

## **Mask mandate- Unmasking the perceptions, practice and barriers among the public in India: A cross-sectional Survey during Covid 19**

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### **Abstract**

#### **Background**

Face mask has become the part of attire universally, irrespective of age and gender. Wearing of mask is mandated in as part of COVID etiquettes by the authority, but the public perception varies widely. Objectives: The objectives of this study were to assess the perceptions, practice and barriers and associated factors among the public in Kerala, on use of facemasks.

#### **Methods**

*Design: A cross sectional survey design was adopted.*

*Settings/ Participants: The setting was the households in capital city of Kerala, southernmost state of India. The study variables were perception, practice and barriers of face mask use, which was assessed using a validated questionnaire. The data were collected from 1123 adult permanent residents of the setting, who were selected randomly with proportional weightage to geographical representation of urban, rural, costal and tribal areas.*

#### **Results**

*Among the sample, the proportion with good perception and practice were 393(35%) and 499 (44.4%) respectively, 598 (53.3%) reported less barriers for the use of face mask. The factors significantly associated with perception of use of face mask were male gender: OR1.80 (95%CI, 1.23-2.64) and living in tribal area: OR*

.069 (.026-.187). Receiving information from DISHA was a protective factor: OR .429 (.685- .268) and any kind of occupation or student status compared to household work was an unfavourable factor for good practice.

### **Conclusions**

Though the facemask mandate is observed by the public, it was revealed that their practices are not optimal. Thus, along with the law, desirable behaviour change strategies are warranted.

**Keywords:** - Face mask, COVID 19, Perception, Practice, Barriers, Public

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## **I. Introduction**

Covid 19 has so far claimed nearly 35 L lives across the globe over a period of 1.5 yrs and left many more severely morbid.<sup>[1]</sup> As thousands are left unemployed and remain poverty stricken, governments have placed stringent guidelines to curb the spread of the virus and are struggling to keep the economies stable. The administrative efforts predominantly focus on preventive aspects, as many countries are desperately suffocating with high number of patients beyond their capacity to handle in-spite of international support.

The public health strategies recommended by WHO in COVID 19 mitigation are social distancing, masking and hand hygiene.<sup>[2]</sup> Mask is considered the safe vaccine and they are popular owing to the simplicity of use and cost-effectiveness.

The rate and practice of mask use vary across populations, age groups, genders and economies.<sup>[3]</sup> In countries like Japan, use of facemask is a part of hygiene etiquette well before the outbreak of COVID-19. But in other countries which mandated masking recently, painstaking efforts were needed to promote and establish the habit. Law enforcement activities including penalty were employed to ensure masking under the Disaster Management Authority Guidelines. Active interventions increased the rate of mask use significantly among public while people have reported lack of knowledge and practical difficulties while wearing a face mask habitually.<sup>[4,5]</sup>

The gap between knowledge and practice are universally reported in use of masks.<sup>[6-8]</sup> There were no previous studies which assessed and compared public attitudes and practice of mask use among a mix of population groups in this part of the world- The start of second wave of Covid 19 has warranted reinforcement of stricter adherence of masking initiatives. Though there are ongoing debates, there are strong experimental evidences stating that wearing a mask will reduce the risk of spread of respiratory infection possibly to 6-15%.<sup>[9,10]</sup> Governments have simplified international guidelines and disseminated them for public interest.

Almost all countries and regions are equally and dangerously affected by SARS CoV2.<sup>[1]</sup> Concerns were always there after world faced threats from H<sub>1</sub>N<sub>1</sub> and SARS before. Mounting evidence suggest that easily implemented single interventions are still effective though combined interventions increase the effectiveness in preventing/ controlling respiratory pandemics.<sup>[11]</sup>

Masks are effective when used properly and improper use will increase the spread of infection.<sup>[10]</sup> Mask use is mandated in public areas, inside home, while in quarantine or reverse quarantine. Little is known about the perception, practice and barriers of common man in mask use, as the governments did not get enough time to assess all these, before implementing masking. A recent two-country study showed that nearly 20% of the public report negative attitudes towards wearing mask and this is correlated with negative attitudes towards Covid 19 vaccination.<sup>[12]</sup> As they cross-influence,<sup>[13]</sup> understanding perception, practice and barriers will help design better public health guidelines and may help strengthen the preventive efforts by delivering tailored teaching.

The aim of this study was to assess the perceptions, practice and barriers among the public in a state of south India, on use of facemasks.

## **II. Methodology**

A cross sectional study was adopted, without any follow-up in either direction. The data were collected between January 2021 and March 2021 in the capital city of Kerala, southernmost state of India. It is one of the most developed states in the country with high population density, high literacy rate and good health quality indicators. This state has representation of urban, rural, costal and tribal population. The study population consisted of all the adult people who are the permanent residents of the study area. People who cannot read the regional language were excluded from the study.

The exposures and outcome were simultaneously assessed from the study population. The study variables were perception, practice and barriers of face mask use, which were finalized based on literature review and the consensus of the study team. A pooled item list was prepared for each variable in regional language, face and content validity of the tools were established with expert review. The perception questionnaire consisted of five knowledge questions and eight attitude questions. There were 25 questions

relating to practice and 14 questions on barriers regarding the use of face mask. The questions were pre-tested and piloted in a similar group. The internal consistency reliability of perception on use of face mask was .765, practice was .668 and barrier was .899

The sampling technique was stratified cluster randomization. The sample size was calculated based on proposed proportion of ideal use of face mask (P), which was 42%, with a relative precision of 10% of P. The type 1 error was 1.96. After adjusting the cluster effect, the estimated minimum sample was 1123, the cluster size was 25 and cluster number was 44. Geographic clustering units were selected based on population proportionate to sampling

and the probable non response bias is adjusted by the additional allowance of 10% in the sample size.

The samples were identified from each cluster and access to the areas was ascertained through the health workers, political and religious leaders. Upon meeting the participants, investigators explained about the study, sought their permission and written informed consent was obtained. The information were collected in an electronic format, all the refused responses were set as mandatory to avoid missing of data. The interview lasted for 15 to 20 minutes.

### **Ethical Considerations**

The study had got approval from Institutional Research Committee and Human Ethics Committee of Govt Medical College, Thiruvananthapuram (HEC.No.05/30/2020/MCT.). Setting permission was also sought from the Mayor of the city. Written informed consent was obtained from the participants. COVID protocol was observed for the data collection.

## **III. Results**

### **Baseline data of the study participants**

The baseline demographic data of the participants showed that the mean (SD) of age was 33.56(14.04), there were 451(40.2%) males and 13(1.2%) did not disclose about their gender. The geographical distribution of participants was urban 430 (38.3%), rural 536(47.7%), coastal 92(8.2%) and tribal 65(5.8%). Regarding the marital status, 577 (51.3%) were married 509 (45.3%) were unmarried, 27(2.4%) widow and 10 separated. The religious characteristics of the participants show that 584(52%) were Hindus, 330(29.4%) were Christians, 141(12.6%) were Muslims and 68(6.1%) were not interested to disclose their religious affiliation. Among the participants, 184 (54.6%) had education up to or less than secondary level. 178(15.9%) has higher secondary education. 365(32.5%) were graduates, 149 (13.3%) were post graduates and 227(20.2%) were with professional education. 368 (32.8%) participants were in below poverty line income category and remaining 755(67.2%) were in above poverty line category. The fig. 1 showed the type of mask used by the public. N- 95 mask by 379 (33.7%), surgical mask by 245(21.8%) and cloth mask by 491(43.7%) were used. 8 (0.7%) were using handkerchief or towel for covering their nose and mouth.

### **Fig.1 Type of Mask use by the Public**

#### **Perception, Practice and Barriers regarding the use of face mask**

The perception is measured as a composite score of knowledge and attitude. In the perception, the mean score was 21.31(SD 3.41) and the median score was 22 (IQR 3). There were 25 outliers in perception score. The mean practice score was 18.64 (SD3.12), median was 19(IQR 4) and there were seven outliers. The mean barrier score was 14.78(SD 6.9) and median score was 15 (IQR 11) (Fig.2).

#### **Fig.2 Box-Whisker plot – Distribution of Perception, practice and Barriers of Mask use**

The perception, practice and barriers were dichotomised based on the median score. There were 730 (65%) of the participants with poor perception regarding the use of mask and remaining 393(35%) had good perception regarding the use of mask. The practice score showed that 624(55.6%) had poor practice and 499 (44.4%) had good practice. The proportion of barriers indicates that 598 (53.3%) reported less barriers in the use of face mask. The factors significantly associated with perception regarding the use of face mask were gender, domicile, education and occupation.

### **Table 1: Factors associated with Perception, Practice and Barriers on use of face mask**

The factors significantly associated with the practice regarding the use of face mask were domicile, marital status, religion, education, occupation and source of information about the use of face mask. The significant factors on barriers on the use of face mask were gender, domicile, education, occupation and income (Table 1).

**Table 2: Factors affecting the ideal use of Face Mask**

Multivariate analysis was undertaken. Variables with  $P < 0.25$  are put in the multivariate model using stepwise conditional binary logistic regression analysis (Table 2). After controlling for all covariates, the Odds Ratio and confidence intervals were significant for gender, domicile and religion. Compared to females, males have 1.8 times of unfavourable practice of face mask use. (OR 1.80 95% CI: 1.23-2.64). The practice of using facemask mask was very much protective among the tribal population compared to urban population (OR .069, 95% CI: 0.26-.187). Compared to Hindus, Christians and Muslims have statistically favourable face mask practice (OR =.638, 95% CI: .426-.958, OR = .408, 95% CI: .238-.697). Occupation was significantly associated with practice of using facemask, the ORs and its confidence intervals are denoting that working outside or student status were identified as unfavourable factors for the use of face mask. The information obtained from Television and DISHA (A Toll-free Tele Health Helpline for COVID related information in Kerala) has a protective effect on the use of face mask.

#### IV. Discussion

Among the sample of 1123, the proportion of good perception and practice were 393(35%) and 499 (44.4%) respectively, 598 (53.3%) reported less barriers for the use of face mask. The factors significantly associated with perception regarding the use of face mask were male gender: OR1.80 (95% CI, 1.23-2.64), living in tribal area: OR .069(95%CI, .026-.187) and belonging to Christian or Muslim community: OR .638(95%CI, .426-.958) and OR .408 (95% CI, .238-.697). Receiving information from DISHA is a protective factor: OR .429 (.685- .268) and any kind of occupation or student status compared to household work is an unfavourable factor for good practice.

The demographic characteristics showed that the population of the study is representing the base population of south Kerala. There is optimal representation from all age group, domicile, religion, educational, occupational and income backgrounds.

The findings revealed that two third of the selected population had good perception towards masking and a better proportion of 44% had good practice. Though people thought that they know everything about masking as a simple intervention,<sup>[14]</sup> the fact is that the perception on the mask use is fairly inadequate. The better practice score than perception may be reflecting the intense administrative and public health efforts over past one year on mask mandate since these data were collected at the beginning of the second wave, March 2021. Also this was a geographical area which never had practiced masking during non-pandemic situation. The better practice score may also be reflecting the better educational background and higher health indices of the state. The reversed tendency of higher practice and lower perception score is interesting and is in contrast with previous reported experimental evidences.<sup>[7,8]</sup> Unsatisfactory scores in the areas of practice and perception were reported among public during the pandemic from China.<sup>[6]</sup>

The current study revealed the factors significantly associated with the practice regarding the use of face mask- domicile, marital status, religion, education, occupation and source of information about the use of face mask. Special groups like healthcare workers and students reported higher KAP than general public earlier also.<sup>[8,14]</sup>

Collective evidence strongly supports the role of public health interventions in promoting adherence to mask use.<sup>[4,5]</sup> The proof from the current study that Television and DISHA has a protective effect on the use of face mask is catchy and evokes special interest. Television is still a popular mass media in this part of the state especially in the lower and lower middle class strata. It evidences that this strategy can be effectively utilised for better reach in difficult to access, remote areas where digital revolution is still away. There were suggestions from previous studies to have brief user-guidelines printed on the packaging by manufacturers to ensure correct use of masks.<sup>[14]</sup>

One of the major findings of this study was that a significant proportion of public, 598 (53.3%) reported less barriers in the use of face mask. The influencing factors on barriers on the use of face mask were gender, domicile, education, occupation and income. A qualitative study from a middle-income country reported informational and financial barriers in the effective use of PPE by public.<sup>[15]</sup> The same study reports cultural and religious norms as the main barriers that affect the acceptability of public health measures, but these were not identified in the current study. Physical difficulties of breathing discomfort and suffocation was reported among mask users during a previous respiratory epidemic outbreak.<sup>[16]</sup>

Inputs from the current study have implications in shaping public health policies as early public interest with face mask may be an independently important factor in controlling the COVID-19 epidemic on a population scale,<sup>[17]</sup> We strongly recommend state-wide opinion-surveys to gather public preferences and strengthening mass media and locally-adapted interventions to improve compliance of mask-related campaigns. The results are explicitly imperative because health behaviours are increasingly recognized as multidimensional

and assumed to vary over the life course and across places.<sup>[18]</sup> These accepted interactions between structure and agency necessitates situating individuals in appropriate context while they are intervened on health reasons.

## V. Conclusion

The study concludes that the good perception and practice of mask use were observed only by less than half of the study participants, but almost all were wearing some kind of face masks, some are even using handkerchief or towel to cover their mouth and nose. Law enforcement and fear of survival during the pandemic are the striving force in mask mandate. But, the optimal use of facemask is needed for safeguarding against contracting the illness. So, measures have to be implemented for effecting behavioural change for the optimal practice of facemask to prevent the spread of infection.

## Strengths and Limitations

This study is highlighted in the state's public health scenario owing to its higher sample size. The strengths of the study included the high reliability of the questionnaire. The medical and public health experts validated the tool. There was sizeable representation from all age groups and both genders which enhances the generalizability of the study results. Though subgroup analysis was not done, inclusion of coastal and tribal population gave representation from special strata, which had reported serious outbreaks during first wave of Covid-19. Reports of mask use and related statistics are rarely reported from sensitive groups such as tribal population.

Poor response rate of online survey might have affected the representativeness. As smart phones are still not common among general public, those received the survey are assumed to be from middle and upper social strata. Unfamiliarity to mobile phone technology may have prevented aged people from responding to the survey. The answers on practice were self-reported and direct observation was not done.

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**Conflicts of interest:** None

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Variable	Perception			Practice			Barriers		
	Poor Perception n = 730 (65%)	Good perception n = 393 (35%)	Chi-square (p value) OR (95% CI)	Poor Practice n = 624 (56%)	Good Practice n = 499 (44%)	Chi-square (p value) OR (95% CI)	Less Barrier n = 598 (53%)	More barrier n = 525 (47%)	Chi-square (p value) OR (95% CI)
<b>Gender</b>									
Male	324	127	21.41 (0.001)	267	184	5.423 (.066)	261	190	7.156 (.028)
Female	394	265		348	311		329	330	
Prefer not to say	12	01		09	04		08	05	
<b>Age in years</b>									
30 and Below	310	269	2.053 (.152)	340	239	4.823 (.028)	299	280	1.244 (.265)
Above 30	268	276		284	260		299	245	
<b>Domicile</b>									
Urban	287	143	13.914 (0.003)	221	209	23.507 (.001)	232	199	95.673 (.001)
Rural	331	205		290	246		230	308	
Coastal	74	18		61	31		75	17	
Tribal	38	27		52	13		61	04	
<b>Marital Status</b>									
Married	372	205	6.516 (.089)	280	297	26.344 (.001)	298	279	6.680 (.083)
Unmarried	338	171		317	192		273	236	
Window/widower	12	15		21	06		19	8	
Separated	8	2		6	04		8	02	
<b>Religion</b>									
Hindu	382	202	4.92 (.178)	281	303	29.397 (.001)	314	270	7.471 (.058)
Christian	212	118		202	128		189	141	
Muslim	84	56		95	45		65	75	
Don't want to disclose	52	17		46	23		30	39	

Variable	Perception			Practice			Barriers		
	Poor Perception n = 730 (65%)	Good perception n = 393 (35%)	Chi-square (p value) OR (95% CI)	Poor Practice n = 624 (56%)	Good Practice n = 499 (44%)	Chi-square (p value) OR (95% CI)	Less Barrier n = 598 (53%)	More barrier n = 525 (47%)	Chi-square (p value) OR (95% CI)
<b>Education</b>									
Less secondary level	32	13	22.550 (.001)	32	13	17.696 (.007)	33	12	100.330 (.001)
secondary level	105	34		63	76		118	21	
Plus two	126	52		94	84		108	70	
Graduate	240	125		218	147		184	181	
Post graduate	92	57		84	65		59	90	
Above PG	22	09		15	05		09	11	
Professional	124	103	118	109	87	140			
<b>Occupation</b>									
Homemakers	108	65	23.701 (0.001)	119	54	42.833 (.001)	114	59	57.781 (.001)
Manual labourer	80	31		49	62		85	26	
Govt/ Private employees	108	48		95	61		66	90	
Small scale institutions	26	10		18	18		22	14	
Professional	113	63		86	90		91	85	
Health Care Professional	54	62		43	73		43	73	
Student	241	114		214	141		117	178	
<b>Income</b>									
Below poverty line	233	131	.640 (.338)	214	150	2.27 (.132)	240	124	34.805 (.001)
Above poverty line	497	262		410	349		358	401	
<b>Source of information</b>									
Television	315	182	10.93 (.091)	316	181	45.489 (.001)	271	226	6.566 (.363)
Radio	14	03		10	07		09	08	
Facebook	34	14		30	18		22	26	
WhatsApp	101	36		72	65		61	76	
DISHA	52	25		47	30		41	36	
Health workers	177	115		116	176		163	129	

Variable	Perception			Practice			Barriers		
	Poor Perception n = 730 (65%)	Good perception n = 393 (35%)	Chi-square (p value) OR (95% CI)	Poor Practice n = 624 (56%)	Good Practice n = 499 (44%)	Chi-square (p value) OR (95% CI)	Less Barrier n = 598 (53%)	More barrier n = 525 (47%)	Chi-square (p value) OR (95% CI)
Friends/Relatives	37	18		33	22		31	24	

**Table 1: Factors associated with Perception, Practice and Barriers on use of face mask**

Variable	B	S.E.	OR (95% CI)	P value
<b>Gender</b>				
Male	.589	.195	1.80 (1.23-2.64)	0.01
Female	-.120	.937	0.89 (0.14- 5.57)	
Prefer not to say			1.00 (ref)	
<b>Domicile</b>				.001
Urban			1.00 (ref)	
Rural	-.256	.188	.774(.535-1.120)	
Coastal	-.649	.372	.523(.252-1.084)	
Tribal	-2.671	.508	.069(.026-.187)	
<b>Religion</b>				
Hindu			1.00 (ref)	.005
Christian	-.449	.207	.638(.426-.958)	
Muslim	-.898	.274	.408(.238-.697)	
Don't want to disclose	-.421	.391	.657(.305-1.412)	
<b>Occupation</b>				
Homemakers			1.00 (ref)	.001
Manual labourer	1.189	.403	3.3679(1.547-7.326)	
Govt/ Private employees	1.291	.348	3.876(1.990-7.551)	
Small scale institutions	2.034	.502	7.611(2.873-20.162)	
Professional	1.339	.361	3.961(1.987-7.898)	
Health Care Professional	1.054	.400	3.085(1.439-6.615)	
Student	.904	.356	1.873(1.047-3.350)	
<b>Source of information</b>				
Television			1.00 (ref)	.001
Radio	-.578	.391	.443(.565-.263)	
Facebook	.100	.720	.842(1.152-.287)	
WhatsApp	-.546	.546	.311(1.578-.201)	
DISHA	.332	.429	.429(1.404-.606)	
Health workers	-.393	.480	.429(.685-.268)	
Friends/Relatives	.336	.408	.391(1.418-.639)	
			1.00 (ref)	
<b>Perception on the use of face mask</b>				
Poor perception			1.00 (ref)	.001
Good Perception	-3.030	.179	.048(.034-.069)	

Table 2: Factors affecting the ideal use of Face Mask

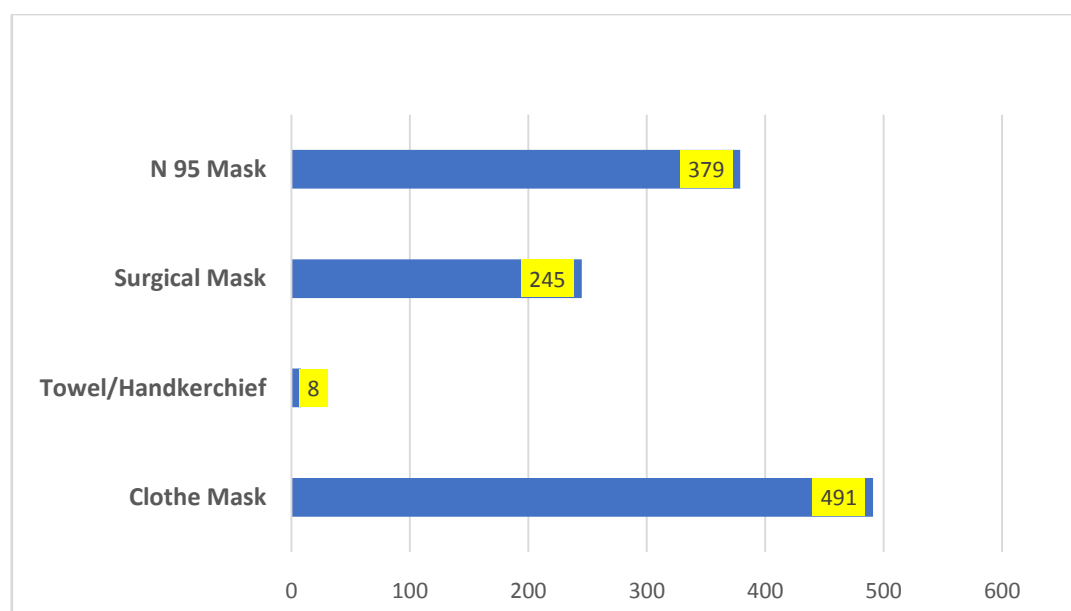


Fig.1 Type of Mask use by the Public

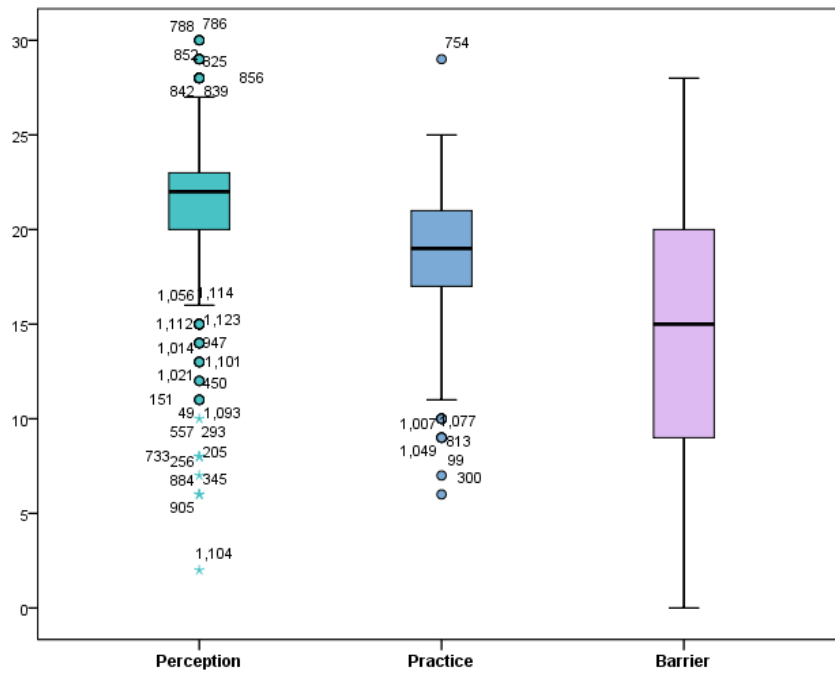


Fig.2 Box-Whisker plot – Distribution of Perception, practice and Barriers of Mask use