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Original Research Article

A cross sectional study on appropriate use of face mask among adults seeking primary health care services in Chennai

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ABSTRACT

Background: The WHO has recommended face mask use during COVID-19 pandemic for all people in all public settings and situations compromising the social distancing. So, face mask use, hand hygiene and social distancing are the preventive measures followed by many countries against this pandemic. But still inappropriate use of masks might lead to failure of these preventive measures against COVID. So, this study was done to determine the prevalence and determinants associated with knowledge and practices of the appropriate use of face masks among patients attending primary health care services in a slum of Chennai.
Methods: A cross-sectional study was done among patients attending urban primary health centre for non-respiratory complaints. A pretested semi-structured questionnaire was used to collect information from the participants. For assessment of practice, direct observation on the use of a face mask was done. Data were entered in Excel and analysed using SPSS 23.0 software. The Chi-square test was used to analyse the determinants.
Results: Only 10% had the knowledge and none had an appropriate practice of face mask use. 85.5% used face mask with the majority being fabric mask users. The male, age >40 years and low SES had significantly poor knowledge on the appropriate use of face mask.
Conclusions: The high prevalence of inappropriate knowledge and practice of use of face masks implies that along with awareness of mask use, behavioral change on appropriate face mask practices is needed.

Keywords: Appropriate face mask use, Knowledge and practices, Urban PHC

INTRODUCTION

A face mask is a loose-fitting and single-use device that covers the nose, mouth and chin which provides a physical barrier against potentially infectious droplets and is a simple, cheap, non-pharmaceutical intervention for self-protection and preventing the spread of respiratory infections.[1,2] During COVID-19 pandemic, face masks have been employed as one of the strategic measures to prevent and control the transmission of SARS-CoV-2.[3] Due to increasing evidence which shows mild or asymptomatic COVID cases contributed to increase spread of this infection, face masks/face covers were considered to be one of the important measures of control in addition to other measures like social distancing, hand hygiene and cough etiquette to reduce the transmission of COVID-19.[4] The WHO recommends all public to wear mask in all outside setting and in any inside setting or place where social distance can't be maintained or not well ventilated for combating this infection in COVID-19 prevalent countries.[5]

The two types of masks used now are medical masks like surgical mask, FFP (filtering face piece respirator masks e.g. N95) and non-medical mask like fabric mask.[4] WHO advised that not to use mask with respiratory valves as it is ineffective in preventing COVID-19 spread.[4] Though there are different types of mask, the appropriate mask-wearing practices for all three masks are similar except for disposal/sterilization practices. And so in this study,

the participants were asked to wear the surgical mask provided to demonstrate their practice of mask-wearing.

The appropriate face mask use is comprised of five components- 1) settings in where they use, 2) while putting on the mask, 3) while wearing the mask, 4) while removing the mask, 5) proper disposal and sterilization of mask.[2,5] Despite health education campaigns were conducted, there are still unsafe or inappropriate techniques in wearing mask as well as poor practices of disposal and sterilization of the masks. A study done in Hong Kong also showed only 2.3% and 0.2% had appropriate face mask practice while putting on and removing the mask.[2] Improper or careless use of face masks might increase the risk of infection in individuals as well as in the community.[4] So, this study was an attempt to assess the appropriate mask use in adults above 18 years.

Chennai city showed the highest number of COVID-19 caseload and containment zones in Tamil Nadu.[6] Slums have overcrowding, poor ventilation, inadequate water supply and unhygienic living conditions like the use of common toilet or sharing of toilets by two or three households which will be a barrier to disposal/sterilization of mask and other preventive practices by the community.[7,8] In this context, this study was conducted in a slum population attending OPD services in Urban PHC, Chennai.

The objective of this study was to determine the prevalence of knowledge and practices of appropriate use of face mask among patients attending primary health care services in a slum of Chennai and to assess the determinants associated with knowledge and practice of appropriate use of face mask.

METHODS

Study design and setting

It was a cross sectional study done on patients attending the outpatient department in Chetpet urban primary health centre (in slum) Chennai for a period of 3 months November 2020-February 2021.

Inclusion criteria

All patients above 18 years attending the PHC or without any symptoms of upper respiratory infection

Exclusion criteria:

Patients with severe illness, unstable or for COVID swab testing.

Sampling size

Prevalence of acceptable/appropriate face mask practice as per study done by Gunaserkan et al is 11.2% with alpha error at 5% and absolute precision (d) as 6% and 10% non-response rate, the sample size was calculated to be 117 and rounded off to 120.[9]

Sampling method

Roughly around 40 patients/day of this slum seek health care services for non-respiratory diseases. By using simple random sampling method, ten patients per day were selected until the desired sample size was achieved.

Data collection method

After obtaining the necessary permission, the PHC was visited by the Investigators. A pretested semi-structured questionnaire was administered in the local language after getting informed written consent from the participants.

The questionnaire consists of two components- socio-demographic data and safe mask-wearing steps which were adapted from WHO guidelines.[5]

The participants were assessed in a ventilated room with maintaining social distance and standard precautions. The surgical mask was given to the participants and knowledge and practices were assessed.

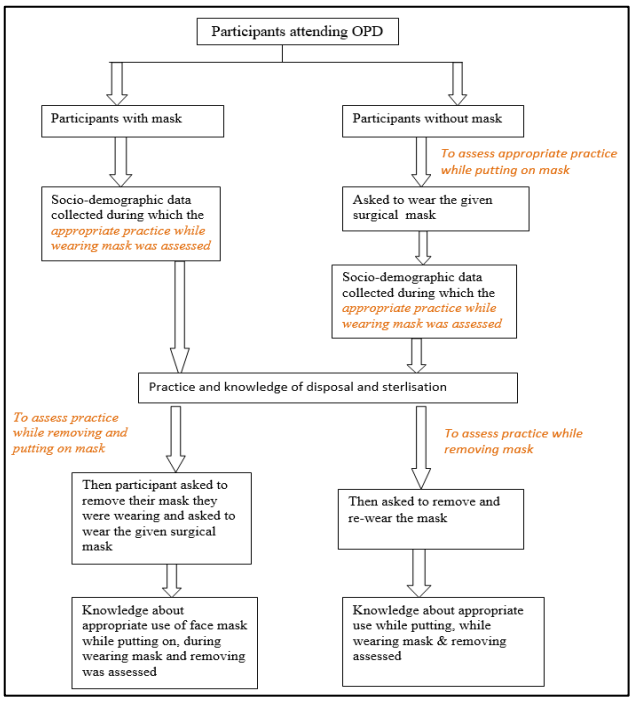

Figure 1: Steps in data collection for participants attending OPD with and without mask.

The steps in which data was collected is given in Figure 1. The participants who already had mask were asked to remove and discarded or stored as per guidelines. In order to avoid exposure of participants to sterilization/disposal practices, initially the sterilization was assessed and then the practice of removal of mask was assessed. Knowledge about appropriate mask use was assessed after the

assessment of practices since assessing knowledge before practice might influence the practice of mask use among participants.

Study variables and operational definition

Socio-demographic data

Age: completed age in years as per participants own words.

Gender: male/female/others.

Education: illiterate- person who didn't know to read and write with an understanding of at least one language; non-formal- person with kinder garden or playschool education; primary school- person who have passed class V; middle school- person who have passed class VIII but not passed class X; High school- person who have passed class X but not passed class XII; higher secondary or diploma holder- person who have class XII certificate/passed or having any diploma but no graduate degree; under graduate- person with any bachelor's degree and post graduate-person with any master's degree.[10]

Socio-economic status: As per Marketing Research Society of India (MRSI) scale, the S.E.S is classified into upper (I), upper-middle (II), lower-middle (III), upper lower (IV) and lower lower (V) based on the education of chief earner and number of durable items in their family.[11]

General mask-wearing practices

Wearing mask while attending OPD or not: Assessed by checking the participant wearing mask or not.

Reason for not using mask: reasons collected as per participants own words and then grouped during analysis (only for participants not wearing mask).

Type of mask: Mask-fabric, surgical and FFP.

Outcome variable- appropriate use of face mask:[4,5]

The participant was considered to have appropriate use of mask if they have fulfilled all the five components- 1) uses mask in the settings as indicated by WHO; 2) puts on or wore the mask correctly; 3) maintained safe/hygienic measures while wearing the mask; 4) removed the mask correctly 5) proper disposal/ sterilization. There were 17 questions (yes or no format) from a-q spread over all five components based on WHO guidelines. If the participant answers yes to all 17 questions, they were considered as having good knowledge and practice of appropriate use of mask.

Based on the type of masks, the proper disposal or sterilization was assessed. For the surgical mask, it must be disposed after one use, in paper or polythene cover and thrown into a closed dustbin; The FFP mask can be stored in a closed breathable paper bag or container for minimum of five days before use; The fabric mask should be washed with soap or detergent in a hot water for at least once a day.[5,12]

Data analysis

The data were entered in Microsoft excel 2013 and analysed using SPSS 23.0 software. The descriptive results were given in proportion with 95% CI and mean with SD. The association between determinants and outcome variable was analysed by Chi square test and Fischer exact test and significance is expressed with p value ($p<0.05$ significant).

RESULTS

Our study results showed that 55.8% of participants were below 40 years of age, around 70% of participants educated above middle school and none of the participants belonged to upper or class I of socio-economic status (Table 1).

Table 1: Socio-demographic distribution of participants (N=120).

Variable	N	%	95% CI
Age (in years) range (20-71 years)			
18-30	60	50.0	40.8-59.2
31-40	7	5.8	2.5-10.0
41-50	13	10.8	5.8-16.7
51-60	26	21.7	14.2-29.1
61 and above	14	11.7	6.7-18.3
Gender			
Male	69	57.5	49.2-66.6
Female	51	42.5	33.3-50.8
Education			
Illiterate	3	2.5	0-5.8
Non formal	10	8.3	4.2-13.3
Primary	4	3.3	0.8-6.7
Middle	18	15	8.3-21.7
High school	29	24.2	16.7-32.5
High sec/diploma	32	26.7	18.4-35.1
Undergraduate	24	20	13.3-26.7
Socio-economic status			
Upper mid (ii)	23	19.2	12.5-26.7
Lower mid (iii)	47	39.2	30-47.5
Upper lower (iv)	40	33.3	24.2-42.5
Lower lower (v)	10	8.3	3.3-13.3

Table 2: General details of mask use in participants.

General mask use practice (n=120)	N	%
Wearing mask while coming to PHC	103	85.8
Reason for not wearing mask (n=17)		
Not able to breathe/uncomfortable	11	64.7
Financial problems	6	35.3
History of mask use during this COVID pandemic	120	100

All of the participants used or using masks during this COVID pandemic but 35.3% (n=17) attended OPD on the day of investigation without mask where the reason for not wearing mask was either uncomfortable to wear or financial constraints to buy mask (Table 2).

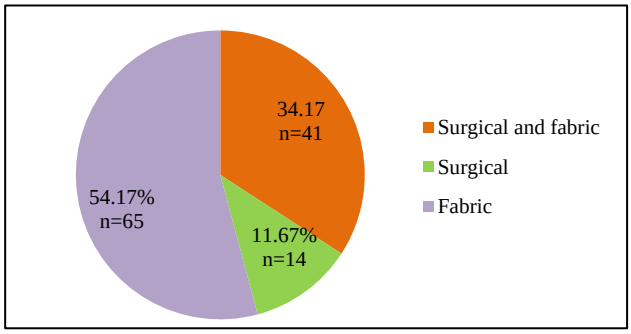

Figure 2: Distribution of participants as per type of mask usage (n=120).

Around 88.3% (n=106) used or using fabric mask, 45.8% of the participants used or using surgical mask and none of them had used N95 or any other respirator mask (Figure 2).

In our study, those who use both surgical and fabric masks (n=41), only 19.3% (n=8) and 9.7% (n=4) had appropriate knowledge and practice of disposal/ sterilization of both the mask. Among participants who were using only surgical mask (n=14), 42.8% (n=6) and 7.1% (n=1) had appropriate knowledge and practice of disposal and in those using fabric mask only (n=65), around 21.5% (n=14) and 6.1% (n=6) had appropriate knowledge and practice of sterilizing the mask before reusing the mask.

Regarding practices, only 16.3% and 15.1% have good practice of disposal of surgical mask and sterilization of fabric mask respectively. Among fabric mask users, around 58% (n=61) had a practice of not washing the mask at least once a day and among surgical mask users around 36% (n=20) reused the mask for more than one day (Figure 3).

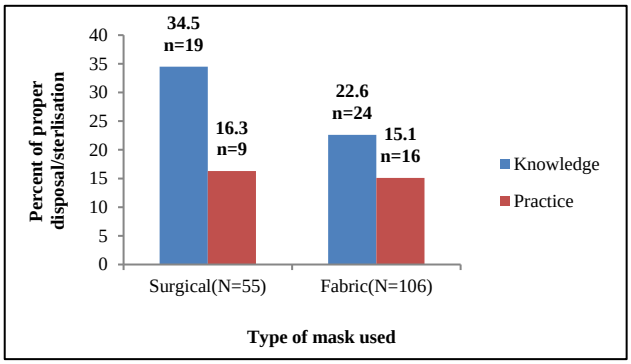

Figure 3: Distribution of knowledge and practice of proper disposal/sterilization of mask.

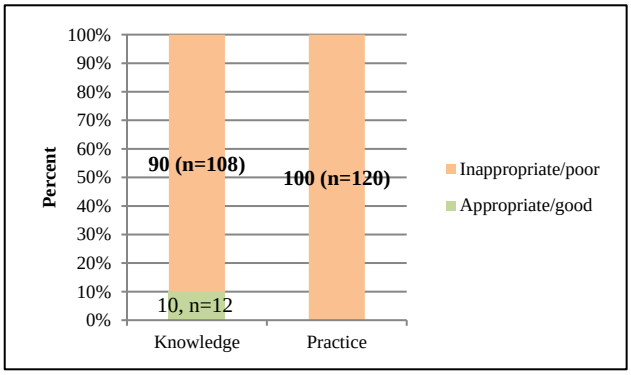

Figure 4: Knowledge and practice of appropriate use of face mask (n=120).

The participants having appropriate/good knowledge was 10% (95% CI, 4.6-15.3%) and none of them had good/appropriate practice of use of mask (Figure 4).

Table 3: Knowledge and practice of appropriate use of mask.

S. no	Appropriate mask wearing practices (n=120)	Knowledge (yes)		Practice (yes)	
		N	%	N	%
I	Mask use settings				
a	Use in setting like public gatherings, markets, hospitals, work place, shopping or religious building	120	100	98	81.6
b	Use in any setting except household where one can't maintain one metre distance from others	72	60	28	23.3
c	Use while anyone other than his/her household member visits the home	30	25	12	10
Used appropriately in settings as indicated (yes for all ques. from a-c)		30	25	12	10
II	While putting on mask				
d	Hand hygiene done before wearing mask	28	23.3	11	9.1
e	Checking for tear or soiling	56	46.6	18	15
f	Identifies outer surface and upper side of mask and also places metal strip over nose correctly	38	31.6	13	10.8
g	Checking and adjusting the mask to cover the nose, chin and mouth	53	44.2	16	13.3

Continued.

S.	Appropriate mask wearing practices (n=120)	Knowledge (yes)		Practice (yes)	
Appropriate use of mask while putting on mask (yes for all ques. from d-g)		26	26.6	9	7.5
III	While wearing mask				
h	Not touching mask outer surface	47	39.1	26	21.6
i	Not keeping mask over neck region/not keeping in pockets or bags etc. and reusing while eating, talking or drinking	56	46.6	13	10.8
k	Washing hands after touching the mask	25	20.8	8	6.6
l	changing mask when torn or wet	51	42.5	23	19.2
m	Not removing in unwanted situations like going to rest room or talking etc. in outdoor setting	77	64.1	21	17.5
Good mask hygiene while wearing mask (yes for all ques. from h-i)		19	15.8	8	6.6
IV	While removing mask				
n	Hand hygiene done before removing	16	13.3	2	1.6
o	Touching only ear strings to remove mask	45	37.5	10	8.3
p	Hand hygiene done after removal	36	30	8	6.6
Good mask hygiene while removing mask (yes for all ques. from n-p)		16	13.3	2	1.6
V q	Disposal/sterilisation as per guidelines	28	23.3	11	9.1

Around 93.4% reported that they don't wash their hands while removing the mask or after touching the outer surface of the mask. These harmful hand hygiene practices influenced on overall prevalence of appropriate use of face mask practices. 1.6%, 7.5% and 6.6% of participants had appropriate or good practice of removing mask, while putting on and wearing mask respectively (Table 3).

Age more than 40 years, male, lower SES were significant determinants of inappropriate use of face mask (Table 4).

Table 4: Association between determinants and knowledge and practices of appropriate use of mask.

Determinants	N	Knowledge	
		N (%)	P value
Age (years)			
Less than 40	67	11 (16.4)	0.008*
More than 40	53	1 (1.9)	
Gender			
Male	69	2 (2.9)	0.003*
Female	51	10 (19.6)	
Education			
Below middle school level	35	1 (2.9)	0.177**
Above middle school level	85	11 (12.9)	
S.E.S			
Class II and III (middle)	70	12 (17.1)	<0.001**
Class IV and V (lower)	50	0	

*Chi square test ** Fischer exact test.

DISCUSSION

The SARS-CoV-2 is a large sized virus (60-140 nm in diameter) and can be filtered by face masks.[13] So, during this COVID-19 pandemic, majority of the countries emphasized that wearing face mask by the public and implemented measures to mandate people to wear masks as still no standard treatment protocol framed for cure.[14,15]

The present study was done to assess the practice and knowledge of appropriate use of face mask and its determinants in the adults attending the out-patient department of primary health centre in Chennai, Tamil Nadu. The socio-demographic profile shows that majority of the study participants belonged to Class III and IV socio economic classes and none belong to class I. This is because class III and IV were largely dependent on the Government health care facility and their residential mostly be in slum areas.

85.8% (CI, 79.5-92.1%) of our study participants used face mask and majority of them with 88.3% (106 out to 120) used fabric while visiting the OPD. Whereas a study done in Malaysia among individuals attending hospital showed that 96.8% of them wore mask and only 24.8% used cloth mask.[9] This difference might be due to the demographic profile of population and geographical variation as our study focussed only on slum population.

In our study, only 10% of participants had good practice of using mask in the settings, 23.3% and 9.1% had appropriate knowledge and practice of handwashing before putting on the mask and only 1.6% and 6.6% performed hand hygiene before and after removing the mask. Knowledge about hand hygiene among participants before removing mask was only 13.3%. Our study results were similar to a study done in Hong Kong which shows a very low prevalence of 8.5% who practiced hand hygiene before wearing the mask and 2.5% and 8.5% only practiced hand hygiene before and after removing the mask.[2] In addition to poor knowledge, this low prevalence of hand hygiene practice while wearing and removing mask among our study population can be due to the inadequate water supply in the slum areas, financial constraints in buying sanitizer and laziness to wash hands every time.

Only 10.1% of the study group had appropriate practice of disposal/sterilization which may be due to water supply problems in the slums, poor attitude towards spending time for mask washing and disposal and due to small space of living, they might dispose them directly to the public bins

Our study shows that none of them had an appropriate practice of face mask use which is similar to a study done on mask-wearing practice in 2017 which shows 100% had poor/inappropriate practice of mask use.[2]

The prevalence of appropriate knowledge of use of mask was significantly less in adults above age 40 years and in lower socio-economic class in our study which is similar to a study conducted in Nepal which showed that lesser odds of having mask-wearing knowledge in elders compared to younger age group.[15] This may be due to the reason the elder age group might have difficulty in accessibility and availability of digital technology.

The prevalence of appropriate knowledge in males was significantly lesser than females which is similar to the Ethiopian study showing males were having less knowledge on mask-wearing practices.[16] A study in Iran showed similar results to our study as male had less prevalence of appropriate use of mask practice compared to females.[17] This may be due to the reason that women may be more likely to protect themselves as they are the caregivers among family members which determines the interest in obtaining proper knowledge of mask use.[18,19]

Belief, knowledge and practice are different concepts. If an individual holds belief and knowledge, it does not imply he/she practices the same. The major difference in the prevalence of the appropriate knowledge and practice of face mask use in our study suggests that simply spending effort and resources to promote belief and improve knowledge of appropriate mask use for the general population is unlikely to result in a behavioural change. Efforts should be focussed on directly teaching the required skill of proper mask use, impacts of improper mask use practices on health and spread of infection and remedies to overcome personal barriers (i.e. laziness, lack of attitude to spend time etc.) to small groups which will have a considerable effect on behavioural change. Our public health education programmes on hand and face mask hygiene practices should be implemented in tailor-made methods for some settings like old age group, low socio-economic people who have less access to technology.

The participants were informed about the correct method of putting on, hygiene to be maintained while wearing, removing, disposal and also the places where the mask should be used along with proper hand hygiene steps at the end of the data collection for each patient.

One of the important advantage of this study is use of direct observation method for assessing first four components of mask use practices which might have led to more validity in our data in comparison to use of questionnaires and self-reporting method.

This study has some limitations. The practices of sterilization/disposal of mask were self-reported which might have impact on the validity and the participants were urban slum people attending the PHC which might limit the generalizability to all people attending the urban PHC.

CONCLUSION

There is a very high prevalence of inappropriate knowledge (90%) and practice (100%) of use of face mask. The majority of them don't have proper knowledge about when to do hand hygiene during mask use. This implies there is a need of behavioural changes based health sessions on proper techniques regarding putting on, wearing, removing, disposing of non-reusable mask and sterilising the fabric masks and hand hygiene indications.

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