Preferences and Practices of Face Mask to Halt the Spread of COVID-19: A Multi-Country Research on the New Normal

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Abstract

Objective: To determine preferences and practices regarding facemasks in order to prevent COVID-19 spread among citizens of different countries.

Methods: It was a cross-sectional study conducted from July to August, 2020. Participants of more than 15 years of age, irrespective of the residing country and gender, who had access to the internet and understood the English language, were voluntarily asked to participate in the study. The survey form was distributed digitally among 12 different countries through social media platforms. The survey form had the following 4 sub-sections: Section one included a written informed consent form, section two included questions regarding socio-demographics, the third section included a question on face mask preferences, fourth section assessed respondents' practices regarding face mask wearing in terms of hygiene and disposing habits.

Results: Among the 2,573 participants, the mean age was 32.58±11.65 years with the majority being females (54.8%). From all the included 12 countries, it was found that a surgical mask was the most preferred type of face mask and there was a statistically significant difference in the percentage of face mask preferences in all countries (p=0.001). The majority of the participants were found to have inappropriate practices regarding face mask usage, hygiene, and subsequent disposing (78.1%). In all countries, the percentage of inappropriate practices was significantly higher than appropriate practices with a p-value=0.001.

Conclusion: Surgical mask was a commonly used face mask and among all countries, practices regarding the usage of face masks, hygiene, and disposal of face masks were inappropriate. However, in both India and America, the second most preferred mask was a reusable fabric mask instead of the N95 respirator. Furthermore, most participants from all the included countries exhibited inappropriate practices when it came to facemask wearing, hand washing, and disposing of the mask.

Keywords: *COVID-19, coronavirus, facemask, hygiene, practices, preferences, N95-respirators, surgical mask.*

INTRODUCTION

Ever since the COVID-19 pandemic emerged as a global threat to the healthcare system, the World Health Organization has made it mandatory and has emphasized the importance of wearing a face mask for the prevention and subsequent spread of the virus [1]. Face mask comes in various forms ranging from the proper N-95 respirator to reusable cloth masks. Each kind of mask has its varying ability to filter out particles. For example, the N-95 respirators are recommended during procedures where infectious aerosols are dispersed in the air or when one comes in direct contact with a COVID-19-positive patient [2]. Surgical masks, on the other hand, are designed to help prevent large-particle droplets, splashes, sprays, or splatter that may contain bacteria and viruses from reaching one's mouth and nose [3]. For people, who are not able to afford the expenses of buying surgical masks, they can also choose to cover their faces with normal reusable cloth masks. These masks are also proven to reduce infection rates by 15% and thus are somewhat of an effective alternative instead of not wearing one at all [4]. The significance of wearing face masks for the prevention and spread of diseases was demonstrated in a study conducted during the influenza epidemic in 2009. Even though this trial showed that masks provided infection control among the population, only 50% of the people preferred wearing one [5]. Furthermore, according to the HKBU Modelling Group for COVID-19, a decline in the reproduction number (Ro) due to the practice of face coverings was observed. The reduction in Ro was estimated as 1-epm,

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which indicated the efficacy of masks to capture viral particles and the willingness of the population to wear masks. The model further suggested that with contact tracing, Ro reduced to 1.35 when wearing masks was implemented. This concluded that it could either be the efficiency of masks or the increased use of masks by the population that resulted in a great reduction in Ro by the end of the month [6]. All of the above-mentioned studies accentuate the importance of wearing a face mask in preventing both the contraction and spread of viral diseases like COVID-19, and thus people must take this precautionary measure seriously and act upon it because the number of deaths due to concurrent virus is reaching new heights with each passing day.

Currently, with the worldwide number of deaths due to COVID-19 reaching a soaring number of 90000, many countries around the world are implementing policies regarding the use of face masks to prevent the community-wide spread of the disease [7]. For example, in China, people at moderate to low risk of getting the infection are directed to wear surgical or disposable masks that are intended for medical use respectively. People who are at very low risk of contracting the disease do not have to wear a mask or can alternatively wear a non-medical mask such as a reusable cloth mask. Similarly, in Hong Kong, it has been made essential for people who are symptomatic to wear a surgical mask when taking public transport or staying in crowded places. The government has also further raised the importance of wearing a mask properly and practicing good hand hygiene before wearing and after removing a mask. The Singaporean government also requires its citizens to wear a mask if they exhibit respiratory symptoms, such as a cough or runny nose [8].

Despite the continuous immense efforts demonstrated by policymakers to prevent the spread of COVID-19, people are still reluctant towards complying with the healthcare policies of wearing face masks. One of the major reasons why this can be so could be since the face masks are highly uncomfortable protective gear. Oftentimes, it is very difficult to breathe through face masks, and for some people, it may even cause potential skin allergies. Therefore, it is crucial to understand the preferences and practices people exhibit toward wearing face masks so that complementary policies can be introduced and implemented by government and healthcare officials. Hence, this survey is designed to fulfill this very purpose, and this survey aimed to determine preferences and practices regarding facemasks in order to prevent COVID-19 spread among people of different countries.

METHODS

This was a cross-sectional study conducted from July to August, 2020. A sample size of 2954≈3000 was calculated using the Open-Epi sample size calculator, by considering as proportion of facemask adherence in public places as 51.2% [9], bond on an error as 1.8%, and 95% confidence level. Participants of more than 15 years of age, irrespective of the residing country and gender, who had accessibility to the internet and understood English participated in the study. The survey form was distributed digitally among different countries through social media networks on both open and closed groups (*i.e.* Facebook, Gmail, Instagram, WhatsApp, and LinkedIn). The study sample was stratified by country into 12 countries. The following 12 countries were included in the survey: 1. Pakistan, 2. Bangladesh, 3. India, 4. Ethiopia, 5. USA, 6. Australia, 7. Saudi Arab, 8. Canada, 9. UAE, 10. UK, 11. Germany, and 12. Iran. The proportions of participants in each stratum were equal. Due to the unavailability of a sampling frame probability sampling was not feasible therefore, a non-probability convenience sampling technique was employed for the selection of participants. This research followed the ethical guidelines specified by the Declaration of Helsinki. Ethical approval was sought by the ethical review committee of Ameen Medical and Dental Center, Karachi Pakistan (Ref# ERC-AMDC/037/2020).

The survey form was constructed on Google Forms in the English language. The survey form had four sections. Section 1 included a written informed consent form in which the aims, benefits, and possible potential risks of the study were explained to the participants. Participation in the study was completely voluntary and all the data was kept secure and confidential and used only for research purposes. Participants were free to withdraw at any point from the study. Section 2 included questions regarding socio-demographics of the study participants such as age (in years), gender (male/female), locality (rural/urban/semi-urban area), employment status (employed/unemployed), income level (<$100/$100-$300/>$300), education level (primary/secondary/post-secondary/graduate/post-graduate), and marital status (married/unmarried). There was a question “how often in the last seven days you wore the mask to prevent contracting and spreading coronavirus?” with options to the response provided as “never” to “always” on a 5-point Likert scale. The participants who answered “always” were given a score of 5 and the participants who answered “never” were assigned a score of 1. The third section of the survey included questions on face mask preferences such as which kind of mask people prefer to buy. Section 4 assessed respondents’ practices regarding face masks. This section included eight questions pertaining to the practices of wearing and removing, and one regarding the practice of disposing of face masks and was designed according to the guidelines provided by WHO [10]. For each of the eight questions, a similar 5-point Likert scale was used, ranging from 5 to 1, with a score of 5 representing strongly agree [11] and a score of 1 representing strongly disagree. For the question regarding disposal habits, the participants were asked “how do you dispose of the mask after use?” Participants who answered “in closed bins” were given a score of 1 and all of the other disposing practices were

given a score of "0". The total practice score was 9 to 41. The questionnaire is attached as a supplementary file.

Participants with scores of more than 75% (Score of 31 out of 41) were classified into appropriate practice. Thus, any score below 75% was marked as an inappropriate practice. The time estimated for the completion of the survey form ranged from 15-20 minutes. The content validation of the study tool was assessed by an expert panel including two infectious disease consultants and two public health professionals with experience of at least five years. The content validity index was estimated as 0.80 which indicated high content validation. For the reliability of the questionnaire, the pilot testing was done on 40 samples before administration and Cronbach's alpha value was estimated as 82% which indicated good reliability.

SPSS version 23 was used to analyse the data. No missing data were found. Numeric variables such as age and practice items score were presented as mean and standard deviation, whereas categorical variables like countries, age groups, gender, residence, education level, employed status, family monthly income, marital status, preference type, and appropriate practices were presented as frequency and percentage. Preference types (N-95 respirator/surgical mask/sponge mask/ sponge mask with air purifier/reusable cloth mask/ homemade mask/fashion brand mask/none) and practices (appropriate/inappropriate practices) were compared between different countries involved in the survey using the chi-square test. A p-value of less than or equal to 0.05 was considered statistically significant.

RESULTS

After inflating the sample size by 10% for non-respondents, a total of 3,300 participants (275 participants per country) were approached, out of which 2573 responded and completed the survey (77.9%). Of 2573 respondents, 259 (10.1%) were from Pakistan, 247 (9.6%) were from UAE, 240 (9.3%) from Bangladesh, 233 (9.1%) from Saudi Arab, 231 (9%) from USA, 227 (8.8%) from India, 221 (8.6%) from Ethiopia, 212 (8.2%) from Iran, 209 (8.1%) from Australia, 205 (8%) from UK, 199 (7.7%) from Canada, and 90 (3.5%) from Germany. Among the 2,573 participants, the mean age was 32.58±11.65 years (Range 15-71 years). Most of the participants were adults (73.6%), 1,411 (54.8%) were females, 1,740 (67.6%) were from urban area residents, 1,125 (43.7%) were graduates, 1,637 (63.6%) were unemployed, 1,429 (55.5%) had family income more than $300 per month, and 2,025 (78.7%) were unmarried. Country-wise socio-demographic characteristics are shown in Table **1**.

Table 1: Country-wise distribution of socio-demographic characteristics of study participants (n=2573).

Variables	Pakistan (n=259)	Bangladesh (n=240)	India (n=227)	Ethiopia (n=221)	USA (n=231)	Australia (n=209)	Saudi Arab (n=233)	Canada (n=199)	UAE (n=247)	UK (n=205)	Germany (n=90)	Iran (n=212)
Age groups												
15-24 years (n=619)	131 (50.6)	78 (32.5)	47 (20.7)	31 (14)	42 (18.2)	20 (9.6)	31 (13.3)	27 (13.6)	34 (13.8)	108 (52.7)	19 (21.1)	51 (24.1)
25-64 years (n=1893)	128 (49.4)	141 (58.8)	173 (76.2)	186 (84.2)	181 (78.4)	186 (89)	198 (85)	169 (84.9)	211 (85.4)	94 (45.9)	67 (74.4)	159 (75)
≥65 years (n=61)	0(0)	21 (8.8)	7 (3.1)	4 (1.8)	8 (3.5)	3 (1.4)	4 (1.7)	3 (1.5)	2 (0.8)	3 (1.5)	4 (4.4)	2 (0.9)
Gender												
Male (n=1162)	86 (33.2)	117 (48.8)	105 (46.3)	89 (40.3)	120 (51.9)	97 (46.4)	116 (49.8)	72 (36.2)	100 (40.5)	93 (45.4)	52 (57.8)	115 (54.2)
Female (n=1411)	173 (66.8)	123 (51.3)	122 (53.7)	132 (59.7)	111 (48.1)	112 (53.6)	117 (50.2)	127 (63.8)	147 (59.5)	112 (54.6)	38 (42.2)	97 (45.8)
Location												
Urban area (n=1740)	180 (69.5)	166 (69.2)	103 (45.4)	172 (77.8)	137 (59.3)	143 (68.4)	180 (77.3)	161 (80.9)	201 (81.4)	123 (60)	60 (66.7)	114 (53.8)
Semi-urban area (n=372)	26 (10)	36 (15)	35 (15.4)	21 (9.5)	52 (22.5)	34 (16.3)	24 (10.3)	24 (12.1)	22 (8.9)	44 (21.5)	10 (11.1)	44 (20.8)
Rural area (n=461)	53 (20.5)	38 (15.8)	89 (39.2)	28 (12.7)	42 (18.2)	32 (15.3)	29 (12.4)	14 (7)	24 (9.7)	38 (18.5)	20 (22.2)	54 (25.5)
Education level												
Primary (n=14)	4 (1.5)	0(0)	5 (2.2)	0(0)	0(0)	0(0)	1 (0.4)	4 (2)	0(0)	0(0)	0(0)	0(0)
Secondary (n=206)	36 (13.9)	66 (27.5)	35 (15.4)	10 (4.5)	12 (5.2)	8 (3.8)	6 (2.6)	16 (8)	8 (3.2)	3 (1.5)	3 (3.3)	3 (1.4)
Post-secondary (n=453)	98 (37.8)	16 (6.7)	9 (4)	21 (9.5)	34 (14.7)	10 (4.8)	24 (10.3)	32 (16.1)	31 (912.6)	105 (51.2)	20 (22.2)	53 (25)
Graduate (n=1125)	118 (45.6)	21 (8.8)	91 (40.1)	111 (50.2)	115 (49.8)	147 (70.3)	77 (33)	60 (30.2)	142 (57.5)	56 (27.3)	43 (47.8)	144 (67.9)
Postgraduate (n=775)	3 (1.2)	137 (57.1)	87 (38.3)	79 (35.7)	70 (30.3)	44 (21.1)	125 (53.6)	87 (43.7)	66 (26.7)	41 (20)	24 (26.7)	12 (5.7)

Variables	Pakistan (n=259)	Bangladesh (n=240)	India (n=227)	Ethiopia (n=221)	USA (n=231)	Australia (n=209)	Saudi Arab (n=233)	Canada (n=199)	UAE (n=247)	UK (n=205)	Germany (n=90)	Iran (n=212)
Employment status												
Employed (n=936)	28 (10.8)	78 (32.5)	31 (13.7)	85 (38.5)	107 (46.3)	97 (46.4)	122 (52.4)	144 (72.4)	130 (52.6)	47 (22.9)	35 (38.9)	32 (15.1)
Unemployed (n=1637)	231 (89.2)	162 (67.5)	196 (86.3)	136 (61.5)	124 (53.7)	112 (53.6)	111 (47.6)	55 (27.6)	117 (47.4)	158 (77.1)	55 (61.1)	180 (84.9)
Income level												
<$100 (n=542)	54 (20.8)	64 (26.7)	36 (15.9)	41 (18.6)	63 (27.3)	36 (17.2)	31 (13.3)	32 (16.1)	52 (21.1)	53 (25.9)	23 (25.6)	57 (26.9)
$100-$300 (n=602)	50 (19.3)	81 (33.8)	27 (11.9)	51 (23.1)	51 (22.1)	44 (21.1)	26 (11.2)	48 (24.1)	54 (21.9)	59 (28.8)	32 (35.6)	79 (37.3)
>$300 (n=1429)	155 (59.8)	95 (39.6)	164 (72.2)	129 (58.4)	117 (50.6)	129 (61.7)	176 (75.5)	119 (59.8)	141 (57.1)	93 (45.4)	35 (38.9)	76 (35.8)
Marital status												
Unmarried (n=2025)	248 (95.8)	204 (85)	211 (93)	141 (63.8)	193 (83.5)	172 (82.3)	138 (59.2)	141 (70.9)	135 (54.7)	179 (87.3)	69 (76.7)	194 (91.5)
Married (n=548)	11 (4.2)	36 (15)	16 (7)	80 (36.2)	38 (16.5)	37 (17.7)	95 (40.8)	58 (29.1)	112 (45.3)	26 (12.7)	21 (23.3)	18 (8.5)

Data is expressed as n(%)

Table 2: Country-wise preferences of participants regarding face masks (n=2573).

Type of mask	COUNTRY											
	Pakistan	Bangladesh	India	Ethiopia	USA	Australia	Saudi Arab	Canada	UAE	UK	Germany	Iran
N-95 respirator (n=497)	49 (18.9)	41 (17.1)	31 (13.7)	47 (19.5)	45 (19.5)	52 (24.9)	50 (21.5)	45 (22.6)	43 (17.4)	41 (20)	20 (22.2)	33 (15.6)
Surgical mask (n=1497)	169 (65.3)	143 (59.6)	62 (27.3)	152 (68.8)	115 (49.8)	112 (53.6)	152 (65.2)	129 (64.8)	179 (72.5)	111 (54.1)	42 (46.7)	130 (61.3)
Sponge mask (n=52)	6 (2.3)	8 (3.3)	9 (4)	1 (0.5)	3 (1.3)	2 (1)	10 (4.3)	3 (1.5)	1 (0.4)	5 (2.4)	1 (1.1)	3 (1.4)
Sponge mask with air purifier (n=72)	8 (3.1)	10 (4.2)	6 (2.6)	4 (1.8)	5 (2.2)	1 (0.5)	4 (1.7)	0(0)	4 (1.6)	14 (6.8)	6 (6.7)	10 (4.7)
Reusable cloth mask (n=303)	18 (6.9)	23 (9.6)	61 (26.9)	13 (5.9)	49 (21.2)	35 (16.7)	12 (5.2)	15 (7.5)	12 (4.9)	27 (13.2)	16 (17.8)	22 (10.4)
Homemade mask (n=114)	8 (3.1)	12 (5)	51 (22.5)	4 (1.8)	11 (4.8)	4 (1.9)	5 (2.1)	2 (1)	4 (1.6)	2 (1)	3 (3.3)	8 (3.8)
Fashion brand mask (n=24)	0(0)	3 (1.3)	6 (2.6)	0(0)	2 (0.9)	0(0)	0(0)	2 (1)	2 (0.8)	3 (1.5)	2 (2.2)	4 (1.9)
None (n=15)	1 (0.4)	0(0)	1 (0.4)	0(0)	1 (0.4)	3 (1.4)	0(0)	3 (1.5)	2 (0.8)	2 (1)	0(0)	2 (0.9)

Data is expressed as n(%)

Table 3: Descriptive analysis of practice items scale.

Items	Never	Occasionally	Sometimes	Often	Always
How often in the last seven days you wore the mask to prevent contracting and spreading coronavirus?	168 (6.5)	224 (8.7)	306 (11.9)	469 (18.2)	1406 (54.6)
-	**Strongly disagree**	**Disagreev**	**Neutral**	**Agree**	**Strongly agree**
Do you wash your hands immediately before wearing your mask?	93 (3.6)	317 (12.3)	626 (24.3)	956 (37.2)	581 (22.6)
Do you wash your hands immediately after removing your mask?	57 (2.2)	126 (4.9)	306 (11.9)	978 (38)	1106 (43)
Do you check your mask for dirt or damage before wearing it?	53 (2.1)	101 (3.9)	207 (8)	1103 (42.9)	1109 (43.1)
Do you check the mask is covering your mouth, nose, and chin?	66 (2.6)	38 (1.5)	92 (3.6)	1007 (39.1)	1370 (53.2)
Do you touch your mask from the front side when removing it? (Reverse scoring)	607 (23.6)	914 (35.5)	365 (14.2)	503 (19.5)	184 (7.2)
Do you check your mask for dirt or damage after removing it?	172 (6.7)	359 (14)	428 (16.6)	1100 (42.8)	514 (20)
Do you wash your mask after each use to remove viral droplets that may have landed on the mask?	385 (15)	573 (22.3)	475 (18.5)	713 (27.7)	427 (16.6)
-	**Closed bin**	**In open space**	**In water**	**I don't dispose and I am reusing the same mask**	**Burn it**
How do you dispose of the mask after use?	1716 (66.7)	161 (6.3)	122 (4.7)	545 (21.2)	14 (0.5)

Data is expressed as n(%)

Out of 2,573 respondents, 1,496 (58.1%) preferred to use the surgical mask, 497 (19.3%) preferred an N-95 respirator, 303 (11.8%) opted for a reusable cloth mask, 114 (4.4%) preferred homemade mask, 72 (2.8%) chose sponge mask with an air purifier, 52 (2%) preferred sponge mask, 24 (0.9%) went for fashion brand mask, and only 15 (0.6%) preferred not to use any type of face mask. Country-wise preferences are displayed in Table **2**. Among all included countries, surgical masks were the most preferred type of face mask. There was a statistically significant difference in the percentage of face mask preferences in all countries ($p<0.001$).

Almost 54.6% always wore masks to prevent contracting and spreading COVID-19, whereas only 6.5% of participants never wore facemasks for the prevention of the viral disease. A descriptive analysis regarding practices of wearing, removing, and disposing of facemasks is displayed in Table **3**.

Out of 2573 participants, only 564 participants had the appropriate practice of facemask wearing, hygiene, and subsequent disposal (21.9%). In all countries, the percentage of inappropriate practices was significantly higher than the appropriate practices with a ($p<0.001$) (**Fig. 1**).

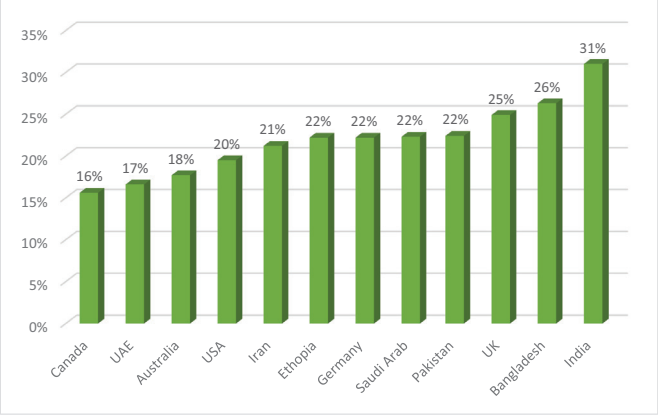

Fig. (1): Country-wise distribution of appropriate practices.

DISCUSSION

The novel coronavirus has shown devastating effects on healthcare systems and economies, affecting both developed and underdeveloped nations. The once bustling public places are now empty and the intensive care units are out of space. Life, as it was once known, has now tremendously changed, with people being forced to adapt to the new norms to better protect themselves from contracting the virus. Individuals have been separated from their colleagues, families, and friends, thus affecting contemporary life on a scale that most human beings have never experienced before [11]. Because there is no such cure or vaccine yet available to the people, public healthcare strategies such as wearing face masks, properly washing hands, and sanitizing surfaces have shown promising results in the prevention and minimization of the viral disease. Therefore, to further improve these protective healthcare strategies, the general habits of people regarding their preferences and practices towards the usage of face masks must be understood [12, 13]. Hence, in the present survey, such preferences and practices amongst people from 12 different countries were assessed.

Even though face masks are one of the main protective gear, people are still non-compliant with their use of it due to the resulting difficulty in breathing. Taking advantage of this issue, many vendors in the markets are now selling lacy face masks and claiming them to be easily breathable and also comfortable. However, what people fail to realize is that even though a lacy material mask might make it easier for one to breathe through, it provides very little actual protection from viral respiratory droplets that results from talking, sneezing, and coughing [14, 15]. Therefore, it is better to use face masks that have proper filter pockets and are made up of tightly knit material to protect oneself from viral droplets. Examples of such masks are the N95 respirators and surgical masks, which are amongst the most frequently used masks, and can block up to 80% of small particles and 96% of microbes [14]. As compared to homemade masks, surgical masks are 3 times more efficacious in reducing the exposure of coronavirus RNA in aerosols and can also decrease influenza viral aerosol shedding by more than 3 folds [14]. Furthermore, in the data that was collected and analysed, it was found that most participants opted towards using surgical masks (58.1%) followed by the N95 respirator (19.3%). A possible reason why the percentage usage of both surgical masks and the N95 respirators is not high among the general population could be because there was a lack of supplies, soaring costs, and potential market restrictions for frontline healthcare providers [8]. These barriers can also explain why 11.8% and 4.4% of the participants in the current study favoured using reusable fabric masks and handmade masks instead of surgical and N95 respirator masks, respectively. It is also rather interesting to note that about 45% of the participants opted to purchase surgical masks in all countries except India. Even though the second most preferred mask in all included countries was the N95 respirator, people from India and the United States opted for reusable fabric masks instead as their second option. A big reason why Indians tend to gravitate towards using reusable fabric masks more can be because many people in India routinely cover their mouths and nose with scarves or any other cloth pieces while going outside to protect themselves from the pollution in the air [16]. Therefore, for Indians, a reusable cloth mask is a more familiar article than the N95 respirators, thus explaining the second most preferred choice. For Americans, a possible reason why they choose reusable cloth masks over N95 respirators can be because there is huge interest amongst the American people when it comes to recycling and reusing objects. Because reusable fabric masks provide that safe medium for multiple uses, Americans tend to favour

buying and using these fabric masks over other more efficient masks like the N95 respirators. Since reusable fabric masks can also come in various colours and designs, fashion might also be a big reason why people choose this kind of mask. Another reason why N95 respirators are not seen as the second most preferred masks in Pakistan, India, and America can be due to the soaring prices of these masks [17-19]. Even though reusable cloth masks do not provide enough barrier against viral respiratory droplets, it is still important to apprehend that wearing any kind of mask even with low filtration efficacy may still be better than not wearing one at all to prevent community transmission of the virus [20].

Needless to say, wearing a face mask is not the only guarantee that can protect one from contracting the virus. Proper hand hygiene, both before and after wearing face masks along with acceptable disposing methods are also just as important if not more in preventing the contraction and spread of the virus. As discussed earlier, many people have opted for makeshift alternatives or repeated usage of disposable surgical masks, but improper practices of face mask like not maintaining hand hygiene while wearing and removing them, might jeopardize the positive effects of these protective gears and increases the likelihood of getting the virus [5, 8]. In the present research conducted, it was found that most participants from all the countries had inappropriate practices regarding the proper usage of face masks and were not following the WHO guidelines on how to wear, maintain hygiene, and dispose of face masks [10]. The highest percentage of inappropriate practices was observed in Canada (84.4%) followed by UAE (83.4%), then Australia (82.3%), and finally the USA (80.5%). Such results indicate the lack of proper education when using face masks. Studies claimed that the risk of virus transmission was low among people who used facemasks [19, 21]. However, in reality, if one does not wash their hands both before and after removing the face mask, then they are equally as likely to contract the virus because the viral droplets may still be on the mask's surface. Similarly, if not disposed of in closed bins, there are chances that the virus can potentially infect other surfaces, causing even more community-wide transmission. Therefore, it is crucial to omit any unauthentic circulating social media messages regarding face mask usage and always refer to authentic sources such as the WHO for proper guidelines. Lastly, governmental interventions, such as awareness campaigns, are also needed to spread nationwide awareness among people.

A few limitations of the present study are that it was an online survey in which there were fewer number participants from a rural area, low-income groups, and low education levels which limits the generalizability of results to the overall population. Furthermore, a non-randomized method of sample selection may also lead to selection bias. We also did not include participants exposed to COVID-19 and classified data according to healthcare workers. Further studies with larger sample sizes and targeting vulnerable groups should be conducted. Moreover, the use of different types of facemasks should be compared with socio-demographic factors and in prospective studies, the efficacy of different facemasks should also be assessed.

The results of our study accentuate the importance of national awareness campaigns that demonstrate to people the ideal habits, both before and after wearing face masks, to effectively prevent the spread of the concurrent virus and even any other future pandemics. Lastly, more information regarding the efficacy levels of different types of masks should be shared with the general public so that people can make educated choices on which mask they choose to wear to protect themselves.

CONCLUSION

Through this study, it was observed that surgical masks are the most commonly preferred type of mask with the runner-up being the N95 respirator. However, in both India and America, the second most preferred mask was a reusable fabric mask instead of the N95 respirator. Furthermore, most participants from all the included countries exhibit inappropriate practices when it comes to facemask wearing, hand washing, and disposing of the mask.

ETHICS APPROVAL

This research followed the ethical guidelines as specified by the Declaration of Helsinki. Ethical approval was sought by the ethical review committee of Ameen Medical and Dental Center, Karachi Pakistan (Ref# ERC-AMDC/037/2020) on 14 July 2020.

CONSENT FOR PUBLICATION

Written informed consent was obtained from all the eligible participants.

AVAILABILITY OF DATA

Data is available from the corresponding author on a reasonable request.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

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AUTHORS' CONTRIBUTION

KA, SG, and HA conceived and designed the study, conducted research, and provided research materials, AJ, YAB, and ZPK collected and organized data. MY and BK analysed and interpreted data. HTD, ZK, and ZPK wrote the initial and final draft of the article, and HA provided logistic support. All authors have critically reviewed and approved the final draft and are responsible for the content and similarity index of the manuscript.

REFERENCES

1. WHO. Coronavirus disease (COVID-19) advice for the public: when and how to use masks. World Health Organization; 2020 [cited 2020 9 Sep]. Available from: https://www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public/when-and-how-to-use-masks.
2. de Man P, van Straten B, van den Dobbelsteen J, van der Eijk A, Horeman T, Koeleman H. Sterilization of disposable face masks by means of standardized dry and steam sterilization processes; an alternative in the fight against mask shortages due to COVID-19. J Hosp Infect 2020; 105(2): 356-7. DOI: https://doi.org/10.1016/j.jhin.2020.04.001
3. FDA. N95 respirators, surgical masks, and face masks: U.S. Food & Drug Administration; 2020 [cited 2020 9 Sep]. Available from: https://www.fda.gov/medical-devices/personal-protective-equipment-infection-control/n95-respirators-surgical-masks-and-face-masks.
4. Davies A, Thompson K-A, Giri K, Kafatos G, Walker J, Bennett A. Testing the efficacy of homemade masks: would they protect in an influenza pandemic? Disaster Med Public Health Prep 2013; 7(4): 413-8. DOI: https://doi.org/10.1017/dmp.2013.43
5. MacIntyre CR, Cauchemez S, Dwyer DE, Seale H, Cheung P, Browne G, *et al.* Face mask use and control of respiratory virus transmission in households. Emerg Infect Dis 2009; 15(2): 233-41. DOI: https://doi.org/10.3201/eid1502.081167
6. Tian L, Li X, Qi F, Tang Q-Y, Tang V, Liu J, *et al.* Calibrated Intervention and Containment of the COVID-19 Pandemic. arxiv 2020 (eprint): arXiv:2003.07353. Available from: https://arxiv.org/abs/2003.07353. DOI: https://doi.org/10.48550/arXiv.2003.07353
7. WHO. Coronavirus disease (COVID-19), weekly epidemiological update: World Health Organization; 2020 [cited 2020 9 Sep]. Available from: https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200907-weekly-epi-update-4.pdf?sfvrsn=f5f607ee_2.
8. Feng S, Shen C, Xia N, Song W, Fan M, Cowling BJ. Rational use of face masks in the COVID-19 pandemic. Lancet Respir Med 2020; 8(5): 434-6. DOI: https://doi.org/10.1016/S2213-2600(20)30134-X
9. Azlan AA, Hamzah MR, Sern TJ, Ayub SH, Mohamad E. Public knowledge, attitudes and practices towards COVID-19: A cross-sectional study in Malaysia. PLoS One 2020; 15(5): e0233668. DOI: https://doi.org/10.1371/journal.pone.0233668
10. Organization WH. Coronavirus disease (COVID-19) advice for the public: when and how to use masks. 2020. Available from: https://www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public/when-and-how-to-use-masks
11. Saracci R. Prevention in COVID-19 time: from failure to future. J Epidemiol Community Health 2020; 74(9): 689-91. DOI: https://doi.org/ 10.1136/jech-2020-214839
12. Khan MH, Yadav H. Sanitization During and After COVID-19 Pandemic: A Short Review. Trans Indian Natl Acad Eng 2020; 5(4): 617-27. DOI: https://doi.org/10.1007/s41403-020-00177-9
13. Dhama K, Patel SK, Kumar R, Masand R, Rana J, Yatoo MI, *et al.* The role of disinfectants and sanitizers during COVID-19 pandemic: advantages and deleterious effects on humans and the environment. Environ Sci Pollut Res Int 2021; 28(26): 34211-28. DOI: https://doi.org/10.1007/s11356-021-14429-w
14. Worby CJ, Chang H-H. Face mask use in the general population and optimal resource allocation during the COVID-19 pandemic. Nat Commun 2020; 11(1): 4049. DOI: https://doi.org/10.1038/s41467-020-17922-x
15. Akhtar J, Garcia AL, Saenz L, Kuravi S, Shu F, Kota K. Can face masks offer protection from airborne sneeze and cough droplets in close-up, face-to-face human interactions?-A quantitative study. Phys Fluids 2020; 32(12): 127112. DOI: https://doi.org/10.1063/5.0035072
16. Panda S, Kaur H, Dandona L, Bhargava B. Face mask - An essential armour in the fight of India against COVID-19. Indian J Med Res 2021; 153(1 & 2): 233-7. DOI: https://doi.org/10.4103/ijmr.IJMR_4486_20
17. OECD. The face mask global value chain in the COVID-19 outbreak: Evidence and policy lessons: OECD Publishing; 2020. Available from: https://www.oecd.org/coronavirus/policy-responses/the-face-mask-global-value-chain-in-the-COVID-19-outbreak-evidence-and-policy-lessons-a4df866d/
18. Dugdale CM, Walensky RP. Filtration Efficiency, Effectiveness, and Availability of N95 Face Masks for COVID-19 Prevention. JAMA Intern Med 2020; 180(12): 1612-3. DOI: https://doi.org/10.1001/jamainternmed.2020.4218
19. Furnaz S, Baig N, Ali S, Rizwan S, Khawaja UA, Usman MA, *et al.* Knowledge, attitude and practice of wearing mask in the population presenting to tertiary hospitals in a developing country. PLoS One 2022; 17(3): e0265328. DOI: https://doi.org/10.1371/journal.pone.0265328
20. Cheng VC, Wong SC, Chuang VW, So SY, Chen JH, Sridhar S, *et al.* The role of community-wide wearing of face mask for control of coronavirus disease 2019 (COVID-19) epidemic due to SARS-CoV-2. J Infect 2020; 81(1): 107-14. DOI: https://doi.org/10.1016/j.jinf.2020.04.024
21. Howard J, Huang A, Li Z, Tufekci Z, Zdimal V, van der Westhuizen H-M, *et al.* An evidence review of face masks against COVID-19. Proc Natl Acad Sci USA 2021; 118(4): e2014564118. DOI: https://doi.org/10.1073/pnas.2014564118