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A Study to Assess Adverse Effect of Mask in Healthcare Professionals during Covid-19 Duties. A Hospital Based Cross Sectional Study.

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ABSTRACT:BACKGROUND: Masks help keep saliva and any other dropletsemitted from breathing, talking, coughing, or sneezingfrom getting into the air and potentially transmitting Covid-19 (or other illnesses).They trap moisture and bacteria inside, touching your skin. This create a seal that prevents moisture from escaping, resulting in a humid environment where acne-causing bacteria is able to thrive

Objective
Health Worker report side effects of prolonged use of mask when wearing mask for COVID-19 protection . This study assesses various adverse effects of prolonged mask use and provides recommendations for mask use.

METHOD: This is a cross sectional study among Health Workers presenting with acne , primarily located in Indore city , in index medical college hospital and research centre (Tertiary Care Centre) Indore who worked in the hospital during the COVID-19 pandemic. All respondents completed an anonymous survey consisting of questions regarding adverse effects of mask, medical history, and demographics

CONCLUSION: Prolonged use of N95 and surgical masks during COVID-19 has caused adverse effects such as acne and skin breakdown causing significant discomfort which needs to be addressed

KEYWORDS: Surgical mask, N95 mask, COVID-19, Coronavirus, Virus, Pandemic , Health workers

I. INTRODUCTION

In January 2020, India encountered its first official case of COVID-19. This novel coronavirus, referred to as SARS-COV 2, originated in Wuhan, China in December 2019. Within a short amount of time, hundreds of thousands of cases were diagnosed around the world, causing the World Health Organization to announce it as an pandemic on January 30, 2020. (2)

COVID-19 is spread by respiratory droplets, and healthcare professionals are mandated to wear PPE when caring for COVID-19 patients. PPE includes gowns, gloves, masks, and face shields. Aside from a major shortage of PPE across the United States causing stress to hospital administrators and healthcare professionals on the front lines, many expressed added stress from adverse effects of prolonged PPE usage.

The last incidence of prolonged use of PPE among healthcare professionals was during the SARS (severe acute respiratory syndrome) outbreak in 2003-2004 which originated in Guangdong, China. Studies focusing on effects of prolonged use of PPE during the SARS outbreak were published in subsequent years. A study by Lim, et al. focused on headaches related to mask use [1], and another study by Foo, et al. discussed adverse skin reactions such as rashes, acne, and itching from mask use [2].

The CDC and WHO recommend wearing N95 masksduring care of patients with highly transmissible diseases such as tuberculosis, SARS, and COVID-19. The N in N95 stands for NIOSH, the National Institute for Occupational

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Safety and Health of the United States and 95 indicates filter efficiency of particles. Thus, an N95 mask is 95% effective at filtering airborne particles including very small ones. In comparison, while surgical masks provide a barrier against large respiratory particles, they are ineffective at providing protection from smaller particles. Surgical masks also do not prevent leakage around the mask when the user inhales. Therefore, surgical masks are ineffective and do not provide enough protection when performing direct care for patients with COVID-19 [3].

To prevent the spread of COVID-19, hospitals required their employees and visitors to wear a mask at all times when in the facility. Generally, employees and visitors wore surgical masks, and when providing direct care for COVID-19 patients, the employees donned N95 masks.

Wearing masks for a prolonged amount of time causes 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 timeframe that an activity can be sustained is decreased when wearing masks and PPE (4). 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.(5)

Headaches 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 headaches (6). Cervical neck strain from donning PPE, sleep deprivation, irregular mealtimes, and emotional stress are other sources of

A hot and humid environment found in the facial region covered by masks, causes discomfort and hyperthermia. This may create a situation where the healthcare professional is unable to recognize dangers and perform manual tasks, and it also significantly affects motor skills (8)The moist environment and pressure from tight fitting masks also block facial ducts. This can explain the increase of acne with prolonged mask use (8)

Frequent PPE and mask changes may cause shearing and breakdown of the skin, and breakdown on the bridge of the nose and cheek bones can be attributed to tight fitting masks and goggles that put pressure on these specific areas (9)

There are multiple things that could cause mask acne

- Not washing your mask often enough,
- Washing it with harsh detergent,
- Mask itself and its materials,
- How frequently you have to wear it.

Masks help keep saliva and any other dropletsemitted from breathing, talking, coughing, or sneezingfrom getting into the air and potentiallytransmitting Covid-19 (or other illnesses). That's what we want them to do, but this means that they trap moisture and bacteria inside, touching your skin. "These masks create a seal that prevents moisture from escaping, resulting in a humid environment where acne-causing bacteria is able to thrive(9)

II. METHODS

Study design

Cross-sectional study atIndex Medical College Hospital And Research Centre (DEDICATED CENTRE FOR COVID-19)

Time duration of study was 1st June 2020 – 30 November 2020

Patient assessment

Health Workers havingacne attending the dermatology clinic were screened for inclusion into the study. An informed consent was taken. Detailed history regarding the duration and extent of the disease, family history, past treatment and aggravating/initiating factors was recorded. History of duration of wearing the mask , reusing the same mask , washing masks using detergents , application of makeup in the area covered by mask , using face wash before and after using the mask following details regarding the presence of other risk factors for acne were noted – hot and humid climate , increased sweating

III. RESULT

Of the 350 participants of this survey, 60% (n = 210) primarily wear a N95 mask and 40% (n = 110) wear a surgical mask throughout their shift. Reported side effects include headache, acne, skin breakdown, and impaired cognition. The majority of respondents (91.5%, n = 321) report one or more of these adverse effects while

8.5% (n = 29) report none of these adverse effects Some found specific brands such as 3M,Venus, , Medline, causing these side effects while others reported no difference from one brand to another

The highest reported side effect was headaches with 71.4% respondents (n = 245) reporting this adverse effect. 15.2% (n = 52) stated their headaches occurred within 1 hour of wearing the mask, 30.6% (n = 105) after 1 hour of wearing the mask, and 29.7% (n = 102) after 3 hours or more of wearing the mask. 24.5% (n = 84) reported no headaches at all from prolonged mask use (Figure 2). The majority of survey respondents (71.4%, n = 245) have no prior history of headaches.

After removing the mask, headaches resolved in 14% of respondents (n = 48) within 30 minutes, 33.8% (n = 116) after 1 hour, while 28% (n = 96) needed medication for treatment to resolve the headache. Medications such as NSAIDs were used for those who needed medication to resolve their headache.

Prior history of sensitive skin was reported in 47.8% (n = 164) of respondents. 51% of survey respondents (n = 175) reported skin breakdown as an adverse effect of prolonged mask use

18.1% (n = 62) reported skin breakdown within 1-3 hours of mask use and 44% (n = 151) after 3 hours or more of mask use. For those who had skin breakdown, the most common area was the bridge of the nose (42.9%, n = 147) and cheeks (28.6%, n = 98). Other areas of skin breakdown are chin (14.3%, n = 49) and behind the ears (32.1%, n = 110). To alleviate skin breakdown, 35.6% (n = 122) used lotions or creams such as bacitracin, Aquaphor , Vaseline , aloe, Cetaphil dam , aloe-Vera, sheabutter, skin prep, and Nevlon. 8.7% (n = 30)

Acne accounted for 53.1% (n = 182) of participants with 11.1% (n = 38) reporting acne within 1-3 hours of mask use and 47.8% (n = 164) after 3 hours of mask use. A history of acne was reported in 35.3% (n = 121) of the respondents while the others reported no history of acne.

Impaired cognition was the least reported adverse effect with 23.6% (n = 81) reporting impaired cognition from prolonged mask use. Of those who experienced this side effect, 2.9% (n = 10) were cognitively impaired within 1 hour of mask use, 9% (n = 31) within 1-3 hours of mask use, and 16.6% (n = 57) after 4 hours of mask use

IV. CONCLUSION

Prolonged use of N95 and surgical masks by healthcare professionals during COVID-19 has caused adverse effects such as acne and skin breakdownin the majority of those surveyed. As a second wave of COVID-19 is expected, and in preparation for future pandemics, it is imperative to identify solutions to manage these adverse effects. Frequent breaks, improved hydration and rest, skin care, and potentially newly designed comfortable masks are recommendations for future management of adverse effects related to prolonged mask use.

V. LIMITATIONS

While this survey captured the experiences of many health care professionals working on the front lines during COVID-19, there are some limitations to this study.

First, pre-existing conditions such as high BMI, asthma, and other conditions were not assessed in this survey, and these could be impacting or increasing the adverse effects addressed in this survey.

Second, issues such as stress level and quality sleep were also not included in this survey, and these important factors could also attribute to adverse effects in the survey respondents.

VI. ACKNOWLEDGEMENT

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