

Adverse Complications of Usage Practice of Face Mask During an Epidemic; Pilot Study on Sri Lankan Perspectives

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ABSTRACT

Accurate use of face mask (FM) is important for prevention of airborne diseases such as COVID 19, and it's related with rapid spread and many post-covid complications. Our group investigated the usage practice of different types of FM using web-based self-administered questionnaire which was validated in the health sector. Study was conducted in public of Sri Lanka. The questionnaire with 23 questions and 8 questions directed for assessing the usage pattern of facemasks. The study represented all the districts and 99% of participants had used the FM and out of that, 55% were females and 45% were males. 71% of participants were young, 17% middle-aged and rest (12%) of above 40 years. Further, 74% of participants who used FM are tertiary educators and the rest are from school education. 50% of them were KN95/N95 users, 40% were disposable surgical masks, 6% used reusable cloth masks and 4% of others. 85% of them had used all disposable FM. Out of them, 65% had reused it and 35% of them had not reused it. Participants who used reusable cloth-masks, 58% washed every time, 36% after several uses, 2% rarely washed and 4% never washed. Regarding using time, 30% uses < 1 hr, 32% for 1-3 hrs, 28% use 3-6 hrs 5% for 6-12 hrs, and 5% > 12 hrs. 95% of participants mentioned that they do proper disposal but only 35% practiced the correct method. Most of them had reused the disposable FM and also use cloth masks without rewashing. This pilot study showed that importance of dissemination of the knowledge on proper disposal of FM and recommended intermittent detailed health education program and disposal monitoring system in this regard.

Index Terms- *Face Mask, Usage Practice, Adverse Complications*

INTRODUCTION

Coronavirus 2 (SARS-CoV-2), disease is a severe acute respiratory syndrome caused by commonly known as COVID-19, and it became a pandemic causing millions of deaths all over the world despite the vaccination program initiated. In Sri Lanka, first case was reported on 15th of February 2020 as one patient and second patient were reported on 11th of March 2020 [1]. Numbers rapidly exceeded more than 1000 in October government made the country lock down to control the spread while arranging the vaccination program with Astrozenica [2]. Since the detection of the first COVID-19 case in from March 2020 up to September 21, there have been confirmed cases with 5,710 deaths [3,4,5]. Government implemented of practicing one meter distancing at everywhere and proper hand washing methods at every entrance to the premises have been strictly adopted at the beginning to reduce the transmission of COVID-19 in the community in Sri Lanka. Strict use of facemasks was also included in the national guidelines. Because community-wide covering of face to prevent transmission through infected saliva and respiratory droplets from individuals was thought to be helpful in control of this infection with subclinical or mild infections [6]. There is also evidence that many people are asymptomatic [7-10]. For example, studies in China and Italy have shown that 78% and 50–75% of people with positive molecular tests were completely asymptomatic [9,10]. Thus, wearing masks by asymptomatic individuals in public was earlier disputed and regarded as not being effective. However, there are great antithetical evidence that shows the use of face masks reduces the risks of COVID-19 transmission to a large degree [11–17].

Mandating face mask use in public is correlated with the daily reduction in COVID-19 transmission, which helps in mitigating the spread of the disease [12]. Despite the consistency in the recommendation for the use of face masks by the healthcare providers and symptomatic individuals, it is not recommended for

the general public and the wider community [18]. Nonetheless, public mask wearing is now highly advocated, particularly in areas in which there are high levels of community transmission. However, the use of face masks by healthy individuals in the community to reduce the risk of viral respiratory infections remains contentious.

The current available types of masks include medical masks, N95 masks, and non-medical cloth masks [19]. Medical masks are loosely fitted devices worn by the health care workers and infected individuals to reduce the transmission risk of contagious respiratory droplets between individuals during coughing or sneezing. However, depending on the type of face masks, the protection rate varies from 33 to 100% in the process of expiratory emissions [20]. For example, cloth face masks have moderate efficacy in the prevention of the disseminated respiratory infections resulting from particles of the same size or smaller than those of COVID-19 [21]. Therefore, many countries have enforced the use of face masks.

A high degree of community compliance with face masking will maximize the reduction in the rate of infections. There are several possible reasons that decrease the compliance of individuals with wearing face masks during the outbreaks. The most important of which are the lack of knowledge, misconception, appearance, and barriers preventing compliance. Assessment of the community's compliance in wearing face masks requires information about their knowledge, attitudes, and perceptions, and then, identification and assessment of the barriers preventing compliance. Physical and social discomfort, confusion or misinformation, low perceived susceptibility to COVID-19, and perceptions of identity and autonomy were reported as the main barriers in using face masks [18].

Compliance is highly affected by the individual's positive perception, which by itself is influenced by knowledge. Measuring the compliance with the mandate of using face masks by the community is of great importance. However, information on the acceptability of the different types of face masks in preventing COVID-19 is scanty and disputed [26]. A few studies have reported on the knowledge, attitude, and practice of health workers regarding

the use of face masks for the prevention of SARS-CoV-2 transmission [19, 20]. Studies on the practice and disposal methods are hardly found.

The aim of this study is to investigate the knowledge and compliance of the community in wearing face masks for COVID-19 prevention. The study also investigates the overall perceptions of barriers to wearing face masks. Therefore, possible recommendations for the improvement of community compliance with wearing face masks will be suggested based on the findings of this study.

MATERIAL AND METHODS

This study was approved by the CINEC ethical review committee. It was conducted online questionnaire, and every participant was given online written informed consent.

The questionnaire was sent for validation before the commencement of the study. This pretested questionnaire was prepared according to the objectives after the literature review. The questionnaire consists of 23 questions and 8 questions were directed to assess the usage pattern of facemasks. The questionnaire was administered to the participants by a web link through various social media applications.

STATISTICAL ANALYSIS

The participants' knowledge and attitude were measured by questions on a five-point Likert scale rating, ranging from strongly agree (5), agree (4), neutral (3), disagree (2), and strongly disagree (1). The mean score of every question was calculated out of five. The average knowledge and barriers against using face masking scores were calculated out of 25 points for the five related questions. The attitude and misconception of the participants' scores were measured out of 40 points for the eight questions. For the questions related to compliance with wearing face masks, the same five-point Likert scale rating was used, ranging from always (5), frequently (4), occasionally (3), rarely (2), and never (1). The average score was calculated out of 15 for the three questions.

RESULTS

This study represented all districts in Sri Lanka Demographic details were analyzed at the phase 1. We found that 99% participants had used the FM. Out of this group, 55% were found to be females and 45% were males.

Figure 1

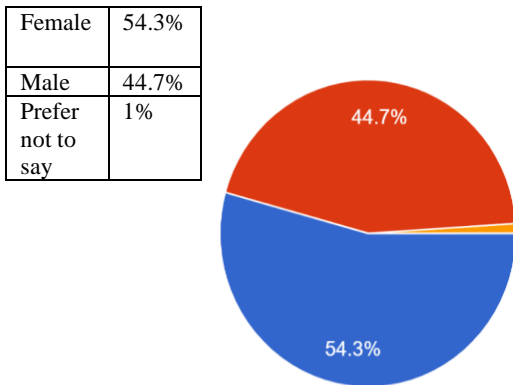


Figure 1 shows the male to female ration of our study group.

Our study participation was covered in all over the country and table 1 shows coverage in Sri Lanka

Table 1 - coverage in Sri Lanka

residence		Frequency	Percent
District	Ampara	3	1.1
	Anuradhapura	9	3.4
	Badulla	9	3.4
	Batticaloa	4	1.5
	Colombo	22	8.2
	Galle	22	8.2
	Gampaha	14	5.2
	Hambantota	21	7.9
	Jaffna	13	4.9
	Kalutara	11	4.1
	Kandy	23	8.6
	Kegalle	18	6.7
	Kilinochchi	6	2.2
	Kurunegala	21	7.9
	Mannar	3	1.1
	Matale	8	3.0
	Matara	9	3.4
	Moneragala	7	2.6
	Mullativu	3	1.1
	Nuwara Eliya	3	1.1
	Polonnaruwa	5	1.9
	Puttalam	2	.7
	Ratnapura	18	6.7
	Trincomalee	6	2.2
	Vavuniya	7	2.6
	Total	267	100.0

Age distribution

In relation to the age group, 71% of participants are young, 17% middle-aged and the rest (12%) of above 40 years. Further, 74% of participants used FM are tertiary educators and the rest are from school education.

Type of face mask

Our study showed that 50% of them were KN95/N95 users, 40% were disposable surgical masks, 6% used cloth masks and 4% of other types.

Reuse and Washing frequency of reuseage.

65% of study participants had reused all types of FM and 35% of them had not used it again. Figure 2 shows the frequency of washing of face mask after usage.

How frequently do you wash your reusable cloth mask?
385 responses

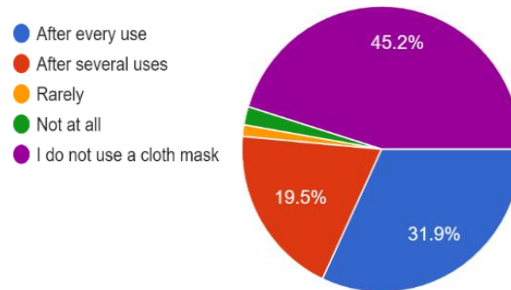


Figure 2 - frequency of washing of the face mask.

Figure 2 shows the frequency of washing of the face mask. The majority had washed after every single use and some participants had washed after several uses and some have never washed it. People who do not use cloth masks are also shown here.

Face mask using time.

Table 2 shows the usage time of the face mask of our study population.

Table 2 shows the majority had used FM within 1-3 hours and around 4.7% of the had used it more than 12 hours at once.

<30 minutes	4.9%
30-45 minutes	12.5%
1-3 hours	31.9%
3-6 hours	28.1%
6-12 hours	17.9%
>12 hours	4.7%

Touching the exposed side of face mask

Figure 3 shows 49.6% of participants mentioning that they unconsciously touch the exposed side while wearing or removing, 7.8% of them said yes to this question and 42.6% said they never touch the front side.

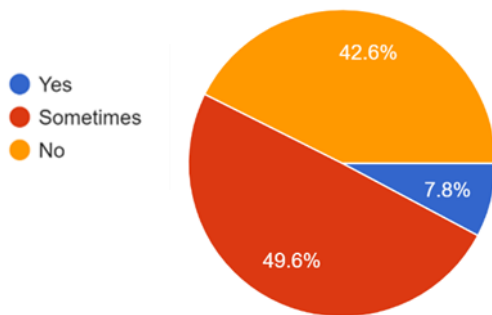


Figure 3 - Touching the exposed side of face mask

Removal of mask while talking

Table 3 shows how frequently they remove the mask while talking.

Table 3 - percentage of the participants removing mask while talking.

Yes	1.8%
Sometimes	23.6%
no	74.5%

Disposal practice

Table 4 shows the percentage of good practice of disposal of used face mask.

Table 4 - percentage of good practice of disposal of used face mask.

Yes	68.3%
Sometimes	26%
no	5.7%

Knowledge on potential risk of using nonsurgical mask.

56.9% of participants showed that they are aware of the risk and interestingly, 32.7% of them said they don't know.

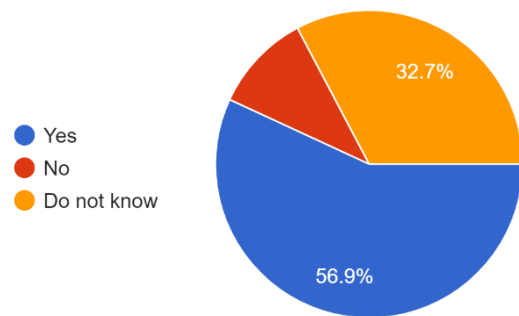


Figure 4 - Knowledge on potential risk of using nonsurgical mask.

We further researched the knowledge on the best type of mask, and we find the results as indicated in table 5.

Table 5 – percentage of participants' knowledge on best type of mask

Surgical mask	19.2%
KN95/N95	71.4%
Cloth mask	1%
Cone style	1.6%
Do not know	6.8%

DISCUSSION

This study was conducted to evaluate the knowledge and practices of wearing face masks during an epidemic in Sri Lanka. Our literature survey indicated that guidelines for wearing masks differ significantly between countries. Further, all the referred studies had the same opinion on the face mask using practice, and benefits of the face mask usage depended on society compliance. Results of our study on FM

usage practice was compatible with the study on a Malaysian community and both studies showed the more than 80% of participants had the knowledge of prevention. Both studies indicated KN95, or surgical type FM were the common facemasks used. Another Sri Lankan study published in the disaster prepared and response division in Sri Lankan government, had found out 47% had used the cloth masks and 61% of them had used surgical and KN95 type. This is compatible with our finding. Most of the participants who used the disposable face masks, had re-used it. This cannot be recommended and the purpose of using the face mask has been impeded. In addition to that some of our participants had used cloth masks and interestingly they believed that it was the best face mask. Filtration effectiveness is lower than the surgical and medically prepared masks [22]. Previous controlled clinical studies had shown that rate of infections is higher in cloth face masks compared to surgical masks [23,24]. A few more studies in relation to cloth face masks had stated that the many factors; thread count, number of layers, type of fabric, and water resistance had determined the effectiveness of the filtration [25]. Wearing at least a cloth mask would be healthier than not wearing face mask during the epidemic. We did not find any person without wearing mask during this critical time.

50% of the participants in this Sri Lankan study had bad practice of touching the outside of face mask when removing or wearing. Misconceptions of wearing face mask were very low despite the unhealthy practices. This must be reiterated to society to adhere to the proper and healthy way of wearing face masks. Most of the studies conducted in the past had stated that most of the participants had used single face mask for 4-8 hrs per day which is compatible with our finding.

Considering all our findings and previous researchers, it is a common sequelae of practicing unhealthy way of using facemask in some communities. This may be related to the socioeconomic status of the user and therefore as the governments of Sri Lanka.

CONCLUSION

The study has revealed a good compliance rate in wearing face masks in public and workplaces in Sri Lanka but the unhealthy practices of usage. It would be recommended to the Sri Lankan Ministry officials in relation to the health to enhance general public awareness campaigns about the appropriate use and practice of face masks. This may be important not only to cover the epidemic but for the intermittent ongoing viral endemics happening time to time in Sri Lanka

REFERENCES

1. Matuschek, C., Moll, F., Fangerau, H., Fischer, J. C., Zänker, K., van Griensven, M., ... & Haussmann, J. (2020). Face masks: benefits and risks during the COVID-19 crisis. *European journal of medical research*, 25, 1-8.
2. Edirisuriya CS *et al.*, 2020. *can face masks protect you from COVID-19*, s.l.: s.n.
3. Howard *et al.*, 2020. *Face masks against Covid -19 : An evidence review*, s.l.: Research Gate. <https://www.hpb.health.gov.lk>, n.d. s.l.: s.n.
4. Huai-Liang Wu *et al.*, 2020. *Face masks shortage and novel corona virus disease (covid-19) outbreak*, s.l.: eclinical medicine
5. Islam *et al.*, 2020. Perception and Attitudes Toward PPE-Related Waste Disposal Amid COVID19 in Bangladesh: An Exploratory Study. *BRIEF RESEARCH REPORT ARTICLE*, Issue 13 November 2020, p. 6.
6. Krejcie, R.V. and Morgan, D.W., 1970. Determining sample size for research activities. *Educational and psychological measurement*, 30(3), pp.607-610.
7. Maragakis, L. L., 2020. *Coronavirus Face Masks & Protection FAQs*, s.l.: Johns Hopkins Medicine Home.
8. Massimiliano Scalvenzi *et al.*, 2020. *Community Knowledge about the use*,

- reuse, disinfection and disposal of masks and filtering face piece respirators*, s.l.: Journal of Community Health.
9. Matuschek *et al.*, 2020. *Face masks benefits and risks during covid 19 crisis*, s.l.: european journal of medical research.
 10. Piotr Nowakowaski *et al.*, 2020. *Disposal of Personal protective equipment during the covid-19 is a challenge for waste collection companies and society*, s.i.: Resources.
 11. Priya B, *et al.*, 2020. An Assessment on the Awareness and Education among General Public : Concerning Rational use of Face Masks during the COVID - 19 Pandemic. *Ijppr. Human*, 18(3), pp. 629-641.
 12. Sangkham, S., 2020. Face mask and medical waste disposal during the novel COVID-19 pandemic. *Article in Case Studies in Chemical and Environmental Engineering*, Issue 19 October 2020., p. 10.
 13. Shuo Feng, 2020. rational use of face masks in the COVID-19 pandemic. *THE LANCET*, 8(5), pp. 434-436.
 14. Srilankabusiness.com. 2021. Face Masks and Respirators Made in Sri Lanka - EDB Sri Lanka. [online] Available at: <<https://www.srilankabusiness.com/ppe/face-masks/>> [Accessed 9 February 2021].
 15. Van der Sande *et al.*, 2008. Professional and homemade face masks reduce exposure to respiratory infections among the general population.
 16. World Health Organization. (2021). WHO Coronavirus Disease (COVID-19) Dashboard. <https://covid19.who.int/>
 17. Trisha G, Schmid MB, Czypionka T, Bassler D, Gruer L. Face masks for the public during the covid-19 crisis. *BMJ* 2020;369: m1435. pmid:32273267
 18. Eikenberry SE, Mancuso M, Iboi E, Phan T, Eikenberry K, Kuang Y, et al. To mask or not to mask: Modeling the potential for face mask use by the general public to curtail the COVID-19 pandemic. *Infect Dis Model.* 2020;5: 293–308. pmid:32355904
 19. Irfan Ul Haq M, Khuroo S, Raina Khajuria S, Javaid M, Ul Haq MF, et al. 3D printing for development of medical equipment amidst coronavirus (COVID-19) pandemic—review and advancements. *Res. Biomed. Eng.* (2020). <https://doi.org/10.1007/s42600-020-00098-0>
 20. Lai A., Poon C., & Cheung A. (2011). Effectiveness of facemasks to reduce exposure hazards for airborne infections among general populations. *J R Soc Interface.* 2012; 9: 938–948. pmid:21937487
 21. Lima MMdeS, Cavalcante FML, Macedo TS, Galindo N, Nelson M, Caetano JA, et al. Cloth face masks to prevent Covid-19 and other respiratory infections. *Rev. Latino-Am. Enfermagem* 2020;28: e3353. pmid:32785565
 22. Chughtai AA, Seale H, Macintyre CR. Effectiveness of Cloth Masks for Protection Against Severe Acute Respiratory Syndrome Coronavirus 2. *Emerg Infect Dis.* 2020 Oct;26(10):e200948. doi: 10.3201/eid2610.200948. Epub 2020 Jul 8. PMID: 32639930; PMCID: PMC7510705.
 23. MacIntyre CR, Seale H, Dung TC, Hien NT, Nga PT, Chughtai AA, et al. A cluster randomised trial of cloth masks compared with medical masks in healthcare workers. *BMJ Open.* 2015;5:e006577. 10.1136/bmjopen-2014-006577
 24. Davies A, Thompson KA, 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;7:413–8. 10.1017/dmp.2013.43

25. Chughtai AA, Seale H, MacIntyre CR. Use of cloth masks in the practice of infection control—evidence and policy gaps. *Int J Infect Control.* 2013;9:1–12. 10.3396/IJIC.v9i3.020.13
26. Shelus VS, Frank SC, Lazard AJ, Higgins ICA, Pulido M, Richter APC, et al. Motivations and Barriers for the Use of Face Coverings during the COVID-19 Pandemic: Messaging Insights from Focus Groups. *Int J Environ Res Public Health.* 2020;17: 9298. pmid:33322672