Journey of COVID Warrior

COVID-19 Impact on Health Care Workers

Surya Kant[1]

Novel Corona Virus causes COVID 19 (Corona Virus Disease of 2019) infection. In December 2019, SARS(Severe Acute Respiratory Syndrome) -CoV-2, was first recognized in Wuhan, China. Genetic sequencing of the virus suggests that SARS-CoV-2 is a beta –coronavirus; which is intimately linked to the SARS virus. Mostly patient develop mild or uncomplicated illness, but 14% often them leads to severe disease which needs hospitalization and oxygen therapy and among them 5% need intensive care.[1]. Health Care employees are at the frontline of this pandemic taking care of infected patients and thereby are at a greater risk of acquiring infection. Health workers impart a crucial job not only in the management of the sick, but also ensures adequacy of infection control and its prevention of infection. Systematic literature are scarce but available sources reflect an infection rate of 1% among health care workers (HCW's) with female preponderance. HCW's of all ages got infected but those with age greater than 55 years had high mortality after being infected. Case fatality rate among HCW's varied across the globe with 0.9% in China to almost 6.1% in India. Ignorance about the epidemiology and transmission of the disease, lack of protective gears due to epidemic unpreparedness were main attributable factors for infection in HCW's. This pandemic has shown great impact on mental health as well as on social wellbeing of health care workers. A proportion of the workforce are faced with depression(22.8%) ,insomnia(34.3%) and anxiety disorders(23.2%) leading to untoward consequences in few cases. Understanding COVID–19 infection and its impact on health workers is crucial not only for characterizing the transmission pattern of the virus but also as a means of prevention of the infection amongst the providers of health care who have a key role in saving the world from this pandemic.

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Key words **: COVID-19, Health care workers, Mortality.**

The ongoing epidemic, COVID-19 is devastating. Despite of the extensive accomplishment of control measures. The outbreak sparked in The city of Wuhan of, capital of Hubei province in China. The case fatality rate (CFR) has gradually incremented from 0.25 to 7%. It may also has the denominator consisting of asymptomatic cases which often remains hidden. The case fatality rate varies depending on age and presence of co-morbid conditions. Health care workers are one of the major vulnerable group as they deals with severe cases (likely with high viral load) and are in close proximity to the cases during procedures such as examination, handling of samples, surgical interventions, intubation and endoscopic procedures which can lead to the spread of virus.

Health care workers include not only doctors ,but all the staffs in the health care fraternity involved in dealing with a COVID–19 patients, including those who are present in the same place as the patient as well as those who may not have delivered direct care to the patients, but who, had indirect contact with the patient's body fluids, possible polluted items of environmental surfaces. This includes health care professionals , allied health workers and additional health workers such as cleaning and laundry personnel, X ray technician, clerks, nutritionists, social workers, laboratory personnel, cleaners, pharmacists, ambulance drivers, catering staff and many more.

According to WHO over 35000 HCW's have been infected with COVID 19 till April 28, 2020. The number is highly under-represented due to under-reporting and lack of systematic reporting of infections among healthcare workers to the WHO. Health care worker are being infected at work place and in the community. Hospitals have been the source of COVID 19 infection in almost every country including India.

Ancillary reports from China claim 3300 health care professionals have been infected and similarly 20% of health care workers from Italy have contracted the infection[4]. In a recently published article from China[5] it is reported that 110 out of 9684 Health care workers in tertiary care hospital positive for COVID 19 , With an infection rate of 1.1%. Majority (71.8%) of them were women with median age of 36.5 years. Most of

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them had non-severe disease (84.5%), while mortality was 0.9%. Major clinical scenario were: Pyrexia (60.9%), weakness (60%), dry cough (56.4%), sore throat (50.0%), and muscle pain (45.5%). Of them 15.5% were first-line HCWs whereas 1.4% were non–first-line HCWs. Nurses who were under the age of 45 years and not the first-line caregivers were at a greater risk to become infected than first-line doctors who aged more than 45 years, with an incident rate ratio of 16.1. Sub clinical infection prevalence is 0.74% among asymptomatic first line health care workers and 1.0% among non first line health care workers. Contact with index patients (59.1%), colleagues with infection (10.9%) and community-acquired infection (12.7%) are the main source of exposure in HCWs. Health care professionals who were not frontline workers were at a higher risk of infection during the early stage of the COVID 19 outbreak before protective measures were introduced. The mortality among Health care workers in various countries are shown in :Table1. The median age wise distribution of COVID-19 infection among HCW's are illustrated in Fig 1.

Another study was done in Netherlands[6] that involved 9,705 HCWs who were screened in two teaching hospitals in Breda and Tilburg. It identified 1,353 (13.9%) individuals who reported fever or other respiratory symptoms. Out of which, 6.4% workers tested positive for SARS Cov-2, representing 0.9% of all HCWs. But amongst those who were tested positive for COVID 19 only 3.5% had patient exposure. However, most of the HCWs had mild illness, with 93.0% satisfying the case definition of fever, cough, and/or shortness of breath. Median age of infection was 49 years, majority being women (82.6%).

Another study from China[7] where they screened orthopedic surgeons for COVID-19 and found 26 of them from 8 hospitals to be positive for Coronavirus. The suspected places of exposure were general wards (79.2%), public places at the hospital (20.8%), operating rooms (12.5%), intensive care unit (4.2%), and outpatient clinic (4.2%). There was transmission from these doctors to others in 25% of cases included family members, colleagues, patients and to friends. Avoidance of wearing an N95 respirator and severe fatigue was found to be risk factors whereas wearing respirators or masks all of the time was found to be protective measures.

Among physicians affected by COVID-19, general physicians constitute the bulk of the burden. Specialty wise affected physicians are depicted in Table 2 and Fig 2.

Although exact data on the burden of COVID-19 infection among HCW's in India is not available, a reputed national daily reported that according to Indian Medical Association, more than 1955 doctors were infected till 31st August , 2020. Out of 1955, 890 belong to general practitioners, 767 resident doctors and 296 house surgeons (depicted in Fig 4) ofthem 266 died due to Covid-19 until last data was compiled as on 31st August 2020. India's first female cardiologist Dr. S Padmavati died at age of 103, due to COVID 19 on 29th August 2020. She was founder

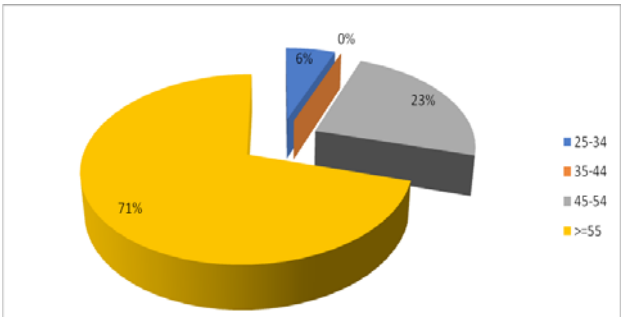

Fig 1 — Pie Diagram showing Distribution of median age at death due to COVID-19 among physicians across the world

Table 1 — *Mortality among health care workers in various countries were as follows*[9]

Country	Frequency (%)	Median Age(years)
Italy	79(39.9%)	69
Iran	43(21.7%)	54
China	16(8.1%)	51
Phillipinnes	14(7.1%)	62
USA	9(4.6%)	67
Indonesia	7(3.5%)	58
France	6(3.0%)	67
Spain	6(3.0%)	59
United Kingdom	4(2.0%)	66
Brazil	2(1.0%)	53
Mexico	2(1.0%)	45
Turkey	2(1.0%)	67
Canada	1(0.5%)	62
Egypt	1(0.5%)	50
Greece	1(0.5%)	-
Honduras	1(0.5%)	56
Pakistan	1(0.5%)	26
Poland	1(0.5%)	-
Serbia	1(0.5%)	59
South Korea	1(0.5%)	60

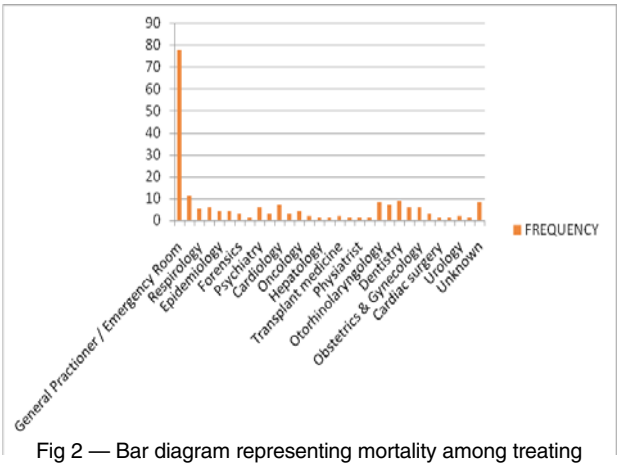

Fig 2 — Bar diagram representing mortality among treating physicians due to COVID-19 according to Speciality[9]

of National Heart Institute, Delhi. She was famous as god mother of Cardiology. State wise distribution of COVID-19 infected HCW's and mortality due to it in India have been depicted in figure-3 and 5 respectively. Over all till 31st August 2020 more than 87000 health care workers have become infected out of them 573 were died.

The deaths noted in less than 40 years are 21 per cent, below 50 years are 29.6 per cent and below 60 years are 55.5 per cent.Age wise distribution of mortality among HCW's in India have been depicted in figure-6.In Indian scenario the highest risk has been seen in operation theatres. The case fatality rate among doctors affected by SARS-Cov-2 was 6.1. A comparison of case fatality rate among general population and HCW's has been represented in Fig 7. High viral load, with physical and mental fatigue of fighting the infection, inadequate supply of PPE during the initial stages of the pandemic , gaps in following precautions and misinterpreting the seriousness of the illness are some of the factors which are implicated in the Indian context ,for mortality and morbidity of HCW's associated with COVID-19 in India[8].

Due to inadequacy of personal protective equipment and long hours of works, the risk of infection got incremented in health care workers across the globe which includes India also.

When healthcare workers get sick, they either go into quarantine or get admitted to the hospital. The total number of healthcare workers and hospital beds are limited. The system gets stressed because of less number remaining workers taking on greater volume of workload. Work burden mainly includes sick health care worker and patients. This increases the infection risk of among the remaining healthcare workers, giving rise to a vicious cycle. Hospitals might also get shut, if there is increased number of infection in HCW's, increasing the stress in the overall system. Healthcare workers cannot be replaced easily. It is not easy to train a new worker in order to perform the same task. Most of these infections were transmitted by patients in a hospital environment which led to temporary closure of certain healthcare facilities. In Maharashtra 42% doctors, 70% nurses almost 80% auxiliary medical workers gets coronavirus infection. Close to 10 hospitals in Maharashtra had to be completely or partially shut down as a consequence of exposure to Covid-19. Other states also had similar reports.

Tributes to healthcare workers are pouring in from around the world amid the COVID-19 pandemic, as the world gives medical heroes a standing ovation from windows and balconies. Blowing of Conch shells, ringing bells and cheering to show solidarity with the Heath Care Workers for their laudable work to battle COVID-19 was done all around India while on the other side there has also been reports of Physical Violence against doctors and nurses in parts of the same country.....

..... When the fear of infections is high among doctors, the public too will be scared and this is the new pandemic.

JIMA, Editorial, June, 2020

The extent of local spread was underestimated previously in countries like Spain, UK and USA which resulted in setting a vicious cycle of healthcare workers getting infected and transmitting it on to there colleagues and patients. If sources are to be believed, in Italy, doctors died due to lack of knowledge about the local spread of the disease. They were treating these patients as annual flu infections which turned out to be COVID 19. In Spain, doctors were not priorly informed about the extent of spread, hence they did not take any possible precautions. Most of the infections among the HCW's occurred in the early phase of the disease when ignorance about the disease transmission and protective equipments – both were at the nadir point. Among all risk factors, ignorance was the most

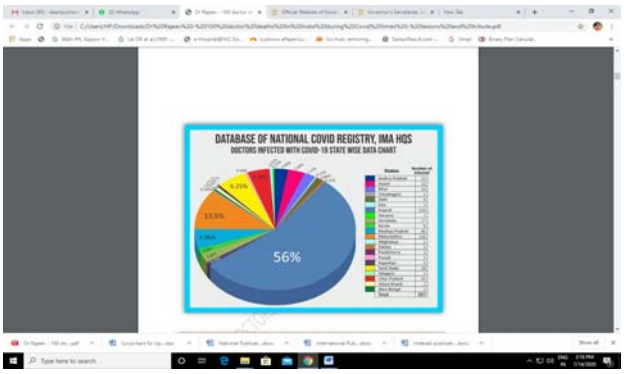

Fig 3 — Pie Diagram representing state wise distribution of COVID-19 infected HCW's in India[15]

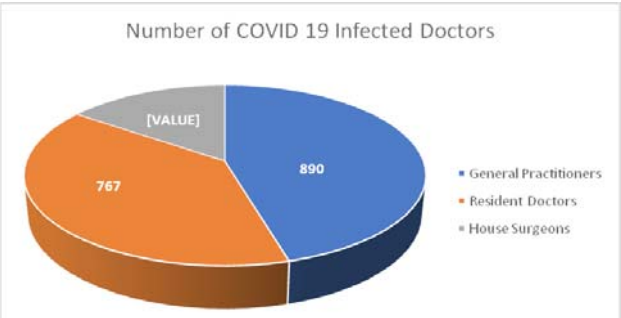

Fig 4 — Pie Diagram representing Number of COVID 19 Infected Doctors[8]

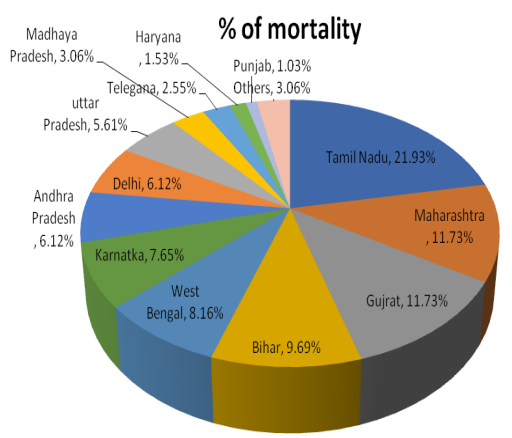

Fig 5 — Pie diagram representing state wise distribution of mortality among Doctor's in India due to COVID-19[8]

dangerous, as well as the most remediable one. Not taking the necessary precautions from the very beginning leading to massive transmission among the care providers.

There is no data available regarding infection rate in auxillary health workers, like field workers, ward boys, sanitation workers, security guards, lab attendants, peons, laundry and kitchen staff.

Medical staffs are being prioritised in many countries, but shortage of PPE are one of the major drawback in most affected facilities.

Cluster of the infections among HCW's occurred at the initial stages of the pandemic due to unpreparedness and lack of protective gears. Alongside their personal safety, HCW's are more concerned, about passing the infection to their families.

In view of this pandemic, health care workers are in direct contact with the cases and are instrumental in the diagnosis, treatment, and care of COVID -19 patients. They are at a high menaceof developing psychological distress and other mental issues .Decisions have to be made fast, with efficient triaging and isolating suspects, in deciding whether to shut down departments and in operation theatres when a patient or staff is tested positive, whilst on limited resources. The continuously growing number of COVID-19 cases, prodigious workload, shortage of personal protection equipment, extensivemedia coverage, lack of specific drugs and feelings of beingun supported may all contribute to the mental burden of mental health diseases of these HCW's. The pressure to act on time and to be appropriate during these critical situations has an increasing effect on the mental health[10]. The use of protective equipment continuously for longer periods causes difficulty in breathing and limited access to toilet and water, resulting in subsequent physical and mental stress. A recent study among healthcare professionals at a tertiary infectious disease hospital for COVID-19 in China, discovered a high incidence of anxiety and stress disorders among health care staff on the forefront ,involved in active management of patients[11]. The study showed that

Table 2 — *Reported Physician Deaths from COVID-19 by Practice Specialty and Median Age (n=198) on April 5, 2020*[9]

Speciality	Frequency (%)	Median Age (years)
General Practitioner(GP)/ Emergency Room	78 (40.6%)	67
Medicine	11 (5.8%)	70
Respiratory Medicine	5 (2.6%)	70
Anesthesiology	6 (3.1%)	68
Epidemiology	4 (2.1%)	66
Infectious Disease	4 (2.1%)	64
Forensics	3 (1.6%)	65
Microbiology	1 (0.5%)	-
Psychiatry	6 (3.1%)	64
Pediatrics	3 (1.6%)	64
Cardiology	7 (3.7%)	68
Hematology	3 (1.6%)	63
Oncology	4 (2.1%)	46
Neurology	2 (1.6%)	34
Hepatology	1 (0.5%)	69
Gastroenterology	1 (0.5%)	29
Transplant medicine	2 (1.0%)	60
Radiology	1 (0.5%)	43
Physiatrist	1 (0.5%)	68
Occupational Therapy	1 (0.5%)	61
Otorhinolaryngology	8 (4.2%)	61
Ophthalmology	7 (3.7%)	57
Dentistry	9 (4.7%)	71
General surgery	6 (3.1%)	63
Obstetrics & Gynecology	6 (3.1%)	59
Neurosurgery	3 (1.6%)	70
Cardiac surgery	1 (0.5%)	-
Orthopedics	1 (0.5%)	54
Urology	2 (1.0%)	66
Plastic surgery	1 (0.5%)	62
Unknown	8 (4.0%)	

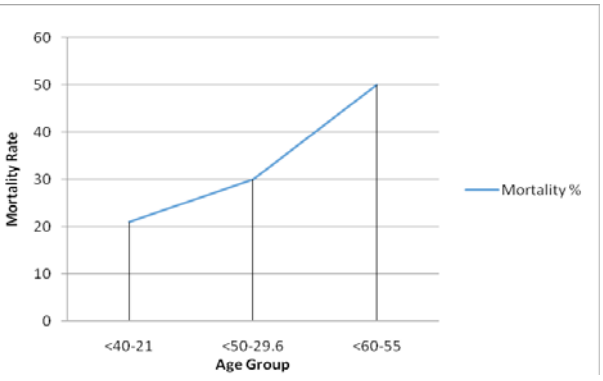

Fig 6 — Age wise distribution of mortality among HCW's in India[8]

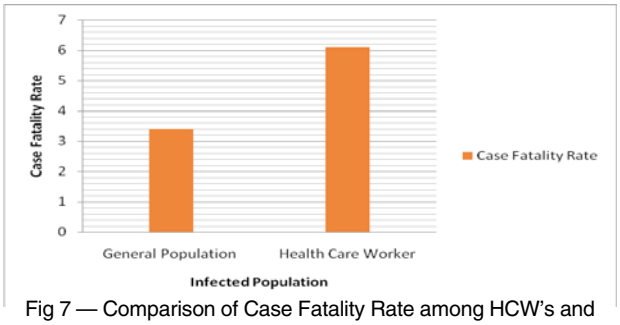

Fig 7 — Comparison of Case Fatality Rate among HCW's and General Population

nurses have a higher incidence of anxiety than doctors. Another study[12] revealed a significant relationship between the prevalence of physical symptoms and psychological outcomes among healthcare workers during the COVID-19 outbreak. A recently published meta-analysis showed a pooled prevalence of Anxiety (23.2),Depression (22.8%) and Insomnia (34.32%) as the three most commonly encountered psychiatric problems among HCW's working in COVID hospitals. Further scrutiny showed gender and occupational differences .Female staff showed higher incidence of affective disorders as compared to male their male colleagues[13]. In India ,also the psychological burden of Covid19 has been alarming. Till April 15th , four healthcare workers died in road traffic accident due to mental and physical stress of infection. Five nurses and one doctor committed suicide because of the stress and stigma of contracting COVID-19 .

Health-care facilities, globally are operating at more than maximum capacity for many months till date. But health-care workers are not inanimate like ventilators or wards, they cannot be urgently manufactured or run at maximum effectiveness for longer duration. It is vital for the administration to look upon health care workers not simply as mechanics , but as human individuals. In this global crisis HCW's are the most essential link in the chain of prevention and control of this pandemic. Therefore ,their safety should be given maximum priority . Provides PPE and cancel unnecessary events there should be prioritization of resources, food rest and family support. Infections among the health workers can be prevented by using proper personal protective equipment and by undertaking taking proper administrative, academic and engineering preventive methods. Presently, health-care workers are every country's most precious resource[14].

Clinicians may not have complete control over situation, but we have to rise to perform our duties and service with equanimity. COVID 19 have exposed ugly fracture of our society, not only in terms of infrastructure and policy also attitude of society perhaps carrying the virus in latent phase. Pandemic only revitalized the virus from latent to dormant phase.

JIMA, Editorial, June, 2020

Amidst all this, it is essential that HCW's also take care of their physical, mental and social wellbeing so that they can discharge their duties to their utmost ability. To overcome the stress and fatigue, some lifestyle modifications can be followed. It is essential to follow a daily routine with adequate sleep (6-8 hrs) and healthy diet. Drinking lukewarm water, concoction and herbal tea may also prove beneficial. Regular exercise and Pranayama have proven benefit in boosting the immunity. Connecting with one's hobby in leisure time can ease out the mental stress. It is always encouraged to talk openly with family or peers , in case one feels any kind of pressure. Engaging in spiritual activities can also boost ones confidence and give strength to overcome this adversity.

Conclusion

The few studies that we have so far in this regard has shown us that the spread of COVID-19 amongst health care workers was basically due to unpreparedness because the nature of the devil attacking us was not well known and studied . The rate of infection was nearly 1% among HCW's. Females were more commonly involved as majority of the workforce of our healthcare workers consists of women. The mortality ranges from 0.9% to 11% in different countries. HCW's of all ages got infected, however the mortality was higher in those above 55 years of age.

Doctors of all medical and surgical faculties can get infected. Falling incidence of Nosocomial COVID-19 infection suggests effective control measures that should be increase response to the promptly sprouting epidemic in order to provide utmost protection to our HCWs and suffering patients.

The spread of the pandemic was not the cause of exhaustion of health facilities rather it exposed the existing lacunae in the health services across the globe. As it is said , *The Dead teaches the living* ,it is after the brave sacrifices of so many health workers who lost their lives treating the diseased that the government and health systems realized that the health workers are the most important resource in this pandemic and started taking adequate measures to protect it. As doctors we felt there was this implicit rule that we must be above sentiments, above agony, above breakdown – until difficult times came that challenged these concepts. We all have challenging times, but doctors and health care providers must believe that they should be capable enough to get over these feelings rapidly in order to be there for their patients and their miseries. If in coming times no further solutions or treatments are possible, health care workers should deliver ease and steadiness for patients and their families. This is a moral calling, one that we cherish deeply. Now health care worker will become more sensitive to the soreness of patients as they themselves cannot frequently see their loved ones, their own fear of getting infected with

COVID-19, and transmitting the infection to their families will further challenge there potential to work with maximal efficacy. All of these fears can become devastating with this growing pandemic. Health care worker therefore, should function and tolerate pain as human heroes. These are extremely hard times and HCW's are indeed heroes- heroes in human skin with human sentiments that must beaccredited and sheltered.

THROUGH THIS ARTICLE WE WOULD LIKE TO PAY TRIBUTE TO ALL THOSE HEALTH CARE WORKERS WHO HAVE LAID DOWN THEIR LIVES FIGHTING COVID-19 AT THE FRONTLINE.

Though dusk is advancing as a lazy surprise
All musics have paused with signs divine
Though I have no companions in vast skies
Though fatigue is creeping in my chassis
Doubts are reverberating in silent paean.
All horizons are covered with obscurities
Still O' my bird , O' bird of mine's
Do not fold your wings , do not close eyes.

Dussamay - Rabindranath Tagore

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