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A Cross Sectional Survey About Knowledge, Attitude And Practice Towards Face Mask Use In Indian Population During Covid-19 Pandemic

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Abstract

Introduction Mother Earth has witnessed 3 huge waves of COVID-19 pandemic till now and before and after each wave, all the discussion in international media comes down to one common point and that is- the role of standard precautions? Research in medicines and vaccines are still evolving but what can guarantee a good safety is the proper implementation and utilization of standard precautions and of which face mask is a core part. We conducted this survey so as to know the current status of knowledge about use of face mask in general population. **Materials and methods** Cross-sectional survey was conducted among general population of India through an internet-based survey using Google forms. Questionnaire was prepared and was validated. Study population was divided into those from health care sector and non-health care sector. Data was analyzed by using various statistical methods. **Results** Statistical differences were found with respect to source of information, type of material used for making a face mask, correct methods of wearing and removing face mask, time period for which one can continuously use a face mask, attitude of people when the face mask gets wet, knowledge of using face mask in children. **Conclusion** Our study findings strongly point to the real life scenario of use of face mask in general population. Though knowledge of face mask can differ among participants from health care sector and non-health care sector; attitude and practices should not. It is unfortunate that the guidelines are still on paper and general public is still far away from important aspects of using face mask. Emphasis should be given towards unbiased awareness on use of standard precautions.

Keywords: Face mask, COVID-19, Knowledge, Attitude, Practice

Introduction

Coronaviruses (CoV) is a family of viruses that affects the respiratory system and can produce varied range of illnesses including Middle East respiratory syndrome (MERS)-CoV and severe acute respiratory syndrome (SARS)-CoV. (**1**) Coronavirus disease 2019 (COVID-19), caused by SARS-CoV-2, was declared a Public Health Emergency of International Concern on January 30, 2020. Subsequently, it was declared a pandemic on March 11, 2020 by the world Health Organization (WHO). (**2**) India reported its first laboratory confirmed case of COVID-19 on 27 January 2020 from Thrissur, Kerala. (**3**)

The WHO has advised for the use of safety measures; such as- wearing a face mask, social distancing and hand hygiene; that can protect an individual from

getting infected. (**4**) It is well known that face masks are effective in preventing entry of microorganisms that are >5-10 µm and aerosols ≤5 µm. These microorganisms can be released from infected individuals during breathing, speaking, coughing and can cause respiratory infections. (**5**)

The safety measures are cost-effective and can easily be used by everyone irrespective of financial status. Today, many countries in the world are facing recurrent waves of the COVID-19 pandemic. Many treatment options have changed. Vaccines against COVID-19 have emerged but the primary protection measures are still the same and are supposed to be followed by everyone despite vaccination status. In order to look for what are the knowledge, attitude and practice of Indian people about the use of these safety measures, we performed this population based study.

Methods

Study Area, Period, And Design

We conducted a cross-sectional survey among the general population of India, from August 18, 2020 to September 25, 2020, through an internet-based survey using Google forms. Internet based survey was used because this study was done in India during the period of lockdown. Link were shared to general public through social media platforms like whatsapp, facebook as well through personalized invitations like short message service (SMS), email. Simultaneously they were also asked to share the link further to their contacts. Thus we managed to get population samples across different states of India.

Data Collection Tool

The survey forms consisted of 4 sections. In section 1, the participants were asked to mention their email id. A brief description about the study was provided in this section and this was followed by consent. Only those participants who gave their consent for further participation were taken for the study. In section 2, the participants were asked to fill basic demographic details that included age, sex, education, residence, profession. The profession category was broadly divided as health care professional (Doctor, Dentists, Nurses, Allied Health professional) and non health care professionals. The section 3 comprised of 23 questions that tested the knowledge, attitude and practice about use of face mask in general population. The questionnaire was developed by reviewing previous different literature on the proper use of face mask and the guidelines by the WHO and that of the ministry of health and family welfare, India; and in consultation with experts from different fields to check the relevance and make necessary changes according to the study requirements. After reviewing literature, we shortlisted 30 relevant questions that would assess knowledge, attitude and practice. These questions were given to 10 experts and 10 subjects to assess clarity, relevance, ambiguity and simplicity. These factors were rates from 1-4 using Likert scale (1 being poor, 4 being optimal). Responses were obtained from 10 experts in the medical field and 10 participants. Questions with total score of >8 were considered for final inclusion into the questionnaire. After calculation of Cohen's Kappa Index, 23 questions with index >0.6 s/o substantial agreement between observers were selected for final inclusion into the questionnaire. The questions were simultaneously posted in 2 languages (English and Hindi). The Hindi translation was done by professional translator. The last section was kept as a query section through which the participants could ask query (in case they have any) related to any question. The responses were recorded depending upon the information asked in the question as either best of the given choices, multiple answer questions and yes/no.

Measurement

Assessment Of Knowledge And Attitude About Face Mask

These questions were based on correct wearing of face mask (**23**), about the number of layers and the type of material that makes an ideal face mask, about the comparative protection offered by different types of masks.

Assessment Of Attitude Towards Use Of Face Mask

Questions were asked about whether face mask alone is sufficient to get a comprehensive protection; about whether a facemask if gets wet should be continued or be disposed of, opinion regarding reusability and effectiveness of face masks, opinion regarding use of face mask by children.

Assessment Of Practices Related To Face Mask

Volume 5, Issue 1; January-February 2022; Page No 727-739

This section focused on the real life situations and the answers were mainly subjective. The participants were asked since when and where do they wear face mask regularly, about the problems face by the people while wearing a face mask and how do they deal with them. They were also asked about the unintentional errors that people make while using or removing a face mask and about the practices they follow while disposing/reusing the mask.

Statistical Analysis

The data obtained from the completed questionnaires were manually entered in Microsoft Excel (version - Office 365). The data was appropriately recoded for the variables. The final sheet was imported into R version 4.1.0 using the "readxl" package and further analysis was done using packages like "tidyverse", "gtsummary", "flextable", "tidyr", "expss", "ggplot2" and their dependencies.

Continuous variables such as age, income were expressed in terms of mean and standard deviation

The outcome variables which were nominal expressed in terms of frequencies and percentages.

Further Chi-square test or Fisher's test was used to find an association between categorical variables and the Wilcoxon rank-sum test was used for the continuous variables.

Results

Demographic characteristics (Table 1)

A total of 345 individuals participated in the study with a mean age of 30 years (Range=18-71). Of these, 197 (57%) were male, 175 (51%) were healthcare professionals, 290 (84.1%) lived in urban areas, and 262 (76%) were graduate and above.

Knowledge about use of face mask (Table 2)

Participants from health care sector obtained information on face mask mostly from WHO guidelines (**66%**) and with discussion with people related to health care sector (**21%**) while television (**21%**), newspaper (**1.2%**) and social media platforms (**14%**) were the sources of information for other participants (**p<0.001**). There was statistical significance difference between knowledge of common man as compared to participants from health care sector with regards to the comparative efficacy of different types of materials that can be used for making face mask (**p<0.001**).

But either group demonstrated poor knowledge on the most commonly used material for making a cloth face cover. Also the knowledge of both the groups regarding the areas of face that should be ideally covered by a face mask was comparatively similar. Both the groups demonstrated good knowledge when asked about the minimum number of layers that a cloth face mask should have (**Fig. 1**).

It was found that participants from health care sector demonstrated significantly better knowledge on how a face mask must be worn. (**p=0.02**)

Table 3 shows the comparative analysis of both the groups with respect to attitude towards use of face mask. Statistically significant difference was found, with the participants from health care sectors demonstrating better attitude, when asked about what one would do if their face mask gets wet (**p=0.012**). Also the health care sector participants group was found to have significantly better attitude about use of face mask by children (**p=0.033**). However, both the groups agreed in similar numbers that, to get maximum protection, the use of face mask alone is not enough **(Figure 2**). It has to be supplemented with other measures like social distancing and hand hygiene. Similarly, the attitude of both the groups was almost similar when asked about reusability and effectiveness of different types of face masks.

Almost 77% participants from each group agreed that cloth face cover can be washed and reused. But only 12% participants agreed that surgical masks should be thrown after single use.

Table 4 shows practices of using face mask in both the study groups. Significant difference in the level of practices was found with regards to time period since using face mask (**p<0.001**), duration up to which one wears a face mask while outside home (**p=0.015**) and steps of removing the face mask (**p<0.001**) with the participants from health care sector demonstrating good practices. No significant difference was found with regards to other common practice methods like sharing of mask within family members, touching outer surface of face mask, hanging the mask around neck and areas where one prefers wearing a face mask. Majority of them denied sharing of the mask amongst family members and also agreed that they

Volume 5, Issue 1; January-February 2022; Page No 727-739

put on mask as soon as they step out of their home. However, an appreciable number of participants from both the groups agreed that they hang the face mask sometimes or often touch the outer surface of the mask.

With regards to washing of a cloth face cover (**Fig.3**), both the group demonstrated similar results. Majority participants in both the groups agreed about washing the face mask separately from normal laundry but very few (**34; 9.9%)** were compliant to standard washing guidelines that include using hot water and bleach.

Practices with regards to disposing of used face masks (**Fig. 4**) were grossly different in both the groups with participants from health care sector demonstrating better adherence towards standard disposing methods.

With regards to the difficulty face by people while wearing face mask (**Fig. 5**); majority faced breathing difficulty with few of the participants facing minor problems like fogging of spectacles, sweating, itching, skin problems, and communication problems.

Discussion

This study was aimed to assess the knowledge, attitude and practice about face mask usage among general public since the outbreak of COVID-19 in India. India is facing COVID-19 pandemic since January 2020 and till date more than 30 million people have got infected and more than 4 lakh people have died. (**6**)

The study population demographics are in line with other studies done so far in India but in our study we have also compared the replies of participants from health care sector with that of non health care sector. (**24**)

With regards to the knowledge component of proper wearing of face mask, only 41% of the participants had complete and appropriate knowledge while 41% had incomplete knowledge. This finding of ours is contradictory with previous studies from India (**24**) that showed 82.5% of the participants with correct knowledge. This difference in our finding can be explained by the multiple choice pattern of our question that was intentionally made to assess absolute and correct knowledge of the participants. It is possible that someone may know the correct method of wearing a face mask but simultaneously he/she must also know what incorrect way is because incorrect wearing can lead to self contamination and a breach in one's safety.

When asked about if cloth face cover is as effective as N95 mask or a surgical mask, just 3.2% respondents marked it as wrong answer. This finding is in accordance with findings by Sayare et al (**24**) in which almost 42% of the respondents gave a wrong answer to this. Though in both the studies, participants agree to the fact that cloth face cover is not equally effective as N95 or surgical mask, the difference in the number may be explained because of difference in the literacy and awareness status of the participants.

This finding is different from previous studies in which almost 55% participants agreed that they reuse mask. (**24**) While in a study from Vietnam, 43.5% of the participants reported to reuse the mask. (**25**)

Universal face masking, as encouraged by the WHO and by the CDC Atlanta, can prove very useful and cost effective strategy in long run. (**4,22**) As advised by the WHO, children below 5 years age should not wear face mask. (**7**) While the Centers for disease control and prevention (CDC) Atlanta advises 2 years and above age group for wearing face mask by children. (**8**)

Face mask solves two purposes for the community-first, it provides source control, i.e. prevents further transmission of the virus from an infected person; (**11,12**) and secondly; it can protect healthy individuals from acquiring the infection. (**13**) Thus, it is of prime importance for the general population to understand and to correctly follow the preventive measures advised by the WHO so that new rises in the number cases can be prevented. Also one should be aware that wearing a face mask alone is not sufficient for infection control. It has to be simultaneously used along with other protective measures like- social distancing and hand hygiene. (**9**,**13**) Face masks of different types are available. The face masks designed for the healthcare workers are mainly the N95 masks and triple layer surgical masks. These masks can be use for 4 to 8 hours and/or should be replace immediately if wet/soiled. These masks are exclusively designed for the health care workers as they have to work in high risk areas. For common people, the WHO advised the use of

Volume 5, Issue 1; January-February 2022; Page No 727-739

cloth based face mask. Cloth based face mask mainly provides source control. Using a cloth facemask by common people also reduced the shortage of N95 masks and surgical masks and they can be reserved for health care workers. (**9**) The material that should be used for preparing a cloth face mask should ideally be polypropylene, polyester, cotton or combination of three. (**19,20**) There should be a minimum of 3 layers in a non medical cloth face mask. (**21**) It is advised that people should follow correct method of how to put on a face mask, how to take it off, and how to dispose it. (**14**) The face mask should be put on as soon as an individual steps out of house. They should not touch the mask with bare hands and if incidentally they get touched, the hands should be properly washed with soap and water. The face mask should be worn at work places continuously for significant duration so as to minimize infection transmission. (**9**)

Face masks, if mishandled, can serve as source of infection and its transmission to a large scale in the community. (**10**) They may provide a false sense of security to many thus people may ignore simultaneous use of other preventive measures like social distancing and hand hygiene. People may touch the mask and can touch the eyes or rub the nose with the same hand. (**15,16**) Wet masks should be immediately replaced as wet mask provides favorable environment for the microbes to grow. Face masks should not be shared with anyone. Single use masks like N95 mask or triple layer surgical masks should be discarded after one time use. The used cloth face masks should be washed and can be reused. But the washing should be either through soap and detergent followed by boiling in hot water for 1 minute or through 0.1 % Hypochlorite solution. If not disposed properly, these face masks can lead to transmission of the virus in the community. All these can do more harm than benefit. (**9**) It is genuine that many people may feel uncomfortable and might even develop various health issues secondary to the use of facemask, like- skin problems, headache, breathing difficulty, vision difficulty, difficulty in communication etc that may lead to non compliance with the recommended guidelines. (**9,17,18**)

Limitations

Our study participants were limited to certain states and with urban predominance. Thus it is difficult to project this pan India. More data are required to understand the real life challenges that are faced by the general public while using face mask and other precautionary measures.

Conclusion

Face mask are mandatory for all since the beginning of COVID era. But mere releasing the guidelines is not enough. It has to be implemented efficiently so that everybody irrespective of his/her literacy or financial status can follow it as per the standard guidelines. Our study highlights that broadly majority of the public is aware of face mask and its importance but its use as per the standard guidelines is still lacking. There is a need to spend more advertising and talks on public interest regarding proper use of face mask in real life situations. Authorities should communicate more on finer aspects of face mask use as little errors in using face mask may pave path for another wave. Materials that can be used to make cloth face cover should be standardized.

Table 1: Demographic characteristics of participants (N=345)

Characteristic	N = 345[1]
Sex	
Female	148 (43%)
Male	197 (57%)
Age (Years)	30, (11)
Highest completed education	
Primary school	1 (0.3%)

Volume 5, Issue 1; January-February 2022; Page No 727-739

Characteristic	N = 345[1]
Middle School	1 (0.3%)
High school	81 (23%)
Graduate	140 (41%)
Post-Graduate and above	122 (35%)
Residence	
Urban	290 (84%)
Rural	55 (16%)
Profession	
Healthcare (Doctor, Dentists, Nurses, Allied Health professional)	175 (51%)
Non-Healthcare/Other professions	170 (49%)

[1]*n (%); Mean, (SD)*

Table 2: Knowledge of respondents regarding usage of face mask

Characteristic	Overall, N = 345[1]	Healthcare (Doctor, Dentists, Nurses, Allied Health professional), N = 175[1]	Non-Healthcare/Other professions, N = 170[1]	p-value[2]
Source regarding method of using mask				**<0.001**
WHO guidelines	200 (58%)	115 (66%)	85 (50%)	
Discussion with doctor/nurse/health care worker	61 (18%)	37 (21%)	24 (14%)	
Television	45 (13%)	10 (5.7%)	35 (21%)	
Social media (Whatsapp/facebook, etc)	37 (11%)	13 (7.4%)	24 (14%)	
Newspaper	2 (0.6%)	--	2 (1.2%)	
Knowledge regarding proper wearing of mask				**0.020**
Correct (complete)	141 (41%)	77 (44%)	64 (38%)	
Correct (incomplete)	140 (41%)	70 (40%)	70 (41%)	
Inappropriate or Incomplete	56 (16%)	28 (16%)	28 (16%)	
Incorrect	8 (2.3%)	--	8 (4.7%)	
Most used material for making cloth face cover				0.2
Cotton based cloth face cover	258 (75%)	126 (72%)	132 (78%)	

Volume 5, Issue 1; January-February 2022; Page No 727-739

Characteristic	Overall, N = 345[1]	Healthcare (Doctor, Dentists, Nurses, Allied Health professional), N = 175[1]	Non-Healthcare/Other professions, N = 170[1]	p-value[2]
Synthetic material-based cloth face cover(polypropylene/ polyester/nylon)	67 (19%)	40 (23%)	27 (16%)	
Tissue paper	20 (5.8%)	9 (5.1%)	11 (6.5%)	
Presence of equal safety and filtration between different materials				**<0.001**
Yes	158 (46%)	62 (35%)	96 (56%)	
No	187 (54%)	113 (65%)	74 (44%)	
[1]n (%),[2]Fisher's exact test; Pearson's Chi-squared test				

Table 3: Attitude

Characteristic	Overall, N = 345[1]	Healthcare (Doctor, Dentists, Nurses, Allied Health professional), N = 175[1]	Non-Healthcare/Other professions, N = 170[1]	p-value[2]
Attitude regarding protection provided by cloth face cover				0.3
Yes, I agree wearing a mask alone is enough	18 (5.2%)	7 (4.0%)	11 (6.5%)	
No, I believe other measures like hand hygiene and social distancing should also be used simultaneously	327 (95%)	168 (96%)	159 (94%)	
Response in consideration of using mask if it gets wet				**0.012**
I continue wearing it	22 (6.4%)	9 (5.1%)	13 (7.6%)	
I change it immediately	210 (61%)	120 (69%)	90 (53%)	
I dry it and reuse it	113 (33%)	46 (26%)	67 (39%)	
Opinion regarding reusability and effectiveness different mask				0.5
Cloth face cover can be washed and reused	266 (77%)	135 (77%)	131 (77%)	
Surgical mask & N95 mask can be used again after washing	25 (7.2%)	10 (5.7%)	15 (8.8%)	
Cloth face covering is equally effective as N95 mask and surgical mask	11 (3.2%)	5 (2.9%)	6 (3.5%)	

Volume 5, Issue 1; January-February 2022; Page No 727-739

Characteristic	Overall, N = 345[1]	Healthcare (Doctor, Dentists, Nurses, Allied Health professional), N = 175[1]	Non-Healthcare/Other professions, N = 170[1]	p-value[2]
Surgical mask should be thrown after single use	43 (12%)	25 (14%)	18 (11%)	
Opinion regarding mask use by children				**0.033**
Yes	247 (72%)	135 (77%)	112 (66%)	
No	5 (1.4%)	2 (1.1%)	3 (1.8%)	
Only in special situations	85 (25%)	37 (21%)	48 (28%)	
I don't know	8 (2.3%)	1 (0.6%)	7 (4.1%)	

Table 4: Practices toward using face mask

Characteristic	Overall, N = 345[1]	Healthcare (Doctor, Dentists, Nurses, Allied Health professional), N = 175[1]	Non-Healthcare/Other professions, N = 170[1]	p-value[2]
Washing hands before putting on the mask				>0.9
Yes every time	162 (47%)	81 (46%)	81 (48%)	
Sometimes	154 (45%)	80 (46%)	74 (44%)	
Never	29 (8.4%)	14 (8.0%)	15 (8.8%)	
Place of wearing mask				0.5
Every time and also when at home	15 (4.3%)	9 (5.1%)	6 (3.5%)	
As soon as you step out of your home	301 (87%)	154 (88%)	147 (86%)	
Overcrowded places	29 (8.4%)	12 (6.9%)	17 (10%)	
Area of face covered by face mask				**0.043**
Mouth only	4 (1.2%)	2 (1.1%)	2 (1.2%)	
Nose only	77 (22%)	30 (17%)	47 (28%)	
Mouth and Nose both	264 (77%)	143 (82%)	121 (71%)	
Hanging mask around neck or forehead				0.081
Yes, very often	31 (9.0%)	13 (7.4%)	18 (11%)	
Sometimes	145 (42%)	66 (38%)	79 (46%)	

Volume 5, Issue 1; January-February 2022; Page No 727-739

Characteristic	Overall, N = 345[1]	Healthcare (Doctor, Dentists, Nurses, Allied Health professional), N = 175[1]	Non-Healthcare/Other professions, N = 170[1]	p-value[2]
Never	169 (49%)	96 (55%)	73 (43%)	
Touching outer surface of mask while in use				0.2
Yes very often	59 (17%)	28 (16%)	31 (18%)	
Sometimes	213 (62%)	103 (59%)	110 (65%)	
Never	73 (21%)	44 (25%)	29 (17%)	
Removal of mask				**<0.001**
First I untie the strings from behind the ear and then remove the mask without touching the outer surface	267 (77%)	154 (88%)	113 (66%)	
I directly remove the outer surface	15 (4.3%)	7 (4.0%)	8 (4.7%)	
I don't follow any fixed pattern of removing the mask	63 (18%)	14 (8.0%)	49 (29%)	
Time period of wearing mask comfortably without any distress				**0.015**
Less than 30 min.	79 (23%)	36 (21%)	43 (25%)	
30 min. to 2 hours	140 (41%)	61 (35%)	79 (46%)	
2 to 4 hours	58 (17%)	34 (19%)	24 (14%)	
More than 4 hours	68 (20%)	44 (25%)	24 (14%)	
Time period regarding regular wearing of mask				**0.001**
Less than 1 month	7 (2.0%)	3 (1.7%)	4 (2.4%)	
1 to 4 months	104 (30%)	38 (22%)	66 (39%)	
More than 4 months	230 (67%)	133 (76%)	97 (57%)	
I don't wear	4 (1.2%)	1 (0.6%)	3 (1.8%)	
Sharing of mask within family				0.8
Yes	25 (7.2%)	12 (6.9%)	13 (7.6%)	
No	320 (92.8%)	163 (93.1%)	157 (92.4%)	

[1]n (%),[2]Pearson's Chi-squared test

Volume 5, Issue 1; January-February 2022; Page No 727-739

FIGURE 1: Knowledge regarding number of layers in respondents' cloth face cover

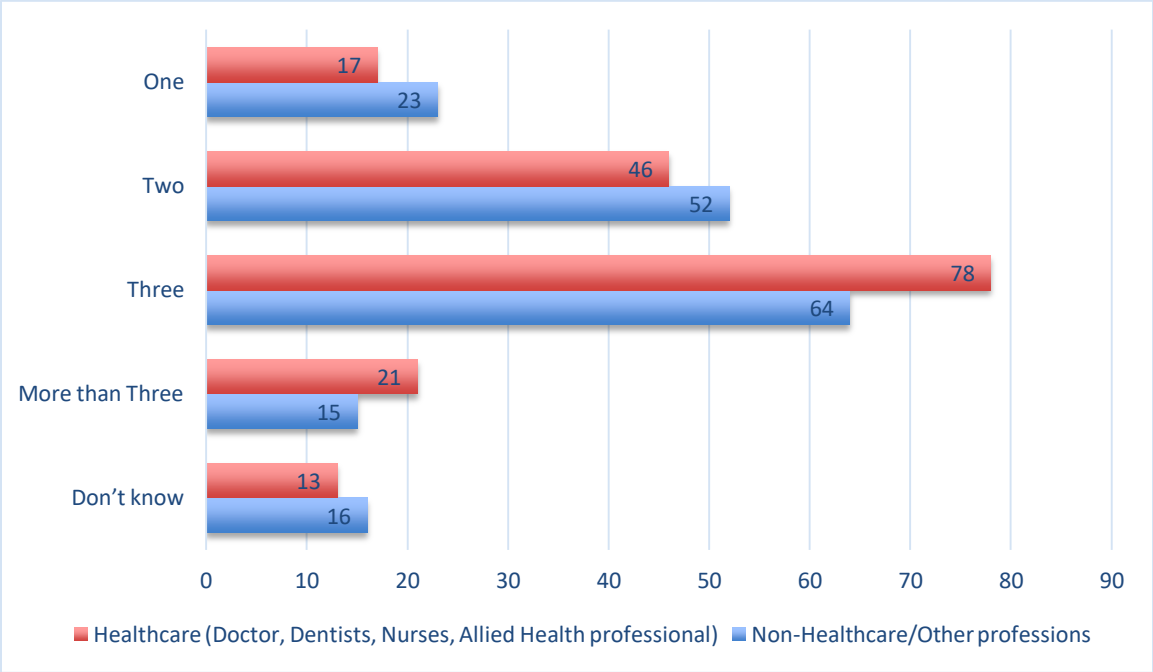
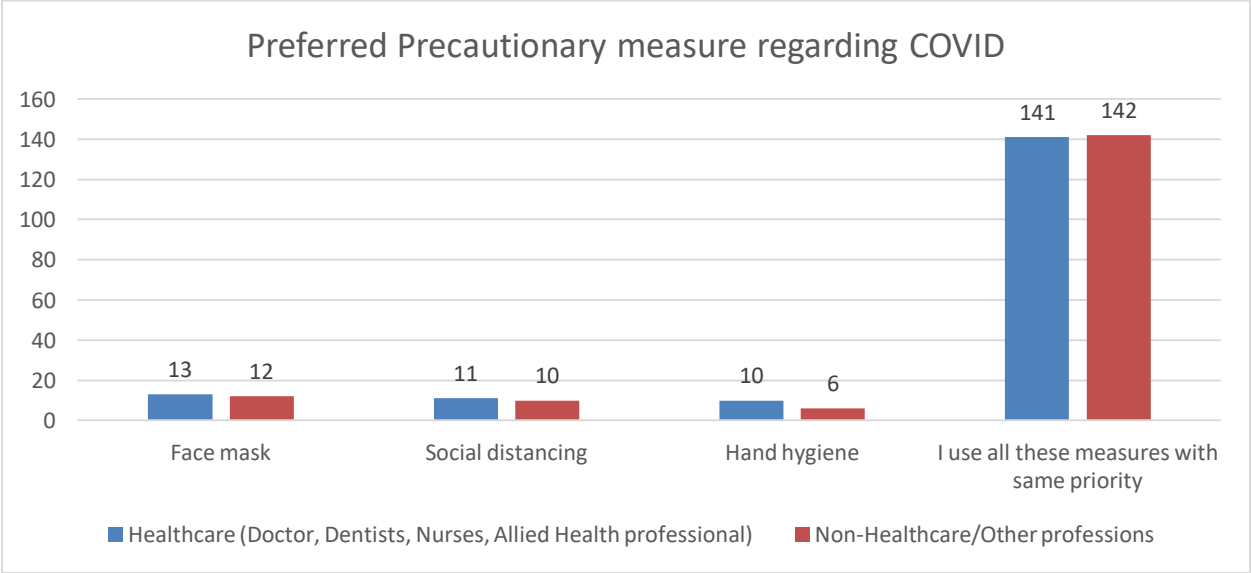


Figure 2: Most commonly used preventive measure



Volume 5, Issue 1; January-February 2022; Page No 727-739

Figure 3: Data on various washing methods used

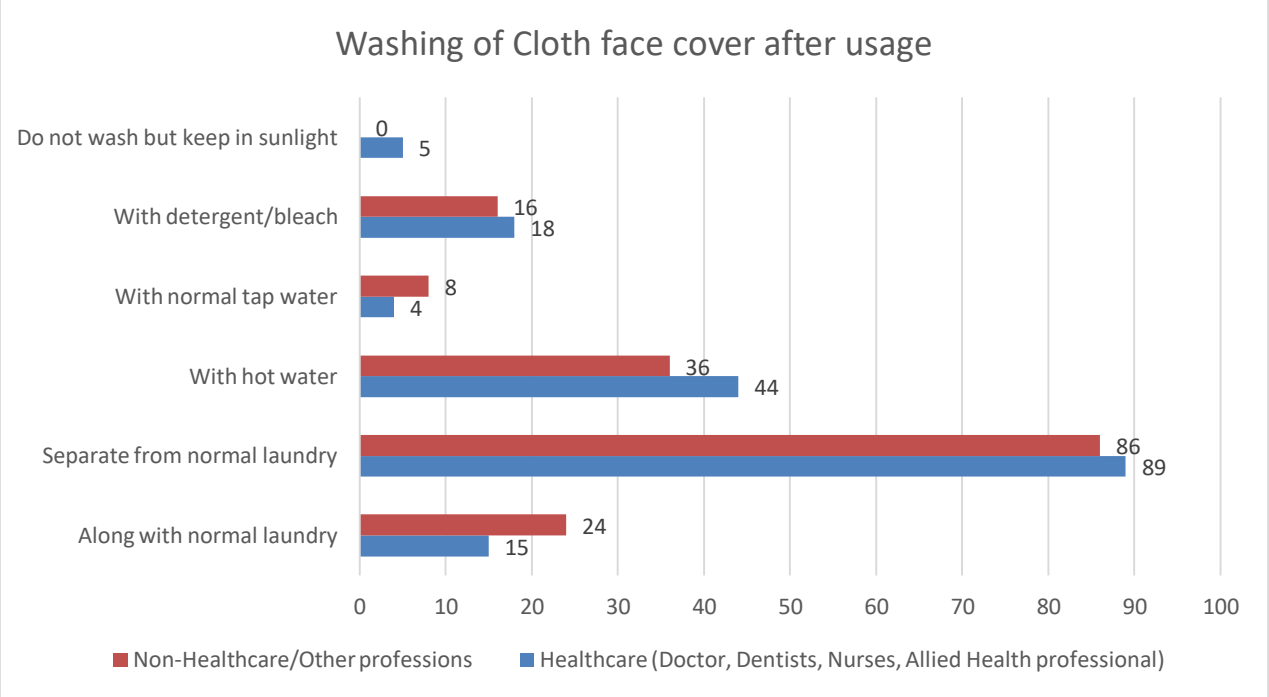
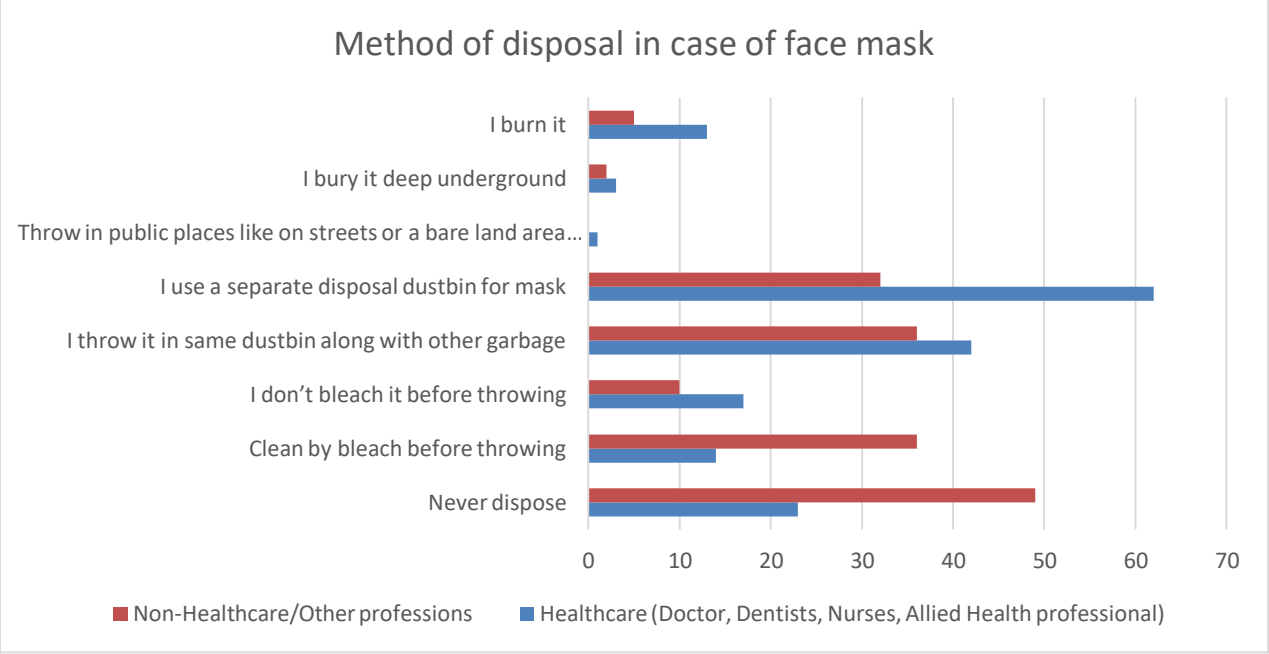
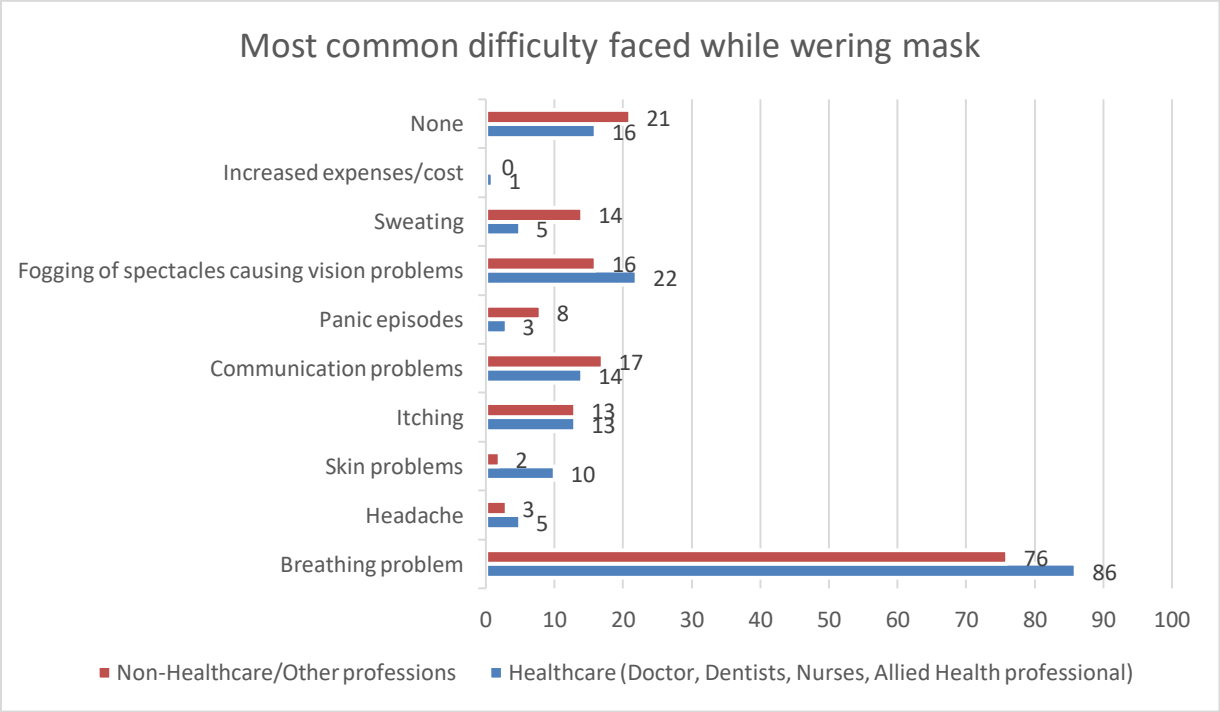


Figure 4: Data on various disposal methods



Volume 5, Issue 1; January-February 2022; Page No 727-739

Figure 5: Data on difficulties faced while using face mask



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Volume 5, Issue 1; January-February 2022; Page No 727-739

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Volume 5, Issue 1; January-February 2022; Page No 727-739