Original Article

Evaluation of Peripheral Oxygen Saturation after Wearing Different Face Masks and Related Anxiety in Healthcare Workers Amid COVID-19 Pandemic at A Tertiary Care Facility in Province of Sindh

Saima Siraj[1], Shamsuddin Solangi[2], Manzoor Ali[3], Hussain Bux Kolachi[4], Shazia Kazi[5] and Sajjad Kazi[4]

ABSTRACT

Objective: To evaluate peripheral oxygen saturation after wearing different face masks and related anxiety in healthcare workers amid COVID -19 Pandemic at a tertiary care facility.

Study Design: Cross-Sectional, Observational and Comparative Study

Place and Duration of Study: This study was conducted at the Isra University Hospital Hyderabad from June 2020 to July 2020.

Materials and Methods: The study was done on group of healthcare workers of the tertiary care hospital; sample size was 57. Informed consent was obtained from all enrolled participants. Proforma was designed and filled by each participant. Data was analysed on SPSS version 22. Chi square test was applied for statistical significance.

Results: Gender distribution of participants in study population male were 39 (68.4%), female 18 (31.6%). Most common age group was 20 – 40 year (89.5%) age range 22 – 66 year. Peripheral Oxygen Saturation was not affected with wearing different masks in different ventilation areas except poorly ventilated area which was environmental. Anxiety related to wearing masks amid Covid – 19 pandemics was statistically significant < 0.05.

Conclusion: It is concluded that there is no effect on peripheral oxygen saturation after wearing different masks in different ventilation areas except poorly ventilated area which was due to environment. There is statistically significant value < 0.05 for related anxiety in healthcare workers after wearing face masks amid COVID - 19 pandemic.

Key Words: SpO2 level, Face masks, Healthcare workers, related anxiety, COVID – 19 Pandemic

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INTRODUCTION

The novel coronavirus disease 2019 (COVID – 19) pandemic, the outbreak was first identified December 31, 2019 in Wuhan city of china. WHO declared COVID – 19 global pandemic in March 11, 2020. First cases of COVID-19 occurred in Karachi and Islamabad Pakistan in February 26, 2020 and become peak in the middle of June 2020. Fear and anxiety developed in the public regarding wearing masks.

[1.] Department of Pulmonology / Medicine[2] / Psychiatry[3] / Community Medicine[4] / Cardiology[5], Isra University Hyderabad.

Correspondence: Dr. Shamsuddin Solangi, Professor of Medicine, Isra University Hyderabad.
Contact No: 03023344693
Email: sksolangi@hotmail.com

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The normal saturation of peripheral oxygen (SpO2) level with pulse oximeter ranges from 95 – 100 percent, age older than 70 years SpO2 level of 95 percent is acceptable level. In Younger age SpO2 level could reach up to 99-100 percent [1]

The Centers for Disease Control and Prevention (CDC) recommends that everyone should wear a mask or cloth face covering in public places, like a grocery store or pharmacy amid COVID-19 Pandemic. The CDC doesn't recommend masking for children less than 2 years due to risks of suffocation. It has been reported that asymptomatic people can transmit the COVID-19 and become important sources of the disease. To reduce the role of asymptomatic or mildly symptomatic people transmission of COVID-19, universal use of face masks in addition to hand hygiene and social distancing seems extremely useful. Consequently, preparing the healthy child to use face masks is strongly needed [2,3]

According to Wickham most people can perform any exercises with a face mask on, they will monitor how they are feeling while exercising and look for specific symptoms such as lightheadedness, dizziness,

numbness or tingling and shortness of breath. You need to stop exercising and sit down and take a break.[4]

The World Health Organization (WHO) released guidance on June 16, 2020, that people shouldn't wear face masks while exercising because it could reduce the ability to breathe comfortably. Some people suggest that medical masks (also known as surgical masks) trap exhaled carbon dioxide and cause retention of CO2 in blood. The WHO says the prolonged use of surgical masks doesn't lead to CO2 intoxication nor deficiency of oxygen.[5]A mask is a core component of the personal protective equipment (PPE). Healthcare workers need when caring for symptomatic patients with respiratory viral infections, in conjunction with gown, gloves, and eye protection. It is also clear that masks serve symbolic roles. Masks are not only tools, but they are also magic that may help increase healthcare workers' perceived sense of safety, well-being, and trust in their hospitals. Although such reactions may not be strictly logical, we are all subject to fear and anxiety, especially during times of crisis[6].

MATERIALS AND METHODS

The study was carried out on group of healthcare workers of Isra University Hospital; from June 2020 to July 2020, sample size was 57. Informed consent was obtained from all enrolled participants. Proforma was designed and filled by each participant. Pulse oximeter was used to measure peripheral oxygen saturation (SpO2) level.

Data was analysed on SPSS version 22. Chi square test was applied for statistical significance. Ethical approval was sought.

Inclusion Criteria:

1. Age above 20 years and below 70 years
2. Healthcare workers
3. Willing for participation

Exclusion Criteria:

1. Age below 20 years and above 70 years
2. Participants with Asthma or COPD
3. Refusing for participation

RESULTS

Table 1. shows demographic distribution of participants in the study population, males were 39 (68.4%), female 18 (31.6%). Most common age group was 20 – 40 year (89.5%) age range 22 – 66 year, mean age was 32.36 ± 1.41 years.

Table 2. shows distribution of participants according to profession of healthcare workers, doctors 32 (56.2%), nurses 17 (29.8), technicians 04 (7.0%), and non – technicians 04 (7.0%).

Table 3. shows peripheral oxygen saturation (SpO2) level with and without face mask in different ventilation areas. SpO2 level dropped to 95 – 96 % in poorly ventilated area with mask and without mask respectively as compared with ventilated and open area 98 – 98% with mask and without mask respectively.

Table 4. shows distribution of SpO2 level with different masks in different ventilation areas. SpO2 level dropped to 95 – 96 % in poorly ventilated area with mask and without mask respectively as compared with ventilated and open area 98 – 98% with mask and without mask respectively. Wearing surgical mask along with N95 mask did not affect the SpO2 level in ventilated and open areas.

Table 5. shows comparison of participants feeling or not feeling suffocation / anxiety after wearing face masks, Chi square test was applied which was statistically significant value < 0.05.

Table No.1: Distribution of participants according to demographic characteristics (n=57)

Variables	Frequency	Percent
Age groups		
20 - 40 years	51	89.5%
41- 66 years	06	10.5%
Total	57	100.0%
Gender		
Male	39	68.4%
Female	18	31.6%
Total	57	100.0%

Mean age (Mean ± SD = 32.36 ± 1.41 years)

Table No.2: Distribution of Healthcare worker according to profession (n=57)

Hospital Staff	Frequency	Percent
Medics		
Doctors	32	56.2%
Nurses	17	29.8%
Paramedics		
Technician	04	7.0%
Non - Technician	04	7.0 %
Total	57	100.00%

Table 3. Distribution of SpO2 level with and without face mask in different ventilation areas (n=57)

Level of Ventilation*	SPO2 with mask	SPO2 without mask
Poorly Ventilated area	95%	96%
Ventilated area	98%	98%
Open area	98%	98%

*Poorly ventilated = Single door, no window. Ventilated = > 1 door and > 1 window. Open = Green space

Table No.4: Distribution of SpO2 level with different masks in different ventilation areas (n=57)

Types of mask	Number of Participants	Ventilation area and Spo2 level %					
		Poorly ventilated		Ventilated		Open	
		With mask	Without mask	With mask	Without mask	With mask	Without mask
Surgical mask	24 (42.1%)	95	96	98	98	98	98
N95 mask	19 (33.3%)	95	96	98	98	98	98
Both (Surgical mask+ N95 mask)	14 (24,6%)	95	96	98	98	98	98

Table 5. Comparison of participants feeling or not feeling suffocation / anxiety after wearing masks (n=57)

Suffocation/Anxiety	Number of participants	Gender		Age	
		Male	Female	< 35 years	> 35 years
Feeling suffocation	22 (38.6%)	11	11	18	5
Not feeling suffocation	35 (61.4%)	28	7	25	9

$X^2 = < 0.05$

DISCUSSION

Governments are making masks mandatory in indoor, public places to help curb the spread of the coronavirus that causes COVID-19 pandemic. There are some anti-mask groups, people spreading misinformation about wearing masks might reduce one's oxygen level. According to Dr. Susy Hota – medical director of infection prevention and control at Toronto's University Heath Network there is no medical or scientific evidence that shows that wearing a mask could reduce blood oxygen level or accumulation of carbon dioxide[5,10]

This study was conducted to assess peripheral oxygen saturation (SpO2) level after wearing different masks and related anxiety in healthcare workers of tertiary care hospital Hyderabad, Pakistan amid COVID – 19 pandemics. Our study population comprised of young healthcare workers < 40 years 51 (89.5%) which didn't showed drop in SpO2 level after wearing different masks in ventilated and open areas. There was drop in SpO2 levels with wearing masks in poorly ventilated areas which was due to environment.

Consistent studies include Esposito S et al (Italy 2020)[3], Klompas Michael et al (USA 2020)[6], Kim MN et al (Korea 2020)[7], Dugdale CM et al (USA 2020)[8], and Roy D et al (India 2020)[11],

Inconsistent studies are Grayson Wickham (USA 2020)[4], Sharma SK et al (India 2020)[9], Feng S et al (China 2020)[12] – texture of cloth was different.

CONCLUSION

Our study concluded that there is no effect on peripheral oxygen saturation after wearing different masks in different ventilation areas except poorly ventilated area which was due to environment. There is statistically significant value < 0.05 for related anxiety in healthcare workers after wearing mask amid COVID-19 pandemic. Poorly ventilated areas be avoided as SpO2 level is affected.

Author's Contribution:

Concept & Design of Study:	Saima Siraj
Drafting:	Shamsuddin Solangi, Manzoor Ali
Data Analysis:	Hussain Bux Kolachi, Shazia Kazi, Sajjad Kazi
Revisiting Critically:	Saima Siraj, Shamsuddin Solangi
Final Approval of version:	Saima Siraj

Conflict of Interest: The study has no conflict of interest to declare by any author.

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