International Journal of Community Medicine and Public Health
Shetty N et al. Int J Community Med Public Health. 2021 Jul;8(7):3474-3477
http://www.ijcmph.com
pISSN 2394-6032 | eISSN 2394-6040

DOI: https://dx.doi.org/10.18203/2394-6040.ijcmph20212604

Original Research Article

Incidence of COVID-19 infection amongst the high risk versus low risk health care workers: an audit from a tertiary cancer care centre

Nitin Shetty[1], Nivedita Chakrabarty[2]*, Amit Joshi[3], Amar Patil[4], Suyash Kulkarni[1], Navin Khattry[3], Sudeep Gupta[3], Preeti Chavan[5], Prasanth Bhat[4], Vivek Bhat[6], Pallavi Rane[7]

[1]Department of Interventional Radiology, [2]Department of Radiodiagnosis, [3]Department of Medical Oncology, [4]Department of Medical Administration, [5]Department of Composite Laboratory, [6]Department of Microbiology, [7]Department of CRS, Advanced Centre for Treatment, Research and Education in Cancer, Tata Memorial Centre, Homi Bhabha National Institute, Navi Mumbai, Maharashtra, India

Received: 25 April 2021
Revised: 29 May 2021
Accepted: 31 May 2021

***Correspondence:**
Dr. Nivedita Chakrabarty,
E-mail: dr.niveditachakrabarty@gmail.com

ABSTRACT

Background: Theoretically, health care workers (HCW) are at increased risk of getting infected with COVID-19 compared to the general population. Limited data exists regarding the actual incidence of COVID-19 infection amongst the high risk and low risk HCW of the same hospital. We present an audit from our tertiary cancer care centre comparing the COVID-19 infection rate between the high risk and low risk HCW, all of whom had been provided with adequate protective measures and health education.
Methods: This is a retrospective observational study from 01 April 2020 to 30 September 2020, in which all the 970 HCW of Advanced Centre for Treatment, Research and Education in Cancer were divided into high risk and low risk groups. High risk HCW included all the medical and non-medical staff directly involved with the care of COVID-19 patients, and rest were low risk HCW. Adequate protective measures and classes for infection prevention were provided to all the HCW. We calculated the incidence of COVID-19 infection in both these groups based on the positive real time-polymerase chain reaction (RT-PCR) result and also looked for any significant difference in incidence between these two groups.
Results: The incidence of COVID-19 infection amongst the high risk HCW was 13% and that of low risk HCW was 14%.
Conclusions: We found no significant difference in COVID-19 infection between the high risk and low risk HCW. Thus, along with protective measures, behavior modifications induced by working in high risk areas, prevented the high risk HCW from getting increased COVID-19 infection compared to the low risk HCW.

Keywords: High risk health care workers, Low risk health care workers, Incidence of COVID-19 infection, Behavior modification

INTRODUCTION

Since the unfolding of the COVID-19 pandemic, our health care workers (HCW), who have been at the forefront caring for and treating COVID-19 patients, have been bearing the brunt of the pandemic.[1] As compared to the general population, health care workers (HCWs) are at an increased risk of COVID-19 infection.[2-4] Limited data exists regarding the actual incidence of COVID-19 infection amongst the high risk and low risk HCW. High risk HCW are those who are directly exposed to the COVID-19 patients, whereas rest of the employees of the hospital are low risk HCW. We present an audit from our tertiary cancer care centre regarding the incidence of

COVID-19 infection amongst the high risk and low risk HCW where adequate protective measures like masks and hand sanitizers were provided to both the groups. Also, training and awareness classes on COVID-19 infection prevention, had been provided to all the HCW before the start of our study period, irrespective of whether they belonged to the high risk or low risk group. The objective of our retrospective observational study was to see the difference of COVID-19 incidence between these groups of HCW and also study the effect of adequate protective measures and awareness classes on risk of COVID-19 infection amongst these two groups.

METHODS

This is a retrospective observational study in which we divided every employee of Advanced Centre for Treatment, Research and Education in Cancer, a tertiary cancer care centre, considered as HCW, into high risk and low risk groups. High risk HCW (HRHCW) included doctors, nurses, technicians posted in COVID wards and swabbing areas, housekeeping staff handling COVID waste disposal and laboratory personnel handling COVID samples. Rest of the employees, including doctors, nurses, technicians, housekeeping staff, administrative staff and scientists who were not directly exposed to the COVID-19 patients in the hospital, were considered low risk HCW (LRHCW). Our study period was from 1st April 2020 to 30th September 2020 and all the 970 employees who were working in our tertiary cancer care centre during the study period have been included in our study. Those employees who had already been infected with COVID-19 prior to the start of study period have been excluded from the study. Our tertiary cancer care centre comprises of radiology, medical oncology, surgical oncology, radiation oncology, anaesthesia, pathology, transfusion medicine, microbiology, clinical pharmacology, basic science research, medical and non-medical administration and housekeeping departments, all of which have been included in our study. Indigenously prepared 60 GSM face masks with a particle capture efficiency of 94% for total particles greater than 0.3 microns had been provided to all the HCW, both in the high risk as well as the low risk groups.[5] Similarly, adequate hand sanitization facilities had also been provided uniformly to all the HCW. The only additional thing provided to the HRHCW had been the personal protective equipment (PPE) kits for use in COVID-19 wards and training for their donning and doffing. Also, audio-visual classes regarding the ways to prevent COVID-19 infection like good hand hygiene practices and social distancing, had been uniformly provided to all the HCW of our tertiary cancer care centre at the start of the pandemic (before the start of our study period), irrespective of whether they belonged to the high risk or low risk group. We calculated the incidence of COVID-19 infection in HRHCW and LRHCW based on the positive RT-PCR result of symptomatic HCW in each of these groups, and expressed them in the form of percentage. Active screening of all the HCW for asymptomatic COVID-19 infection using RT-PCR was not undertaken as it was not practically feasible due to limited resources. Incidence of COVID-19 infection was expressed as percentage with 95% confidence intervals (CI) separate for high risk and low risk HCW. Comparison of the incidence of COVID-19 infection between the high risk and low risk HCW was achieved using Chi-square test. Significance was set at a p value of 0.05. Statistical analysis was performed using the statistical package for social sciences (SPSS) IBM Corp. released 2017, IBM SPSS statistics for Windows, version 21.0. Ethical committee clearance for this study had been sought. Since it is a retrospective observational study, clinical characteristics of all the study participants are not available, however, we have the demographic data in the form of age and gender distribution.

RESULTS

Table 1 depicts the outcome of our study.

Table 1: Outcome of the study.

Outcome	High risk HCW	Low risk HCW	Total
	285	**685**	**970**
COVID-19 positive	37	96	133
Incidence of COVID-19 infection (%)	13	14	

Thus, we see that the overall incidence of COVID-19 infection amongst the high risk HCW was 13% and that of low risk HCW was 14%. There was no significant difference between the overall incidence of COVID-19 infection amongst the HRHCW and LRHCW (p value=0.746). Only pathology department showed significant difference between the incidence of COVID-19 infection amongst the HRHCW and LRHCW, in which, the incidence of COVID-19 infection in the HRHCW was 8% and the incidence of COVID-19 infection in the LRHCW was 40% (p value <0.05). Figures 1 and 2 depict the age group and gender distribution of all the study participants (staff) respectively.

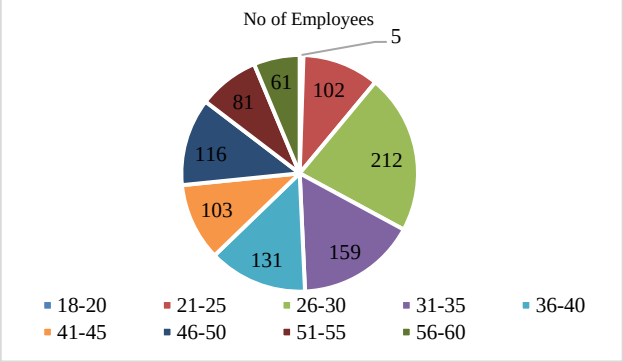

Figure 1: Age group distribution (in years) of all the study participants (staff).

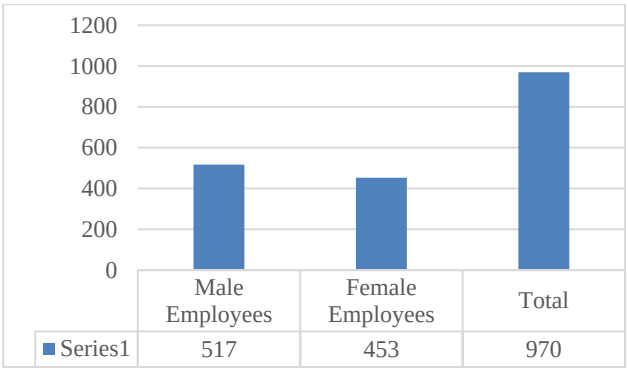

Figure 2: Bar diagram showing the gender distribution of all the study participants (staff).

Figures 3 and 4 show the age group and gender distribution of all the COVID-19 positive staff respectively. As shown in Figures 1 and 3, maximum staff are in the age group of 26-30 years.

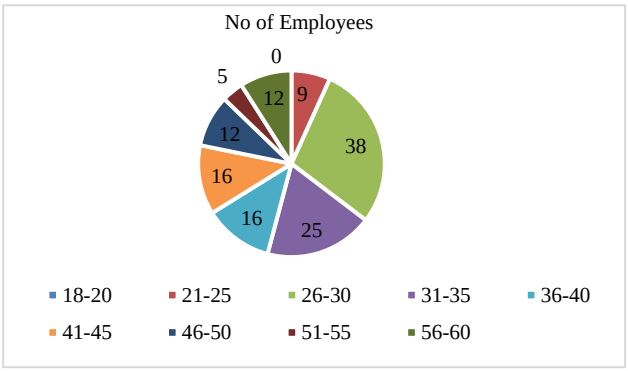

Figure 3: Age group distribution (in years) of all the COVID-19 positive staff in our study.

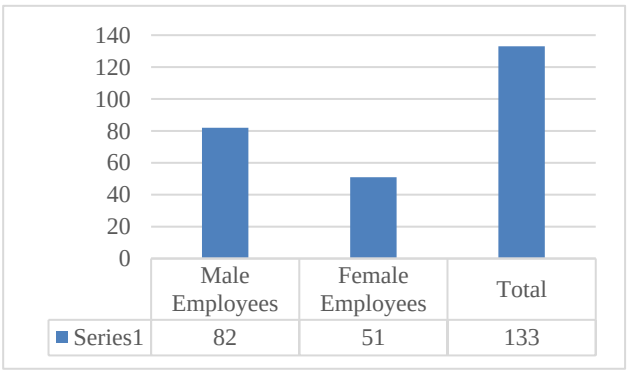

Figure 4: Gender distribution of all the COVID-19 positive staff in our study.

DISCUSSION

In our study, there was no statistical difference in the overall incidence of COVID-19 infection between the high risk and low risk HCW. There can be two implications of this result; firstly, consistent use of protective measures like masks and hand sanitizers, and strict adherence to the behavioral modifications induced by the COVID-19 duty even outside the hospital premises, prevented the high risk HCW from getting overtly increased infection from hospital or from the community compared to the low risk group and; secondly, since the low risk HCW were not directly exposed to the COVID-19 patients, they became casual in their approach and did not take the necessary precautions and protective measures either in hospital or in the community and thus got COVID-19 infection rate similar to that of high risk HCW. The significantly high incidence of COVID-19 infection amongst the low risk HCW in the pathology department could either be due to the lack of adequate precautions taken by the low risk HCW in hospital and community or due to infection acquired from their family members. In either case, at least the high risk HCW did not show any significantly increased COVID-19 infection compared to the low risk group contrary to the popular belief. There has been one international study till date comparing the incidence of COVID-19 infection of HCW with that of the general population in the surrounding area, in which they found that HCW had a lower rate of COVID-19 infection compared to that of the general population.[6] As per their study, the reduced incidence was due to the efficacy of PPE kits worn by the HCW.[6] This study also found similar COVID-19 infection rates among high versus low exposure areas.[6] Another study has shown that awareness classes for infection prevention and PPE kits help to reduce COVID-19 infection among HCW.[7] High risk HCW wear PPE kits only during COVID duty and not outside the hospital premises which means that they have similar risk of acquiring infection from the community as the low risk HCW, and the similar incidence of COVID-19 infection amongst high risk and low risk HCW in our study and in fact significantly increased risk among the low risk HCW in the pathology department, points to the possibility that high risk HCW are more likely to diligently follow the necessary preventive measures within and even outside the hospital compared to the low risk HCW. To the best of our knowledge, there has been just one international study till date comparing the infection rate between the frontline (high risk) and non-frontline (low risk) HCW within the same hospital.[8] In this study, there was lower incidence of COVID-19 infection in the frontline HCW as compared to the non-frontline HCW and one of the reasons they cited for the high incidence among non-frontline HCW was that the study was undertaken during the early part of the pandemic when adequate protective measures were not universally available to all the non-frontline HCW in the low risk areas.[8] In our study however, protective measures (masks, hand sanitization facilities, awareness classes) were universally provided to all the HCW irrespective of high risk or low risk group. Our study had two limitations though; firstly, only symptomatic HCW were tested for COVID-19 using RT-PCR whereas asymptomatic HCW who might be harboring the infection have not been taken into consideration, so actual number of cases could vary; secondly, hospital is not the only source of COVID-19 infection for these HCW, they could have acquired infection from community and family members as well.

But these two confounding factors were present for both high risk as well as low risk HCW.

CONCLUSION

As the high risk HCW are aware of the increased risk of getting infected, they are more likely to consistently use protective measures like masks, hand sanitizers along with behavioral modifications like strict adherence to good hand hygiene practices and social distancing even outside the hospital, which could prevent them from significantly increased incidence of COVID-19 infection compared to the low risk HCW. Thus, with proper precautions and behavioral modifications, it is possible for the high risk HCW to fight this COVID-19 pandemic without causing significantly increased risk to their lives.

ACKNOWLEDGEMENTS

Authors would like to thank Dr. Vedang Murthy, Dr. Sudhir Nair, Dr. Bhakti Trivedi, Dr. Meera Achrekar, Anjali Rawat and Chital Naresh for their valuable contributions. They also would like to thank all the staff of our tertiary cancer care centre.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Nguyen LH, Drew DA, Graham MS, Joshi AD, Guo CG, Ma W, et al. Risk of COVID-19 among frontline health-care workers and the general community: a prospective cohort study. Lancet Public Health. 2020;5:475-83.
2. World Health Organization. Prevention, identification and management of health worker infection in the context of COVID-19: interim guidance. 2020. Available at: https://www.who.int/publications/i/item/10665-336265. Accessed on 03 October 2020.
3. World Health Organization. Transmission of SARS-CoV-2: implications for infection prevention precautions: scientific brief, 09 July 2020. 2020. Available at: https://www.who.int/publications-detail-redirect/modes-of-transmission-of-virus-causing-covid-19-implications-for-ipc-precaution-recommendations. Accessed on 03 October 2020.
4. World Health Organization. Infection prevention and control during health care when coronavirus disease (COVID-19) is suspected or confirmed: interim guidance. 2020. Available at: https://www.who.int/publications/i/item/WHO-2019-nCoV-IPC-2020.4. Accessed on 03 October 2020.
5. Walawalkar S, Joshi M, Khattry N, Sapra, BK, Khan A, Pujari PK, et al. Particle removal from air by face masks made from Sterilization Wraps: Effectiveness and Reusability. PLoS One. 2020;15(10):e0240398.
6. Jeremias A, Nguyen J, Levine J. Prevalence of SARS-CoV-2 Infection Among Health Care Workers in a Tertiary Community Hospital. JAMA Intern Med. 2020;180(12):1707-9.
7. Chou R, Dana T, Buckley DI, Selph S, Fu R, Totten AM. Epidemiology of and Risk Factors for Coronavirus Infection in Health Care Workers: A Living Rapid Review. Ann Intern Med. 2020;173(2):120-36.
8. Lai X, Wang M, Qin C. Coronavirus Disease 2019 (COVID-2019) Infection Among Health Care Workers and Implications for Prevention Measures in a Tertiary Hospital in Wuhan, China. JAMA Netw Open. 2020;3(5):e209666.

Cite this article as: Shetty N, Chakrabarty N, Joshi A, Patil A, Kulkarni S, Khattry N. Incidence of COVID-19 infection amongst the high risk versus low risk health care workers: an audit from a tertiary cancer care centre. Int J Community Med Public Health 2021;8:3474-7.