Characteristic of Health Care Worker with COVID-19 Mainland China, Jan 4-Jun 2, 2020

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Abstract

Background: The coronavirus disease 2019 (COVID-19) among health care workers (HCWs) in China has been contained rapidly. Here, we report the results of a descriptive, exploratory analysis of all HCWs cases diagnosed during the outbreak and the containment of the epidemic.

Methods: All COVID-19 cases of HCWs reported through Jun 2, 2020, were extracted from the Chinese Red Cross Fund (CRCF)

Keywords: Covid-19; CDC; SARS-CoV-2

Introduction

As of Jun 2, 2020, the COVID-19 pandemic had resulted in 83,021 cases and 4,634 deaths in mainland China [1]. In the summary report of 72,314 cases from the Chinese Center for Disease Control and Prevention (CDC) during the early period of the epidemic, 1,716 health workers with laboratory-confirmed COVID-19 were reported [2]. Five of them died through Feb 11, 2020 [2]. We performed a descriptive, exploratory analysis of the outbreak and also the containing of COVID-19 among Health Care Workers (HCWs) in mainland China.

Methods

The epidemiological characteristics of HCW with COVID-19 in

general population' peak time. Of the 3,623 HCWs, the vast majority (98.8%) was from Hubei Province, and the clear majority (82.6%) from Wuhan. Out of the total 117,100 HCWs in Wuhan, 2,993 HCWs were diagnosed with COVID-19 resulting in an overall 2.6% infection rate. Only 45 HCWs were from 16 provinces outside of the Hubei Province, with 1-15 cases in each province.

Time of diagnosis	No
Early-January, 2020	19
Mid-January, 2020	429
Late-January, 2020	1483
Early-February, 2020	1037
Mid-February, 2020	431
Later-February, 2020	145
Early-March, 2020	54
Mid-March, 2020	10
Late-March, 2020	4
Early-April, 2020	7
Mid-April, 2020	1
Late-April, 2020	2

Table 1: Number of health care workers with laboratory-confirmed or clinically diagnosed covid-19, by time of diagnosis, as of June 2, 2020.

Of the 3,623 HCW in mainland China, a vast majority (3,350) were from 171 hospitals, fewer (264) were from 119 community health centers, and only nine were from private or local CDC clinics. Seven ten hospitals with the largest number of HCW infected accounted for 1504 of the 3350 hospital-based COVID-19 infections among HCW with each of the seven hospitals had between 96 to 324 COVID-19

HCWs. The Central Hospital of Wuhan had the highest number of COVID-19 HCW (324) and the highest infection rate (7.5%). In contrast, fewer HCW infection occurred in hospitals specializing in infectious disease. Every two hospitals converted into designated COVID-19 facilities (Wuhan Jinyintan Hospital and Wuhan Pulmonary Hospital) were hospitals specializing in infectious disease and had only 20 and 12 COVID-19 HCW (infection rate: 2.2% and 1.7%, respectively). Tongji Hospital of Tongji Medical College and Wuhan Union Hospital had the highest number of HCW in Wuhan, but with low infection rate of 1.8% and 1.2%. Hubei Integrated Chinese and Western Medicine Hospital, where the first four patients were reported to the local CDC (by Jixian Zhang, MD), had relatively few COVID-19 HCW (75 cases, the infection rate, 5.8%) and no deaths.

Among the total 31 HCW who died from COVID-19, 23 were men, and 8 were women. The fatality rate was 2.2% for male HCW and 0.3% for female HCW. Twenty-three of the HCW were physicians, two were nurses, and four were other HCW. The fatality rate was 2.1% for physicians, 0.11% for the nurses, 0.64% for other HCW (Table 2). Among the 31 HCW deaths, 23 were diagnosed in mid-January and late-January 2020, and 21 died before Feb 20, 2020. The median age of the 26 HCW with data available on age was 55 years (range, 29 to 72) and, 16 of those who died were 55 years or older (Table 3). Eighteen of 31 HCW who died were from top-level hospital, six from middle-level hospital, six from low-level hospital, and two from a private clinic. Their HCW were from Hubei Province, including the 23 from Wuhan. Only one was from outside of Hubei Province (Table 4). Among the 2,993 HCW with COVID-19 in Wuhan, 23 died, and the fatality rate was 0.77%. Six were from the Central Hospital of Wuhan with 324 COVID-19 HCW, and the fatality rate was 1.9%. Among the

Characteristic	No. of deaths from COVID-19	No. of HCWs with COVID-19	Fatality rate	
Physicians	25	1,188	2.1%	RR (Physicians/Nurses) = 19.1
Nurses	2	1,808	0.11%	
Other health care workers	4	627	0.64%	RR (Other HCWs/Nurses) = 5.8

Table 2: Comparison on deaths from COVID-19 for physicians, nurses, and other health care workers (HCWs).

Characteristic	No. with available information (%) for Deaths from COVID-19	Male	Female	Doctors	Nurses	Other health care workers
Age group (years)	26	19	7	23	1	2
16-44	6	4	2	6		
45-54	4	3	1	3		1
55-64	7	6	1	6	1	
65	9	6	3	8		1

Table 3: Demographic characteristics with age distribution among the health care workers died from COVID-19.

Characteristic	No. of deaths from COVID-19
Hospital level	n=31
3 (Top-level)	18
2 (Middle-level)	6
1 (low-level)	5
Other health facilities	2
City or Rural	n=31
City	31
Rural	0
Wuhan or outside of Wuhan	n=31
Wuhan	23
Hubei province outside of Wuhan	7 (In 5 cities with 1-3 HCWs in each city)
Out of Hubei province	1

Table 4: Practice location among the health care workers (HCWs) died from COVID-19.

Discussion

In mid-January, as more and more patients infected with COVID-19, especially the fourteen HCW in the Neurosurgery unit in Wuhan Union Hospital, were reported CDC, high contagiousness and severity of the new disease were further recognized [2]. It prompted the Chinese government amending the National Infectious Disease Law to categorize COVID-19 as a Class B notifiable disease. Furthermore, to upgrade the management to the highest level of Class A infectious diseases on January 20 [7]. The law required all cases to be immediately reported to China's Infectious Disease Information System. Protective measure for front-line HCW were upgraded to the highest-level as Class A infectious disease. Since then, all front-line HCW have had sufficient protection awareness, screening protocols, and rigorous protection, including coverall, N95 masks, and goggles. All patients with COVID-19 were admitted to the designated hospital or other facilities. Three weeks later (mid-February), the daily number of infected HCW was significantly reduced (Figure 1). Reporting infection cases, especially the cases among HCWs, and the amendment to National Infectious Disease Law played a vital role in increasing protection awareness among all HCWs. Strict implementation of coverall protection protocols and admission of all COVID-19 patients to designated facilities eventually all resulted in a rapid decline in the number of HCW infected [8]. Only 45 HCW were infected with

COVID-19 outside Hubei Province. The lockdown of Hubei Province was timely and effective, avoiding the infection of HCW outside Hubei Province.

Two tertiary hospital (Wuhan Union Hospital and Tongji Hospital) with the largest number of HCW had low infection rate and only one death. Two hospital specializing in infectious disease were among the three designated hospital and had low infection rate and no death. The hospital (Hubei Integrated Chinese and Western Medicine Hospital), reporting the first COVID-19 patients, had a relatively low infection rate and no death. The hospital (Wuhan Union Hospital), reporting the first 14 HCW with laboratory-confirmed COVID-19 in the same unit, had a low infection rate and no death. These implied that adequate protection awareness and measures could prevent COVID-19 infection and the subsequent risk of death.

The number of women HCW with COVID-19 was more than twice of the men. The difference was because 50% of the HCW with COVID-19 (1,808/3,623) were nurse and the majority of the nurse were women [9]. The fatality-rate of nurse was lower than physician. This reduction in the fatality rate may be confounded by age and gender since most women HCW were nurse, and most nurse are younger than physician. Being younger has proven to be protective for COVID-19 fatalities [10-13].

Conclusion

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