



EFFECTS OF PROLONGED USE OF FACEMASK, HAND HYGIENE AND SOCIAL DISTANCING PRACTICES AMONG HEALTHCARE WORKERS AT A TERTIARY CARE TEACHING HOSPITAL IN RURAL AREA DURING THE COVID-19 PANDEMIC

Community Medicine

Arshmeen Kaur*

Medical Intern, Rural Medical College, Loni, Ahmednagar, Maharashtra, India.

*Corresponding Author

**Dr. Jayant
Deshpande**

Professor, Dept. of Community Medicine, Rural Medical College, Loni, Ahmednagar, Maharashtra, India.

**Prathamesh
Dombé**

Medical Intern, Rural Medical College, Loni, Ahmednagar, Maharashtra, India.

ABSTRACT

Introduction: The first case of COVID-19 in India was reported on 30th January, 2020. Covid-19 is spread by respiratory droplets. The WHO has advised to - maintain at least 1-meter distance with others, wear a mask & regularly wash our hands. The CDC and WHO mandate wearing personal protective equipment (PPE) during care of patients with suspected, probable or confirmed COVID 19. Facemasks are of vital importance in protecting healthcare workers from the Corona virus disease and preventing its spread. In this study we are going to assess whether the prolonged usage of facemask and other hygiene practices have effects on health care workers leading to improper use.

Methods: A descriptive cross-sectional study carried out at a tertiary care teaching hospital in rural area, during the period of April 2020 to January 2021. A total of 111 complete responses were obtained via a questionnaire made using google forms and distributed via social media. The obtained data was entered in excel sheet and tables were made according to study objectives.

Results: Among 111 participants 43.25% were residents & 56.75% were interns. N95 mask was used by 67.56%. Difficulty in breathing (72.97%), excessive sweating around mouth (69.36%), pain behind the ear (73.87%), (46.84%), decrease in working hours (42.34%), blurring of vision or fogging of glasses (58.55%) were the most common symptoms experienced by the participants w.r.t use of face mask. Alcohol based hand-rub was preferred by 54.05%. Itching of hands & reaction to powdered latex gloves was experienced by 53.15% & 44.14% participants respectively. 31.53% attended social-event during the pandemic and 63.15% of them observed that social-distancing was followed there. 77.47% experienced difficulty in communication due to social distancing for which 46.84% inadvertently drew closer to people while talking.

Conclusion: Most common type of mask used was N95. Breathing difficulty, nasal congestion & nasal discomfort were most common nasal symptoms w.r.t. use of mask. Among dermatological and pressure symptoms excessive sweating around mouth and pain behind ear were common symptoms. Most of them also suffered from headache which affected their working hours. Blurring of vision and dry mouth were also observed by majority of participants. Hand hygiene practices were adequate and alcohol based hand-rub was preferred. Itching of hands and reaction to powdered latex gloves was a major complaint following hand hygiene practices.

KEYWORDS

COVID-19, health care workers, prolonged facemask usage, hand hygiene, social distancing practices

INTRODUCTION

Novel corona virus is said to have been originated in Wuhan, China in December, 2019. The first case of COVID-19 in India was reported on 30th January, 2020. [1] Covid 19 is spread by respiratory droplets and its most common symptoms include fever, cough and breathlessness. To prevent spread of coronavirus disease, the WHO has given public health advice such as - maintain at least 1-meter distance with others, wear a facemask at all times, avoid touching eyes, nose and mouth, regularly wash or disinfect hands, disinfect frequently touched surfaces regularly, etc. [2] Healthcare workers are mandated to wear personal protective equipment (PPE) during care of patients with suspected, probable or confirmed COVID 19. Continuous usage of facemasks can lead to a wide spectrum of nasal discomfort such as dryness, itching, burning, crusting, pain, congestion, altered sense of smell and bleeding, complaints pertaining to facial skin such as acne, rash and redness and of the oral cavity such as halitosis. Prolonged use of face mask causes increased heat beneath the mask. Dry nose occurs due to decreased water carrying capacity of air in nose. Oral bacteria tend to colonize giving rise to halitosis. [3] Bacterial overgrowth on the skin in the regions of the face covered by the mask and local pressure on the skin from close-fitting masks as well as from increased perspiration occludes pilo-sebaceous ducts resulting in a flare-up of acne. [4] Pressure-related effects of mask include pain and skin breakdown over the nasal bridge, cheek bones and behind the ears. [5] Facemask associated headaches could possibly be related to hypoxemia and hypercapnia due to inadequate ventilation, mechanical factors such as pressure from tight straps on superficial facial and cervical nerves, or the stress associated with its use. [6] Increased levels of CO₂ cause nausea, confusion, giddiness, impaired cognition and disorientation. Both the quality and the time frame for which an activity can be performed are affected. [7] Two people wearing mask may unconsciously come closer as mask affects the quality and volume of speech. An impulse to touch the eyes arises whenever exhaled air goes directly into the eyes. If the hands are contaminated, this will lead to spread of infection. [8] Frequent hand washing (>10 times daily) increases the risk of skin damage. Symptoms include dryness, roughness, itching, burning, erythema, edema, blistering, scaling, and

fissuring commonly on knuckles and web spaces, where irritants and allergens tend to accumulate. [9] Long-term use of latex gloves causes maceration due to over-hydration of stratum corneum, characterized by whitening, softening, and wrinkling of the skin. Skin reactions to gloves include dry skin, itch, and rash. Latex sensitization could explain the symptoms reported by some individuals in our study, while a more likely explanation could be the increased frequency of hand-washing and exposure to soaps resulting in irritant contact dermatitis of the hands. [10] Although majority of PPE-related manifestations are mild and self-healing, sufficient time for rest and recovery is not always available in the current situation. The critical point is that adherence to strict PPE protocol is paramount, and presence of even mild abrasion, itching, or discomfort may lead to inadvertent protocol breaches, such as frequent touching or removal of masks and/or repeated adjustments of PPE. The aim of this study is to record the various adverse effects faced by health care workers due to prolonged use of facemask, hand hygiene practices and social distancing.

MATERIALS AND METHODS

This was a descriptive cross-sectional study carried out among the Medical Interns and Residents working at the Pravara Rural Hospital (PRH), Loni. Indian COVID-19 guidelines mandated the usage of masks throughout the hospital leading to different behavioral patterns amongst the study subjects. A self-made and tested questionnaire was distributed to the interns and resident willing to participate in the study. Interns and residents between 22-35 years of age were included and those with any co-morbidity such as bronchial asthma, tuberculosis, hypertension, obesity, diabetes mellitus, etc. were excluded from this study. A total of 125 interns and residents participated in the study from which 14 responses were excluded because they did not satisfy the inclusion criteria or were incomplete. The variables studied through the questionnaire were age, gender, type of mask used, various symptoms w.r.t nose, eyes, facial skin, pressure symptoms, etc. were studied along with general hand hygiene practices and its consequences. Social distancing practices and difficulties faced due to it were also studied. To describe the characteristics of the study population, Microsoft Excel 2010 (Microsoft Corporation, Redmond,

Washington) was used. Collected data was entered and pertinent tables were made according to the aims and objectives of the study.

RESULTS

A total of 111 responses from interns and residents working at PRH were studied. 67.56% of participants used N95 mask exclusively. Difficulty in breathing on exertion (72.97%) was most common nasal complaint observed. **(Table No. 1)** Among dermatological and pressure complaints excessive sweating around mouth (69.36%) and pain behind ear (73.87%) were most common. Among Neurological complaints headache (46.84%) and decrease in work efficiency w.r.t working hours (42.34%) were most common. Blurring of vision due to fogging of glasses / visors (58.55%) was the most common ocular complaint while dryness of mouth (40.54%) was the most common oral complaint. Nasal symptoms (61.11%) and ocular and oral symptoms (56.66%) were maximum with the use of triple layered surgical mask. 62.5% reported skin and pressure symptoms with the alternative use of N95 and triple layer surgical mask and 50% reported neurological symptoms with the alternative use of N95 and cloth mask. **(Table No. 2)** Alcohol based hand rub (54.05%) was preferred over hand washing with soap and water. Majority of participants (77.4%) observed hand hygiene practice after examining each patient. **(Table No. 3)** Among effects due to enhanced hand hygiene practices during the pandemic 53.15% experienced dryness or itching of hands and 44.14% had reaction to powdered latex gloves. **(Table No. 4)** Due to practice of social distancing 77.47% of participants faced difficulty in communication for which 46.84% drew inadvertently closer to people while talking and 22.52% took mask down while talking. **(Table No. 5)**

DISCUSSION

In a cross-sectional study conducted by P.K Purushothaman et.al.^[3] at SRM medical college & hospital India incidence of generalized nasal discomfort, difficulty in breathing on exertion and itching and irritation of nose was found to be 48.80%, 58.20% and 52.00% respectively. In similar study conducted by Chughtai et.al.^[11] in Vietnam 52.4% and 44.4% experienced generalized nasal discomfort and difficulty in breathing respectively. While in present study incidence of dry nose, crusting or cracking of nose, blood on tissue paper, altered sense of smell, hot or burning sensation in nose, nasal congestion and itching and irritation of nose was 36.03%, 30.63%, 0.9%, 10.18%, 27.02%, 54.96% and 59.45% respectively.

Purushothaman et.al.^[3] found that out of 250 study subjects, 56.0% had complained of acne, 39.0% of redness or skin rash, 67.60% of excessive sweating around mouth, 45.20% of pain behind ear and 30% of pain on nasal bridge or cheek bones. Similarly, in a study by Rosner E et.al.^[12] carried out in New York in year 2020, incidence of acne was 53.1% and of redness or skin rash on face was 51%. Chris C.I. Foo^[13] conducted a study at a hospital in Singapore where acne was complained by 59.6% individuals while 35.8% reported redness of skin or rash. In present study 55.85%, 43.24%, 69.36% and 73.87% participants complained of acneiform eruptions on face, redness or skin rash, excessive sweating around mouth and pain behind ear respectively, while 39.63% complained of pain on nasal bridge or cheek bone.

Lim E.C.H.^[6] conducted a study at a tertiary care hospital during the SARS outbreak from March 2003 to March 2004 and found that headache was reported in 37.26% of individuals. Incidence of 71.4% & 23.6% of headache and impaired cognition respectively was observed in a study by Rosner.E et.al.^[12] Chughtai et.al.^[11] reported headache in 46.2% individuals. In present study headache was reported in 46.84% individuals, 18.01% reported nausea or giddiness & impaired cognition &/ confusion was reported in 12.61%. Additionally, in present study decrease in work quality and decrease in working hours was reported by 37.83% & 42.34% individuals respectively.

Incidence of dryness of mouth, halitosis, and sore throat was 35.30%, 22.40%, 25.20% respectively, while least incidence was of dry eyes i.e., 15.60% in the study conducted by Purushothamn et.al.^[3] In present study dryness of mouth (40.54%) accounted for most common complaint followed by dry eyes (33.33%), halitosis (28.32%) and sore throat (25.22%). In addition to above mentioned symptoms, in present study 58.55% participants complained of blurring of vision/ fogging of glasses.

In a study carried out by Anne Guertler et.al.^[14] at Munich, Germany, 83.2% complained of dryness of hands, 18.4% of peeling or bleeding of hands and 9.6% complained of fissures or cracks on hands. In another study by Chris. C.I Foo et.al.^[13] 21.4% participants reported

reaction to powdered latex gloves. In present study dryness of hand was complained by 53.15% of participants. 16.21% and 10.81% complained of fissures or cracks and peeling or bleeding respectively. 44.14% of participants in present study reported reaction to powdered latex gloves.

CONCLUSION

A significant number of healthcare workers who participated in this survey experienced various adverse effects of prolonged usage of facemasks. The most common type of face mask used was N95. The most common nasal complaints were difficulty in breathing accompanied by nasal congestion, nasal discomfort and itching &/or irritation of nose. Pain behind the ear, excessive sweating around the mouth and acneiform eruption on the face were most common dermatological and pressure complaints. Among ocular and oral ones blurring of vision due to fogging of glasses / visor and dryness of mouth were most common complaints respectively. Many participants also complained of headaches and decrease in work efficiency w.r.t time. Alcohol based hand rub was preferred method for hand hygiene. Frequent touching and readjustment of facemask was observed. Also many experienced dryness of hands and reaction to latex gloves due to enhanced hand hygiene practices. Majority of participants faced difficulty in communication due to social distancing for which they inadvertently drew closer or took down their mask.

Table no.1- Use of facemask and nasal symptoms

NASAL SYMPTOMS	PERCENTAGE
1. Generalized nasal discomfort	59.45%
2. Dry nose	36.03%
3. Crusting / cracking inside nose	30.63%
4. Blood on tissue paper or napkin	0.9%
5. Altered sense of smell	10.18%
6. Hot/burning sensation in nose	27.02%
7. Nasal congestion	54.96%
8. Itching/irritation of nose	59.45%
9. Difficulty in breathing on exertion	72.97%

Table No. 2 -Co-relation between Symptoms and type of mask used

TYPE OF MASK	N95 Mask	Triple Layer Surgical Mask	N95 & cloth mask alternatively	N95 or surgical mask alternatively	All three masks alternatively
SYMPTOM	36%	61.11%	38.88%	46.62%	37.96%
Nasal Symptoms					
Skin & pressure Symptoms	56%	53.33%	40%	62.5%	55%
Neurological Symptoms	31.2%	46.66%	50%	33.75%	20%
Oral Symptoms & Ocular Symptoms	36.53 %	56.66%	30%	48.75%	20%

Table No.3-Adequacy of handwashing Practices

Handwashing practice	PERCENTAGE
1. After examining each patient	77.4%
2. After each and every invasive procedure	16.21%
3. Only at the beginning and end of each shift	5.40%
4. Only if hands are visibly soiled	0.9%

Table No.4-Effects of hand hygiene practices

SYMPTOMS	PERCENTAGE
1. Dryness or itching of hands	53.15%
2. Fissures or cracks	16.21%
3. Peeling or bleeding	10.81%
4. Reaction to powdered latex gloves	44.14%

Table No. 5 -Effect of social distancing on communication

Effect	YES	NO
1. Difficulty in communication	86 (77.47%)	25 (22.52%)
2. Inadvertently draw closer to people during conversations	52 (46.84%)	59 (53.15%)
3. Bring your mask down while talking	25 (22.52%)	86 (77.47%)

REFERENCES-

- 1) www.who.int/director-general/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19---11-march-2020
- 2) <https://www.cdc.gov/niosh/nppt/topics/respirators/dispart/respsource3healthcare.html>
- 3) Purushothaman, P.K., Priyanga, E. & Vaidhyswaran, R. Effects of Prolonged Use of Facemask on Healthcare Workers in Tertiary Care Hospital During COVID-19 Pandemic. *Indian J Otolaryngol Head Neck Surg* (2020).
- 4) Tan K T, Greaves M W. N95 acne. *Int J Dermatol* 2004; 43: 522–523
- 5) Lan J, Song Z, Miao X, Li H, Li Y, et al. (2020) Skin damage among health care workers managing coronavirus disease-2019. *J Am Acad Dermatol* 82: 1215–1216.
- 6) Lim ECH, Seet RCS, Lee K-H, Wilder-Smith EPV, Chuah BYS, et al. (2006) Headaches and the N95 face-mask amongst healthcare providers. *Acta Neurol Scand* 113: 199-202.
- 7) Johnson AT (2016) Respirator masks protect health but impact performance: A review. *J Biol Eng* 10: 4.
- 8) *BMJ* 2020; 369 doi: <https://doi.org/10.1136/bmj.m1435> (Published 09 April 2020) Cite this as: *BMJ* 2020;369:m1435
- 9) World Health Organization (2009) WHO guidelines on hand hygiene in health care: https://www.ncbi.nlm.nih.gov/books/NBK144013/pdf/Bookshelf_NBK144013.pdf
- 10) Yan Y, Chen H, Chen L, et al. Consensus of Chinese experts on protection of skin and mucous membrane barrier for health-care workers fighting against coronavirus disease 2019. *Dermatologic Therapy*. 2020; 33:e13310. <https://doi.org/10.1111/dth.13310>
- 11) Chughtai, Abrar & Seale, Holly & Tham, Dung & Hayen, Andrew & Rahman, Md & Macintyre, Chandini. (2016). Compliance with the Use of Medical and cloth mask among health care workers in Vietnam. *Annals of Occupation Hygiene*. 60. Mew008. 10.1093/annhyg/mew008.
- 12) Rosner E (2020) Adverse Effects of Prolonged Mask Use among Healthcare Professionals during COVID-19. *J Infect Dis Epidemiol* 6:130. doi.org/10.23937/2474-3658/151013
- 13) Foo CC, Goon AT, Leow YH, Goh CL. Adverse skin reactions to personal protective equipment against severe acute respiratory syndrome--a descriptive study in Singapore. *Contact Dermatitis*. 2006 Nov;55(5):291–4. doi: 10.1111/j.1600-0536.2006.00953.x. PMID: 17026695; PMCID: PMC7162267
- 14) Guertler A, Moellhoff N, Schenck TL, et al. Onset of occupational hand eczema among healthcare workers during the SARS-CoV -2 pandemic—comparing a single surgical site with a COVID -19 intensive care unit. *Contact Dermatitis*. 2020;83: 108-114.