Public Health Section

Awareness of Facemask and its Usage in the Rural Community of Western Maharashtra during COVID-19 Pandemic: A Cross-sectional Survey

URMILA HARIRAM JAT¹, VAROON CHANDRAMOHAN JAISWAL², ISMAA SHAKIL AHMED RUMANI³, SAVNI MANDAR PARGI⁴, SNEHAL AVINASH GHODEY⁵



ABSTRACT

Introduction: The Coronavirus Disease-19 (COVID-19) pandemic caused by 2019 novel coronavirus was first reported in Wuhan, China. It is a disease of the respiratory system with clinical presentation of fever, cough, breathlessness, headache, fatigue etc. Transmission route is through person to person contact and through direct contact with respiratory droplets generated when an infected person coughs or sneezes. In such cases usage of facemasks is very crucial. At the same time awareness regarding the same in the community is very important. Hence, through this survey authors have assessed and recorded the awareness about facemasks and its usage in the community in the Indian population along with the basic hygiene precautions taken by the people.

Aim: To conduct a detailed survey regarding the awareness and usage of facemask in the rural population in Maharashtra.

Materials and Methods: The study was a three month crosssectional online survey conducted by Maharashtra Academy of Engineering Education and Research's (MAEER's) Talegaon Dabhade Physiotherapy College in the rural community of western Maharashtra, India, from October 2020 to December 2020. A self-administered online questionnaire consisting of 20 questions was prepared regarding the awareness about masks usage and proper methods to be considered with reference to the guidelines given by World Health Organisation (WHO), Indian Council of Medical Research (ICMR), Centers for Disease Control (CDC) and Prevention and literature reviews. The forms were shared on social media platforms such as WhatsApp, Facebook, and Instagram using Google forms. Statistical analysis was done by descriptive analysis using percentage.

Results: Out of total 390 participants, 210 (53.84%) were males and 180 (46.15%) were females. Considering the knowledge about the types of masks available was 67.1%, self-education was 88%. A 44% of the population thinks that one can wear a facemask up to eight hours if worn properly. Similarly knowledge about disinfecting the mask before throwing was 86%. Active efforts to maintain good hygiene by washing hands was 90%. Also, 55% of the population avoids touching their mask frequently. In practice, 56.1% of the population avoids wearing a mask while walking or jogging. Varieties of masks are being used by the people depending on the cost and availability.

Conclusion: The coronavirus pandemic has evoked a sense of awareness about self-care, hygienic habits and being updated about one's health. Further work can be done on cost effectiveness and availability of the good quality masks.

Keywords: Coronavirus Disease-19, Public awareness, Social distancing

INTRODUCTION

The COVID-19 pandemic caused by the 2019 novel coronavirus was first reported in Wuhan, China. It was declared as a health care emergency of international concern on 30th January 2020 and a pandemic on 11th March 2020 by the WHO [1]. India being a country of large population, maintaining social distancing is a big problem due to overcrowding and lack of space. Delayed approach in the rural areas and less awareness leads to a higher risk of spread of infection in this region since 68.8% of the population resides here. The spread of infection must be slowed in a number of sub-tropical areas and communities. According to the survey, just 27% of rural residents were aware of the criteria for reporting to a healthcare facility immediately, and 60% were uninformed of the transmission of infection by asymptomatic carriers, indicating a lack of communication and primary healthcare guidance [2]. Similar to Severe Acute Respiratory Syndrome (SARS) virus coronavirus has its major effect on the respiratory system of the humans which further leads to multiorgan failure in many individuals with co-morbidities [3]. The cardinal symptoms due to the viral infection include running nose, cough, rise in body temperature, early fatigue, breathlessness, etc., similar to that of viral pneumonia. Many asymptomatic cases have been reported as well. The mode of transmission is through the droplets of saliva or discharge from the nose when an infected person

coughs or sneezes. As reported by Journal of the American Medical Association (JAMA) researchers "the rapid spread of the disease is through both respiratory and extra-respiratory routes" [4]. Kumar M et al., rightly explained the pathophysiology of COVID-19 infection by describing the viral structure, genome and replication cycle [5].

Many researches conducted over the months suggest that the best way to prevent and slow down the transmission is by maintaining physical distancing, avoid going to crowded places, maintaining health hygiene by often using an alcohol based hand rub frequently, by wearing a facemask and not touching eyes, nose and mouth very often [2,6,7]. During the COVID-19 pandemic the facemask has been employed to serve as an important precautionary measure against the spread of Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2). The use of facemask is intended to serve as a source to limit transmission of virus in healthcare settings or community [8]. The WHO and other public health organisations agree that the masks can limit the spread of respiratory viral diseases such as COVID-19. Various types of masks are available to the community including cloth multi-layered masks, surgical masks, N95 mask, etc. Facemask play a crucial role in protection and prevention of this transmissible disease [9]. The N95 mask which is a type of respirator works on basic mechanism by filtering large

and small particles when an individual inhales after wearing it. Some N95 masks have valves that make it easier to breathe through the mask, as the unfiltered air is released when the wearer exhales further reducing excess CO2 inhalation. The cloth mask is intended to trap the droplets that are released when the wearer coughs, sneezes, or even talks [10]. The use of different types of masks with regards to the place, time and manner of use is an important source of knowledge for the healthcare workers, public healthcare workers, medical professionals, doctors, etc., [11]. It is essential for us as healthcare worker to assess the understanding, awareness and the usage of facemasks in the community. Appropriate usage of masks is the key for prevention of infection and this can be improved through awareness [12,13]. As a result, the aim of this study was to undertake a complete evaluation of facemask awareness and usage in rural communities in Maharashtra using an online survey over a three month period. The objective of the research work was to analyse the degree of awareness and understanding in the community regarding the use of facemasks, it includes questions about the types of masks available, efficacy of the same, methods of using it, duration of use and the ways to dispose the mask etc.

MATERIALS AND METHODS

The study was a cross-sectional survey and was conducted in the form of a web based online survey from October 2020 to December 2020. The consent of the participants was taken and data collection was done between June 2020 to August 2020. The study was approved by the Institutional Ethics Committee (EC/NEW/INST/2019/377/18).

Sample size calculation: The sample size was calculated using Statistical Package for Social Sciences (SPSS) software. The sample size was calculated with Precision=5.00%, Prevalence=50.00%, Population size=infinite. The estimated sample size was n=385 keeping 95% of Confidence Interval specified limits (45%-55%) with n=385 and n* prevalence=193 observed events: (45.0212%-55.2365%).

Statistical analysis: Statistical Package for Social Sciences version 20.0 was used for data management and analysis. Statistical analysis was done by descriptive analysis using percentage.

Inclusion criteria: All community people between the age group 18 and above residing in a rural area of Maharashtra, India.

Exclusion criteria: All healthcare professionals including doctors, nurses, medical and paramedical students were excluded from the survey.

Questionnaire

Formulation of the Questionnaire: A self-administered online questionnaire consisting of 20 questions was prepared regarding the awareness about masks usage and proper methods to be considered with reference to the guidelines given by WHO (Geneva, Switzerland), Indian Council of Medical Research (ICMR, India) and Centre for Disease Control and Prevention (CDC, USA) and literature reviews provided [12-14]. The questionnaire was comprised of two sections in which consisted of (A) Demographic information and (B) Awareness of facemasks and its usage in the community questions.

Distribution of the questionnaire: The form was peer reviewed by the faculties of community medicine and experts in the field of physiotherapy. The corrections given by them were taken into consideration and changes were made accordingly. This form was also converted in the regional languages i.e., Hindi and Marathi languages. The original form was translated to English to the targeted languages by the experts and again back translation was done and the discrepancies were resolved. The forms were shared on social media platforms such as WhatsApp, Facebook, Instagram using Google forms. Pie charts were created from the replies collected through the Google form. The information was converted into a

table format and included in the final report. Scoring was not done, every item was analysed categorically.

RESULTS

The form was filled by 396 participants, out of which a total of 390 participants had given their consent of willingness and completed the survey with a response rate of n=390 (99%). The mean age of the study participants was 23 years among the age group of 18 years and above [Table/Fig-1].

Age (years)	years) Male Fema	
18 to 20	21	22
21 to 30	73	43
31 to 40	52	42
41 to 50	39	36
51 to 60	18	26
>60	7	11
Total	210 (53.85%) 180 (46.15%)	

[Table/Fig-1]: Distribution of the subjects according to age and gender (n=390).

The questionnaire comprised of questions that would give an understanding and knowledge of the individual regarding the use of facemask and its crucial role in the pandemic. The survey outlines that 66% people were aware of the various types of facemasks available in the market and 88% took active efforts to self educate about the methodological considerations before using the mask ([Table/Fig-2]; Q 1,2). The healthy hygiene habits of washing hands before and after using the facemask, inspecting it for any damage, and assessing for its firm fitting were 90.3%, 79%, and 87.1%, respectively. A sense of responsibility and conscious hygiene habits have been inculcated by the people ([Table/Fig-2]; Q 3-7). The survey recorded that the maximum population (88%) thought

		Responses				
Q. no.	Questions	Yes (%)	No (%)	Cannot specify (%)		
1.	Do you know the types of masks available and their uses?	262 (67.1%)	31 (8%)	97 (24.9%)		
2.	Did you educate yourself about the steps to be followed while wearing the mask and removing it?	343 (88%)	31 (8%)	16 (4%)		
3.	Do you wash your hands before and after using the mask?	351 (90%)	31 (8%)	8 (2%)		
4.	Do you inspect the mask for any damage on regular basis?	304 (78%)	47 (12%)	39 (10%)		
5.	Do you adjust the mask for the gaps and its firm fitting?	339 (87%)	(87%) 35 (8.9%) 16 (4			
6.	Do you think it is important to disinfect the mask before disposing it?	335 (86%)	16 (4%)	39 (10%)		
7.	Do you touch your facemask very often?	43 (11%)	214 (55%)	133 (34%)		
8.	Do you think the use of facemask can reduce the risk of spread of COVID-19 infection in community?	343 (88%)	20 (5.1%)	27 (6.9%)		
9.	In your opinion is it necessary to maintain physical distancing if you are wearing a mask?	374 (96%) 8 (2%) 8 (8 (2%)		
10.	Do you wear the mask on while exercising or jogging?	105 (26.9%)	219 (56.1%)	66 (17%)		
11.	Do you think it is advisable for children under the age of 2 years to wear mask?	117 (30%)	140 (36%)	133 (34%)		

[Table/Fig-2]: Questionnaire on awareness of face masks and its usage in the

that wearing a facemask and maintaining physical distancing could reduce the risk of spreading COVID-19 infection as rightly proven by many researches ([Table/Fig-2]; Q 8,9). Although many people were uncertain whether to cover their face while jogging and other activities that included some kind of exertion as 27% wore their facemask on and 56% did not and 17% of the population found it difficult to decide ([Table/Fig-2]; Q 10). A similar unclear response regarding the use of facemasks for children below the age of two years was noted ([Table/Fig-2]; Q 11). The respondents were aware regarding the procedure of wearing the mask ([Table/Fig-3]; Q 12-15). Also, the maximum duration for which one should be wearing the same facemask was obscure and was replaced in an inconsistent manner ([Table/Fig-3], Q 16, 17). This could further lead to the same facemasks being ineffective after certain duration and curtail higher risks of exposure to the viral infection.

The pandemic led to production of different types of masks and were used based on one understanding for the same. Many people preferred using the triple layered mask (46%), although single layer or surgical masks were also used. Significant use of cloth masks was seen in 34% of the participants, 19% N95 mask and 13% used a combination of surgical and cloth mask or N95 masks alternatively (Table/Fig-3], Q 18, 19).

Most of the references about the proper methods of wearing the mask were via websites like WHO, Centres of Disease Control and Prevention while the other options opted for were social media applications (apps), newspapers, Arogya Setu app developed by Government of India ([Table/Fig-3], Q 20).

to know the correct steps to follow for wearing the mask but 75% knew for coverage of mask on face only. People have been actively working to enhance healthy hygiene practices such as frequent hand washing since the COVID-19 pandemic, with 90% of those surveyed disinfecting their hands after wearing or removing a mask. Following the outbreak of the pandemic, the importance of health and fitness has increased. Although 16.9% of the respondents had no clue what the mask was for, 26.1% of the population wore it while walking or jogging [15]. Limited availability and comfort with the cloth mask could be the probable reasons for using one mask for a long time. Present survey demonstrated that 44% of the people think that a good mask can be worn up to eight hours if worn properly and 32% believe that it can be worn up to four to five hours. A 34.2% wore a cloth mask, 19% wore N95 mask and other combination of different masks were used as well. High costs of the N95 mask during the initial phase of the pandemic led to the usage of other masks like the surgical and variable cloth masks. The difficulties associated with the N95 mask-like breathlessness. excess CO2 reinhalation, sweating has been some of the reasons for the popularity of cloth masks. In a study by Parida SP et al., elaborated the difference between N95 respirators and surgical masks, in which the N95 mask has shown 95% filtration from airborne particles whereas surgical masks does not provide with any reliable level of protection from the airborne particles. The article also shows that homemade face covers can also be used as advised by CDC since it is made at home and is cost-effective.

Q. no	Questions	Responses						
10	What parts of the face should be covered	Nose only		Nose and Mouth		Nose to chin		
12.	while wearing a mask?	0 (0%)		125 (32%)		265 (68%)		
13.	How do you remove the mask?	By using the side straps		By pulling from the front		No particular method is followed		
		351 (90%)		8 (2%)		31 (8%)		
14.	How often do you wash your mask?	Daily		After every use		Cannot specify		
		129 (33%)		199 (51%)		62 (16%)		
15.	For how much duration one should wear a mask?	Not more than 4-5 hours Up to 8 hours.		, if worn properly	Cannot specify			
		125	125 (32%) 172 (44%)		(44%)	93 (24%)		
16.	Good washable facemask should be?	Single layered		Double layered		Triple layered		
		39	(10%)	171 (44%)		180 (46%)		
17.	How often do you replace your mask?	Everyday		Every week		Every month	Cannot specify	
		117	7 (30%)	101 (26%)		47 (12%)	125 (32%)	
18.	How are you disposing the masks?	Directly in the open dustbin	Pack and throw in closed dustbin	Pack and throw in the dustbin	Directly in the dustbin	Cannot	specify	
		31 (8.2%)	289 (73.8%)	4 (1%)	4 (1%)	62 (16%)		
19.	Which type of mask are you using?	Surgical mask	Cloth mask	N95 mask	Surgical and cloth	Surgical and N95 masks	Cloth and N95 masks	
		35 (9%)	133 (34.2%)	74 (19%)	54 (13.8%)	39 (10%)	55 (14%)	
20.	From where did you get the reference of the steps to be followed for wearing the mask?	Youtube	Newspaper	Official websites	Arogya Setu app	Social media apps	Other	
		27 (6.9%)	16 (4.1%)	137 (35.3%)	31 (7.9%)	101 (25.8%)	78 (20%)	

DISCUSSION

The aim of this online survey was to track public knowledge and behaviour regarding the facemask and its usage in the pandemic. There was a clear and significant comprehension of the pandemic's awareness and knowledge, as well as the relevance of facemask utilisation, its duration, types, and hand washing for the same. In this survey, it was documented that people wore a facemask as a precautionary tool and provided themselves with the basic information for the same through newspapers, television, social media apps, government websites etc., 67.1% people were aware of the types of masks available in the market. In a study by Chakrawarty A et al., 82.5% reported

In public places, hospitals, clinics, and the workplace, the risk of infection is increased, necessitating the use of additional types of masks, including double masks. Although it is not advised for healthcare workers to use a cloth mask [16]. According to present study, some people pack their masks and dump them in the dustbin, while others throw them in the open trash can. In generic terms, 90% of the population do think that wearing a mask can reduce the spread of infection. A similar study done by Trivedi D et al., have recorded the knowledge among individuals concerning facemask of which 58% responders were using non-medical cloth mask, 13% used N95, 21% used sari, dupatta or handkerchief to cover their mouth and 8% responders did not

use facemask at all [17]. A 68% of the population in the survey wore the mask from nose to chin and 90% removed it using side straps. A 51% of the people washed their mask after every use and 33% washed it every day. Similar results were seen in a study by Sayare B et al., majority of the participants cover their nose, mouth and chin with the face mask (75%), and remove the mask completely before eating (82.1%), re-use of the same mask is reported to be 55.8% [18]. Our survey has effectively discussed the minute details and the knowledge among the individuals about the use of facemasks in this pandemic. A study conducted in Uganda has displayed that 60.1% of their study population had satisfactory knowledge on the use of facemasks although the level of knowledge differed with their education, being least in the uneducated [19]. The medical and Paramedical staff can further intervene to educate people on a clinical basis. Availability of facemasks and sanitisers, disposable units etc. at rural healthcare centres could serve as a small but important initiative to curb COVID-19 cases in the rural regions and therefore reduce load on healthcare system of the country.

Limitation(s)

The online survey had its own shortcomings as it could not reach out to the population that didnot have a smartphone, those who were not using any social media apps and the uneducated. A similar interview based survey could be more beneficial and help to cover a larger population, covering a major geographical rural area and the uneducated population.

CONCLUSION(S)

The overall knowledge and awareness in the present study population was satisfactory. The limited access to medical facilities and regular health information can limit the people from following the COVID-19 norms and taking the pandemic seriously. A small number of studies have been undertaken in rural areas to test their knowledge and awareness of COVID-19 infection in greater depth. It is critical that the government, private groups, and healthcare staff educate and notify them about the pandemic's seriousness. According to this study the knowledge about the pandemic and the importance of facemask in the community has drastically increased hence, further implication in the community can help reduce the number of people being infected and control the spread. Despite these findings, a lot can be done to constantly keep a check on the people's attitude, awareness and practices to limit the infection control. Further interview based studies can be conducted to have a better understanding about the people's knowledge.

Acknowledgement

This research was supported by MAEER'S Physiotherapy College. We are thankful to my Head of Department Dr. Varoon C Jaiswal who moderated this paper and in that line improved the manuscript significantly, Co-PG Dr. Ismaa Rumani for the assistance in the

survey, colleague Dr. Savni Pargi, and I would like to express my appreciation to the experts of the regional languages for translation of the questionnaire.

REFERENCES

- [1] Lai CC, Shih TP, Ko WC, Tang HJ, Hsueh PR. Agents Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and coronavirus disease-2019 (COVID-19): The epidemic and the challenges. Int J Antimicrob Agents. 2020:55(3):105924.
- Gupta P, Gupta A, Dixit S, Kumar H. Knowledge, attitude, and practices regarding COVID-19: A cross-sectional study among rural population in a northern Indian District. J Family Med Prim Care. 2020;9(9):4769-73.
- [3] Adhikari SP, Meng S, Wu Y-J, Mao Y-P, Ye R-X, Wang Q-Z, et al. Epidemiology, causes, clinical manifestation and diagnosis, prevention and control of coronavirus $\,$ disease (COVID-19) during the early outbreak period: a scoping review. Infect Dis Poverty. 2020;9(1):29.
- [4] Lauer SA, Grantz KH, Bi Q, Jones FK, Zheng Q, Meredith HR, et al. The incubation period of Coronavirus disease 2019 (COVID-19) from publicly reported confirmed cases: Estimation and application. Ann Intern Med. 2020;172(9):577-82.
- [5] Kumar M, Al Khodor S. Pathophysiology and treatment strategies for COVID-19. J Transl Med. 2020;18(1):353.
- Udwadia ZF, Raju RS. The N-95 mask: Invaluable ally in the battle against the COVID-19 pandemic. Lung India. 2020;37(4):323-28.
- [7] Chu DK, Akl EA, Duda S, Solo K, Yaacoub S, Schünemann HJ et al. Physical distancing, face masks, and eye protection to prevent person-to-person transmission of SARS-CoV-2 and COVID-19: a systematic review and metaanalysis. Articles. 2020;395(10242):1973-87.
- Rubio-Romero JC, Pardo-Ferreira MDC, Torrecilla-García JA, Calero-Castro S. Disposable masks: Disinfection and sterilization for reuse, and non-certified manufacturing, in the face of shortages during the COVID-19 pandemic. Saf Sci. 2020;129(104830):104830.
- di Sanità E-IS. EpiCentro [Internet]. Iss.it. [cited 2021 Sep 7]. Available from: https://www.epicentro.iss.it/
- [10] Bartoszko JJ, Abdul M, Farooqi M, Alhazzani W, Loeb M. Medical masks vs N95 respirators for preventing COVID-19 in healthcare workers: A systematic review and meta-analysis of randomized trials. Influenza Other Respir Viruses. 2020;14(4):365-73.
- [11] Liu X, Zhang S. COVID-19: Face masks and human-to-human transmission. Influenza Other Respi Viruses. 2020;14(4):472-73.
- [12] Cdc.gov. [cited 2021 Sep 7]. Available from: https://www.cdc.gov/coronavirus/2019ncov/prevent-getting-sick/how-to-wear-cloth-face-coverings.html.
- When and how to use masks [Internet]. Who.int. [cited 2021 Sep 7]. Available from: https://www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-forpublic/when-and-how-to-use-masks
- [14] June 4th. SOP on preventive measures to contain spread of COVID-19 in offices [Internet]. Gov.in. [cited 2021 Sep 7]. Available from: https://www.mohfw.gov.in/ pdf/1SoPstobefollowedinOffices.pdf
- Chakrawarty A, Ranjan P, Thrinath A, Aggarwal E, Isaac JA, Berry P, et al. Assessment of preventive practices followed by general public during COVID-19 pandemic-A cross-sectional survey from India. Cureus [Internet]. 2020; Available from: http://dx.doi.org/10.7759/cureus.11274
- [16] Parida SP, Bhatia V, Roy A. Masks in COVID-19 pandemic: Are we doing it right? J Family Med Prim Care. 2020;9(10):5122-26.
- [17] Trivedi D, Narute J, Shindhe V. Knowledge and practice of using facemask during n COVID-19 pandemic: A epidemiological survey. Int J Clin Biochem Res. 2021;7(4):497-500.
- [18] Sayare B, Bhardwaj VK, Fotedar S, Vashisth S, Thakur AS, Rawat SK, et al. Knowledge attitude and practices regarding mask usage during COVID-19 pandemic in general population of India: a qualitative study. Int J Community Med Public Health. 2021;8(4):1857.
- [19] Sikakulya FK, Ssebuufu R, Mambo SB, Pius T, Kabanyoro A, Kamahoro E, et al. Use of face masks to limit the spread of the COVID-19 among western Ugandans: Knowledge, attitude and practices. PLoS One. 2021;16(3):e0248706.

PARTICULARS OF CONTRIBUTORS:

- Postgraduate Student, Department of Cardiovascular and Respiratory Physiotherapy, MAEER's Physiotherapy College Talegaon Dabhade, Pune, Maharashtra, India.
- Professor and Head, Department of Cardiovascular and Respiratory Physiotherapy, MAEER's Physiotherapy College Talegaon Dabhade, Pune, Maharashtra, India.
- 3. Postgraduate Student, Department of Cardiovascular and Respiratory Physiotherapy, MAEER's Physiotherapy College Talegaon Dabhade, Pune, Maharashtra, India.
- Postgraduate Student, Department of Musculoskeletal Physiotherapy, MAEER's Physiotherapy College Talegaon Dabhade, Pune, Maharashtra, India.
- Professor and Principal, Department of Musculoskeletal Physiotherapy, MAEER's Physiotherapy College Talegaon Dabhade, Pune, Maharashtra, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:

Urmila Hariram Jat.

Bajaj Auto Colony Akurdi, Pune, Maharashtra, Pune, India. E-mail: iaturmila7753@gmail.com

AUTHOR DECLARATION:

- Financial or Other Competing Interests: None
- Was Ethics Committee Approval obtained for this study? Yes
- · Was informed consent obtained from the subjects involved in the study? Yes
- For any images presented appropriate consent has been obtained from the subjects.

PLAGIARISM CHECKING METHODS: [Jain H et al.] Plagiarism X-checker: Jun 15, 2021

 Manual Googling: Oct 11, 2021 • iThenticate Software: Oct 12, 2021 (6%) ETYMOLOGY: Author Origin

Date of Submission: Jun 08, 2021 Date of Peer Review: Jul 28, 2021 Date of Acceptance: Oct 13, 2021 Date of Publishing: Nov 01, 2021