Original Article

Compliance on the Use of Different Types of Face Mask by Healthcare Workers and General Public in Tertiary Care Hospital of RMU during COVID-19 Pandemic

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Abstract

Objective: To determine the compliance on the use of different types of facemask among HCWs, patients and the general public in different hospital settings of tertiary care hospital of RMU during COVID-19 pandemic

Material and Methods: Cross-sectional descriptive study was done among 397 study subjects of either gender consisting of HCWs, patients, and the general public visiting the tertiary care hospital from 6th April-6th June 2020. Subjects were enrolled through convenience non-probability sampling. Data was gathered by self-structured proforma. The study consisted of questioning the frequency of washing hands, using hand sanitizers, practicing physical distancing, using eye protection goggles or face shields, the practice of sterilizing or changing of shoes and clothes after coming back to home, frequent use of disposable gloves, use of caps or head covers and water-repellant aprons and gowns. Data were analyzed by SPSS version 25.0.

Results: A total of 397 study subjects including 206 (52%) males and 190 (48%) females were enrolled in the study. 118 (29.7%) had an underlying disease, 93 (78.8%) of them showed regular use of masks. The mean age of participants was 34.7 ± 12.2 years. 90.4% of study subjects had good compliance with using face masks in hospital settings, 25.9% study subjects used respirator type of masks while the use of homemade cloth was 4.8%. A total of 57.8% of study subjects had use of single masks, 22.5% used double masks, and 10.4% people used triple masks remaining 9.3% uses no masks at all. Among 189 HCWs 54% were using respirator type of masks and 46% were using surgical masks. The general public preferred to use locally made surgical masks or homemade cloth because they are cheap and easily available.

Conclusion: The selection and use of PPE especially facemasks vary among HCWs and non HCWs. Even among HCWs usage varies according to the type of healthcare workers and the working environment. Overall compliance with the use of face masks and other PPE was considerably low among non HCWs. Our study has provided preliminary data about the usage of masks among HCWs and non HCWs. Longitudinal studies must be conducted to collect better evidence about the use of the face mask as PPE and its associated factors.

Keywords: COVID-19, Face mask, Health care workers (HCW), Personal protective equipment (PPE).

Introduction

In this era of medical advancement, people have been continually exposed to outbreaks of highly diffusible pathogens such as a recent coronavirus COV-2.[1] Since the very first case of a novel coronavirus (COVID-19) infection pneumonia detected in Wuhan, China, a series of confirmed cases of the COVID-19 were found in Beijing.[2]

According to the latest reports of WHO updated on 06 June 2020, among 216 effected countries, areas, or territories 6,663,304 confirmed cases and 392,802 deaths have been reported.[3] As COVID-19 spread by 4 different routes 1.contact, 2.airborne, 3.droplets, 4.orofecalroute.[1] The primary route of transmission of SARSCov-2 is tiny droplets while coughing, sneezing, and speaking, the most common droplet size ranging from 5 micrometers to 10 micrometers.[5,7,8] In this regard, the use of a mask by general population have been recommended as a potential tool to tackle the COVID-19 pandemic and such an important preventive measure that can't replace the importance of other PPEs, however, wearing masks suggest compliance in other health behaviors as well.[5]

Mask can be used either for the protection of a healthy person in risk or non-risk environment or source control.[5] Although the subject of transmission of Novel Coronavirus is still under discussion, however, the studies show that most transmission of COVID-19 takes place from symptomatic people when physical distancing and preventive measures are ignored and there is also the possibility of pre-symptomatic transmission and asymptomatic transmission.[6]

Therefore the objective of the present study is done to determine the compliance on the use of different types of facemask among HCWs, patients, and the general public in a hospital setting and to compare the masks usage with other PPEs among HCWs and non-HCWs in RMU and allied hospital settings during COVID-19 pandemic. This study will help to examine the knowledge, attitude, and behavior of people to comply with infection control precautions and the pertinent issues that are considered influential in compliance with this disease and their adoption of SOPs pertinent to this disease that is being disseminated via social media**.**

Material and Methods

A cross-sectional descriptive study was made among 397 study subjects of either gender consisting of HCWs, patients, and the general public visiting the Holy Family Hospital Rawalpindi from 6th April-6th June. Subjects were collected from COVID-19 isolation center, COVID-19 screening center, General OPD, General Ward, Emergency Room(ER), Operation Theater, Hospital Laboratory, Administration Block, and security staff of Holy Family Hospital. Subjects were enrolled in the study through convenience non-probability Sampling. Data was gathered by self-structured proforma pertinent to demographics, profession, risk of exposure, use of masks, and specifications of the masks being used as well as information regarding the use of masks with other PPEs. The study was consisted of questioning the frequency of washing hands, using hand sanitizers, practicing physical distancing, using eye protection goggles or face shields, the practice of sterilizing or changing of shoes and clothes after coming back to home, frequent use of disposable gloves, use of caps or head covers and water-repellant aprons and gowns. Data were analyzed by SPSS version 25.0.

Results

Of the total of 397 study subjects, most 206 (52%) of them were males, and 190 (48%) females and out the total, 118 (29.7%) had an underlying disease. The mean age of participants was 34.7 ± 12.2 years. Among 189 HCWs, 93 were doctors, 42 nurses, 11 lab technicians, 17 sanitary workers, about 25 in the category of others consisted of the clerical staff of the hospital, security guard, and computer operator. 207 general population was comprised of patients and their attendants visiting the hospital.
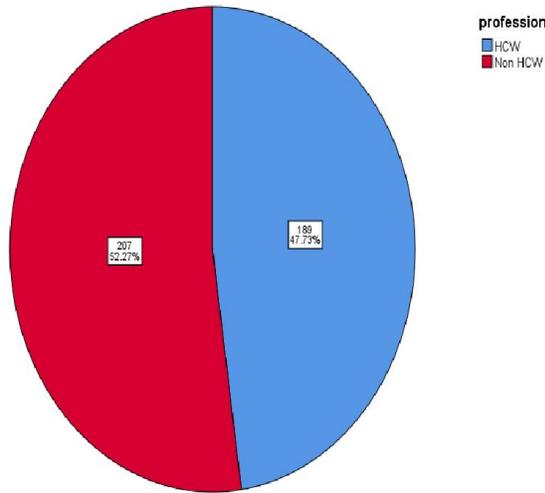
Figure 1:
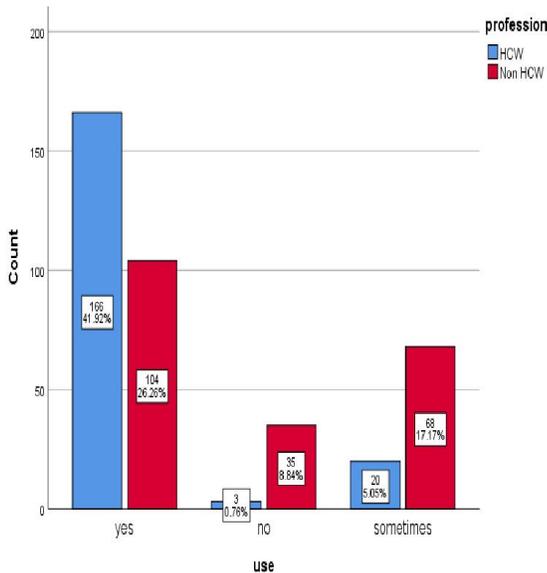
Figure 2: Frequency of using mask among HCWS is more than non-HCW

Compliance on the use of mask among doctors and nurses is highest as shown in the table below:

Table 1: Frequency of Using Face Mask among Different HCWs

		Use			Total
		Yes	**No**	**Some times**	
Type of HCW	**Doctors**	91	0	2	93
	Nurse	39	0	3	42
	Lab technician	8	0	3	11
	Sanitary workers	14	0	3	17
	Others	14	3	8	25
Total		166	3	19	188

Practicing the use of masks in a high-risk environment i.e. COVID-19 isolation center and screening center was more as compared to other places within the hospital. The study also showed the comparatively less frequent use of masks in general OPD visited mostly by Non-HCWs.

Frequent practice of using a single mask among non-HCWs as compared to double and triple masks among HCW is observed. A total of 57.8% of people used single masks, 22.5% used double masks, and 10.4% people used triple masks remaining 9.3% used no masks.

The practice of using other PPEs like the use of goggles, head caps, gowns, and gloves, face shield, was less as compared to the use of masks for safety purposes. But the frequent practice of using hand sanitizers and frequent hand wash was observed. It was also observed that people belonging to low socioeconomic status prefer to use the homemade mask as compared to the middle or high-income class who were using medical masks.

Table 2: Types Face Mask usage among Different HCWs

		Type of Face Mask					Total
		Surgical	Respirator N95	kN95 with valves	kN95 without valves	Homemade cloth	
Type of HCW	Doctors	20 (21.5%)	10 (10.7%)	26 (28%)	37 (39.8%)	0	93
	Nurse	34 (80.9%)	20 (5%)	2 (4.7%)	4 (9.5%)	0	42
	Lab technician	10 (90.9%)	0	1 (9%)	0	0	11
	Sanitary workers	15 (88.2%)	0	1 (5.8%)	1 (5.8%)	0	17
	Others	20 (90.9%)	0	1 (4.5%)	0	1 (4.5%)	22
Total		99 (53.5%)	12 (6.5%)	31 (16.8%)	42 (22.7%)	1 (0.5%)	185

Discussion

An international qualitative study conducted on 20 focal groups of HCWs showed the mixed views of participants on levels of protection afforded by various types of products available, however, N-95 respirators were considered the most effective.[11] The results of the present study indicated that among90.4%people who are in good compliance with using face masks in hospital settings, 25.9% use respirator type of masks, and the majority of them are HCWs, belonging to middle or high socioeconomic status. Use of kN-95 is more frequent as compared to other respirators as it is more easily accessible in the markets and the use of homemade cloth is 4.8% generally by low socioeconomic class.

An international study conducted by Chughtai A, et al from Vietnam, showed that both medical and cloth masks were described as being "comfortable" and "easy to inhale through." Medical masks were associated with being "safe," "effective," "airy," and "hygienic," whereas cloth masks were "soft" and "cheap." Some of the negative aspects related to medical masks included that they are "expensive" and can be "soaked with sweat," and may cause skin allergies whereas cloth masks are "difficult to tie" and "dirty".[11] Our study showed that 62.1% use of locally made surgical/medical masks in RMU and allied hospitals is because the hospital is visited mostly by my general public belonging to low socioeconomic status.

Survey study showed that the scarcity of facemasks in hospital setups is another issue and the type of product used is extremely dependent on what is being provided by the hospital.Medical/surgical masks are always available[11] but questioning their efficacy, filtration effects of cloth masks relative to surgical masks. Particle sizes for speech are on the order of 1 μm [14] while typical definitions of droplet size are 5 μm-10 μm.[15] Generally, available household materials had between a 49% and 86% filtration rate for 0.02 μm exhaled particles whereas surgical masks filtered 89% of those particles.[16] In a laboratory setting, household materials had a 3% to 60% filtration rate for particles in the relevant size range, finding them comparable to some surgical masks.[17] In another laboratory setup, a tea cloth mask was found to filter 60% of particles between 0.02 μm to 1 μm, where surgical masks filtered 75%.[18] Our study supports the survey study at this point because 54% of HCWs and almost 99% of non-HCWs use surgical masks and homemade masks respectively, in hospital settings because of their easy accessibility.

Comprehensive multilingual source of current literature on the topic shows that COVID-19 is primarily a respiratory disease and the outcomes of infection with this Novel Virus ranges from people with very mild, non-respiratory symptoms to severe

acute respiratory illness, progressing to sepsis with multi-organ failure and even death. WHO guidelines revealed that some people infected have reported no symptoms at all, however, older people and those with underlying medical issues are more likely to develop serious illness.[9] Masks have a compounding effect in a way that they both protect an individual from transmitting and being exposed to infection.[12] So the appropriate use of facemasks and respirators is important to provide the desired level of protection; however, it requires knowledge, training, and supervision.[11] The impact of this could be a dramatic reduction in R0. If we are to assume masks are 80% effective in preventing spread on an individual basis, the overall risk-reduction in a single interaction between two people should be 96%. If we are to be conservative and assume that low compliance and mask-quality reduce individual risk by 50% instead of 80%, the overall risk reduction within a single interaction between two people is 75%.[12]

Centers for disease control and prevention (CDC) advises covering mouth and face with a cloth face cover especially when in crowded places because one can spread COVID-19 infection even if he does not feel sick. CDC also advises not to cover the face of children below age 2 years or anyone who has trouble breathing or unconscious or incapacitated or otherwise unable to remove the mask without the support and that the cloth face cover is not a substitute for physical distancing so it is better to keep (2m) distance between yourself and others.[4]

Since health care facilities provide 24/7 services to the patients with severe Acute illnesses, and such facilities are critical in identifying early signals of emerging infections that could constitute a public health emergency, either locally or internationally. This timely identification and reporting of emerging infections, rapid management of patients, health-care workers, or visitors who may be infected with an infection of potential concern are key administrative control measures, that can help the community to control disease in pre-pandemic stage and to support an efficient public health response. The response comprises of implementation of adequate IPC measures, patient treatment, and immediate reporting.[10]

Likewise, our study on one of the IPC measures i.e. compliance on the use of different types of face mask among HCWs, Patients and the general public and to correlate the association of using masks with other IPC measures gave us results that compliance on the IPC measures among non-HCWs is low as compared to HCWs. HCWs working in the more risk environment or those who are in direct patient contact, have a more definite use of multiple masks, mainly respirators. HCWs who are in indirect contact with patients i.e. administrative staff preferably use surgical masks. Using different types of masks in different layers shows that level of awareness among health care workers is more as compared to non-healthcare workers. On the other hand, people belonging to low socioeconomic status prefer to use reusable homemade masks.

In our study, 78% of the people with the underlying disease make regular use of masks while visiting a hospital during the COVID-19 pandemic. Compliance on the use of mask shows compliance with other health care behaviors as well such as frequent hand washing, and hand sanitization, physical distancing, use of eye protectors, caps, gloves, and gowns. Lack of knowledge in this regard may increase the fear of COVID-19 infection, this fear may bring people in the phase of denial for the use of other protective measures and even timely detection and treatment of disease.

Conclusion

The profession and the working environment have a great impact on the choice of using PPEs. Even among HCWs usage varies according to the type of healthcare worker and working environment. Overall compliance with the use of PPE was considerably low among non HCWs. Our study has provided preliminary data about the usage of masks among HCWs and non HCWs. Longitudinal studies must be conducted to collect better evidence about the use of the face mask as PPE and its associated factors.

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