% employees reported skin related problems. There has been an increased incidence of skin due to the extended use of facemasks. Contact dermatitis, contact urticaria occurs due to adhesives, rubber in straps, free formaldehyde released from the non-woven polypropylene and from metal in clips[6,8]. Foo et al., analysed healthcare workers during the SARS pandemic in 2003 at Singapore, and reported that 51.4% experienced

itch induced by face masks [9]. In an experimental study by Roberge et al., of a group of 20 healthy people wearing surgical masks during continuous walking on a treadmill at a low–moderate work rate (5.6 km/h) for 1 h, facial itch occurred in 7% of participants, and an additional 11% experienced skin irritation. In the current study reported skin related problems include excessive sweating around the mouth, acne and rashes<sup>[10]</sup>.

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## 5. Conclusion

The study identified various side effects of prolonged mask usage among employees. Working with a mask for longer periods of time is not always a choice, but rather a necessity, and this necessity must be carefully monitored and managed by the concerned authorities to minimize negative effects

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## Compliance with ethical standards

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### *Disclosure of conflict of interest*

Author declares no conflict of interest.

### *Statement of informed consent*

Informed consent was obtained from all individual participants included in the study.

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