

COVID-19 health care worker infection: Additional concerns

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Abstract

Health Care worker (HCW) infection with corona virus disease 2019 (COVID-19) is a serious problem and is generally attributed to transmission from patients with COVID-19 infection. There are now recommendations for best practices to limit such transmission. However, there are additional concerns regarding HCW infection with COVID-19, those of transmission of the infection from one HCW to another. This is suggested by a recent prospective cohort study that found 44% of frontline HCWs showed evidence of SARS-CoV-2 infection by reverse transcriptase polymerase chain reaction (RT-PCR) or serology. This higher prevalence of the infection among HCWs could be from transmission of the infection between one another during general and professional interactions in non-patient care settings such as hospital corridors or classrooms. The HCWs may adhere to required guidelines with personal protective equipment (PPE) when attending to patients but may be lax during the above interactions. Furthermore, it may be difficult to maintain social distancing. Viral transmission during pre-symptomatic and asymptomatic stages compounds the problem. Although PPE may be protective, adequate availability of PPE does not seem to completely reduce risk. Hence the current commentary attempts to address this issue and suggests that health-care systems should develop additional strategies to protect HCWs from the infection. Potential risk of false negative test results with RT-PCR especially in early stages of the disease precludes routine screening of HCWs as a solution to address the additional concerns. While successful vaccines have been developed, emerging variants are posing a problem. Hence, universal and strict use of triple layered surgical mask or N95 mask along with face shields for all hospital staff members from entry to exit from the hospital appears to be only logical preventive strategy as of now.

Introduction

Health Care worker (HCW) infection with corona virus disease 2019 (COVID-19) is a serious problem and there is a potential risk of mortality associated with it [1]. Such infection is generally attributed to transmission from patients with COVID-19 infection and there are now recommendations for best practices to limit such transmission. A recent population-based cohort study in the UK and USA found that front-line health-care workers had at least a threefold increased risk of COVID-19 compared to general community [2]. The study found that front-line HCWs, particularly those who are from Black, Asian, and minority ethnic backgrounds, could be at substantially greater risk of COVID-19. Although personal protective equipment (PPE) is protective, adequate availability of PPE did not seem to completely reduce risk. Hence the study suggested that health-care systems should develop additional strategies to protect health-care workers from COVID-19 [2]. A recent prospective cohort study found that 44% of frontline HCWs showed evidence of SARS-CoV-2 infection either by RT-PCR or serology at an acute National Health Service hospital trust in London [3]. The issue is of serious concern since transmission from one HCW to another can occur and constitute “additional concerns” and this report attempts to address those concerns in the context of “non-patient care” settings in a hospital while suggesting some preventive measures.

In addition to pre-symptomatic transmission, transmission from asymptomatic persons is an important concern as they can transmit the virus to others for an extended period, perhaps longer than 14 days with viral load similar to that of symptomatic persons [4]. Spread of the infection can occur through respiratory droplets ($>5\ \mu\text{m}$), or aerosols ($\leq 5\ \mu\text{m}$) or submicron aerosols ($<1\ \mu\text{m}$). It is

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possible that submicron virus-containing aerosols can be transferred deep into the alveolar region of the lungs, where immune responses seem to be temporarily bypassed [5]. It has so far emphasized that the virus can spread through the air only in case of medical procedures that produce aerosols. However, there are several scientific evidences to claim that the COVID-19 coronavirus is airborne [6]. The claim contradicts previous evidence that suggested that it was transmitted from person to person through droplets from the nose or mouth, which are expelled when a person with the disease coughs, sneezes or speaks. Guidelines exist for airway management in the operating room and interventional suites in known and suspected cases of COVID-19 patients as risk in those involved in airway management is about 6-fold compared to those who are not involved [7]. Because of potential airborne transmission, universal airborne precautions are also recommended for providers caring for any patient, irrespective of COVID-19 test result status, during this pandemic [8]. It is also suggested that care should be taken for preventive measures in non-clinical areas as well [9]. The HCWs may adhere to required guidelines with personal protective equipment when attending to patients but may be lax during general or professional conversations with colleagues and coworkers. It is also difficult to maintain social distancing during teaching or similar academic sessions, giving a scope for transmission between HCWs during pre-symptomatic or asymptomatic stage. In addition, there is increasing evidence that the 6 feet distancing recommendation is not enough under many indoor conditions where aerosols can remain airborne for hours, accumulate over time, and follow air flows over distances further than 6 feet [5]. Many individuals with COVID-19 infection remained asymptomatic for a prolonged period, and viral load was similar to that in symptomatic patients. Hence, transmission by asymptomatic patients is a real problem [10]. The issue of potential airborne transmission is of serious concern during pre-symptomatic/asymptomatic stage. Face shields are now being recommended to reduce transmission in the community setting as well [11]. A recent study by Lee et al. found no infections among community health workers after the addition of face shields to their personal protective equipment [12]. The median (interquartile range) interval of time from detection of infection with reverse transcriptase-polymerase chain reaction (RT-PCR) to symptom onset in pre-symptomatic patients was 15 (13-20) days. Patients who were asymptomatic at the time of detection of a positive RT-PCR remained asymptomatic during a median (IQR) of 24 (20-26) days from diagnosis [10]. There is an increasing demand for RT-PCR testing for all HCWs. It is suggested that such a testing strategy should link population-representative epidemiological surveillance to predict prevalence, with adaptive testing for symptomatic individuals at times of low prevalence, and rapidly expanding to include the asymptomatic HCWs during possible new infection waves [13]. But there is a high incidence of false negative test results. It ranges from 67-100% during the incubation period, to a low of 20% on the third day of symptoms and again going up to 66% on the 16th day of symptoms [14]. Hence, if screening of asymptomatic HCWs is contemplated, one might make a case for repeated testing 7-10 days apart. That should address the false-negative issue as well as the risk related to pre-symptomatic and asymptomatic transmission, but might be impractical. For example, a recent mathematical model showed PCR testing of asymptomatic HCWs decreases Covid-19 transmission by 23%, provided results are available in 24 hours [15]. That may be difficult to achieve. While successful vaccines have been developed, emerging variants are posing a problem [16]. Therefore, preventive

strategy of social distancing where feasible, wearing masks and face shields by all HCWs and hospital staff from entry to exit from the hospitals appears reasonable at present. Currently, this strategy appears to be logical solution until effective vaccine preventive strategy evolves.

Conflicts of Interest

The author declared no conflicts of interest.

Author's Contribution

Srinivas Mantha, MD: This author conceived the idea, written and finalized the manuscript.

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