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Research Article

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Extent of Exposure of Healthcare Workers to Coronavirus 2019 (Covid-19) In A General Hospital in The State of Qatar

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Abstract

In December 2019, pneumonia of unknown origin was identified in Wuhan, China. A month later, the Director-General of the World Health Organization (WHO) declared a public health emergency of international concern (PHEIC) because a new virus, called Severe Acute Respiratory Virus – Coronavirus 2 (SARSCoV2), is easily spread through droplets of saliva or discharges from infected people. This emerging virus is the cause of the Coronavirus Disease 2019 (COVID-19), which started as a small cluster of pneumonia cases in Wuhan, China. WHO and other specialty societies recommended quarantine of identified COVID-19 patients for 14 days at a minimum. The study is looking into how many healthcare workers have COVID-19 infections, and how widespread the infection is. They are also investigating how much exposure each healthcare worker has had to the virus in the past 14 days, and how much exposure they may have had in the past month. They are also looking into whether there is a relationship between the profile of the healthcare workers and their level of exposure to COVID-19.

Our study found that most people who tested positive for COVID-19 were aged 35-45 years old, mostly women. Most of the COVID-19-positive people in our study were nurses, which is typical for female workers. And for the non-clinical strata were from the engineering and housekeeping departments. There were a few people who tested positive and had other health conditions. The main unit of assignment for nurses in our study was the Adult Emergency Department. The main unit of assignment for non-clinical staff in our study was the engineering and housekeeping departments. There were few people who had underlying health conditions.

The study found that there is no significant relationship between the amount of exposure of healthcare workers to Coronavirus 2019 (COVID-19) overall or among clinical staff, but there is a significant relationship between the amount of exposure of healthcare workers among non-clinical staff. Most of the respondents were in home quarantine. No respondent was in-patiently admitted to the hospital or in the intensive care units. Most of the respondents were COVID-19 vaccinated with primary doses plus a booster dose. Unvaccinated staff had more moderate symptoms. There were no severely symptomatic respondents diagnosed with COVID-19 infections. Most of the symptoms reported by the participants of the study included fever, sore throat, body malaise, and cough. This may reflect the effectiveness and importance of COVID-19 vaccines. Future researchers are recommended to review their hospital's COVID-19 infections among staff and to develop prevention strategies.

Keywords: Covid-19; Exposure, Clinical; Non-clinical; Pandemic



Introduction and Background

In December 2019, pneumonia of unknown origin was identified in Wuhan, China, and in a months' time, a novel coronavirus outbreak was declared by the Director-General of the World Health Organization (WHO) as a public health emergency of international concern (PHEIC), this is the highest WHO alarm level [1]. The novel virus, Severe Acute Respiratory Virus – Coronavirus 2 (SARSCoV2) has taken the globe by surprise, as it easily spreads through droplets of saliva or discharges from infected persons through coughing, sneezing, and the like. This emerging virus is the cause of the Coronavirus Disease 2019 (COVID-19), started as a small cluster of pneumonia cases in Wuhan, China; as it was identified across the globe, was declared a global pandemic. According to [2], COVID-19 leads to mild to moderate respiratory illness where patients can recover even without requiring special treatments. However, if the patients are older people, especially with underlying medical conditions such as diabetes, cancer, cardiovascular disease, or chronic respiratory disease – the patients have a higher likelihood to develop serious illness. WHO and other specialty societies recommended quarantine of identified COVID-19 patients for 14 days at a minimum.

Frontline hospital staff is important during the COVID-19 pandemic. They selflessly provided care and support to the affected patients in different hospital settings across the world. However, as the COVID-19 pandemic reached its peak, so did the number of frontline hospital staff become infected with the virus. The COVID-19 pandemic hit Qatar in December 2021 and affected a lot of people in the country. This includes the healthcare workers who work at the hospital where I live. They were not exempted from the pandemic and were just as affected as the other people in Qatar.

Personal Protective Equipment (PPE), hand hygiene, and early identification of suspected cases is a few of the pillars of Infection Prevention and Control (IPC) to prevent cross-transmission among patients, staff, and visitors. Yet, compliance is varied in different parts of the world with global PPE shortage due to increasing demands. With the risk of non-availability of PPE, non-compliance to hand hygiene, and difficulty in identifying suspected cases; the risks of getting infected with COVID-19 are growing exponentially.

As the pandemic spread far and wide, the number of cases even those living with the hospital staff at home is becoming a struggle. However, another dilemma is that healthcare workers may have high compliance with IPC in the performance of their tasks, yet they may be exposed to the community. Community exposures observed may include household exposure to family members that turned COVID-19-positive, meeting a COVID-19-positive friend or colleague outside the hospital or during social gatherings. This research study was conducted to describe COVID-19 among healthcare workers that unfortunately got infected by the disease. This study sought to identify the extent of exposure of healthcare workers to COVID-19 in a general hospital in the state of Qatar.

Hence, the researcher was challenged to undergo a study that provided essential information on the extent of exposure through a COVID-19 risk assessment amongst healthcare workers

who tested positive for COVID-19 during Qatar's third wave. The study described the demographics of the staff with COVID-19 infection and the extent of community or hospital exposure. The conclusion of the study would be able to identify and understand the appropriate interventions to be added in preventing further infections and cross-transmissions in the event of another surge of emerging or reemerging infectious diseases and/or pandemics. The research further identified system gaps that may guide in ensuring pandemic measures are in place in the healthcare facility.

The study aimed to determine the extent of exposure of healthcare workers to COVID-19 in a general hospital in the state of Qatar. Specifically, this study attempted to answer the following questions: (1) What is the demographic profile of the hospital staff with COVID-19 infections in terms of: Age, Gender, Nationality, Position, Unit of service, and Comorbidities. (2) What is the extent of community exposure based on COVID-19 risk assessment within the past 14 days before COVID-19 positive diagnosis, (3) What is the extent of hospital exposure based on COVID-19 risk assessment past 14 days before COVID-19 positive diagnosis, (4) Is there any significant relationship between the profile of the participants and the extent of exposure and (5) Are there other concerns, issues or factors that may contribute to the extent of exposure to COVID-19.

Methodology

This study will utilize the quantitative, descriptive inferential research design. Quantitative descriptive design will be used to determine the attribution and risk factors of Coronavirus disease 2019 (COVID-19) amongst hospital staff in a selected general hospital in Qatar. The study was conducted in one of the hospitals in the outskirts of Qatar, with 325 bedded a capacity that includes 248 general and acute patient beds and 77 critical care, high dependency, and burns patient beds, and an additional 77 observation or day beds. During the COVID-19 second wave, the hospital shifted to be a COVID-19 facility for two (2) months to help the fight against COVID-19 in the State of Qatar.

The study will use Purposive, Stratified Random Sampling to select COVID-19-positive hospital staff. The researcher will select participants based on the belief and assumption that an expert with knowledge about the subject is selected and invited to participate. Further, stratified random sampling will be used, after dividing the strata, to select the sample. The COVID-19-positive hospital staff will be further subdivided into two strata: Clinical staff which includes nurses, physicians, and allied health staff, and non-clinical staff which includes engineering staff, housekeepers, catering staff, security staff, clerks, nursing aides, and secretaries. depending on staff that will voluntarily participate. the computation yielded one hundred twenty (120) non-clinical healthcare workers and two hundred forty-six (246) clinical healthcare workers. The study included three hundred sixty-six (366) total participants or 45% of the total COVID-19-identified healthcare workers.

This study used a modified form of the Risk Assessment for Healthcare Workers Exposed to Persons with COVID-19 from the United States – Centers for Disease Control and Prevention. The questions in this part were adapted to be specific to healthcare

workers working with patients who have COVID-19. The adapted risk assessment form included questions about age, gender, nationality, position, a unit of service, and any medical conditions that might increase the risk of exposure to COVID-19. The study also looked at the risk of exposure to COVID-19 from household exposure, contact with patients outside of the hospital setting, and exposure to airborne particles from aerosol-generating procedures. The research team have conducted interviews with the participants after receiving approval from the hospital's institutional review board (IRB) and the university's ethics committee.

Results

Our results regarding Demographics Illustrate:

1. Most people aged 36 to 45 years old were COVID-19 positive in the period of December 2021-January 2022 than in any other age group.
2. Large part of the participants was composed of female participants. However, when comparing the clinical staff to the nonclinical staff, more male staff were found among the clinical staff. However, among the nonclinical staff, more female staff were found. This suggests that there is a difference in the way that males and females are affected by SARS-CoV-2.
3. Most of the participants are from Indian or Philippine nationalities. It reflects that a large majority of the workers in the general hospital in Qatar are from these nationalities.
4. Nurses make up the largest group of respondents in this study. Out of 366 people who participated, 209 are nurses. This might be because most staff at the facility are nurses. Meanwhile, engineering staff with 29 people, followed by nursing aides with 27 people, and housekeepers with 26 people were identified among the non-clinical strata.
5. Most people that tested positive for the coronavirus are from emergency department among the clinical strata. Engineering and Housekeeping department staff were the most numbers that tested COVID19 positive among non-clinical strata.
6. It was identified that 89 (24.32%) people out of the 366 participants were comorbid. The remaining 277 were healthy and had no comorbidities when they participated in the study.

As to the extent of exposure to COVID19 infection, the study found that 247 (67.49%) of people in the study were exposed to the community. Meanwhile, 111 (30.33%) were exposed to the hospital setting. The hospital exposure can be further divided into (1) patient-to-staff exposure that accounts to 38 (34.23%) and (2) staff-to-staff exposure that accounts to 73 (65.77%) of hospital exposure. Patient-to-staff exposure were due to delayed COVID-19 results of asymptomatic patients that were screened prior to procedure or surgeries, or by inappropriate or non-compliance to the use of Personal Protective Equipment (PPE). There were 8 (2.19%) participants that were uncertain of their COVID19 exposures.

Among the 247 community-exposed respondents, 154 (62.35%) were exposed with COVID19 spouses, children,

roommates, or flatmates. Another 90 (36.44%) were exposed due to common conference and attending community gatherings during the holidays. The remaining 3 (1.21%) exposure were due to exposure to COVID19 positive acquaintances and friends.

The majority of patient-to-staff hospital exposure were due to inappropriate or incomplete PPE, wherein 16 (42.11%) were exposed to COVID-19 patients during procedures; 10 (26.32%) were within one meter of COVID19; 8 (21.05%) were direct skin-to-skin exposure; 3 (7.89%) environmental cleaning and disinfection without PPE and 1 (2.63%) assisting with aerosol generating procedure without appropriate N95 mask.

Meanwhile, it was a breakthrough to know that 73 staff were exposed in-hospital but staff-to-staff wherein 58 (79.45%) were during pantry break with colleague later tested COVID19 positive; 12 (16.44%) exposed to COVID19 staff that was on-duty and 3 (4.11%) exposed to on-duty without appropriate PPE during rounds and endorsements. Healthcare workers are most likely to be exposed to COVID-19 when they socialize with patients or when they are on duty and meet other staff. The most common way to be exposed to COVID-19 is when staff take breaks together. The results have shown that there was no significant relationship between demographics and COVID19 acquisition based on age, nationality, unit of assignment and profession. However, it was identified that there is a significant relationship in the extent of exposure of healthcare workers to COVID19 when grouped according to gender among non-clinical staff ($p = 0.021$, CI 95%).

It was also identified that 343 (93.72%) of the respondents. It is also emphasized that the cases were mild, and staff were able to self-isolate at home. The others were isolated in a Ministry of Public Health facility as they were not able to self-isolate. There was one COVID-19-positive employee who was quarantined in a hotel. No COVID-19-positive employees were admitted to in-patiently to the hospital nor to the Intensive Care Unit.

The 259 (70.77%) participants received the COVID19 primary dose vaccine, and 99 (27.05%) already received a booster dose. Overall, most people who got infected with the virus did not experience any symptoms. However, 7 (1.91%) of respondents were unvaccinated and had developed symptoms of severe cough, palpitations and continuous, high-grade fever that were not observed amongst the vaccinated cases. Majority of the cases amounting to 326 (89.07%) of participants were asymptomatic or mild symptomatic with fever (21.04%), sore throat (17.21%), body malaise (16.12%) and cough (13.39%).

Conclusion

Understanding the extent of COVID-19 exposure and subsequent transmission will guide us in future interventions in the event of another COVID-19 pandemic wave or any other surge of infectious disease. Similar to the study by [4,5] and the USA-CDC (2020), our study has shown that most COVID19 positive respondents were aged 35 – 45 years old, this shows that the workforce was still considered as young regardless of being in the clinical or non-clinical healthcare worker strata.

It has also reflected that majority of the clinical respondents

were of female gender and universally it is common for nurses to be of female gender. This is also shown in the study of [6,7] majority were female staff tested COVID-19 positive compared to male staff. Meanwhile, among the nonclinical strata were majority males, as these included engineering staff, housekeepers, and nursing aides that were universally identified as the male gender. This echoed the study of [8] that identified male gender as a risk factor for SARS-CoV-2 acquisition as men are usually outside the home and as there were many communities acquired infections.

The staff of Indian and Philippine nationality was the most common staff that tested COVID-19 positive, reflecting the workforce. [9], have shown that COVID-19 among healthcare workers is common among Black, Asian and minority ethnic backgrounds. There were more nurses in the clinical staff strata and engineering, nursing aides, and housekeeping staff in the non-clinical staff strata. This reflected the earlier study done by [10] in Qatar wherein the Primary Health Center workers reported increase COVID-19 positivity among non-clinical, outsourced staff (i.e., engineering and maintenance staff, support staff, housekeeping staff, etc.) compared to the frontline clinical staff. This was opposite the studies of [6] and [11] that showed nurses to be commonly infected compared to other healthcare professionals.

The Adult Emergency Department is the main unit of assignment in clinical staff strata. Meanwhile, the majority of the COVID-19 respondent in the non-clinical strata were from Engineering and Housekeeping Department. In the study of [12] in Qatar highlighted that only 5% were positive from a COVID-19 dedicated facility and 95% of infections were identified among staff in non-COVID-19 facility. The perceived exposures were either due to colleagues (45%) or a patient (29%). This is different from the study of [4] where most medical staff with COVID-19 were identified from other clinical departments at 72.2% rather than emergency department that only had 3.7% COVID-19 positivity.

There were few respondents that had underlying comorbidities usually diabetes mellitus and hypertension during the conduct of the research. The majority were healthy and young individuals. The same comorbidities were identified in the study of [7] in Oman, it includes high - risk medical conditions such as asthma, hematological, respiratory, neurological disease, chronic heart disease, obesity, and diabetes mellitus.

Our study has shown that as risk assessed, both the clinical and non-clinical staff COVID-19 infection were high-risk exposure from the community based on those tested in December 2021–January 2022. Among community-acquired infections, it was commonly due to household exposures to spouses or their children. There should be appropriate strategies in place nationwide for continuous screening and quarantine of COVID-19-positive cases in the community. This will reduce the possibility of community exposure among hospital staff. According to [13], attending specific events were related to COVID-19 infections. These results coincide with the study of [5] where 61.3% of COVID-19 infection acquisition from 204 positively tested healthcare workers were community acquired (n = 125) compared to the 25.5% (n = 52) that

were acquired from the hospital setting. Yet, the findings of [14], showed no association between community exposures such that of contact with household patient or use of public transportation to acquire COVID-19 infections.

Furthermore, there were fewer hospital-acquired infections of COVID-19 among the overall respondents of this study. Most exposures were staff-to-staff in-hospital exposure and not due to handling COVID-19-positive patients, mainly during exposure within 6 feet of COVID-19-positive staff during pantry breaks and socialization during these breaks. According to [15], use of suboptimal PPE and reported reuse and extended mask use are contributing factor to COVID-19 exposure and succeeding infections. However, Taylor, J. et al (2020) identified limited nosocomial transmission from a confirmed COVID-19 case despite aerosol generating procedures being performed. Moreover, within friends, family or acquaintances having meals was a significant reason for transmission [13]. It was identified in the study of [14] that meetings significantly increased risk of transmission and yet sharing meals was not high risk for COVID-19 transmission. In the study of [11], eating and breakroom areas was identified as areas of higher risk for occupational acquisition of SARS-CoV-2. This is further studied by [16,17] in a study conducted in Milan wherein the healthcare workers were exposed to other positive hospital staff.

Further comprehensive research can be made on the significant effect of COVID-19 vaccines on the extent of exposure to COVID-19 among healthcare workers, especially in the setting of Gulf Region. Moreover, future researchers are recommended to review their hospital's COVID-19 infections among staff and guide in creating prevention strategies. Other dimensions not covered by this study can also be further explored to learn more about COVID-19 among healthcare workers.

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Conflict of Interest

None.

References

1. (2021) World Health Organization. Timeline: WHO's COVID-19 response.
2. (2020) World Health Organization. Novel Coronavirus (2019-nCoV) Situation Report - 1.
3. (2020) World Health Organization. Coronavirus.
4. J Chu, N Yang, Y Wei, H Yue, F Zhang, et al. (2020) Clinical characteristics of 54 medical staff with COVID-19: A retrospective study in a single center in Wuhan, China. *J Med Virol* 92(7): 807-813.
5. Z Al Maskari, A Al Blushi, F Khamis, A Al Tai, I Al Salmi, et al. (2021) Characteristics of healthcare workers infected with COVID-19: A cross-sectional observational study. *International Journal of Infectious Disease* 102: 32-36.
6. S Bandyopadhyay, RE Baticulon, M Kadhum, M Alser, DK Ojuka, et al. (2020) Infection and mortality of healthcare workers worldwide from COVID-19: a systematic review. *BMJ Global Health* 5(12): e003097.
7. ZGH Al Abri, MSA Al Zeedi, AA Al Lawati (2021) Risk Factors Associated with COVID-19 Infected Healthcare Workers in Muscat Governorate, Oma. *Journal of Primary Care & Community Health* 12: 2150132721995454.
8. J Rashedi, B Mahdavi Poor, V Asgharzadeh, M Pourostadi, H Samadi Kafil, et al. (2020) Risk Factors for COVID-19. *Le Infezioni in Medicina* 28(4): 469-474.
9. LH Nguyen, DA Drew, MS Graham, AD Joshi, CG Guo, et al. (2020) Risk of COVID-19 among front-line health-care workers and the general community: a prospective cohort study 5(9): e475-e483.
10. MG Al-Kuwari, M Ali AbdulMalik, AA Al-Nuaimi, J Abdulmajeed, HE Al-Romaihi, et al. (2021) Epidemiology Characteristics of COVID-19 Infection Amongst Primary Health Care Workers in Qatar: March – October 2020. *Frontiers of Public Health* 9: 679254.
11. V Spilchuk, VH Arrandale, J Armstrong (2022) Potential risk factors associated with COVID-19 in health care workers. *Occupational Medicine* 72(1): 35-42.
12. J Alajmi, AM Jeremijenko, JC Abraham, M Alishaq, EG Concepcion, et al. (2020) COVID-19 infection among healthcare workers in a national healthcare system: The Qatar experience. *International Journal of Infectious Diseases* 100: 386-389.
13. Galmiche S (2021) ComCor study on places of infection with SARS-CoV-2: where are French people catching the virus? *Institut Pasteur*.
14. B Davido, S Gautier, I Riom, S Landowski, C Lawrence, et al. (2021) The first wave of COVID-19 in hospital staff members of a tertiary care hospital in the greater Paris area: A surveillance and risk factor study 105: 172-179.
15. MP Breazzano, J Shen, AH Abdelhakim, LRD Glass, JD Horowitz, et al. (2020) New York City COVID-19 resident physician exposure during exponential phase of pandemic. *The Journal of Clinical Investigation* 130(9): 4726-4733.
16. SM Rajčević, F Masci, E Crespi, S Franchetti, A Longo, et al. (2020) Source and symptoms of COVID-19 among hospital workers in Milan. *Occupational Medicine* 70(9): 672-679.
17. HM Al Kuwari, HF Abdul Rahim, LJ Abu Raddad, AB Abou-Samra, Z Al Kanaani, et al. (2020) Characterization of the SARS-CoV-2 outbreak in the State of Qatar, February 28– April 18, 2020. Preprint MedRxiv.