ejpmr, 2021,8(4), 561-567

SJIF Impact Factor 6.222

EUROPEAN JOURNAL OF PHARMACEUTICAL AND MEDICAL RESEARCH

www.ejpmr.com

Research Article

ISSN 2394-3211

EJPMR

FRONT-LINE HEALTH CARE PERSONNEL ON COVID-19 DUTY – AN INTERVIEW-BASED CROSS-SECTIONAL STUDY

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Article Received on 08/02/2021 **Article Revised on 01/03/2021** **Article Accepted on 21/03/2021**

ABSTRACT

This cross-sectional interview-based descriptive study was conducted on 315 frontline health care personnel (females: 137; 43.49%; males: 178; 56.51%), using chain sampling technique. Significant gender-wise differences were observed in age groups of ≤30 years (Z=5.776; p<0.0001); 31-40 years (Z=2.832; p=0.004); and ≥51 years (Z=3.500; p=0.0004). 26 (18.98%) females and 41 (23.03%) males tested COVID positive, without significant gender difference (Z=1.197; p=0.231) in their mean duration of duty. There was no significant gender difference in the frequency of hospitalization (Z=0.468; p=0.638) or in the mean duration of hospitalization (Z=0.426; p=0.670) or in self-reported history of close contact with COVID positive person outside the workplace (Z=0.643; p=0.522). Significant gender difference (Z=2.169; p=0.03) was observed in use of hydroxychloroquine prophylaxis. Males had a significantly (Z=2.049; p=0.040) higher frequency of diabetes mellitus. Among those who tested COVID positive, more females (Z=2.817; p=0.004) were aymptomatic, whereas significantly more males had muscle / body ache (Z=2.103; p=0.035) and fever or chills (Z=6.230; p<0.0001). Unambiguous and timely communication to actively combat misinformation, perceptible support from seniors, screening personnel for mental health vulnerabilities, proactively tackling stigma and job-related stress are some of the interventions for mitigating problems faced by frontline health care personnel.

KEY WORDS: Coronavirus pandemic, COVID-19, Frontline, Health care personnel.

INTRODUCTION

Coronaviruses are enveloped non-segmented spherical RNA viruses. Club-like spike glycoproteins on the surface, as seen under the electron microscope, impart a crown-like appearance to the virus. The name coronavirus is derived from the Latin word "corona" meaning a crown.[1] Alphacoronavirus, Betacoronavirus, Gammacoronavirus and Deltacoronavirus constitute the four genera of coronaviruses. The former two genera infect only mammals, while the latter two infect birds, as well as, mammals.[2] On February 11, 2020, the World Health Organization officially named the disease causing the 2019 novel coronavirus outbreak as "coronavirus disease 2019" (abbreviated as COVID-19: 'CO' stands for 'corona,' 'VI' for 'virus,' and 'D' for disease). This virus was previously referred to as "2019 novel coronavirus" or "2019-nCoV."[3]

The Severe Acute Respiratory Syndrome coronavirus (SARS-CoV), Middle East Respiratory Syndrome coronavirus (MERS-CoV) and COVID-19 are betacoronaviruses that are responsible for severe illness in humans while the other human coronaviruses cause only mild upper respiratory diseases, although some of them can cause severe infections in infants, young children and elderly individuals.[4-6]

The symptoms of COVID-19 infection include fever, cough, fatigue, malaise and dyspnoea,[7] while the involvement of the digestive system manifests as abdominal discomfort and diarrhoea. [8] The identified routes of transmission for COVID-19 include transmission through droplets, [9] contact, [10] aerosol, [11] and the digestive system.[8] The virus can be transmitted from person to person before the onset of symptoms, during the incubation period (up to 24 days) [12] and also from asymptomatics.[13]

The critical interventions to minimize the transmission of the COVID-19 virus in health care facilities and the community include infection control measures[14] and social distancing.[15] Enforcing lockdowns for the purpose of disease containment are, at best, short-term

measures because they lengthen the doubling time of cases[16] and decrease the transmission of infections but are not sustainable in the long-term due to their enormous socio-economic and political costs.[17] Lockdowns also thwart access to family, friends, and other social support systems causing loneliness, anxiety and depression.[18]

Frontline health care personnel (FHCP) face role conflict between professional and familial roles, such as, having to care for a child or an ailing elderly person in the family. [19-21] During the SARS outbreak, a study from Toronto [21] reported that FHCP who experienced job stress, perceived stigmatization and felt that they were under observation, coped by evading crowds and colleagues.

The less educated among FHCP (for instance, non-clinical staff) may be unduly prejudiced by misinformation, myths and rumours circulating on social media. The correct information should be immediately disseminated by the administration to prevent doubts, dilemmas and mental conflict among the FHCP.[22,23]

Quarantine and isolation of other FHCP would result in staff shortages, forcing them to work with new set of colleagues for long hours with limited resources, frequent re-assignment to unfamiliar tasks (especially for non-clinical staff), [24] with frequent change of duties in a new environment, all of which would cause mental stress.[21, 25] While caring for their infected colleagues, most FHCP would be unable to "switch off" their emotions and they may feel helpless if their colleagues suffer complications or mortality.[22]

In the aftermath of the SARS pandemic, some research has been conducted on the risks to the wellbeing of FHCP but still there is a dearth of information on impact of infectious disease outbreaks.[26] Studies[27,28] have advocated greater social support[29] through collaboration, training, team-building,[27] stress reduction[30] and unambiguous communication [31] as beneficial measures to restore confidence among FHCP.[32]

The objective of the present study was to interview FHCP working in a COVID-19 facility to determine their age-sex profile, use of preventive measures and their COVID-19 status.

MATERIALS AND METHODS

This cross-sectional interview-based descriptive study was conducted using the chain sampling technique. A pre-tested and pre-validated questionnaire was administered via Google forms to front-line health care personnel who were working in COVID-19 facilities. Informed consent was taken on the Google forms. The data were adapted to Microsoft Excel spreadsheet (Microsoft Corporation, Redmond, WA, USA) and analyzed using SPSS statistical software Windows Version 25.0 (IBM Corporation, Armonk, NY, USA). The percentage of responses and the standard error of difference between two sample proportions were calculated. For continuous data, the standard error of difference between two means was calculated. 95% Confidence interval (CI) was stated as: [Mean-(1.96)*Standard Error)] – [Mean+(1.96)* Standard Error)]. The statistical significance was determined at $p<0.05$.

RESULTS AND DISCUSSION

Age and Gender distribution: Of the 315 FHCP who participated in the study, 137 (43.49%) were females and 178 (56.51%) were males. About one-third of the total FHCP or 98/315 (31.11%) were females aged ≤30 years. The age distribution of FHCP (Table-1) depicts the significant gender-wise differences that were observed in the following age groups – ≤30 years ($Z=5.776$; $p<0.0001$); 31-40 years ($Z=2.832$; $p=0.004$); and ≥51 years ($Z=3.500$; $p=0.0004$). A USA-based study, [33] published in 2020, reported that women comprised 76.8% of frontline personnel in health care and 85.2% of those in child care and social services.

Table 1: Age distribution.

Age group (years)	Females (n=137)	Males (n=178)	Z value	'p' value
≤30	98 (71.53%)	69 (38.76%)	5.776	<0.0001 *
31-40	13 (09.49%)	38 (21.35%)	2.832	0.004 *
41-50	12 (08.76%)	25 (14.04%)	1.444	0.149
≥51	14 (10.22%)	46 (25.84%)	3.500	0.0004 *

Z=Relative deviate; *Significant

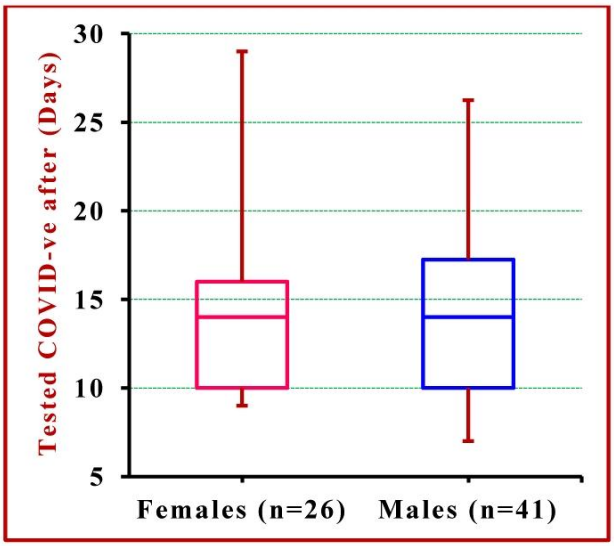

Fig 1: Duration (days) for return to COVID Negative status.

COVID positive status: Among the 137 female FHCP and 178 male FHCP, 26 (18.98%) females and 41 (23.03%) males tested COVID positive. 23 (16.79%) female FHCP and 38 (21.35%) male FHCO tested COVID positive by RT-PCR, without significant gender difference (Z=1.015; p=0.307); whereas the female and male FHCP who were COVID antigen positive were 03 (02.19%) and 03 (01.69%), respectively, without significant gender difference (Z=0.324; p=0.748). For females, COVID negative status was achieved in 15.40 +/- 6.34 days (95% CI: 14.34–16.46 days) and for males, in 15.50 +/- 7.48 days (95% CI: 14.40–16.60 days) without significant gender difference (Z=0.058; p=0.953). The minimum, as well as maximum duration for return to COVID Negative status was lower for males, while the first quartile was identical for both genders (Fig 1).

COVID positive status and duration of duty: Out of 26 COVID positive female FHCP, 15 (57.69%) were on COVID duty, while out of 41 COVID positive male FHCP, 18 (43.90%) were on COVID duty; without significant gender difference (Z=1.100; p=0.271). There was no significant gender difference (Z=1.197; p=0.231) in the mean duration of current duty for those testing COVID positive, which was 69.13 +/- 73.60 days (95% CI: 56.80–81.46 days) and 90.71 +/- 69.10 days (95% CI: 80.55–100.86 days) for females and males, respectively. The minimum, first quartile, median, third quartile of duration of duty (days) was lower for females, while the maximum duration of duty was almost identical for both genders (Fig 2).

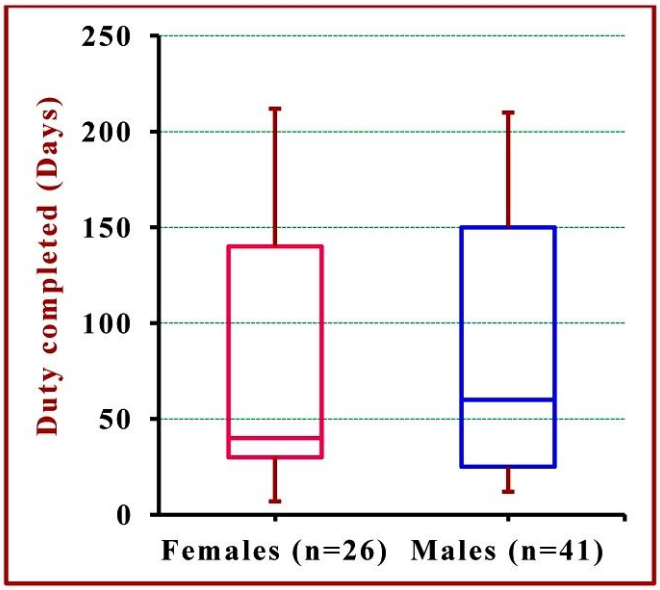

Fig 2: Duration (days) of completed duty.

Hospitalization: Among the COVID positive FHCP who were hospitalized, 11 (42.31%) were females (n=26) and 15 (36.59%) were males (n=41), without significant gender difference (Z=0.468; p=0.638). There was no significant gender difference (Z=0.426; p=0.670) in the mean duration of hospitalization, which was 9.45 +/- 4.89 days (95% CI: 8.64–10.27days) and 10.33 +/- 5.60 days (95% CI: 9.51–11.16 days) for females and males, respectively. The minimum and median of the duration of hospitalization was identical for both genders; the first quartile and maximum duration was marginally higher for female FHCP; while the third quartile of the distribution was higher for male FHCP (Fig 3).

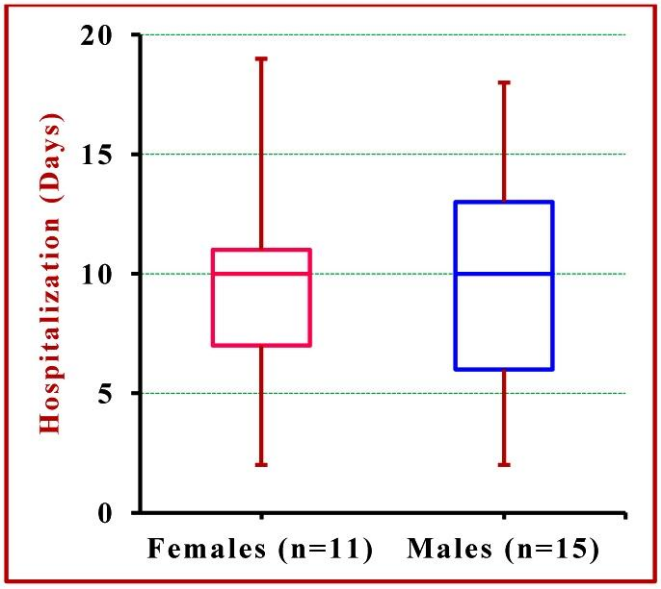

Fig 3: Gender differences in duration of hospitalization.

Prophylaxis: 51 (37.23%) females and 46 (25.84%) males used Hydroxychloroquine prophylaxis, with significant gender difference (Z=2.169; p=0.03). In the present study, more male FHCP reported using ayurvedic and homeopathic formulations for COVID prophylaxis, with significant gender difference (Z=3.092; p=0.002). In contrast, other studies [34, 35] have found that the self-reported use of Complementary and Alternative Medicine was more common in women, as compared to men. All the FHCP reported using full PPE.

History of contact: Close contact with COVID positive person outside the workplace was reported by 46 (33.58%) females and 66 (37.08%) males, without significant gender difference (Z=0.643; p=0.522). In the United States, out of 1,423 FHCP who reported contact with a laboratory-confirmed COVID-19 patient, 384 (27%) reported contact in a household setting; 187 (13%) reported contact in a community setting; whereas 72 (5%) reported contact in multiple settings.[36]

Co-morbidity: The reported co-morbid conditions were type 2 diabetes mellitus, hypertension, asthma and thyroid dysfunction. Significant gender difference (Z=2.049; p=0.040) was observed in frequency of type 2 diabetes mellitus, with preponderance in male FHCP. The overall frequency of co-morbidity was 10.47% in the present study. It has been reported that 38% FHCP had at least one co-morbid condition.[36]

Symptoms: Out of 26 COVID +ve female FHCP, 11 (42.31%) were asymptomatic; whereas out of 41 COVID +ve male FHCP, 05 (12.20%) did not have symptoms, revealing significant gender difference (Z=2.817; p=0.004). The gender differences in frequency of muscle / body ache and fever or chills were statistically significant (Table-2).

Table 2: Gender differences in symptoms.

	Females (n=26)	Males (n=41)	Z value	'p' value
On COVID duty	15 (57.69%)	18 (43.90%)	1.100	0.271
Asymptomatics	11 (42.31%)	05 (12.20%)	2.817	0.004 *
Sore throat	12 (46.15%)	23 (56.10%)	0.794	0.429
Muscle / Body ache	09 (34.62%)	25 (60.98%)	2.103	0.035 *
Loss of taste / smell	07 (26.92%)	12 (29.27%)	0.207	0.833
Weakness	07 (26.92%)	13 (31.71%)	0.417	0.674
Headache	06 (23.08%)	13 (31.71%)	0.763	0.447
Congestion / runny nose	04 (15.38%)	08 (19.51%)	0.429	0.667

Fever or chills	02 (07.69%)	35 (85.37%)	6.230	<0.0001 *
Breathlessness	01 (03.85%)	04 (09.76%)	0.897	0.368
Cough	09 (34.62%)	15 (36.59%)	0.164	0.872

Z = Relative deviate; *Significant

The reported frequency of symptoms among COVID +ve FHCP was follows – fever (68%), cough (78%), breathlessness (41%), muscle aches (66%), headache (65%), sore throat (38%), diarrhea (32%), loss of smell or taste (16%) and runny nose (12%).[36]

Table 3: Gender differences in Post-COVID symptoms.

	Females (n=9)	Males (n=12)	Z value	'p' value
Muscle / Body ache	03 (11.54%)	03 (07.32%)	0.418	0.674
Weakness	06 (23.08%)	07 (17.07%)	0.389	0.696
Breathlessness	01 (03.85%)	03 (07.32%)	0.802	0.423

Z = Relative deviate

Post-COVID symptoms: Nine out of 26 (34.62%) female FHCP and 12 out of 41 (29.27%) Male FHCP reported post-COVID symptoms, without significant gender differences (Table 3). Experiences with epidemics in the past have revealed that health care personnel are at increased risk of adverse physical health outcomes, such as, post-traumatic stress, burnout, depression and anxiety, which may last many years after cessation of the epidemics.[37, 38] Female gender, student status, presence of symptoms and poor self-rated health status are among the reported risk factors for high levels of stress and anxiety.[39]

CONCLUSION

Though health care systems have responded by recruiting new staff and training and retaining their existing staff, the prevalence of post-traumatic stress disorders, anxiety, depression and professional burnout is not yet known since the pandemic is still ongoing. These are mediated by various biological, psychological and socio-cultural factors. Effective, unambiguous and timely communication to actively combat misinformation, perceptible support from the senior staff and administration, screening personnel for mental health vulnerabilities, proactively tackling stigma and job-related stress are some of the interventions for mitigating problems faced by FHCP. It is necessary to design customized interventions for FHCP who are working in low-resource settings. These include provision of customized psychosocial support at multiple modalities and levels; education of FHCP, their families and the public; shift rotation, in-house rest and recreation facilities and shortened duty hours to improve the working conditions of FHCP. The lessons learned during the COVID-19 pandemic ought to be applied to future pandemics so that the FHCP can function proficiently.

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