Promoting Health Worker Safety; A Priority for Patient Safety during COVID -19 Pandemic and Beyond

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Abstract

Background: As per World Health Organization, health workers accounted for over 1.4 million COVID-19 infections globally. This paper attempts to identify key risk factors for health worker infections in India, describe its impact on their wellbeing and the health systems, and derive lessons from other country experiences, that could be adapted to Indian context for strengthening health workers safety and preparing health systems for future waves.

Methods: A systematic review of existing published articles, government and media reports was undertaken. Online databases -MEDLINE, EMBASE, PUBMED and Google Scholar were searched using key terms related to COVID-19 infections in health workers. Thirty-four papers were included dependent on their relevance to research objectives.

Conclusions: The key risk factors for health workers infection were; unsafe exposure to patients infected with COVID-19, lack of adequate personal protective equipment, and suboptimal infection prevention and control measures and compliance. Health workers infection has impacted their health and psychosocial wellbeing and diminished healthcare system capacity to provide safe and effective healthcare. Safeguarding the health workers is critical, and requires multifaceted approach for strengthening infection prevention and control measures and supplies, strategic workforce planning, dedicated policies and capacity building interventions.

Key Words: *COVID-19, Health worker, patient safety, Health system, Infection prevention and control, Psychological wellbeing*

Introduction

When theme for the 2020 world patient safety day (17 September) was established as "Health workers safety: A priority for patient safety", not many realized that it would be so pertinent in the era of Coronavirus Disease of 2019 (COVID-19). The Severe Acute Respiratory Syndrome- Coronavirus-2 (SARS-COV-2) that causes COVID-19 will continue to wreak havoc globally and in India, till the time effective vaccine or treatment is found.

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The health workers (HWs) have emerged as the true heroes in battle against COVID-19. However over 1.4 million HW (nearly 10% of all cases) acquired COVID 19 and thousands have died [1].HWs infection and deaths lead to a huge knock-on effect; not only for their own health and psychosocial wellbeing, but also diminishing the health systems capacity to provide safe and effective patient care- both COVID-19 and non-COVID19 related. Therefore, to prevent avertable mortality and sustain an effective COVID-19 response, prevention and management of HW infections and preserving their psychosocial well-being is pivotal.

In India, nearly 5% of all COVID-19 cases are detected amongst HWs[2]. Given the rapid nationwide rise

in COVID-19 cases, we may soon be heading towards an outstripped health system, as India already grapples with chronic HW shortage. With this backdrop, this paper attempts to identify key risk factors for HW infections in India, describe its impact on HW health and wellbeing, and the health systems at large, and derive lessons and best practices from other country experiences that could be adapted for Indian context for strengthening the health worker safety and preparing health systems for future COVID-19 waves and pandemics

Materials and Methods

A systematic review of existing published and non-published articles and reports was undertaken and the four online databases -MEDLINE, EMBASE, PUBMED and Google Scholar, were searched covering the period after the first COVID-19 case was reported in the world - 1st January 2020 to 1 August 2020. The search strategy used variants and combinations of search terms related to COVID-19, HWs infection, Infection prevention and control (IPC), Health System. The retrieved studies were exported, and duplicate articles were discarded. Studies included could be in any setting, given these were in English language. We also included media articles and government reports that covered the COVID-19 pandemic and response in India in general. We excluded articles if they covered topics that were not relevant to India. We located 1286 articles, of which 66 were related to HWs during COVID-19 response, and of that 34 were considered relevant to this review. The Preferred Reporting Items for Systematic Reviews and Meta-Analysis extension for Scoping Reviews (PRISMA-ScR) guidelines was used to write and report the findings.

Findings

Key risk factors of SARS-CoV-2 infections amongst HWs in India

There were limited studies and data on HW infections in the Indian context. Only six articles identified the key reasons for HWs infections with SARS-CoV-2 at work place. The majority HW infections were due to 1) unsafe exposure to patients infected with COVID-19; 2) Lack of adequate of personnel protective equipment (PPE); and 3) suboptimal infection prevention and control (IPC) measures and compliance.

Unsafe exposure of HWs to the COVID-19 infected patients, especially with atypical symptoms or mild flu like symptoms was the most common risk factor[3]. A case control study of HWs across India, disclosed that the use of PPE was independently associated with the reduction in odds of getting infected with SARS-CoV-2[4]. Inadequate PPE use was mainly due to acute shortage of PPE to protect HWs during pandemic. Nearly 1 million PPE kits and 4.6 million N95 masks were available against the estimated requirement of 38 million masks and 6.2 million PPE kits.[5] As a result, PPE were available only at 27% sites, N95 masks at 50% sites, and only surgical masks were available at 39 % sites according to a study conducted at 51 primary health centers across India[6].

Limited knowledge and understanding about IPC measures such as appropriate PPE use particularly correct sequencing of donning and doffing of PPE and rapid triage were important risk factors for HW infections. Surprisingly, suboptimal hand hygiene among HWs was also reported as a vital factor for COVID-19 infection, with compliance rates sometimes dipping below 20%[7]. Lack of access to reliable and adequate alcohol-based hand rub (ABHR) is major challenge at some facilities[8].

Three predisposing risk factors were identified for HW infections- 1) Workplace, 2) profession, and 3) pre-existing comorbidities. HWs working in certain high-risk departments such as emergency departments, COVID-19 wards, Intensive Care Units (ICUs) and Operation theaters acquired more infections compared to other departments[9, 10]. Professional groups such as anesthetists, surgeons, and ophthalmologists had higher infection rates compared to other cadres, possibly due to prolonged exposure to infectious patients with high-viral load during aerosol generating procedures [11-13]. HWs with pre-existing medical conditions (such as hypertension, diabetes mellitus, cardiovascular disease, chronic lung disease, and immune-compromised conditions)[14]. Most commonly affected age group was 26 to 41 years (61%) [15] possibly due to highest proportion of HWs falling in this age group.

It also emerged that the actual number of HWs infected with COVID-19 could be higher than 5% of total COVID-19 cases, but this could not be substantiated due to paucity of available data. Although it also cannot be

ruled out that some HWs also acquire infections in the community rather than the healthcare settings.

Impact of HWs Infections

The COVID-19 infection has a huge impact on the health and psychosocial wellbeing of the HWs, as well as on the already outstretched health system for maintaining the COVID-19 and non COVID-19 related essential health services.

On Health and Psychosocial well being of HWs:

A study conducted at multi-healthcare centers across India, demonstrated that even without lab confirmation, HW's with symptoms resembling COVID-19 such as headache, throat pain, lethargy, fever and breathlessness, reported a higher rate of anxiety, stress, depression, and Post Traumatic Stress Disorder (PTSD)[16]. Another cross sectional study from eastern India, revealed that all frontline doctors regardless of specialty had higher stress levels during COVID-19 pandemic, however higher stress was significantly associated with females and unmarried individuals [17].

Other causes that affected psychosocial wellbeing of HWs during pandemic were: fear of infecting their families, lack of PPE, loneliness, lack of support (food, lodging, transportation and childcare needs due to school closures), lack of access to up-to-date information about COVID-19, and growing incidences of harassment, violence and social stigma against them [18]. Finally, the anxiety and guilt associated with ethical decisions on prioritization of hospital bed allocation, ICU care - who to admit and who to refuse care, when health systems become overwhelmed limiting the resources [19-21].

On Health Systems and continuity of safe patient care provision:

The staff shortage due to COVID-19 infections have led to work overload and longer duty hours for the remaining HWs, and thus leading to burnout and making them prone to medical errors putting their own and patient safety at risk. India with its density of physicians (7.8 per 10,000 population) and nurses (21.1 per 10,000 population) is already far below the WHO threshold of 45 HWs per 10,000[22]. The COVID -19 infections amongst HWs further exacerbated the staff shortages either directly due to HWs being infected themselves, or having to quarantine being the close contacts of infected HWs, or some HWs just being too afraid to go to work.

The other essential health services too are disrupted especially the outpatient services related to non-communicable diseases (NCD), the antenatal care, TB treatment and immunization clinics have seen significant decline in patient footfall as also the use of clinical services including elective surgeries [23 24]. This is partly due to reallocation of scarce HW's to COVID-19 care but also because high HW infections instilled s fear of hospitals amongst the patients, which has contributed to delay in care-seeking, that can have longer term health impacts [25].

Interventions to strengthen HW safety

The measures to strengthen HW safety are suggested based on the innovations and best practices seen in various countries including India, and as per the WHO guidance[26]. The proposed interventions for the COVID-19 response and future waves and pandemics are broadly aimed at supporting HW safety and needs at three levels 1) individual, 2) institutional and 3) system wide.

Interventions and tools to support HWs at the 'individual level'

Building capacity and competencies:

Trainings and capacity building in Infection Prevention and Control(IPC) is the most critical intervention that must continue throughout the career. This needs to be followed up with on-job trainings specifically on handling patients with highly infectious disease, appropriate use of PPE, prevention and management of complications and septicemia, and patient safety incidents. Additionally, training on soft skills such as effective communication, teamwork as well as engagement of patients, their families and caregivers is vital[27].

The current online training resources on IPC, clinical management including ventilation, and logistics is available on Ministry of health and Family Welfare (MoHW) website, besides the Integrated Government Online Training (iGOT)-Diksha platform, that has been utilized to conduct uniform training to all cadres of HWs across country. Similarly, Online training and webinars

for Physicians and nursing personnel is conducted by AIIMS, New Delhi[5]. However, IPC training must be reinforced for those working on the frontlines of the COVID-19 response, especially among redeployed HCWs with little experience in the clinical management of infectious diseases.

Strengthening infection prevention and control (IPC), including provision and appropriate use of PPE:

The risk of HWs infection can be mitigated by strictly adhering to the most recent IPC guidelines of the MoHFW. Adequate precautions including maintaining physical distance, frequent hand washing or use of hand rub and respiratory etiquette must also be maintained in common spaces outside wards- such as the canteens, staff rooms and resting areas. Within healthcare facility, the appropriate use of PPE including a gown, gloves, facemask, and a face shield or goggles is essential. Adequate availability and access to IPC supplies (such as ABHR, soap, disinfectants, PPE), and preposition IPC supplies at point of entry and patient care also needs strengthening [28].

Psychosocial support for HWs:

In India, a dedicated toll-free helpline-08046110007 has been established for providing support to HWs. HWs are encouraged to practice stress management techniques and the training modules are available on MoHFW website. However, engaging psychology departments of universities and providing psychological support and counseling services using digital health tools could further help to address such a crisis[29]. Additionally, provision of a rest area, care for basic physical needs such as food, group activities for stress reduction, leisure activities, and periodic visits by a counselor could be an option as successfully tried in China. India can consider experiences from African continent, where psychological support from retired nurses and HIV counselors and support among HWs through social media, such as the 'Vula' platform in South Africa or WhatsApp, which may also relieve stress, could provide advice on clinical decision-making, and can also be used to circulate messaging on psychological support[30]. Visits by politicians, and other public figures and healthcare leaders or managers should to the hospitals to, acknowledge their commitment and Has also been quite successful in boosting HW morale as seen in Italy, Spain and China [31]

Remuneration and incentives:

The MoHFW guidance mandates timely payment of frontline HWs such as ASHAs, other voluntary HWs and to those requisitioned from outside government sectors; recently lack of timely or adequate payment of HWs was primary cause of strikes[32]. Maintaining staff motivation may be especially challenging where levels of trust in the health system and in the government are low. Financial remuneration based on duties performed and risk allowances may be used for motivating and retaining HWs, although there might be jealousy, as other staff will continue to care for non-COVID-19 patients and hence miss out on these benefits. Risk allowances were used during the recent Ebola epidemic in Western Africa where the benefits were apparent, but also the jealousies of those not receiving these allowances[30].

Interventions at 'Institutional level'

Improve HWs availability through hiring, task shifting and rational distribution;

Recruitment of additional HWs with relevant skills such as HWs that are unemployed or retired, HWs from private sector, research institutes, military health workforce and Red Cross could be deployed on temporary basis. Reassign HWs with risk factors (due to pre-existing co-morbidities, immunosuppression) to non-COVID essential services and in telemedicine, non-COVID-19 outpatient clinics or administrative positions, and skilled and healthy HWs to COVID affected area. Singapore and South Korea deployed HWs from other disciplines and recent medical graduates, as well as China moved HWs to Wuhan from other provinces. Similar practices could be adapted in Indian context[33]. Mobilizing existing CHWs and health volunteers is also important strategy utilized by China and could be key information source to dispel myths in the Indian community, but also perform symptom screening and contact tracing[34].

Decent working conditions- occupational health and safety, and manageable workload:

Implement triage in the hospitals and infectious-source controls including engineering controls such as adequate ventilation and access to water and sanitation

for health (WASH) services. Display of visual alerts (educational material in vernacular language) for family members and patients can also help reduce infection risk amongst HWs. Providing security that prevents harassment, stigma and violence against HWs including implementation of "Zero Tolerance" law passed by GoI against HWs attackers[35].

Providing manageable working hours and blame free environment where HWs have timely access to information on evolving situation, clinical protocols, guidelines and decision to ensure effective implementation[36]. Provide briefings on rights, roles and responsibilities in context of COVID-19 response[37]. Telemedicine and remote care such as *e-sanjeevani* OPD, could further help reduce workload as also the infections for HWs [38].

Interventions at 'System wide level'

Strengthening information systems for HWs, including to track HWs infections:

Our study clearly highlights the lack of data regarding HW infections. It is pertinent to strengthen existing information systems for HWs for timely reporting of HW infections and deaths, monitoring and tracking HWs infections and surveillance mechanisms or to identify issues that warrant course correction. This is critical to inform and update COVID-19 response policies or guidelines and rapid decision-making based on evidence..

Licensing and regulatory reforms:

Testing of HWs is being done on priority basis in India. However, there is a need for universal guidelines for testing and reporting of infections in HWs. disability, death, return to work and recognition of COVID-19 infection as a professional exposure disease in certain occupational group.

Regulatory reforms are needed during COVID -19 response, allowing HWs to perform tasks for which they were not licensed despite having competencies and training, redeployment across different employers, public/private sector, geographic region.

Investing in health systems with multisectoral approach:

The government's '*Aatmanirbhar Bharat*' project to become more self-reliant is likely to augment building lifesaving equipment's like PPE, ventilators, hospital infrastructure, ICU beds, oxygen supply in hospitals, strengthening of laboratories, hiring of additional human resources which were scarce before pandemic. All this will improve the health care system and facilities in India[39]. Additionally, working with other sectors and communities to ensure adherence to non-pharmaceutical interventions and public health measures can contain COVID-19 pandemic thus putting less strain on HWs and health systems.

Discussion

The key risk factors for HWs infections at work place were unsafe exposure to infected patients with COVID-19, lack of adequate PPE and, suboptimal IPC measures and compliance. Similar finding were revealed in a multi-country rapid review conducted by Mhango et.al [40].Our review highlighted exposure to COVID -19 patients especially with atypical presentation as a risk factor, similar finding were observed in Thailand, a patient admitted with dengue fever also had COVID-19 and the treating HW also got infected with COVID-19[41], that warrants full IPC precaution with all patients. Acute shortage of PPE was our review's major finding, related outcome were also reported in prospective cohort study from UK and USA, where risk of COVID-19 infections were threefold in HWs without PPE in comparison with HW with adequate PPE[42]. Support from International donors may be beneficial, many European nations have received support in terms of human resources and PPE during COVID-19 from government of China. Furthermore, HWs in high risk departments and contaminated aerosol exposure (risk ratio of 13.2) were at greater risk [43],our review also presented similar results as risk factor, that necessitates full donning of PPE in these departments and taking adequate precautions while performing aerosol-generating clinical procedures. A review on physician deaths from Covid-19 showed, physicians 57 years and older with preexisting medical conditions accounted for three-quarters of Covid-19-related deaths[44]. In our review most affected age group was 26 to 41 years, however due to dearth of adequate infection and mortality data amongst HWs, we cannot fully corroborate the findings

Lack of complete knowledge about IPC measures, poor hand hygiene and lack of availability of updated IPC guidelines were reported from mainly low income countries [45-47].Our review has also showed low knowledge about IPC measures amongst HWs in various facilities across India. Hence continuous IPC training to all cadres of HWs is critical.

HWs infection has impact on their psychosocial wellbeing in our review, Similar conclusion was documented by Lai and colleagues who analyzed 1257 HWs psychological status exposed to COVID-19, where considerable proportion of HWs reported symptoms of depression (50.4%), anxiety (44.6%), insomnia (34.0%) and distress (71.5%) respectively[48]. Support and new innovations in this field is highly recommended because India already have dearth of professionals in this area. HWs infections also stressed health system capacity in our review. Alike concern was also reported from Italy's overstrained health system workforce, Italian physicians have advocated a home based or community-centered care system for Covid-19 to not only decrease the workload on HWs but also reduces the HWs exposure and transmission of disease[49].

The key Interventions for HWs safety were strengthening IPC measures, improving availability and access to appropriate and adequate PPE, strategic workforce planning, dedicated policies and capacity building interventions as well as a system wide and multi-sectoral approach. Countries such as South Korea, Singapore and Hong Kong have tackled current crisis because of their strong investment in IPC and surveillance and response mechanisms. Surveillance and response measures are often missing in many health settings in India, these countries provide important lessons to invest more in these measures for appropriate response to future waves and pandemics[50].

Conclusion

The COVID-19 pandemic has highlighted the systemic challenges that compromise HW safety, which in turn has immense impact not only on health and psychosocial wellbeing of HWs but also on the health system's capacity to provide safe and effective patient care. Thus, safeguarding the health and wellbeing of HWs is an immediate and utmost priority that requires multifaceted approach including strengthening Infection prevention and control, improving availability and access to appropriate and adequate PPE, strategic workforce planning, dedicated policies and capacity building interventions, as well as a system wide and multisectoral approach. It is only then India will be able to prepare a responsive and resilient workforce in face of the COVID-19 pandemic and emerging populations health demands. COVID-19 pandemic has put India's health systems to litmus test, yet has also offered several lessons for future- particularly on importance of building resilient health systems, effective governance, management of human resources for health, investing in infrastructure as well as use of health technology including telemedicine and digital health. While there may be many primacies for the COVID-19 response in India, we strongly urge governments, the private sector, and the general populace to pay concerted attention to HWs safety and wellbeing because "safe health workers are essential for patient safety".

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