

ORIGINAL ARTICLE

Causes of Alarming High Frequency of Covid 19 Infection in Health Care Workers: A Third World Perspective

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ABSTRACT

Background: Covid 19 infection is spreading like a wild fire world wide. More worrisome thing is that it has spread in health workers too which are the sole care takers of affected patients, despite of use of personal protective equipments and taking other precautions.

Aim: To conduct a study at local level to see causes of high frequency of Covid 19 infection in health care workers.

Methods: We conducted a cross sectional observational study in which we enrolled 195 doctors, nurses and paramedics from different hospitals of punjab ,who were affected from covid 19 infection and gave them a questionnaire to fill regarding use of mask, (surgical, cloth, n=95)/duration of its use, use of surgical cap, goggles, soap or hand sanitizer use/frequency, technique of donning/doffing of PPE etc,to find out that where is the fault.

Results: Out of total 195 participants 148 were doctors from various specialties, departments and with different work experience.47 were nurses and other paramedical staff including lab workers, pharmacists, ward boys and others. Out of 195 participants 42(21.5%) did not use PPE (cover-all with surgical apron, mask KN-95 or N-95, goggles/face shield) whereas 153(78.5%) used it.

Conclusion: We concluded at the end of our study that improper doffing techniques, overuse of masks for more than 3 days,and infrequent hand washing may be the reasons for increased rate of infection and need to be dealt promptly.

Keywords: Covid 19 infection, health care workers, high frequency of infection

INTRODUCTION

Covid 19 infection is continuously spreading worldwide. More than 100,000 people are infected with global mortality of 3.4% estimated by WHO¹⁻³.

It is a highly contagious disease which spread by droplet infection. In this situation health care workers are at major risk of getting this infection. In China it has been estimated that 3000 health care workers are affected with several deaths. More serious thing is that this virus can also be transmitted by asymptomatic infected individuals⁴.

To minimize the risk of transmission in health care workers center for disease control and prevention recommends safety techniques⁵ that include N-95 respirators, PPE (personal protective equipment) including coverall and gown and face shield/goggles and gloves surgical cap and shoe covers.

There is a specific sequence and methodology of donning and doffing of PPE and both should be performed in separate dedicated areas. So, education and training about donning and doffing is very important⁽⁶⁻⁷⁾. Similarly use of soap and alcohol-based hand sanitizers inactivate SARS -COVID2 as recommended by CDC⁸⁻⁹.

One of the most convincing hypotheses for this alarmingly high rate of infection amongst health care workers is not observing universal precautions (SOPs) in a way prescribed by WHO. In this study we intend to test this hypothesis. We recruited doctors, nurses and paramedical staff from Lahore general hospital Lahore and other major health care facilities of the city

We conducted a survey to find out attitude and practices about using PPEs.

METHODOLOGY

It is a cross sectional observational study in which we took 195 health workers including doctors, nurses and paramedical staff mainly from Lahore General Hospital and other hospitals after approval from Ethical Review Board. We gave them a questionnaire regarding use of PPE focusing on the type of the mask used, donning and doffing techniques for protective suits, use of soap/hand sanitizer and frequency of their use, use of shoe

covers, goggles, surgical caps and apron. Either health workers were given the questionnaire to fill or were questioned on telephone.

RESULTS

Out of total 195 participants 148 were doctors from various specialties, departments and with different work experience. 47 were nurses and other paramedical staff including lab workers, pharmacists, ward boys and others. Out of 195 participants 42(21.5%) did not use PPE (cover-all with surgical apron, mask KN-95 or N-95, goggles/face shield) whereas 153(78.5%) used it. But out of all only 120(61.5%) knew the correct sequence of wearing or donning and 75(38.5%) had no idea how to put on a protective suit in proper sequence. As far as doffing or sequence of removing is concerned only 56(28.7%) knew the accurate technique.139 people (71.3%) were removing their kits in a wrong way.

Next was the hand washing with sanitizer or soap and its frequency. All 195 health care workers(HCW) were using soap or hand sanitizer but frequency of using it differed. Out of 195 ,111(56.9%) were those who washed their hands after 2 hrs., 59 (30.3%) washed their hands every hour, and only 25(12.8%) were those who washed their hands every half an hour.

Then was the change of mask. Out of 195 health care workers,133(68.2%) changed their mask on 3rd day and 58(29.7%) after day 1. 102(52.3%) used goggles while 93(47.7%) did not.131(67.2%) used shoe covers and 63(32.3%) did not use them.118(60.5%) used surgical apron and 77(39.5%) did not wear it. As far as type of masks are concerned, 90 health care workers (55.6%) used KN-95 and surgical masks both, 31(19.1%) used only KN-95 masks while N-95 which is an imported and expensive mask was used by only 3 HCW (1.9%). Ordinary surgical mask was used by 38(23.5%) health care workers. These were in our view significant findings which perhaps led to the increased frequency of infection in health care workers.

DISCUSSION

It is quite evident from the result of our study that 3 factors most probably contributed to increasingly high frequency of COVID 19 in health workers. First is improper doffing or removal of PPE. There is recommendation by WHO that all health workers dealing directly

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with COVID 19 pts must wear a proper N-95 or FF14 mask. There is also recommendation that a medical mask, gown, goggles or face shield is sufficient for the staff not attending the covid-19 patients directly. WHO also recommend that staff should be fully trained in the use of PPE¹¹. When infection of covid 19 amongst health workers in China rose, they conducted various researches to find out the cause and its remedy. During the process of observation and research in China¹², it was found that medical team members should focus on standardized PPE donning method, and the staff should remain dressed this way when treating patients¹³. In addition, the doffing of PPE after the shift specifically needs more attention. Results were quite similar to our study, where doffing technique was more frequently found inadequate or outright wrong. The Chinese study adopted the buddy system throughout the procedures of donning and doffing PPE, meaning an assistant should be present throughout the process of donning and doffing, something that we seriously lacked in our system. In another study published in the journal of the society for health care epidemiology of America 39% of the health care workers (HCW) made errors in removing PPE. So, we should re-evaluate our strategies for removing PPE as well as health care workers should be trained in proper and recommended doffing and donning methods. Zellmer et al and Beam et al also found different flaws in doffing of PPEs by health care workers^(15,16). In our study too only 120 participants (61.5%) were donning properly in contrast to just 56 or (28.7%) who were doffing their properly. Reason behind this may be long duty hours and fatigue and perhaps health care workers are no more focused and attentive by the time they are done with their shifts and it comes to doffing PPEs whereas when they don the "kit" they are fresh.

Second reason of increased frequency of infection in health care workers was possibly decreased frequency of hand washing. All the participants were using soap or hand sanitizers but majority who got infection were using it after 2 hrs. or even more than that i.e. 111 out of 195 who got infected were less frequently washing their hands. Evidence from both the SARS and COVID-19 epidemics, shows that hand hygiene is very important to protect health care workers from getting infected with both diarrheal and respiratory diseases^{17,18}.

Third major reason seems to be re-use of masks for 3 days or more. CDC does not recommend use of N-95 or any component of PPE to be decontaminated and reused except in crisis like situations⁽¹⁹⁾. Some methods are being tried all over the world to decontaminate and reuse these masks but they did not turn out to be very effective like microwaving, for example, can partially rather melt the masks²⁰. Alcohol and bleach destroy the static charge within the mask, which is vital to its proper function^{19,20}. The active layer of an N-95 mask is 90% empty space, so the fibers need help to trap 95% of the particles that pass through—they get that help from static electricity^{19,21}. Both the UV light and hydrogen peroxide methods require equipment that not all hospitals have on hand. Steaming and baking method is recommended only for individuals at low risk for infection beside having no access to new masks. This is not recommended method for healthcare professionals^{22,23}.

CONCLUSION

There were 3 main reasons for this disturbingly higher frequency of COVID 19 in health care workers; wrong doffing technique, less frequent use of soap or hand sanitizer, re-use of contaminated masks for over 3 days. So, we need to address these issues promptly. Proper hands on workshops for donning and doffing with an assistant should be mandatory for every health worker involved in the care of covid 19 patients. Awareness should also be given in this workshop regarding more frequent use of soap or hand sanitizers. Masks should be ideally discarded after a single use. But this practice can hardly be followed given the severe financial constraints in the third world countries.

Conflict of interest: Nil

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