

Pattern of COVID-19 infection among health care workers at tertiary care center in Rewa, Madhya Pradesh

Mishra Ambrish¹, Marathe Neera², Singh Sandeep³, Derashri Gaurav^{4*}

Department of Community Medicine, Shyam Shah Medical College, Rewa, Madhya Pradesh, India

Received: 10-01-2021 / Revised: 26-02-2021 / Accepted: 13-03-2021

Abstract

Background: In the setting of wide-spread community transmission, health care workers (HCWs) are at greatest risk for community acquisition as well as potential health care acquired infection. The objective of this study is to assess risk profile of all the COVID positive HCWs and to determine the proportion of them among all the HCWs working in COVID wards in Sanjay Gandhi Memorial and Gandhi Memorial Hospital, Rewa (Madhya Pradesh, India). **Materials and Methods:** All COVID positive HCWs were interviewed regarding possible source of infection, symptoms, co-morbidities, addictions, prophylaxis and breach in PPE if any. **Results:** Out of total 96 HCWs, 24 (25%) contracted infection while working in COVID wards and rest 72 (75%) HCWs contracted infection from other sources. 60 (62.5%) were symptomatic and 7 (7.2%) had co-morbidities. **Conclusion:** Every patient should be suspected as COVID positive and must be undergone screening mandatorily amid community transmission. More research needs to be done on different aspects of COVID-19 among HCWs as there is a lack of data in this regard. **Key words:** COVID-19; HCWs; Pattern of COVID-19. **Key Messages:** Prioritising the provision of PPE, increase in testing capacity, placing older, more experienced HCWs mostly in organisational positions, minimising exposure by adjusting shift schedules, providing food and sleep facilities, regular breaks, and adequate time off between shifts could be some first restorative measures in the right direction for betterment of HCWs.

Keywords: Management, Covid 19, Patient.

This is an Open Access article that uses a fund-ing model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.

Introduction

WHO declared COVID-19 a pandemic on 11th March 2020. As of 17th October 2020, there have been 39,196,259 confirmed cases of COVID-19, including 1,101,298 deaths across the world, out of which more than 7,000 health care workers have succumbed to death[1]. In COVID-19 situation Report 82[1], the WHO subject stressed the under-representativeness and paucity of publications and national situation reports that provide information on the number of infected HCWs. Furthermore, findings regarding clinical characteristics, outcomes, risk profile and possible source of infections of COVID-19 among HCW are less studied. With this background, this study attempts to throw light on risk profile and possible source of infections among COVID positive HCWs and to determine their proportion among all the HCWs working in COVID wards in Sanjay Gandhi Memorial and Gandhi Memorial Hospital, Rewa (Madhya Pradesh, India).

Methodology

Study population included 96 COVID positive health care workers (including supporting staff) working in COVID and Non-COVID wards in Sanjay Gandhi and Gandhi Memorial Hospital, Rewa (Madhya Pradesh) which was designated as Dedicated COVID Hospital (DCH). The data was collected from 14th April 2020 to 31st October 2020. Rosters of all the HCWs; working in COVID wards since April month, were obtained from Superintendent Office of SGMH & GMH. Meanwhile, database of all COVID positive HCWs was maintained right from the beginning and 15-20 minutes phone call interview was conducted after every HCW was found COVID positive. Information regarding possible source of

infection, symptoms, co-morbidities, addictions, prophylaxis and breach in PPE if any, was collected.

Statistical Analysis- Collected data was entered in MS Excel spreadsheet, cleaned and coded appropriately and analysed using SPSS trial version 18 software. Chi-square test was applied and p-value ≤ 0.05 was considered statistically significant.

Results

A total of 96 health care workers having diagnosed with SARS-CoV-2 with the help of RT-PCR test, were included in the study out of which 42 (43.75%) were males and 54 (56.25%) were females with mean age 31.16 ± 6.03 years. Out of total 96 HCWs, 24 (25%) contracted infection while working in COVID wards and were posted for average duration of 7.22 ± 2.29 days. Out of these 24 HCWs, 7 (29.1%) admitted breach in PPE/ inability to stick to IPC practices mainly while doffing procedure. Total number of HCWs posted in COVID wards from April'20 to October'20 was 463. Rest 72 (75%) HCWs contracted infection from other sources such as 13 from patients admitted in non-COVID wards, 3 HCWs travelled from hotspot districts, 36 got it from other COVID positive HCWs and source of infection among 20 HCWs were unknown.

Total 3 asymptomatic patients from non-COVID wards were found COVID positive on screening; who came in contact with 92 HCWs. Out of these 92 HCWs, 13 were found COVID positive after testing. These HCWs were involved in direct and prolonged care.

All over, 75 HCWs had travel history out of whom, 3 (4%) who had travelled to hotspot districts were found COVID positive when tested on arrival according to the guidelines. Contact list of every COVID positive HCW was prepared and every contact was undergone testing and mandatory quarantine for 14 days before working again.

Total number of HCWs who came in contact with positive HCWs were 156 out of whom, 36 were found COVID positive, the reason

*Correspondence

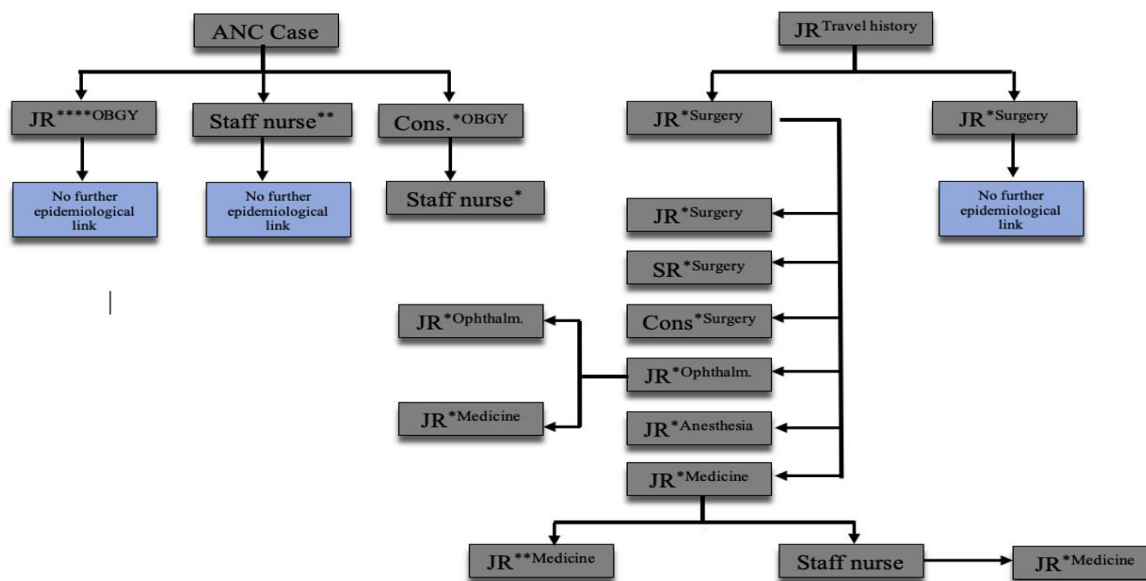
Dr . Gaurav Derashri

Department of Community Medicine, Shyam Shah Medical College, Rewa (M.P.), India.

E-mail: dr_gauravderashri@gmail.com

of which could be compacted hostel rooms allotted on sharing basis for junior residents and nurses. There were 20 HCWs whose source of infection could not be pin-pointed; they might have contracted the infection from either community or hospital. Further investigation revealed that 2 separate chains of transmission were initiated firstly by a first year junior resident who had travelled from hotspot district to Rewa for joining his duty and other one being an ANC case. A 26 years old pregnant female patient with history of severe anaemia was admitted to SGMH & GMH for delivery. The said patient had complaint of

breathlessness since 3 days. The patient was initially screened for temperature, oxygen saturation, and travel history in ANC ward and was kept in screening area for a while till result came out to be positive for COVID-19. 15 HCWs were found to be high-risk contacts; out of whom, 8 were found COVID-positive when tested. Taking all COVID positive HCWs into account, 2 HCWs got severely ill and were put on oxygen and aggressive treatment followed by full recovery. No casualty has been reported among HCWs in SGMH during study period.



Where *, **, **** (Number of HCWs infected); Cons.= Consultants.

Fig 1: Chains of Transmission Of Covid-19 In SGMH & GMH, REWA
Table 1: Distribution of COVID-19 cases based on source of infection (N=96)

	Cases from COVID ward posting(N=24)	Cases from other sources(N=72)	p-value
AGE			
20-35	17 (71)	55 (76.3)	0.1429
36-50	6 (25)	9 (12.5)	
50+	1 (4)	8 (11.2)	
GENDER			
Males	15 (62.5)	27 (37.5)	0.0325
Females	9 (37.5)	45 (62.5)	
CATEGORY			
Doctors	14 (58.3)	41 (56.9)	0.0887 [#]
Nurses	6 (25)	28 (38.9)	
Supporting staff	4 (16.7)	3 (4.2)	
DEPARTMENT			
Medicine	12 (50)	16 (22.2)	0.0456 [#]
Surgery	5 (20.8)	19 (26.3)	
Anaesthesia	2 (8.3)	2 (2.8)	
Paediatrics	3 (12.5)	3 (4.2)	
OBGY	2 (8.4)	10 (13.8)	
Others	0	22 (30.5)	

[#]With yate's correction

Table 2: Clinical profile of COVID positive HCWs (N=96)

	Male (N=42)	Females (N=54)	p-value
CLINICAL STATUS			
Symptomatic	35 (83.3)	25 (46.2)	0.0002
Asymptomatic	7 (16.7)	29 (53.8)	
PROPHYLAXIS TAKEN			
Yes	22 (52.3)	8 (14.8)	0.00007
No	20 (47.6)	46 (85.2)	
CO-MORBIDITIES			
Yes	3 (7.1)	4 (7.4)	0.9643
No	39 (92.9)	50 (92.6)	
ADDICTIONS			
Yes	21 (50)	1 (1.8)	0.00001
No	21 (50)	53 (98.2)	

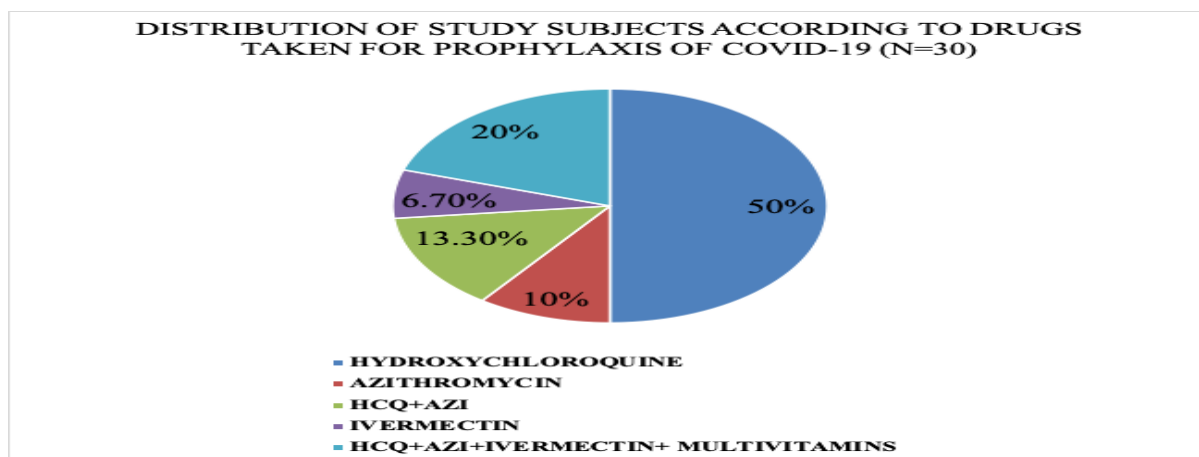


Fig 2: Distribution of study subjects according to drugs taken for prophylaxis of COVID-19(n=30)

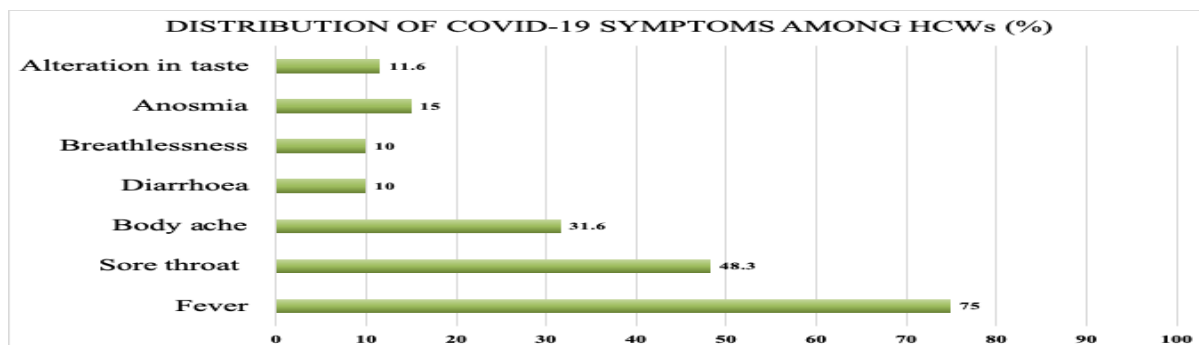


Fig 3: Distribution of COVID 19 symptoms among HCWs(%)

Disucssion

In the present study, major proportion of COVID positive HCWs were of females (56.25%), same as reported by 3,4,6,7,8. Mean age reported in our study was 31.16 ± 6.03 years which is a bit on the younger side in comparison to rest of the studies[3-8].Proportion of COVID positive HCWs from HCWs working in COVID wards in our study was found to be 5.18%. This indicates adequate and proper use of PPE, this is in contrast to other studies which reported much higher rates of contraction of COVID-19 among HCWs working in COVID wards due to reasons like inadequate use or breach in PPE or other IPC measures.According

to the study done by Pranab Chatterjee et al[3], proportion of nurses among COVID positive HCWs was found more than doctors. On the contrary, in our study; proportion of doctors was found more; among which majority 69% were junior resident doctors. This can be explained by prolonged working hours and inadequate numbers of para-medical staff.In our study, 72 (75%) HCWs contracted infection prominently from other sources namely from patients admitted in non-COVID wards, while travelling, from other COVID positive HCWs and unknown sources. These results may suggest that community contacts played a significant role in SARS-Cov-2 transmission among HCWs. The

pooled prevalence of asymptomatic COVID positive HCWs across the globe; including 12,089 HCWs, was 40% according to Sergio et al [6]. These results were in alignment with our study in which it was reported to be 37.5%. This finding reveals the potential of silent transmission still represents an enormous issue that needs to be addressed efficiently, especially in a resource constrained country like India having high density population. The most common symptom reported in our study was fever (75%) followed by sore throat (48.3%) and body ache/ myalgia (31.6%). Similar findings were reported by other studies [3-8], which also reported most common symptom to be fever followed by dry cough/ sore throat, myalgia and malaise. Prevalence of severely ill HCWs with COVID-19 was found to be between 0 to 5% [3-8] while in our study, it was 2.08% indicating comparatively favourable clinical course, which may be partly due to their medical expertise leading to earlier recognition of symptoms and moreover younger age, less underlying diseases and addictions.

Conclusion

Every patient should be suspected as COVID positive and must be undergone screening mandatorily amid community transmission. Infrastructure-wise architectural changes need to be done for ease in quarantine facilities and for prevention of further transmission of infection to individuals residing in adjacent environment. Consequently, prioritising the provision of PPE, increase in testing capacity, placing older, more experienced HCWs mostly in organisational positions, minimising exposure by adjusting shift schedules, providing food and sleep facilities, regular breaks, and adequate time off between shifts could be some first restorative measures in the right direction for betterment of HCWs. More research needs to be done on different aspects of COVID-19 among HCWs as there is a lack of data in this regard.

Limitations

Firstly, it is a single-centre analysis from a large tertiary hospital so results may not be applicable to all health care settings. Secondly, detailing of various exposures, co-morbidities and addictions could have been more helpful. Lastly, transmission from HCWs to patients could not be ascertained.

Conflict of Interest: Nil

Source of support: Nil

References

1. WHO COVID-19 situation report October'20 <https://www.who.int/publications/m/item/weekly-epidemiological-update---27-october-2020>
2. Kumar A et al., SARS-CoV-2 antibodies in healthcare workers in a large university hospital, Kerala, India, *Clinical Microbiology and Infection*, <https://doi.org/10.1016/j.cmi.2020.09.013>.
3. Pranab Chatterjee, Tanu Anand, KhJitenkumar Singh, Reeta Rasaily, Ravinder Singh et al. Healthcare workers & SARS-CoV-2 infection in India: A case-control investigation in the time of COVID-19. 2020;151(5):459-467.
4. Nandita S. Mani, Jehan Z. Budak, Kristine F Lan, Chloe Bryson-Cahn, Allison Zelikoff, Gwendolyn E.C. Barker et al. Prevalence of Corona virus Disease 2019 Infection and Outcomes among Symptomatic Healthcare workers in Seattle, Washington. 2020 ;71(10):2702-2707.
5. Papoutsi E, Giannakoulis VG, Ntella V et al. Global burden of COVID-19 pandemic on healthcare workers. *ERJ Open Res* 2020; 6: 00195-2020.
6. Sergio Alejandro Gomez-Ochoa, Oscar H Franco, Lyda Z Rojas, Peter Francis Raguindin, Zayne Milena Roa-Diaz, Beatrice Minder Wyssmann et al. COVID-19 in health care workers: A living systematic review and meta-analysis of prevalence, risk factors, clinical characteristics and outcomes. 2020.
7. Corman VM, Landt O, Kaiser M, et al. . Detection of 2019 novel coronavirus (2019-nCoV) by real-time RT-PCR. *Euro Surveill*. 2020;25(3):2000045.
8. Marjolein F.Q. Kluytmans-van den Bergh, Anton G.M. Buiting, Suzan D. Pas, Robbert G. Bentvelsen, Wouter van den Bijllaardt, Anne J.G. van Oudheusden, Miranda M.L. van Rijen, Jaco J. Verweij, Marion P.G. Koopmans, Jan A.J.W. Kluytmans. SARS-CoV-2 infection in 86 healthcare workers in two Dutch hospitals in March 2020; 3(5): e209673.