Section: General Medicine

Original Research Article

EFFECTS OF WEARING MASKS ON HEALTH OF HEALTHCARE WORKERS

Sreegeetha[1], Chetan Jambagi[2], Deepak Kumar Garg[3], Dharmesh[4], Arun N[5]

[1]Associate Professor, Department of Medicine, Katuri Medical College, Andhra Pradesh, India.
[2]Classified Specialist, Department of Medicine, Military hospital, Jodhpur, Rajasthan, India.
[3]Graded Specialist, Department of Medicine, Military hospital Jodhpur, Rajasthan, India.
[4]Commandant, Military Hospital Jodhpur, Rajasthan, India.
[5]Graded Specialist, Department of Medicine, Military Hospital, Trivandrum, Kerala, India.

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Corresponding Author:
Dr. Arun N
Email: jazziyer@gmail.com

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Abstract

Background: COVID-19 pandemic started in Dec 2019 and is continuing ever since. The virus has undergone multiple mutations and since it's a novel virus, not much is known about it and daily new things are being learnt. This has led the humans to focus on preventive measures from getting infected by the virus till the time definitive cure is found. The preventive measures include wearing of masks, hand sanitisation and social distancing. But these preventive measures are also detrimental if undertaken in excess as being determined by multiple studies. The objective is to determine the ill effects of excessive and prolonged wearing of face masks, which has become the need of the hour. **Materials and Methods:** This observational study was done in a tertiary care hospital in India where the mean temperature ranges from 20 to 47.8 degrees Celsius over the last decade. **Result:** The study found claustrophobia as the most common effect of prolonged mask wearing followed by increased irritation over face and increased tiredness. Many subjects also complained of disturbances in sleep, vision and hearing. **Conclusion:** SARS-CoV2 has created a lot of havoc and spreads easily via air droplets. Also, new variants with differing virulence are emerging on a regular basis. Wearing of masks is an important method of protecting oneself from getting infected but at the same time one needs to be careful from the ill effects of wearing masks for prolonged periods. It is suggested that in order to reduce the ill effects of wearing face masks for prolonged durations, we can have frequent break from wearing of masks, frequent washing of face with water (in order to get rid of the dirt and sweat) and to do deep breathing exercises so as to free oneself from the feel of being claustrophobic and get some fresh air in the lungs. Also, one must make sure of the integrity, correct fitting and breathability of the masks when using a new mask or reusing a mask after adequate decontamination.

INTRODUCTION

From time to time, there have been many pandemics (like Black death, Spanish flu) which have caused a great havoc in the history of mankind. From Dec 2019 to 2021 it has been a year of great turmoil and mania, especially for the Health Care Workers (HCW). A lot of confusion was present regarding the prevention, quarantine and treatment protocols. Multiple preventive measures have been implemented, like use of masks, hand sanitizer and social distancing to name a few. In this article we are discussing about one such preventive measure and its effects on the health of the HCW.

There are pictures of medical professionals from the early modern age treating patients suffering from the bubonic plague wearing beak-like masks. These masks were supposedly filled with herbs such as clove or cinnamon as well as liquids and led to the term 'beak-doctors'.[1] Medical masks have evolved from "beak masks" to "mouth bandage" to N95 and N99 masks. The wearing of face masks has become an accepted norm and moreover a new type of fashion in the society. They come in all types of patterns and types and are made of different materials. This mask wearing is more important for the HCWs who have to wear the mask for prolonged periods while being involved in the patient care. It is true that masks prevent the spread of the disease but wearing the mask for prolonged time periods may also take a toll of both the physical and emotional health. Hence this study was an effort to determine the common effects the masks have on the health of healthcare workers.

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MATERIALS AND METHODS

This study was done in Military Hospital, a tertiary care hospital Jodhpur in India with where the mean temperature ranges from 20 to 47.8 degrees Celsius over the last decade. The study was performed from Jun 2020 to Dec 2020. A questionnaire was designed which included various questions such as the common side effects experienced, preference of mask, working conditions. It was first validated with a small sample size of 20 individuals and then further distributed electronically among the doctors and paramedical staff of the hospital and an anonymous survey was done. Inclusion criteria was the people willing for the survey and exclusion criteria was the people unwilling for the survey. Statistical analysis was done using the IBM SPSS statistical software.

RESULTS

The questionnaire was administered to total of 500 medical staff however only 103 Health Care Workers responded, of which 75(72.8%) were men and 28(27.2%) were women. Of these, there were 46(44.7%) doctors, 41(39.8%) paramedics and 16(15.5%) nurses who took part in the study. Majority of the test subjects were in the age group of 20 to 40 yrs.

Table 1: Distribution of study subjects.

Gender	Occupation			Total
	Doctors	Paramedics	Nurses	
Male	33	41	0	75
Female	13	0	16	28
Total	46	41	16	103

As the hospital is situated in Rajasthan, the working conditions of the health care workers were also considered, 40.8% worked in an Air-Conditioned environment, 32% had humidified air circulators and 27.2% had only fans. 43.7% people worked in Out Patient Departments, 32% in Wards, 7.8% in administrative offices and rest 16.5% worked in all three places. 70.9% people had working hours of less than 8 hrs and 29.1% had more than 8 hrs. The frequency of wearing masks was as 69.9% individuals wore the mask for less than 8 hrs while remaining 30.1% for more than 8 hrs.

Table 2: Duration of mask wearing.

Number of Hours	Frequency	Percent	Frequency	Percent
1.00	1	1.0	72	69.90
2.00	2	1.9		
4.00	5	4.9		
5.00	2	1.9		
6.00	20	19.4		
7.00	7	6.8		
8.00	35	34.0		
9.00	3	2.9	31	30.10
10.00	11	10.7		
11.00	1	1.0		
12.00	12	11.7		
14.00	2	1.9		
15.00	1	1.0		
18.00	1	1.0		
Total	103	100.0	103	100.00

While 66% (68) individuals wore N95 masks, 15.5% (16) preferred surgical masks, 8.7% (9) preferred cloth mask and 9.7% (10) preferred both N95 and surgical masks. Of the 78 individuals preferring N95 masks, 1.3% preferred mask with respiratory valve, 76.9% preferred without respiratory valve and remaining 21.8% preferred both with and without valve. Also, 74.5% preferred mask with strap behind the head and 25.5% preferred it behind the ears.

Table 3. Distribution of wearing different type of mask.

Mask	Frequency	Percent
N95 Mask	68	66.0
Surgical Mask	16	15.5
Cloth Mask	9	8.7
N95 and Surgical Mask	10	9.7
Total	103	100.0

People touched their masks 95.1% of the time, as shown in the graph. Of these 62% people always sanitised their hands, 27% did it sometimes and 11% didn't sanitise their hands at all before and after touching the mask.

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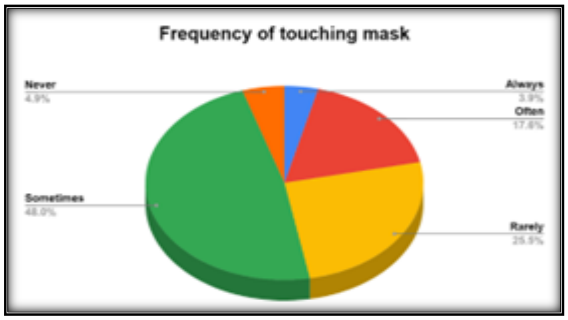
Table 4: Relation between mask type and adverse effect

	Frequencies			Percentage		
Effect	**N95**	**Surgical**	**Cloth**	**N95**	**Surgical**	**Cloth**
Claustrophobia	46	18	6	61.33	69.23	66.67
Irritation over face	42	10	3	56.00	38.46	33.33
Increased tiredness	29	7	3	38.67	26.92	33.33
Skin lesions	26	9	2	34.67	34.62	22.22
Headache	21	9	0	28.00	34.62	0.00
Breathing difficulty	18	9	2	24.00	34.62	22.22
Sleep disturbance	13	2	1	17.33	7.69	11.11
Increased drowsiness	12	1	0	16.00	3.85	0.00
Hearing disturbance	11	2	0	14.67	7.69	0.00
Visual disturbance	4	2	1	5.33	7.69	11.11
Increased forgetfulness	4	1	0	5.33	3.85	0.00
Throat irritation	1	1	0	1.33	3.85	0.00

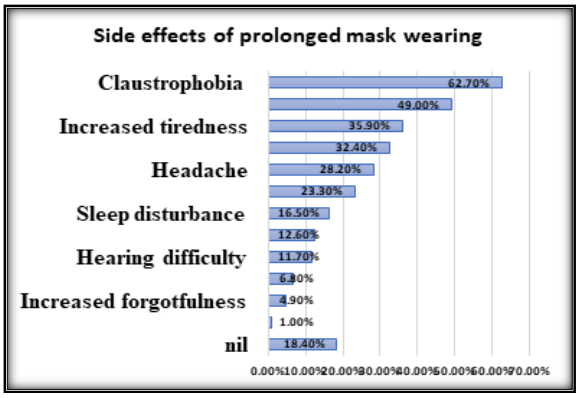
Interestingly, claustrophobia, increased face irritation, tiredness and headaches were more commonly experienced by the women while men had more of breathing difficulty, sleep disturbance, visual and hearing disturbances, as shown in the following table:

Table 5: Relation between gender and adverse effects

	Frequency		Percentage	
	Male	**Female**	**Male**	**Female**
Claustrophobia	41	24	54.67	85.71
Irritation Over Face	32	19	42.67	67.86
Increased Tiredness	23	14	31.08	50.00
Skin Lesions	16	18	21.33	64.29
Headache	18	11	24.32	39.29
Breathing Difficulty	19	5	25.68	17.86
Sleep Disturbance	14	2	18.92	7.14
Increased Drowsiness	9	4	12.16	14.29
Hearing Disturbance	11	1	14.86	3.57
Visual Disturbance	6	1	8.11	3.57
Increased Forgetfulness	4	1	5.41	3.57
Throat Irritation	1	0	1.35	0.00



The effects of prolonged use of face masks as experienced by the individuals are as: 62.7% people experienced claustrophobia, 49% had increased irritation over mask, 35.9% people experienced increased tiredness, 32.4% developed acne and skin rash over face, 28.2% experienced headache, 23.3% breathing difficulty, 16.5% sleep disturbance, 12.6% increased drowsiness, 11.7% had hearing difficulty, 6.8% had visual disturbance and 1% had throat irritation, while 18.4% didn't experience any issue.



As shown in the following table, claustrophobia was equally caused by all the type of masks, N95 mask caused more irritation over face, sleep disturbance, increased drowsiness and hearing disturbance as compared with the other two varieties of masks. Surgical masks caused more of breathing difficulty, and headache as compared to others. Cloth masks caused most of visual disturbance as compared to others.

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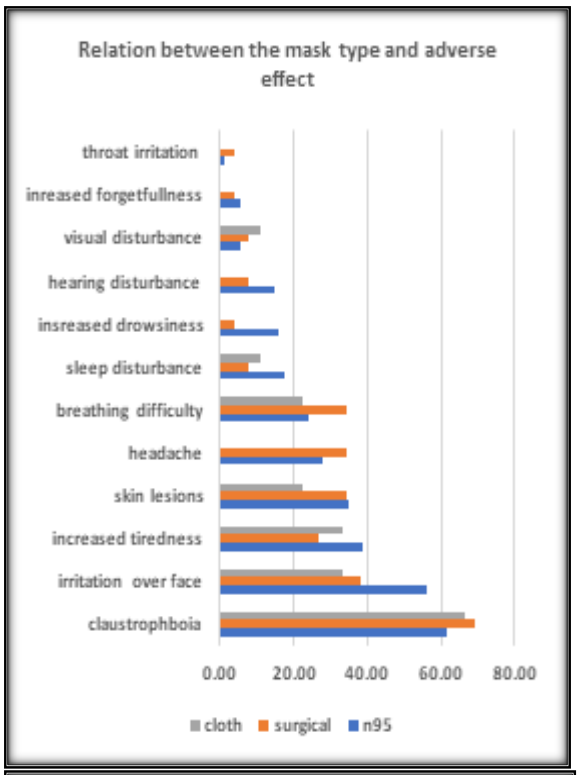
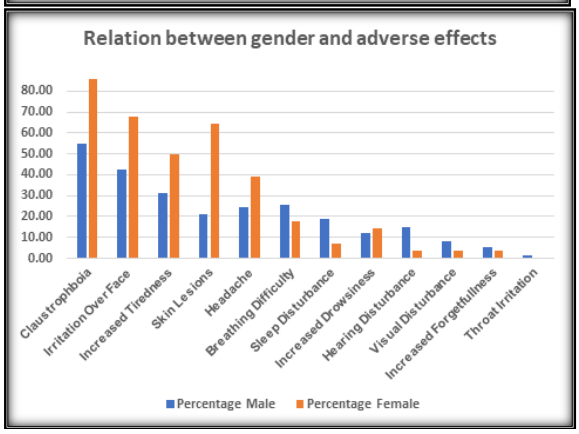
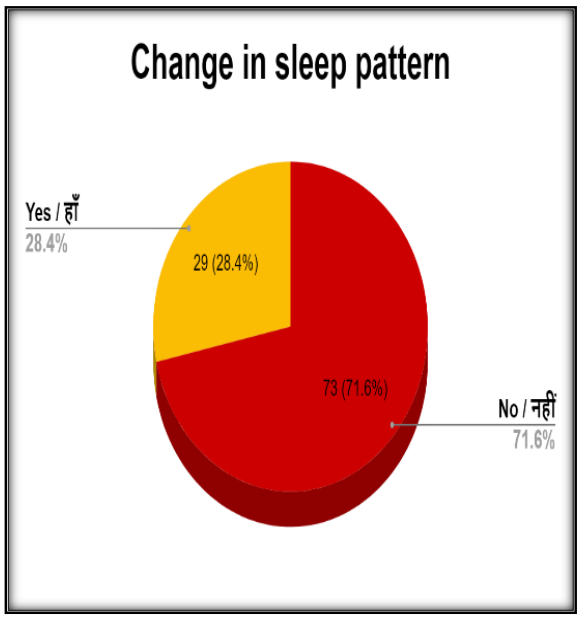
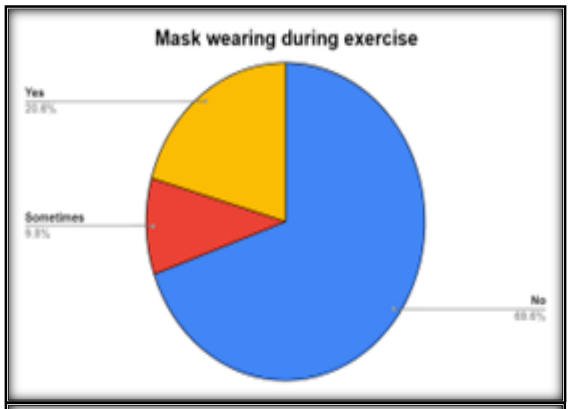


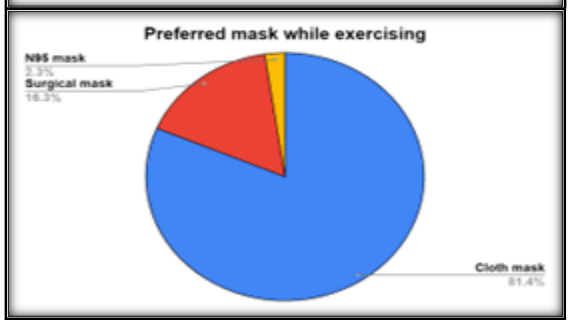


While the sleep pattern of majority of the subjects was mostly 6-7 hrs (77.8%), 18.2% slept less than 6 hrs and 4% slept more than 7 hrs and of these 28.4% experienced change in sleep pattern.



20.6% people preferred to wear masks while exercising while 9.8% wore it sometimes. Of these 44.2% individuals were comfortable exercising with masks on and 55.8% were not comfortable. The preferred mask during exercising was the cloth mask as worn by 81.4% individuals, 16.3% preferred surgical masks and 2.3% preferred N95.





On the emotional aspect, 37.3% people felt that mask wearing had an impact on their beauty and physical appearance, of which 17.5% people were emotionally affected. 62.7% of the subjects had difficulty in recognising the other individual with masks on. 71.6% people had difficulty in communicating with other people. 65.7% of the subjects started talking in louder voice, as experienced by the individual.

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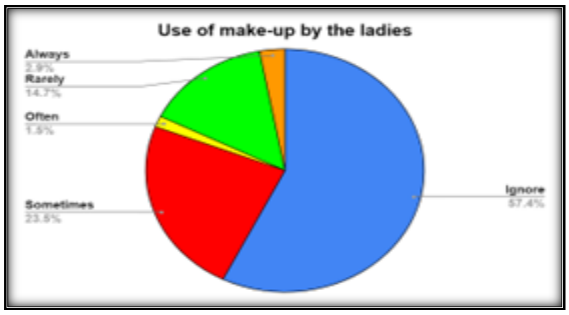
Almost everyone (99% people) felt very happy after removing mask after the day.

73.5% people noticed advantages of wearing the mask, mostly comprising of protection from the droplet infection, reduction in breathing polluted air, reduction in allergic rhinitis and had a sense of security from the respiratory infections.

42.6% women felt the need to increase the use of their makeup kit after wearing of the mask.



DISCUSSION

As the saying goes 'prevention is better than cure', there is an increased emphasis on wearing of masks, socials distancing and hand sanitisation. The WHO, CDC, other health and govt agencies are reiterating the importance of these preventive measures which help in reducing the chance of infection and thereby reducing morbidity and mortality. There is another saying which says 'excess of everything is bad', so is the case in the present COVID scenario, as determined by multiple studies done on this topic. A study done by Beiu et al determined that frequent hygienization of hands may generate various changes in skin texture, ranging from the development of cutaneous xerosis (dryness of the skin) up to irritant contact dermatitis (ICD) or, rarely, even allergic contact dermatitis (ACD).[2] On similar lines, excessive wearing of masks has a profound effect on the health of an individual. A study done by Rosner et al, determined the common side effect of headache followed by skin rash and acne, after wearing the mask for prolonged periods.[3] Another similar study done by Purushothaman et al determined the common side effect of difficulty in breathing on exertion and excessive sweating around the mouth which leads to poor adherence to wear masks continuously.[4] Our study found that claustrophobia was the most common effect of wearing masks, followed by increased irritation over face, increased tiredness, skin rash, headache, breathing difficulty and sleep changes, to name a few. Most of these symptoms can be explained by the fact that a properly worn mask creates a physical feel of a closed environment with warm humid air to inhale and the build-up of carbon dioxide in the breathing zone can cause undesirable symptoms such as fatigue, headache and loss of concentration, as assessed by a study conducted by Geiss, O. (2021).[5] Interestingly, 11.7% of test subjects reported hearing difficulty, probably because the voice of the other individual gets drowned in the layers of mask. Also 6.8% reported visual disturbance probably due to increased fogging of spectacles due to exhaled air from an ill-fitted mask also due to increased concentration of inhaled carbon dioxide from the breathing zone.

The upsurge of COVID cases and increased emphases on the use of personal protective measures has created an increased demand for the supply of personal protective equipment, most notably the face masks. However due to the mismatch of the supply and demand, the people are forced to reuse the masks more than once. This reuse of mask can be dangerous as it can lead to exposure of the pathogen with the individual, thereby rendering the preventive measures futile. The reuse of masks and their decontamination, if done, needs to be highly regulated and needs to be carried out with utmost care and precaution. Multiple studies have been done to determine the best method of decontamination. One of the methods suggested by CDC was of reusing the Filtering Facepiece Respirator (FFR) by issuing each HCW 5 FFRs. Upon completion of a shift, the FFR is placed in a paper bag and redonned after sitting in that bag for 5 days. This time period was determined based on data that suggests that SARS-CoV-2 can exist on surfaces for as much as or longer than 72 hours. This allows a HCW to cycle through their own previously used masks.[6] A study done by Fischer et al analysed and compared four readily available methods of decontamination of the masks namely, UV, 70% ethanol, 70°C heat and vaporized hydrogen peroxide (VHP). The study indicated that N95 respirators can be decontaminated and reused up to 3 times by using UV light and VHP and 1–2 times by using dry heat.[7] A study by Alcaraz et al indicated that the type IIR polypropylene medical masks can be washed (with detergent at 60C) up to 10 times, washed 5 times and autoclaved 5 times, or washed then sterilized with radiations or ethylene oxide, without any degradation of their filtration or breathability properties.[8] The method of decontamination of the masks must ensure that their filtration capability, integrity of the mask, and their breathability is not lost. This reuse of masks also benefits the ecology by decreasing the waste burden and consumption of polypropylene (commonly used in masks). It also reduces the financial burden on the individual as there has been an increase in the prices of the masks as shown by a study done by Goel et al. They found that increased demand and mandating the wearing of masks by all people yields higher prices than when masks are recommended or mandated only for essential personnel.[9] This also helps to preserve the vital resources for the Front-Line Workers.

CONCLUSION

True to the fact that wearing of masks is an important measure for prevention of COVID-19 disease, the healthcare workers should take adequate measures

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for reducing the adverse effects. The measures include, incorporation of deep breathing exercises and meditation for improving the oxygenation and lung capacity, use of moisturisers for the skin breakdown and skin rash and timely breaks in between the working hours.

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