ORIGINAL ARTICLE

IMPACT OF SARS-COV-2 ON FRONTLINE HEALTHCARE WORKERS IN AZAD KASHMIR: A MULTICENTRE SURVEY

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Background: Healthcare workers (HCWs) are especially prone to contracting SARS-CoV-2 infection due to their work requirements. This study was conducted to analyze the frequency of SARS-CoV-2 infection among frontline healthcare workers and various predictive factors of this infection in healthcare workers. **Methods:** This was a descriptive cross-sectional study. Data was collected at Obs/Gyn Department, Sheikh Khalifa Bin Zayed Al-Nahyan (SKBZ)/Combined Military Hospital Muzaffarabad, from Main Covid-19 Pandemic Data Collection and Information Centre, Muzaffarabad, from 15th April to 14th October 2021. Screening was offered to healthcare professionals and other supporting staff of all hospitals dealing with SARS-CoV-2 infection. Information was recorded on a structured questionnaire. Categorical variable were explained by frequency. Fischer exact test and χ^2 test were used, and $p<0.05$ were considered significant. **Results:** There are 4,776 healthcare workers in AJK. A total of 2,219 individuals were COVID positive, out of them 118 were healthcare workers. Males were 53% and females were 47%; 77% of cases were aged 25–50 years. Physicians were 51.7% outnumbering nurses and allied staff. The cumulative incidence was 2.4%. Infection rate among frontline HCWs was 1%; it was 1.6 among HCWs in other departments, and 0.5% in HCWs with no patient contact. The rate of co-morbidities in affected HCWs was 33.05%. **Conclusion:** The risk of disease was high among frontline healthcare workers as compared to general population. The severity of infection was more in patients with co-morbidities. Among HCWs, the highest number of patients with COVID-19 were physicians.

Keywords: SARS-CoV-2, Impact, frontline healthcare worker, COVID-19, Coronavirus

Pak J Physiol 2022;18(2):58–61

INTRODUCTION

Since the outbreak of SARS-COV-2 a novel coronavirus healthcare worker (HCWs) are over burdened by increased duty hours after it has been declared as a pandemic by the World Health Organization.[1] This pandemic put healthcare system under tremendous pressure and challenged its ultimate capacity to deal with fast past infectious virus. Healthcare professional took responsibility and shouldered policy makers with utmost efforts in line of their duty.

In the study presented herein, we have tried to underscore some of the imperatives and challenges currently being faced by frontline health workers in Azad Jammu and Kashmir State and propose certain recommendations to reduce the impediment being imposed on them in order to ensure the provision of rapid and efficient health care services.

Earnest service and unconditional approach has always been considered as fundamental ethic for all health workers (HCWs), especially in time of peril as the present day. The last 15 months have been unusual for every individual across the globe as it has set the new norms for worlds living with COVID-19. SARS-CoV-2 pandemic has not only implicated widespread morbidity and mortality but it has created fear and burden among HCWs and put everything on emergency mode. Reports across the world reveal that COVID-19 has resulted risk for anxiety, depression, insomnia, and post-traumatic stress disorder among front line health care workers. It has also been shown that severe burnout syndrome affects as many as 33% of critical care nurses and up to 45% of critical care physicians that reflects the magnitude this virus has taken a toll on the HCWs.[2]

Back in 2003 outbreak of Severe Acute Respiratory Distress Syndrome or SARS was reported for the first time in Hanoi, Vietnam. Outbreak of COVID-19 seems a repeat history, as reflected by the data presented by Chinese National Health Commission, with statistical data revealed that more than 3,300 HCWs got infection in first of week of March with at least 46 deaths till mid of march. Similarly, in Italy 20% of their HCWs were infected, with significant number were reported losing their lives to the virus.[3,4] Those who survived COVID-19 infection developed certain degree of immunity against SARS-CoV-2 as shown by the antibody titres done after six month of recovery.[5,6] Only effective vaccination against COVID-19 can

prevent it in near future. As virus transmission percentage is not exactly known so it is difficult to assess the seropositivity of population but it is estimated to range between 60% and 80%.[7,8]

Until this compilation in Pakistan there have been 332,993 cases and 6,806 deaths (as 29th October, 2020, 1700 hours) reported officially by Ministry of Health. Meanwhile in Azad Jammu and Kashmir (AJK), there have been 4,082 cases and 89 deaths (as of 29th October, 2020). Now another wave of SARS-CoV-2 has set in and frontline healthcare workforce is highly exposed to SARS-CoV-2 infection again. Screening of HCWs with COVID-19 RT-PCR is of pivotal importance for surveillance of the pandemic and to predict the likely course herd immunity. Surveillance of the proportion of COVID-19 positive health care workers is an important indicator of spread of SARS-CoV-2.

We aimed to see the frequency of COVID-19 infection among frontline healthcare workers in AJK healthcare system and to analyze various predictive factors of this infection.

METHODOLOGY

A total of 118 healthcare workers, who were found SARS-CoV-2 positive were included in the study from April to October 2020. Information regarding epidemiological factors, exposure, symptoms and others relevant clinical information was taken on a structured questionnaire. Frontline or first line healthcare workers were defined as HCW directly involved in care of confirmed or suspected COVID-19 cases, or stationed at emergency. Non-first line HCWs were those HCWs who were involved in general patients other than COVID-19. Categorical variable were explained by frequency. Chi-square test and Fischer exact test were used as per type of variable. SPSS-24 was used for data analysis. Two sided $p<0.05$ was considered significant.

RESULTS

There were 4,776 HCWs working actively in AJK. Out of a total number of 2,219 patients diagnosed in AJK during the study period, 118 were healthcare workers, 52% were males and 47% were female, 77% cases were aged 25–50 years, median age was 33 years. Physicians were 51.7% and they outnumbered nurses and allied staff. The cumulative incidence was found to be 2.47%. (Table-1).

COVID-19 infection was found to be 24% among the frontline HCWs, 76% among workers in other clinical departments and those with no direct contact with the patient (59% & 14% respectively). Infection rate was 0.8% among frontline healthcare workers, 1.4% among workers in other clinical departments and 1.6% among workers with no patient contact. (Table-2).

Co-morbid conditions associated with 118 COVID-19 confirmed HCWs are shown in Table-3. The rate of co-morbidities in affected HCWs was (39/118, 33.05%). Common co-morbidities among all COVID-19 positive individuals were diabetes (21, 17.79%), hypertension (8, 6.77%), cardiovascular disease (4, 3.38%), asthma (2, 1.69%). Three (2.54%) of SARS-CoV-2 affected women were pregnant.

Fever was the most common presenting symptom. Majority (102, 84.3%) of affected HCWs had mild course of disease while disease was severe in 12 (9.9%) cases. CPAP was used in 12 patients. Four (3.3%) had critical disease, out of which 2 frontliners died. Fatality rate among HCWs was 1.69%. Infectivity was higher in diabetic and in hypertensive individuals and majority presented with features of common flu. (Table 4).

Seventy-two (61%) HCWs got infection presumably from the Ward, 28 (23.7%) from Emergency Department/Clinic, while 18 (15.2%) were infected in community. Only 3 had travel history to cities with high prevalence of Covid 2 cases. More (72, 61%) second line workers were infected than frontline HCWs in non-COVID wards ($p<0.001$). Twenty-eight HCWs had presumably transmitted infection to their families as well. Comparison of co-morbidities and symptoms between frontline and non-frontline HCWs found no significant difference in both subgroups. Age group 26–50 was the most affected group. (Figure-1).

Table-1: Frontline HCWs according to their category and workplace

	HCWs	HCW with COVID-19	HCW without COVID-19	Estimated cumulative Incidence
Total	4776	118	4658	2.47
Job category				
Physician	1135	61	1074	5.37
Nurses	649	10	639	1.54
Assistants (paramedics)	2992	47	2945	1.57
Department				
Outdoor and wards	3284	100		3.05
Other departments	1492	18		1.21

Table-2: Exposure location and job categories of HCWs with confirmed SARS-CoV2 infection

Parameters	Total	Frontline HCW		% of frontline HCWs
		Yes	No	
Presumed exposure location				
ER/OPD	24	20	4	16
Wards	76	5	71	4
Other	18	5	13	4
Job category				
Physicians	61	30	31	51.6
Nurses	4	4	0	3.3
Allied	6	6	0	5
Transmitted to family/ friends	28	13	15	

Table-3: Co-existing diseases in HCWs with confirmed SARS-CoV2

Clinical Features	Total	Frontline HCW	
		Yes	No
Diabetes mellitus	21	9	12
Hypertension	8	2	6
Cardiovascular Disease	4	0	4
Pregnancy	3	1	2
Asthma	2	1	1
Renal disease	1	0	1

Table-4: Signs and symptoms in confirmed positive HCWs (n=118)

Signs and symptoms	Total	Frontline HCW		
		Yes	No	*p*
Fever	78	34	44	0.002
Cough	45	17	28	0.55
Body aches	68	30	38	0.01
Sore-throat	39	16	29	0.30
Shortness of breath	27	12	19	0.79
Loss of taste	4	3	1	0.112
Loss of smell	10	5	5	0.304
Diarrhoea	7	5	2	0.04
Headache	8	4	4	0.441
Anorexia	3	2	1	0.269
Photophobia	1	1	0	0.339
Nausea	2	2	0	0.113

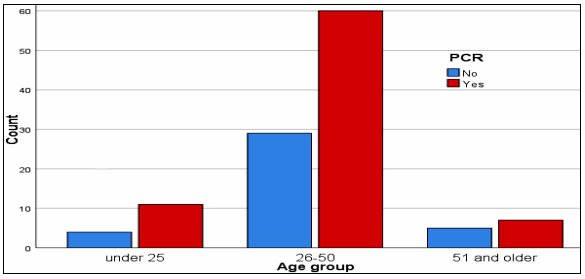

Figure-1: SARS-CoV-2 infection in age groups

DISCUSSION

This study started in Gynaecology Department of SKBZ Hospital Muzaffarabad. Later on, all district and teaching hospitals in Azad Jammu and Kashmir were included in the study. These hospitals are catering patients from all over the State, and HCWs were at higher risk of getting viral infection.

The risk of acquiring the infection from patients is more in HCWs due to their direct and prolonged contact with patients suffering from COVID-19. The HCWs may not notice contracting the disease for a while. When compared SARS and Middle East Respiratory Syndrome with COVID-19, it was noticed that COVID-19 infection has much longer incubation period than the former infections.[9] Longer incubation period results silent propagation of virus to others without showing any symptom.[10] Many COVID-19 patients visiting hospitals had no or very subtle symptoms and some showed atypical symptoms. Presence of such patients in hospital setting poses greater risk for health staff and clinicians over there.[11–13]

The data analysis stratified with age reflected higher involvement of younger (21–30 years) healthcare workers with a successive declining trend with an increase in age. The reason behind this trend was higher proportion of this age group being in direct contact with the patients and for longer period of time. Similar observations were made by Cortis D[14]. However, the severity of the disease in this group was lesser than those with advancing age because of lesser number of workers with co-morbids and better immunity for long working hours with infective patients. More male than female healthcare workers were involved probably due to social limitations of female workers. Global results suggest that men and women are equally affected, except in Pakistan where 72% cases were male, and the disease severity and mortality was more among males.[15]

COVID-19 is associated with a varying degree of disease, its course and common symptoms including fever, cough, sore throat, myalgias and shortness of breath. Diarrhoea remained an uncommon symptom in our study population. This is in agreement with Wei-Jie Juan *et al*[16]. Fever was the most common symptom in our location. Other common symptoms were cough, body aches, sore throat, and shortness of breath. Loss of taste and smell were less prevalent among all confirmed cases of COVID-19.

Among 4,776 healthcare workers 118 (2.47%) were affected with COVID-19, out of which 39 (33.05%) had associated co-morbidity. Among these patients the most common co-morbidity was diabetes followed by hypertension and IHD; pregnancy, asthma and renal disease were least associated. A study conducted in China[17] showed similar pattern of association with co-morbidities. Hypertension was the leading co-morbidity in China (39.5%), Italy (35.9%), USA (38.9%), and UK (27.8%), while in Iran diabetes was the commonest co-morbidity. Globally, diabetes was the second highest prevalent co-morbidity in 5 out of 7 countries reviewed. The presence of one or more comorbidity was associated with increased severity of the disease although not clearly associated with increased fatality rate in COVID-19 patients.[18]

Our results revealed that people having co-morbidities developed severe symptoms and had higher mortality rate compared to those with no co-morbid conditions. A total of 0.978% of HCWs with COVID-19 infection were asymptomatic. It has been reported that viral load in asymptomatic and symptomatic patient has no significant differences.[12]

In this study 77.3% of affected HCWs did not progress to severe disease that may be attributed to age; majority of HCWs were less than 50 years old. HCWs have gained sufficient knowledge to deal with viral infection at early stage. Establishment of free of

cost PCR testing with 24 hours reporting time by the Government favoured early diagnosis and treatment with a better outcome for COVID-19 HCWs and the general public.

CONCLUSION & RECOMMENDATIONS

The frontline healthcare workers are at a greater risk of COVID-19. Among healthcare workers the highest number of patients with COVID-19 were physicians. Periodic testing and booster doses of vaccine must be practiced for HCWs, especially for those who worked for the past 15 days where more than two patients with hospital associated COVID-19 infections are reported.

REFERENCES

1. WHO Director-General's opening remarks at the media briefing on COVID-19 –11 March 2020. World Health Organization 2020. Available from: https://www.who.int/director-general/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19---11-march-2020. [Accessed: 11 April 2020]
2. Marc Moss, Vicki S Good, David Gozal, Ruth Kleinpell, Curtis N Sessler. A critical care societies collaborative statement: burnout syndrome in critical care health-care professionals. A call for action. Am J Respir Crit Care Med 2016;194:106–13.
3. Centers for Disease Control and Prevention (CDC). Update: Outbreak of severe acute respiratory syndrome--worldwide, 2003. MMWR Morb Mortal Wkly Rep 2003;52:269–72.
4. Nguyen LH, Drew DA, Graham MS, Joshi AD, Guo CG, Ma W, *et al*, Coronavirus Pandemic Epidemiology Consortium. Risk of COVID-19 among front-line health-care workers and the general community: a prospective cohort study. Lancet Public Health 2020;5(9):e475-e483. doi: 10.1016/S2468-2667(20)30164-X. Epub 2020 Jul 31. PMID: 32745512; PMCID: PMC7491202.
5. Al-Abdely HM, Midgley CM, Alkhamis AM, Abedi GR, Lu X, Binder AM, *et al*. Middle East Respiratory Syndrome coronavirus infection dynamics and antibody responses among clinically diverse patients, Saudi Arabia. Emerg Infect Dis 2019;25(4):753–66.
6. Liu L, Wei Q, Lin Q, Fang J, Wang H, Kwok H, *et al*. Anti-spike IgG causes severe acute lung injury by skewing macrophage responses during acute SARS-CoV infection. JCI Insight 2019;4(4):e123158. doi: 10.1172/jci.insight.123158.
7. Britton T, Ball F, Trapman P. A mathematical model reveals the influence of population heterogeneity on herd immunity to SARS-CoV-2. Science 2020;369(6505):846–9.
8. Sette A, Crotty S. Pre-existing immunity to SARS-CoV-2: the knowns and unknowns. Nat Rev Immunol 2020;20(8):457–8.
9. World Health Organization. Novel coronavirus (2019-nCoV) technical guidance. Available from: https://www.who.int/emergencies/diseases/novel-coronavirus-2019/technical-guidance. [Accessed: March 19, 2021]
10. Centers for Disease Control and Prevention. Interim Guidelines for Collecting and Handling of Clinical Specimens for COVID-19 Testing. Available from: https://www.cdc.gov/coronavirus/2019-nCoV/lab/guidelines-clinical-specimens.html. [Accessed: March 19, 2021]
11. Riou J, Althaus CL. Pattern of early human-to-human transmission of Wuhan 2019 novel coronavirus (2019-nCoV), December 2019 to January 2020. Euro Surveill 2020;25(4):2000058.
12. Li Q, Guan X, Wu P, Wang X, Zhou L, Tong Y, *et al*. Early transmission dynamics in Wuhan, China, of novel coronavirus-infected pneumonia. N Engl J Med 2020;382(13):1199–207. doi: 10.1056/NEJMoa2001316. Epub 2020 Jan 29.
13. Chen J, Qi T, Liu L, Ling Y, Qian Z, Li T, *et al*. Clinical progression of patients with COVID-19 in Shanghai, China. J Infect 2020;80(5):e1–e6. doi: 10.1016/j.jinf.2020.03.004.
14. Cortis D. On determining the age distribution of COVID-19 pandemic. Front Public Health 2020;8:202. doi: 10.3389/fpubh.2020.00202. eCollection 2020.
15. Ahmed SB, Dumanski SM. Sex, gender and COVID-19: a call to action. Can J Public Health 2020;111:980–3. https://doi.org/10.17269/s41997-020-00417-z.
16. Guan WJ, Ni ZY, Hu Y, Liang WH, Ou CQ, He JX, *et al*, China Medical Treatment Expert Group for Covid-19. Clinical characteristics of Coronavirus disease 2019 in China. N Engl J Med 2020;382(18):1708–20. doi: 10.1056/NEJMoa2002032.
17. Guan WJ, Liang WH, Zhao Y, Liang HR, Chen ZS, Li YM, *et al*. Comorbidity and its impact on 1590 patients with COVID-19 in China: a national analysis. Eur Respir J 2020;55(5):2000547.
18. Bajgain KT, Badal S, Bishnu B, Santana MJ. Prevalance of comorbidities among individuals with COVId-19: a rapid review of current literature. Am J Infect Control 2021;49(2):238–46.

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Received: 12 Aug 2021 **Reviewed:** 13 May 2022 **Accepted:** 29 May 2022

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SH: Data collection, Analysis
ZA: Critical review
ZIA: Data collection, Analysis, Interpretation
MFU: Data collection, Analysis, Interpretation

Conflict of Interest: None to declare
Funding: No funding received from any governmental or commercial agency