

## Pattern of COVID 19 Infection among Front line Health Workers and Contact Tracing Done among them. Our Experience in a Tertiary Care Hospital

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### Abstract

**Background:** A considerable number of front-line workers are under risk due to repeated infection and exposure. The pattern of COVID 19 infection among the front-line workers was important, so that more focus would be laid on protecting them. Contact tracing is one key strategy for interrupting chains of transmission of SARS-CoV-2. This study aimed to find the pattern of COVID 19 infection among front line health workers and describe the process of contact tracing.

**Methodology:** The list of front-line workers with possible symptoms of COVID-19 or had come in direct contact with a "case" was shared with the department of community medicine for contract tracing activity as per the guidelines. The front-line workers who were categorized as High Risk were quarantined immediately and those who were categorized as Low-Risk were advised to be vigilant regarding the development of symptoms and were asked to continue with their routine duties with extra precautionary measures as they form a very vital part of the resource in this combat against COVID-19.

**Result:** About 138 front line health workers were affected by COVID-19 among which staff nurses (51) amounted to the maximum number who were affected.

**Conclusion:** COVID-19 was high among front-line workers and had a large number of high-risk contacts. Nurses were found to be most affected with COVID 19 infection.

**Key Words:** COVID-19, Pattern, Contact Tracing, Front-line workers

**Introduction:**  
COVID-19 caused by novel coronavirus, SARS-

CoV-2, was first detected on 31 December 2019 in Wuhan, People's Republic of China. The virus was

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identified to be a respiratory pathogen and was found to be highly contagious with cases ranging from asymptomatic to severe respiratory infections. WHO declared COVID-19 a public health emergency of international concern on January 30, 2020 and India reported its first COVID-19 case in the state of Kerala on the same day. WHO declared COVID-19 as a pandemic on March 11 2020. In a period of less than 3 months it affected millions of people and causing governments and countries to shut down routine public life and business which led to implementation of various public health measures throughout the world. Pondicherry is a union territory in the southern part of India. On March 17, 2020, the first case of COVID-19 was identified in the district of Mahe. Since then, Pondicherry has seen a rapid rise in the number of COVID-19 cases just like the rest of the nation and the world.<sup>1</sup>

During this pandemic even though every human being has been affected directly or indirectly to various degrees, the front-line workers have been placed under immense and unprecedented pressure all the while putting their physical, mental and social well-being at risk. The front-line workers are at constant risk of exposure to contract the COVID-19 virus. WHO have provided guidance on the quality, performance characteristics and related standards of personal protective equipment (PPE) to be used in COVID-19. The PPE include surgical masks, non-surgical masks, gloves, goggles, face shields, gowns and N95 masks. Despite use of PPE, the front-line workers get affected by COVID-19 and it is necessary to identify them as early as possible and quarantine these front-line workers so as to stop the spread among the front-line workers which can greatly affect the work force against this pandemic. It is estimated that over 15,000 front line workers have been affected by COVID in India so far.<sup>2</sup>

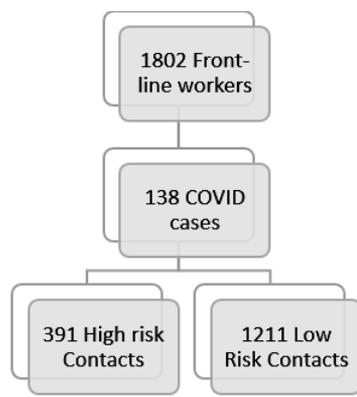
World nations and its governments introduced several non-pharmaceutical interventions, including social distancing and hygiene policies to control the rapid spread of COVID-19 virus. Contact tracing is one such intervention which plays an instrumental role in the identification and isolation of positive cases. Contact tracing has been one of the cornerstones

of infectious disease control and prevention for many years and it has proved to be one of the most important tools in curtailing COVID-19 transmission, morbidity and mortality. Contact tracing is the process of identifying, assessing, and managing people who have been exposed to someone who has been infected with the COVID-19 virus. Contact tracing is done by public health experts and quarantine of contacts identified through contact tracing interrupt transmission between people and are essential public health tools for controlling the virus. also help people who are at a higher risk of developing severe disease know earlier that they have been exposed so that they can get medical care quicker if they go on to develop symptoms. Contact tracing now-a-days can also be done digitally by using mobile technologies to digitally track and notify individuals about their interactions with potentially infected individuals. During the COVID-19 pandemic, this digital approach offers governments a more cost-effective and safer method than traditional contact tracing with regards to COVID-19 pandemic.<sup>3</sup> Hence this study was done to find the pattern of COVID 19 infection among front line health workers in a tertiary care hospital and describe the process of contact tracing done among the frontline workers to control the spread of COVID-19

## Methodology

The study was conducted between June 2020 and November 2020 among the front-line workers of a tertiary care hospital in Puducherry. Once a front-line worker is reported to be positive for COVID-19, the person is isolated and the details of the person who has been infected is immediately informed to the team in the HPC (Health Promotion Clinic) which is being used as the control room to coordinate all contact tracing works. Having undergone a basic course on COVID-19 contact tracing provided by John Hopkins University, the contact tracing of the patient was done and the details were documented.<sup>4</sup> Front-line workers with possible symptoms of COVID-19 or had come in direct contact with a "case", were isolated and the complete details pertaining to "contact tracing" as per the guidelines laid by the John Hopkins University were obtained. The persons who are

categorized under high risk are made to quarantine with immediate effect and are advised to undergo RT-PCR to check for COVID-19 infection after 14 days. The persons who are categorized under low risk are advised to continue with their routine work, as they form a very vital part of the resource in this combat against COVID-19, with adequate personal protective measures but with extra precaution to look after symptoms/cardinal signs of COVID and in case he/she develops a sign/symptom of COVID, it is to be reported immediately to a health center nearby for further management.



## Results

During the pandemic between June 2020 to November 2020, out of 1802 front-line workers, 138(7.65%) front line health workers were affected by COVID-19 in Pondicherry Institute of Medical Sciences. A total of 391 (21.7%) High risk contacts and 1211 (67.2%) Low Risk contacts were identified through the process of contact tracing.

The month-wise trend of COVID-19 infection among the front-line workers was studied for the duration between June 2020 and November 2020. The COVID-19 cases were a minimal at the beginning with caseload at the month of June 2020 being 2 cases constituting only 1.4% of the total cases between

the mentioned study duration. The cases began to rise steadily and rapidly and reached the peak with the maximum number of cases, 61 i.e., 44% of the COVID-19 cases, which was recorded in the month of August 2020. The number of COVID-19 cases among the front-line workers can be seen to start falling from September 2020 with 39 cases (28.2%) followed by 16 cases (11.6%) in October 2020 and finally 2 cases (1.4%) for the month of November 2020.

The pattern of COVID-19 among the various categories of front-line workers in the tertiary care hospital was also studied. Staff nurse (51) accounted to the maximum number of COVID-19 cases among the Front-line workers as they constitute the major workforce in the hospital who are constantly in close-contact with COVID-19 patients. They amounted to 36.9% of the total COVID-19 cases among the front-line workers. Doctors (38) amounted to 27.5% of COVID-19 cases among the front-line workers. 7.24% of the COVID-19 cases among front-line workers was found among the ward attenders and the rest 28.2% (39) of the COVID-19 cases was seen among janitors, electricians, technicians, receptionists, etc.

**Table 1: Distribution of COVID-19 cases and contacts among health-care workers:**

Category	Number
Total Number of COVID-19 cases	138 (7.65%)
Total number of cases subjected for contact tracing	138 (100%)
High Risk Contacts	391 (21.7%)
Low Risk Contacts	1211 (67.2%)
Total Number of Health-care workers	1802

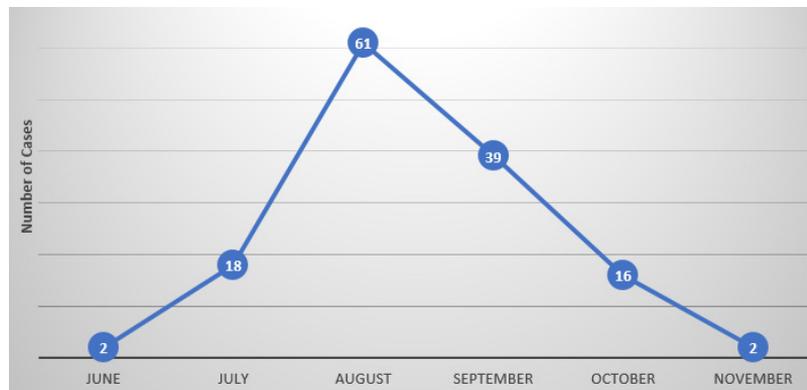


Figure 1: Month-wise trend of COVID-19 cases among health-care workers:

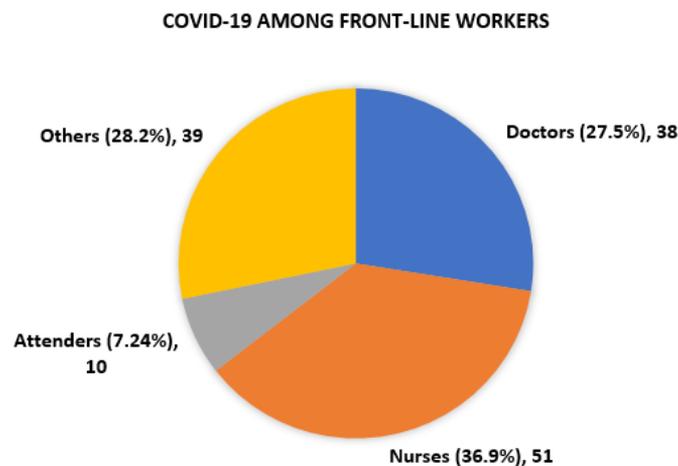


Figure 2: Reported Infections among various cadres of health-care workers:

### Discussion

This article describes the role of contact tracing in early case detection and thereby breaking the chain of transmission by restricting the mobility of the infected individuals through various methods such as quarantine and isolation. This helps us in preventing the spread of COVID-19 virus not only in the hospitals but also in the community. Also, the pattern of infection among the frontline workers was identified.

The front-line workers are at increased risk of getting COVID-19 infection. This study shows that about 7.65% of the front-line workers were affected by COVID-19 infection. This is similar to a study done by Nguyen LH et al which shows 4.7% of the tests that had come out positive for COVID-19 were found to be among the front-line workers.<sup>5</sup>

Matt j. keeling et al shows contact tracing helps in identifying untraced cases and contacts with 1 in 6 cases turning out to be infected. The definition of contacts is based on the duration of contact with infected person and has been stated to be 4 hours which is similar to the contact duration presumed in our study. It has also been suggested that the burden of high number of contacts can be reduced by changing the definition of contacts but this will increase the risk of undetected cases.<sup>6</sup>

A study conducted by Shilei Zhao et al developed a different model for preventing the spread of COVID-19. The model used was based on Susceptible, Un-quarantined infected, quarantined infected, Confirmed infected (SUQC) model. The outbreak was analysed by applying the everyday data released of the confirmed infections in the SUQC model.<sup>7</sup>

Another study by Joel Hellewell et al which showed a stochastic transmission model which quantifies the potential effectiveness of contact tracing, active case finding, and isolation of cases at controlling a severe acute respiratory syndrome coronavirus 2. They identified that highly effective contact tracing and case isolation is instrumental to control a new outbreak of COVID-19 within 3 months.<sup>8</sup>

A study conducted by Lash et al where named contacts were identified using contact tracing of COVID-19 infected patients. The study revealed that the positive test prevalence was higher among named contacts than general population. This study reaffirms with our study which stresses on the importance of contact tracing in curtailing the outbreak of COVID-19.<sup>9</sup>

Kelly Jean et al conducted an evidence-based review to identify studies related to the effectiveness of contact tracing in viral outbreaks. The search dates were from database inception to July 24, 2020. Outcomes of interest included measures of incidence, transmission, hospitalization, and mortality. Contact tracing was mostly evaluated in combination with other nonpharmaceutical interventions and/or pharmaceutical interventions. Although some degree of effectiveness in decreasing viral disease incidence, transmission, and resulting hospitalizations and mortality was observed, these results were highly dependent on epidemic severity (R0 value), number of contacts traced (including presymptomatic and asymptomatic cases), timeliness, duration, and compliance with combined interventions (eg, isolation, quarantine, and treatment). Contact tracing effectiveness was particularly limited by logistical challenges associated with increased outbreak size and speed of infection spread. These findings align with findings of our study in shedding light on the importance of contact tracing in prevention and breaking chain of transmission of COVID-19 and also points at few challenges that was faced during contact tracing.<sup>10</sup>

### Conclusion

The study shows among the frontline workers who were affected by COVID 19, a significant number

of high-risk contacts was identified. Staff nurse were the most commonly affected amongst the front-line workers in our tertiary care hospital, thus requiring our focus to be directed more towards increasing the personal protective measures towards protecting the nurses and other front-line workers.

Contact tracing process helps us to find the high risk and low risk contacts of COVID 19 affected individuals and thereby applying necessary preventive measures to curtail the spread the infection.

**Ethical clearance-** As the results obtained were from secondary data and explanation of the process involved has been mentioned, it is eligible for exemption from ethical clearance. Hence ethical clearance was not obtained.

**Source of funding-** Self

**Conflict of Interest -** Nil

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