

Original Article

STUDY OF CARRIER RATE OF COVID-19 AMONG PARACLINICAL and GOVERNMENT DEGREE COLLEGE STUDENTS AT A TERTIARY CARE HOSPITAL, SRIKAKULAM

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ABSTRACT

Objective: Role of nosocomial transmission of SARS-CoV-2 is becoming increasingly recognized, with several reports indicating that the number of asymptomatic cases can be several-fold higher than the reported symptomatic cases. With this background, we did study to know the carrier rate of Covid-19 in healthy, asymptomatic adolescents and young adults and to compare it among students exposed and not exposed to healthcare settings.

Methods: Nasopharyngeal swabs were collected from 200 students: DMLT trainees as test group and Degree college students as control group, in equal number. Samples were subjected to RT-PCR test for Covid-19, by extracting RNA by using the "HimediaHiGenoMB" kit and doing PCR by using "Meril Covid-19 one-step RT-PCR kit."

Results: All the participants are in the age group of 18-22 y and Female students constituted 73.5%. All participants in the test group were vaccinated (100%), but only 34% in control group (94.4% of female and 64.28% of male students had two doses). One-fourth of male students were not vaccinated at all in control group. None of the control group were positive for covid-19, but four male students (16%) and 11 female students (14.6%) were positive in test group.

Conclusion: Healthcare professionals (HCPs) are at risk of getting infection of Covid 19, because of their exposure to asymptomatic or, pre-symptomatic or to the Covid-19 positive persons before the diagnosis being made. Vaccine coverage in male students was less when compared to female students. Hundred percent vaccine coverage was seen in HCPs.

Keywords: Asymptomatic carriers, Covid-19, Healthcare settings, RT-PCR, SARS-CoV-2, Vaccination status

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INTRODUCTION

Corona viruses are ssRNA viruses and enveloped; carrying petal or club shaped or crown-like peplomer spikes giving the appearance of solar corona. One of the important member of corona viruses is SARS-CoV-2, causative agent of Corona virus disease-2019 (Covid-19), is originated from Wuhan city of China at the end of 2019 and it has caused an explosive catastrophic pandemic that affected almost all parts of the world, and produced significant loss of lives and the worst financial crisis recorded ever, since World War II [1]. Covid-19 is transmitted by inhalation of respiratory nuclei and can present as an asymptomatic carrier state, acute respiratory disease, and pneumonia [2]. Transmission of SARS-CoV-2 from individuals with infection but no symptoms (including those who later developed symptoms and thus were considered pre-symptomatic) has been well documented in many studies [3-5]. In this context we made an attempt to know the carrier rate among students; Some are exposed to Health care settings and some are not exposed to Hospital environment.

Inclusion criteria

1. Students of 18 y and above who are willing to give informed, written consent for the study.
2. Students who are asymptomatic for Covid-19.

Exclusion criteria

1. Students who had Covid 19 in the last one year
2. Students with fever or any symptom of upper respiratory tract.

Study period: November 2022

MATERIALS AND METHODS

Nasopharyngeal swabs were collected from 200 students: hundred samples from degree college students who were not exposed to healthcare settings as control group and hundred samples from MLT

trainee students who were exposed to healthcare settings as test group. Informed, written consent, was taken from the participants before study, showing that, if they are tested positive, they would isolate themselves as well as they would get their contacts to be tested.

Ethics committee approval

Institutional Ethics committee approval was taken and approval from Principal, Government degree college, Srikakulam was taken to conduct study on the students.

Collection of nasopharyngeal swabs

Synthetic fiber swabs with thin, flexible plastic shaft were used to collect nasopharyngeal swabs. we asked the participants to tilt the head back and then inserted swab gently until resistance is encountered. Then swab was rubbed, rolled and then swab was left in place for few seconds to allow the swab to absorb secretions. Then swab was removed gently while rotating it. Swabs were, then placed in the properly labeled VTM tubes, triple packed and then transported to the laboratory in a vaccine carrier. Samples were subjected to RT-PCR test by extracting RNA first and then by doing PCR test.

Testing protocol

1. Viral RNA extraction was done by using "HimediaHiGenoMB" kits.
2. RT-PCR was done by using "Meril Covid-19 one-step RT-PCR kit" using ORF 1 ab gene (FAM), Nucleoprotein N gene (HEX), and RNase P (ROX) as internal control.

a) If internal control RNase P (ROX) is positive, then only we will consider the other genes. Presence of ORF 1 ab gene is considered as the positive result, even if nucleoprotein N gene is negative even after re-extraction and retest. Without ORF 1 ab gene, if nucleoprotein N gene is positive, we have to repeat the extraction and retest the sample. If again ORF 1ab negative, result is negative.

b) In the absence of internal control ROX gene, the test is invalid and we should repeat the sample.

c) As quality control we use, ORF 1 ab gene, Nucleoprotein N gene, Internal control ROX gene, with no Ct value or Ct value with >35 as negative control and Ct value with <35 as positive control.

d) If a typical S-type (sigmoidal) amplification curve is detected by the FAM and HEX channel, it indicates that Covid-19 virus is positive.

e) If FAM and HEX channels don't detect a typical S-type (Sigmoidal) amplification curve (No Ct), it indicates that covid-19 virus is negative.

f) If the internal control channel ROX failed to detect Ct or Ct>35, it indicates that the concentration of the tested sample is too low or

there is an inhibitory reaction from the interfering substance. In such cases we have to repeat the test.

RESULTS

Female students participated with enthusiasm in the study. Out of two hundred students, females constituted 73.5% (72 from control group and 75 from test group). All of the participants are in the age group of 18-22 y. In the control group, 72 were females and 28 were males and in test group, they were 75 and 25, respectively.

Coming to their vaccination status, percentage of vaccination status was high in females as shown in table 1.

Table 1: Represents vaccination status of total group

Type of study group	Male			Female			Grand total
	Control	Test	Total	Control	Test	Total	
Number of students participated	28 (14%)	25 (12.5%)	53 (26.5%)	72 (36%)	75 (37.5%)	147 (73.5%)	200
Vaccination status							
Two doses	18	25	43 (21.5%)	50	75	125 (62.5%)	168 (84%)
Single dose	3	0	3 (1.5%)	20	0	20 (10%)	23 (11.5%)
Not vaccinated	7	0	7 (3.5%)	2	0	2 (1%)	9 (4.5%)

Regarding vaccination of the test group participants, all were vaccinated (100%) when compared to only 34% in control group (94.4% of female students had two doses of covid-19 vaccine, when compared to 64.28% of male students). One-fourth of male students were not vaccinated at all in the control group, when compared to 2.7% of female students as shown in the table 2.

Table 2: Showing vaccination status of control group

Vaccine	Male	Female	Total
Two Doses	18 (64.28%)	50 (94.4%)	68 (34%)
Single Dose	3 (10.71%)	20 (27.77%)	23 (11.5%)
Not Vaccinated	7 (25%)	2 (2.7%)	9 (4.5%)
	28	72	100

Among total samples, fifteen were positive for Covid-19 by RT-PCR (7.5%). All positives were from test group only, i.e. Students who were exposed to healthcare environment. None of the control group were positive for covid-19. In test group four male students (16%) and 11 female students were positive (14.6%) as shown in the table 3.

Table 3: Showing number of students participated and their positivity rate

Type of study group	Male			Female			Grand total
	Control	Test	Total	Control	Test	Total	
Number of students participated	28 (14%)	25 (12.5%)	53 (26.5%)	72 (36%)	75 (37.5%)	147 (73.5%)	200
Number of positives	0	4 (16%)	4 (7.54%)	0	11 (14.6%)	11 (7.48%)	15 (7.5%)

All the contacts of these Covid-19 positive MLT trainees were participants in this study, except family members of one Covid-19-positive female student and they were also tested and found negative for covid-19.

DISCUSSION

Coronavirus disease 2019 (Covid-19), caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), was first reported in December of 2019 in Wuhan City, the capital of Hubei Province in China and has become a worldwide pandemic [6-8] It has been suspected that infected persons who remain asymptomatic play a significant role in the pandemic, but their relative number and effect have been uncertain [9]. Later the role of nosocomial transmission of SARS-CoV-2 is becoming increasingly recognized, accounting for 12-29% of cases in some reports [10]. More importantly, several other reports indicate that the number of asymptomatic cases can be several-fold higher than the reported symptomatic cases [11]. Under baseline assumptions, approximately 59% of all transmission came from asymptomatic transmission: 35% from pre-symptomatic individuals and 24% from individuals who are never symptomatic [3]. One review suggested that the likelihood of approximately 40% to 45% of those infected with SARS-CoV-2 will remain asymptomatic and that the virus might have greater potential than previously estimated to spread silently and deeply through human populations [9].

As far as our knowledge, testing for asymptomatic carrier state of covid-19 virus was not done in our area. In this background we

made an attempt to know the carrier state in adolescents and young adults by collecting samples from DMLT students as test group and degree college students as control group. Adolescents and young adults because of their physical vigour, usually come into contact with number of people. Hence we thought that this group is the ideal one to know the carrier state of covid-19 and to compare the difference between exposure to Healthcare settings and not.

In our study, 16% of male students and 14.6% of female students were positive for covid-19 by RT-PCR test in the test group that agrees with the study of Wang *et al.* [10]. It shows that the asymptomatic carrier state for Covid-19 was almost equal in both genders, indicates that irrespective of gender, healthcare personnel at work are exposed equally for Covid-19, in spite of taking two doses of vaccine and at the same time, they pose a threat to patients as well as to community unless they follow all precautions while discharging healthcare services.

In one study asymptomatic carrier state was 1.8% in healthy volunteers, whereas it was 7.5% in this study [12]. In one meta-analysis, the percentage of asymptomatic SARS-CoV-2 infections among populations tested for was 0.25% [13]. But none in the control group were tested positive in the present study in spite of not wearing masks and not practicing social distance, even though still Covid 19 is

existing in the community. Further in-depth study is necessary to know the various epidemiological factors responsible for it.

As counselled before study, all the positives from test study isolated themselves for ten days and wore masks continuously. Follow-up was given for ten days, but none of them developed any symptoms. Regarding their contacts, all of them are residing in rooms away from their families except one female student, who is living with her family. All the contacts were participants themselves except the female student family members who got tested and were negative.

Asymptomatic infection accounted for 0.76% (28/3674) in the study of hospital staff by Fuling Zhou [4], whereas 3% of HCWs in the asymptomatic screening group tested positive for SARS-CoV2 in one study [5]. In the study of Rivett *et al.*, 57% were truly asymptomatic/paucisymptomatic and 40% had experienced symptoms compatible with coronavirus disease 2019 (Covid-19) >7 d prior to testing, but in the present study all positives were asymptomatic prior to study and afterwards also. Rivett *et al.*, also tested for viral genome sequencing which showed that the majority of HCWs had the dominant lineage B. 1. [5], whereas we didn't test for genome sequencing in the present study.

A CDC modeling study estimated that 59 percent of transmission could be attributed to individuals without symptoms: 35 percent from pre-symptomatic individuals and 24 percent from those who remained asymptomatic [14]. Shuhui Duan *et al.* opined that a large amount of asymptomatic carriers of SARS-CoV-2 existed after the elimination of clinical cases of Covid-19 in Wuhan City. Asymptomatic carriers might be the reason for resurgence of Covid-19 cases in China. To prevent such situation and to ensure the safety of resumption of work, institutions should conduct Covid-19 prevention training for staff and screening for asymptomatic patients, and take quarantine measures as soon as possible in areas with high density of population [4]. McMichael *et al.* also documented asymptomatic cases in their study [15].

Asymptomatic or pre-symptomatic transmission is clearly reported and is estimated to account for around half of all cases of COVID-19 [16]. Screening approaches focused solely on symptomatic HCWs are, therefore unlikely to be adequate for suppression of nosocomial spread [5]. As asymptomatic carriers play a critical role in the spread of the Covid-19 pandemic, understanding the actual prevalence of asymptomatic cases is important for setting control measures in both the community and health care settings [17].

Vaccines offer life-saving protection against Covid-19. Due to deficient knowledge about the effectiveness of the vaccine, people are reluctant to take vaccine [18]. Vaccine acceptance which has been associated with Health information, could be a critical factor influencing vaccine uptake [19]. More over family support, herd mentality and free vaccination strategies can help improve vaccination among hesitant students, while vaccination risk psychology and "wait-and-see" psychology reduce the possibility of vaccination [20].

Before collecting nasopharyngeal swabs, vaccination status of all participants was recorded. 84% of total participants had two doses of vaccine against Covid-19 where as it was 76.2% in one study conducted in China [20]. In a study that explored the attitude and hesitancy of students in UAE universities toward the Covid-19 vaccines, majority of participants were female respondents (76.6%) and the average age of respondents was 21 y, similar to our study (73.5% and 20 y respectively). But vaccine coverage is lower than (67%) our study (84%) [21]. 61.89% of medical students were not vaccinated for Covid-19 in a Caribbean medical school [22]. Where as it was 61.9% in another study [23]. But medical students were not included in this study. In another study for higher education students who were aged 18 y and older, revealed 91.4% of participating students had been vaccinated against Covid-19 at least once which is a little higher than the present study (85.5%) [24].

The threat of Covid-19 pandemic is not over yet. Any new variant may appear at any time and involve large number of population at the cost of national growth. That's why it is necessary to be vigilant, vaccinated and follow all precautions to prevent spread of infection. Healthcare authorities should strength IEC activities to create

awareness among general public to thwart any eventualities regarding Covid-19.

CONCLUSION

Healthcare professionals (HCPs) are at risk of getting infection of Covid 19, as they have been exposed constantly to asymptomatic or, pre-symptomatic or to the Covid-19 positive persons before the diagnosis being made. Vaccine coverage in male students was less when compared to female students in general. Hundred percent vaccine coverage was seen in HCPs.

RECOMMENDATIONS

Practicing the three important steps in containing Covid-19, that are maintaining social distance, wearing the mask, and practicing hand hygiene should be followed not only by HCPs, but also by general public to prevent spread of Covid 19 infection from asymptomatic or pre-symptomatic cases.

LIMITATIONS OF THE STUDY

Our study limited only to small group and Genomic study was not done. This study needs extension to involve large group and to include study of genomics to generalize the findings of the study.

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AUTHORS CONTRIBUTIONS

All the authors have contributed equally.

CONFLICTS OF INTERESTS

Declared none

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