ORIGINAL ARTICLE

Non-Compliance with Universal Masking Policy by Patients During Covid-19 Pandemic: A Major Threat to Health Care Worker in Pakistan

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ABSTRACT

Objective: To determine the frequency of patient compliance with universal face mask policy during COVID-19 pandemic using simple observable criteria.

Study Design: Cross sectional study

Place and Duration of Study: Pakistan Railway Hospital, Rawalpindi during the third wave of COVID-19 pandemic over a period of one month from 15 March 2021 to 15 April 2021.

Materials and Methods: A total of 266 patients were recruited from the general population of patients visiting our hospital after undergoing screening for COVID-19 at the filter clinic. Face mask compliance was defined as the wearing of a disposable surgical mask while employing correct techniques as per the World Health Organization and National Institute of Health guidelines for hospital settings.

Results: Majority of the patients (79.9%) wore a surgical face mask as recommended for hospital settings. However, only 41% employed the correct mask wearing technique. Patients under strict supervision in outdoor clinics were more likely to wear mask as compared to their indoor counterparts (76.79% vs 51.76%). Correlation was significant at a level of 0.492. One third (34.2%) of the patients did not cover their face, nose, and chin completely. An overwhelming majority (129/183 or 70.49%) admitted reusing the mask multiple times.

Conclusion: The study findings indicate that while majority of the general population of patients visiting our hospital wore a face mask, compliance with correct mask wearing technique as per recommended guidelines was poor. Our results support strict implementation of universal masking policies for hospitals in Pakistan as part of a multifaceted strategy to minimize transmission of infection in health care settings.

Key Words: *COVID-19, Face Mask, Health Care Worker, Hospital-Acquired COVID-19 Infection, Patient Compliance.*

Introduction

One in every five health care workers (HCW) dealing with COVID-19 patients is at risk of contracting nosocomial COVID infection during patient encounter.[1] Break through COVID 19 infection has been reported in 25% of fully vaccinated HCW during the COVID-19 delta variant surge.[2] With more and more HCW and vulnerable patients contracting hospital-acquired COVID-19 infection, hospitals are at risk of becoming a potential hub of disease spread to community.

As many as 55% of hospital-acquired COVID-19 infections are a result of direct patient to patient transmission.[3] While physical distancing is the most important way to prevent the spread of COVID-19 from person to person, there is very limited space at the hospital to do this safely. In outpatient clinics and waiting areas it may be particularly difficult to maintain social distancing. In December 2020, World Health Organization (WHO) issued interim guidelines recommending universal face masking within both outdoor and indoor health care settings.[4] A universal masking policy requires all medical and non-medical staff, patients, and visitors to always wear a face mask while in hospital. Universal face masking limits COVID-19 transmission from patient to health care provider and vice versa.[5] There is a strong correlation between universal masking in hospitals and lower rate of infectivity amongst HCW.[6,7] The model has

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been implemented with proven reduction in hospital acquired COVID-19 infection.[8]

Over 40% of COVID-19 infected patients/visitors may be asymptomatic carriers.[9] Furthermore, a negative screening test at the time of admission, does not completely rule out the possibility of COVID-19 infection.[10] Such individuals may become an undetected source of hospital acquired COVID-19 infection for HCW and other patients. Safety of our health care workers thus relies heavily on face mask compliance by patients and visitors. Present study was conducted to determine the patient compliance with universal face masking in our hospital. The findings of this research could be used to improve strategic management of COVID-19 pandemic in a resource limited hospital setting.

Materials and Methods

The study was conducted at Pakistan Railway Hospital Rawalpindi during the third wave of COVID-19 pandemic, over a period of one month from 15 March 2021 to 15 April 2021.

It was a cross-sectional study. With 51% prevalence of face mask in general community, the sample size was calculated as 165 using WHO sample size calculator with a confidence level of 95%, and a relative precision of 15.[11]The study was initiated after the approval of institutional ethical review committee. A total of 266 patients aged 18 years and above were included by random convenient sampling after taking informed consent. The study subjects were selected from various points after undergoing initial screening at the COVID filter clinic. These included patients presenting to general outpatient department (OPD) clinics and indoor patient departments (IPD)/green zone, where mask wearing was a mandatory requirement as per our hospital policy. COVID suspect patients admitted in yellow zones and those in critical areas such as emergency room (ER) and intensive care unit (ICU) were excluded from the study. Medical/allied health sciences students and hospital employees were also excluded from the study to control the confounding effect resulting from their knowledge differences with the general population.

Two trained investigators assessed the face mask compliance in patients during their physician encounter in OPD or IPD. A pilot study validated, structured observational checklist, based on WHO and NIH guidelines on face mask use, storage, and disposal in the context of health care settings was used as the survey tool.[4,12] Data was collected by visually observing face mask compliance as per given operational definition as well as asking certain direct questions. Rational use of face mask was defined as wearing of a one-time use disposable medical/surgical mask as recommended for hospital settings.[4] Correct manner of mask use was assessed as a score out of 5 and included following simple observable criteria for study purposes: (1) face mask must cover nose, mouth and chin completely; (2) it must not be worn under the chin or on the hair; (3) it should have two elastic ties that do not overlap and a metallic clip at the top (4) the face mask must not be touched or manipulated once worn; (5) it should not be lowered while talking. Each correct practice was awarded 1 mark and 0 was marked for non-compliance. For face masks to be effective in preventing infection, their storage and disposal are equally important. Surgical mask is a one-time use product that must be discarded after single use. It should be stored in a separate paper or plastic bag when not in use e.g., during eating/drinking. It is to be removed from behind and thrown away in a closed bin.

Data was analyzed using IBM SPSS version 23.0 with a

Table I: Patients' Demographic Characteristics and Settings

Characteristics	Frequency (N)	Percentage (%)
Gender		
Male	111	41.73
Female	155	58.27
Age		
Adult	108	40.6
Middle Aged	113	42.5
Aged	45	16.9
Occupation		
Employees	93	34.96
Students	8	3.00
Housewives	132	49.6
Retired	22	8.27
Unemployed	11	4.14
Education		
Nil	82	30.8
Primary	84	31.6
Secondary	50	18.8
Inter	27	10.2
Graduate	23	8.6
Setting		
IPD	85	32.0
OPD	181	68.0

margin of error of 5%. Categorical data was calculated as frequencies and percentages. Cross tabulations and correlation matrix was checked for interaction between the variables. Pearson's chi-square test was used to look for any statistically significant difference in variables and face mask compliance. *p*-value of less than 0.05 was considered significant at 95% confidence interval.

Results

A total of 266 patients were included in our results. Table I shows the patient characteristics and settings. Majority of the patients in our study (229/266 or 86.09%) wore a face mask while 37/266 (13.90%) patients did not. Out of the 229 patients who wore a mask, 183/229 or 79.9% wore the recommended surgical mask while 43/229 (18.77%) wore a fabric mask and 3/229 (1.31%) used a N 95 mask.

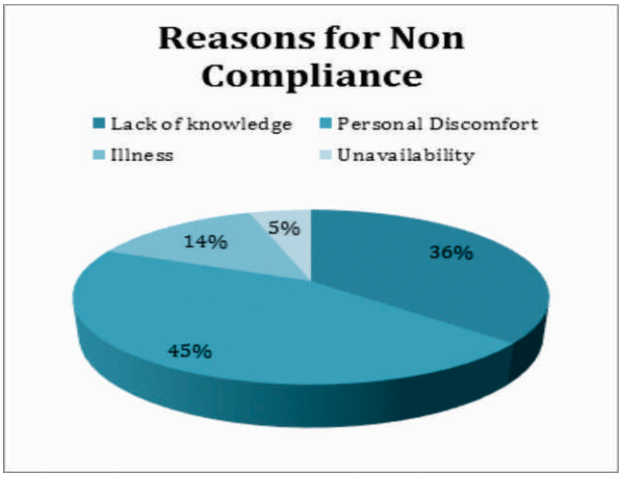

Fig. 1 Reasons for Non-Compliance

Mask wearing technique was assessed for the 183 patients who wore a surgical mask. A score of 5/5 was achieved by only 65/183 (41%) patients.

Table II: Depicts the Criteria Observed and Patient Behavior

Question	Response	N	%
1. Is the mask fully covering nose, face, and chin?	Yes	139	75.96%
	No	44	24.04%
2. Was the colored side out and lighter side in?	Yes	162	88.52%
	No	21	11.47%
3. Did the mask have 2 elastic straps and a metal strip on top?	Yes	169	92.35%
	No	14	7.65%
4. Did the patient lower their mask while conversing?	Yes	57	31.14%
	No	126	68.86%
5. Did the patient touch or manipulate their mask during encounter?	Yes	76	41.53%
	No	107	58.47%

An overwhelming majority (129/183 or 70.49%) admitted reusing same mask multiple times. A sealed paper/plastic bag was used to store the mask by only 9/183 (4.92) patients. Very few patients (28/183 or 15.30%) discarded their used mask in a closed bin. Figure 2 depicts these face mask practices.

Fig. 2: Face mask Practices

Fewer IPD patients (44/85 or 51.76%) wore surgical mask as compared to 139/181 (76.79%) OPD patients. Correlation was significant at a level of 0.492. IPD patients were also less likely to cover their face completely as compared to their OPD counterparts (21/43 or 48.8% vs 41/138 or 29.7%). There was no significant correlation between gender and face mask compliance in terms of wearing the right type of mask and overall compliance score. However, males were more likely to touch the mask than females with p value of 0.129. Although not directly included in the study population, 148/266 (55.6%) of the patients were accompanied by attendants. Almost one-third of them (45/148 or 30.4 %) did not wear a face mask.

Discussion

Face mask non-compliance by patients poses a significant threat to HCW and other patients. While majority of the patients (87%) in this study wore a face mask, actual compliance as per operational definition was very low. One in every five patients wore a non-surgical fabric mask or other barrier masks such as hijab/bandana/handkerchief which are not recommended for hospital settings. [13] Data suggests that face mask compliance in health care settings may be suboptimal despite a universal masking policy.[14] A hospital-based study conducted in Pakistan early in pandemic, reported that although 90.4 % of the study population was compliant with wearing a face mask only 62.1% of them used a

surgical mask.[15] The relatively good compliance with wearing of surgical face mask in our study is more likely the result of a strict internal mask policy at our hospital rather than increased community awareness. A comparison of results from various in-hospital settings further confirms this. Patients under strict supervision in OPD clinics were more likely to wear mask (139/181 or 76.79%). On the contrary, patients admitted in wards were less compliant (44/85 or 51.76%). It may be argued, that wearing of mask may be difficult for some patients due to underlying illness. However, only stable patients with no breathing difficulty were included in our study. Furthermore, the results of our study prove that only 14% patients considered underlying illness to be a barrier to face mask wearing.

Correct mask usage is as important as wearing a mask and is critical in limiting disease spread.[13] In the present study, correct mask wearing technique was employed by only 41% of the patients. Results of our study are comparable to a hospital-based study reported by Kumar et al, in which 64.7% of the study population had a suboptimal score with respect to correct mask usage.[16] According to the results of a Malaysian study, 11.2% patients/visitors did not cover their face completely with face mask.[17] In comparison, one third of our subjects (34.2%) did not cover their face, nose, and chin completely. Manipulation of face mask can increase the risk of self-contamination.[18] A significant number (40.8%) of patients in our study were found to touch their face masks while 31.14% lowered their masks during conversation. This contrasts with other regions such as China, South Korea, and Europe where face touching behaviors were negligible and observed in 1.1%, 2.2% and 6.1% respectively.[19] Face masks when not properly maintained, stored, and discarded can themselves become a potential source of disease spread.[20] An alarmingly high proportion of patients in our study (71%) did not discard their one-time surgical masks after use and admitted reusing same mask for several days. An even higher number (84.6%) of patients did not throw the used mask into a closed bin after use. This is in keeping with the results of an Italian study in which 50.3% people reused masks for extended periods and 70.5% threw used masks in general waste.[21] Earlier a local community-based survey reported by Fazal et al also concluded that 73.2% of the study population did not exercise safe mask disposal and 60% of the public discarded the used masks in general waste.[22]

Pakistan Railways Hospital is an ISO 9001-2015 certified, 350-bedded semi-government teaching hospital affiliated with Islamic International Medical College, Riphah International University. It has on an average 650 outpatient visits per day. Soon after the COVID-19 pandemic hitting Pakistan, the hospital was quick to implement necessary policies in line with national guidelines. Hospital infection control measures with reduction in the number of entry/exit points, strict hand hygiene/face mask policy & thermal detection were undertaken. The COVID-19 filter clinic screens all patients for COVID-19 symptoms and ensures only patients wearing surgical masks are allowed to proceed further. Despite these checks and balances, the results of our study reflect the general apathy of our public towards the pandemic.

Our study has some limitations. It was conducted in a single semi-government hospital hence results cannot be extrapolated to rest of Pakistan. The study was conducted over a short duration and the sample size is therefore small. Our hospital policy requires all hospital staff to wear face mask hence they were excluded. Compliance of an attendant accompanying the patient at the time of his physician encounter was however observed and reported separately. The major strength of our study is its direct observational design which is an accurate reflection of participant's actual practice. The study does not evaluate the association between facemask non-compliance and rate of hospital acquired infection amongst HCW. More studies are required to determine this important aspect as well as temporal relationship between COVID- 19 infection in HCW and larger community.

Conclusion

The study provides preliminary data highlighting sub optimal face mask compliance by the general population of patients despite a facility-wide universal face mask policy at our hospital. Strategies to increase awareness and promote rational use of face masks in patients visiting hospitals during COVID 19 pandemic will be helpful in minimizing hospital acquired COVID-19 infection amongst health care workers and patients alike. Telehealth and home care

rather than hospital focused system are viable options to be considered in this public health crisis.

REFERENCES

1. The Lancet. COVID-19: protecting health-care workers. Lancet. 2020;395(10228):922.
2. Milan Sharma. Breakthrough Covid-19 infections found in 25% healthcare workers during Delta surge: Study. India Today. 2021.
3. Rickman HM, Rampling T, Shaw K, Martinez-Garcia G, Hail L, Coen P, et al. Nosocomial Transmission of Coronavirus Disease 2019: A Retrospective Study of 66 Hospital-acquired Cases in a London Teaching Hospital. Clin Infect Dis. 2021;72(4):690–3.
4. Mask use in the context of COVID-19: interim guidance, 1 December 2020. World Health Organization. World Health Organization. 2020.
5. Advani SD, Smith BA, Lewis SS, Anderson DJ, Sexton DJ. Universal masking in hospitals in the COVID-19 era: Is it time to consider shielding? Infect Control Hosp Epidemiol. 2020;41(9):1066–7.
6. Klompas M, Morris CA, Sinclair J, Pearson M, Shenoy ES. Universal Masking in Hospitals in the Covid-19 Era. N Engl J Med. 2020;382(21):e63.
7. Wang X, Ferro EG, Zhou G, Hashimoto D BD. Association Between Universal Masking in a Health Care System and SARS-CoV-2 Positivity Among Health Care Workers. JAMA. 2020;324(7):703.
8. Lee JK, Jeong HW. Wearing face masks regardless of symptoms is crucial for preventing the spread of COVID-19 in hospitals. Infect Control Hosp Epidemiol. 2021;42(1):115–6.
9. Gudbjartsson DF, Helgason A, Jonsson H, Magnusson OT, Melsted P, Norddahl GL, et al. Spread of SARS-CoV-2 in the Icelandic Population. N Engl J Med. 2020;382(24):2302–15.
10. Watson J, Whiting PF, Brush JE. Interpreting a covid-19 test result. BMJ [Internet]. 2020;369(May):1–7. Available from: http://dx.doi.org/doi:10.1136/bmj.m1808
11. 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 [Internet]. 2020;15(5):1–15. Available from: http://dx.doi.org/10.1371/journal.pone.0233668
12. Ministry of National Health Services Regulations and Coordination. Govt. of Pakistan. Guidelines for Mandatory use of Face Mask. 2020;(December):1–5.
13. J. Picard a , G. Cornec a , R. Baron a PS. Wearing of face masks by healthcare workers during COVID-19 lockdown: what did the public observe through the French media? J Hosp Infect. 2020;617–20.
14. Datta R, Glenn K, Pellegrino A, Tuan J, Linde B, Kayani J, et al. Increasing Facemask Compliance among Healthcare Personnel during the COVID-19 Pandemic. Infect Control Hosp Epidemiol. 2021;2019:1–7.
15. Sarfraz S, Raza R, Aziz K, Umar M, Noreen K, Shehryar M. 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. J Rawalpindi Med Coll. 2020;24(Supp-1):71–6.
16. Kumar J, Katto MS, Siddiqui AA, Sahito B, Jamil M, Rasheed N, et al. Knowledge, Attitude, and Practices of Healthcare Workers Regarding the Use of Face Mask to Limit the Spread of the New Coronavirus Disease (COVID-19). Cureus. 2020;(April).
17. Gunasekaran GH, Gunasekaran SS, Gunasekaran SS, Hanim Bt Abdul Halim F. Prevalence and acceptance of face mask practice among individuals visiting hospital during COVID-19 pandemic: Observational study. Hilos Tensados. 2019;1:1–476.
18. Matusiak Ł, Szepietowska M, Krajewski P, Białynicki-Birula R, Szepietowski JC. Inconveniences due to the use of face masks during the COVID-19 pandemic: A survey study of 876 young people. Dermatol Ther. 2020;33(4).
19. Chen YJ, Qin G, Chen J, Xu JL, Feng DY, Wu XY, et al. Comparison of Face-Touching Behaviors before and during the Coronavirus Disease 2019 Pandemic. JAMA Netw Open. 2020;3(7):1–10.
20. Kwon JH, Burnham CAD, Reske KA, Liang SY, Hink T, Wallace MA, et al. Assessment of Healthcare Worker Protocol Deviations and Self-Contamination during Personal Protective Equipment Donning and Doffing. Infect Control Hosp Epidemiol. 2017;38(9):1077–83.
21. Scalvenzi M, Villani A, Ruggiero A. Community Knowledge About the Use, Reuse, Disinfection and Disposal of Masks and Filtering Facepiece Respirators: Results of a Study Conducted in a Dermatology Clinic at the University of Naples in Italy. J Community Health [Internet]. 2021;46(4):786–93. Available from: https://doi.org/10.1007/s10900-020-00952-3
22. Fazal M, Khawar T, Raza Z, Maryam L, Bilal A, Burney S. Compliance and Etiquettes of Using Face Masks in Public during COVID-19 Pandemic: A Community-Based Survey from Islamabad, Pakistan. Pakistan J Public Heal. 2021;11(2):79–86.

CONFLICT OF INTEREST

Authors declared no conflicts of Interest.

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DATA SHARING STATMENT

The data that support the findings of this study are available from the corresponding author upon request.