

Knowledge, Attitude and Practices Regarding Utility of CBNAAT in the Diagnosis of SARS-CoV-2 Disease among Medical Interns: A Cross-sectional Study

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ABSTRACT

Introduction: Coronavirus Disease-2019 (COVID-19) causes respiratory tract infections in human beings ranging from mild illnesses like common cold to severe disease like pneumonia. Currently, nucleic acid amplification tests Reverse Transcriptase-Polymerase Chain Reaction (RT-PCR), Cartridge Based Nucleic Acid Amplification Test (CBNAAT) and TrueNat) and rapid antigen detection tests are approved for diagnostic purpose by Indian Council of Medical Research (ICMR). Medical interns, the primary contact healthcare personnel, need to be sensitised regarding proper utilisation of CBNAAT, so that rapid and accurate diagnosis of Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) can be made in comparison to the more commonly used RT-PCR technique.

Aim: To evaluate the Knowledge, Attitude and Practices (KAP) of Bachelor of Medicine and a Bachelor of Surgery (MBBS) interns towards accessibility of CBNAAT in SARS-CoV-2 infection in a tertiary care hospital.

Materials and Methods: A cross-sectional study was performed through questionnaire shared via online platform amongst 102 Medical interns working at College of Medicine and Sagore Dutta Hospital from 22nd August 2021 to 21st September 2021. Based on their response, KAP was assessed by using a three-point Likert Scale. The collected data was entered in Microsoft excel, and reported as frequencies and percentages.

Results: Among 102 internees, 84 interns responded. Among 84 medical interns 31% had good, 50% had average whereas 19% had poor level of knowledge. About 58 (69%) agreed that CBNAAT can be used as a method for rapid diagnosis of SARS-CoV-2. About 75 (89.3%) answered that they are sending samples for COVID-19 testing. Only 56 (66.7%) agreed that CBNAAT should be recommended.

Conclusion: The present study revealed that majority of the MBBS interns had positive attitude towards different aspects of CBNAAT utility but most of them had gaps in their KAP. This demands extra efforts to sensitise and train them adequately.

Keywords: Coronavirus disease-2019, Cartridge based nucleic acid amplification test, Severe acute respiratory syndrome coronavirus 2

INTRODUCTION

Coronaviruses (CoV) represent a major group of viruses causing respiratory tract infections in human beings. The illnesses may vary from mild common cold to severe disease like pneumonia. After SARS in 2003 and Middle East Respiratory Syndrome Coronavirus (MERS-CoV) in 2012, emergence of SARS-CoV-2 has been arousing profound global health concern [1,2]. This began as an outbreak in December 2019 and had spread to more than 200 countries within five months. This has started in Wuhan, China in December 2019, probably due to cross-species transmission [3]. World Health Organisation (WHO) has declared it as pandemic on 11th March, 2020 [4]. This deadly virus is the causative agent of COVID-19. It can proliferate through respiratory droplets and via close contact with infected person [1,2]. About 80% of individuals who are infected didn't show any noticeable symptoms and however capable to transfer the infection rapidly [2]. Due to its unique transmission potentials and lack of definitive antiviral therapy, SARS-CoV-2 caused wide spread infection throughout the world. Evidence shows that Healthcare Workers (HCWs) are particularly at high risk of acquiring SARS-CoV-2 infection from hospitalised patients, resulting in loss of precious man-power, panic and even shutting down of hospitals because of limited staff [5].

As of now there is no particular treatment against COVID-19, social distancing, face masks and frequent hand washing with soap or alcohol based hand rubs are still the major prevention measures in the population [6]. Besides all those preventive measures, timely

diagnosis of cases is one of the most important tools in breaking the chain of COVID-19.

Currently nucleic acid amplification tests RT-PCR, CBNAAT, TrueNat) and rapid antigen detection tests are approved for diagnostic purpose by ICMR. Among these, nucleic acid testing modalities are confirmatory but require dedicated infrastructure and trained technicians. However, in hospitals with large number of patients RT-PCR is one of the most acceptable diagnostic modality as more than 90 samples can undergo testing in one time. But it has its disadvantage i.e. long turn-around time. In contrast, turn-around time in CBNAAT and TrueNat is very less i.e. an hour and even single sample can be tested. Moreover, CBNAAT and TrueNat do not require huge infrastructure. Lastly rapid antigen detection test can be used as point-of-care test but a negative result need to be confirmed by nucleic acid detection method [7].

The ICMR has approved Cepheid Xpert Xpress SARS-CoV-2 (CBNAAT) use from the beginning of pandemic. CBNAAT test should be run under Bio Safety Level-2 (BSL-2) conditions and with appropriate biosafety precautions. This test detects Envelope (E) gene and also the SARS-CoV-2 specific N2 region of the Nucleocapsid (N) gene [7,8]. CBNAAT/Xpert Xpress being rapid and considerably reliable test for COVID-19 confirmation will greatly reduce the turnaround time, which is a key factor in emergency case detection [9,10]. Also, the workload of testing centres can be reduced to a large extent by using high throughput CBNAAT/ Xpert Xpress machines. However, the limiting factor behind the mass use of high-throughput machines and cartridges is their high cost [11].

The KAP assessment of HCWs and medical students toward such outbreaks is essential due to the large amount of misconceptions and false information that are circulating on social media [12]. Previous viral epidemics like SARS, MERS and Ebola have shown that the assessment of KAP among HCWs is actually considerably useful in raising awareness about best practices and educating them [13-15].

Medical Interns, being the 1st contact health personnel in hospitals need to be sensitised towards proper utilisation of CBNAAT, so that rapid and considerably accurate diagnosis of SARS-CoV-2 can be made in comparison to the more commonly used RT-PCR technique. Also, there is no particular study published with regard to KAP study towards CBNAAT in COVID-19 era in medical students. Hence, the present KAP study was conducted to assess the existing KAP among MBBS interns regarding CBNAAT COVID-19 diagnosis and justify the need for conducting further training.

MATERIALS AND METHODS

A hospital-based descriptive type of cross-sectional study was conducted on MBBS interns, who were posted at College of Medicine Sagore Dutta Hospital, Kolkata, a tertiary care teaching hospital in West Bengal, India, from 22nd August 2021 to 21st September 2021 after getting permission from Institutional Ethics Committee (IEC) (Memo No: CMSDH/IEC/241/08/2021 dated on 21/08/2021). A departmental core committee was formed comprising of the members of the present study to design it appropriately and prepare a questionnaire also based on experience of members in the department. The questionnaire form was posted and circulated using various social media platforms (Google form was circulated through E-mail or Whatsapp) among the participants. The study participants were informed about the details of the study objectives for filling the questionnaire at the beginning of the study.

Inclusion criteria: All MBBS interns (total 102) of the current batch who expressed willingness to participate (total 84) in the study and signed an informed consent form were included in the study. Identity of all the study subjects was kept confidential.

Exclusion criteria: Those interns who were unwilling to participate in the study (total 18 interns did not participate).

Study Procedure

A self-designed questionnaire was prepared by authors and sent to experts for their valuable opinions regarding the validity of the questionnaire. No pre-questionnaire training was imparted to the participating interns in this department. The questionnaire had three parts. First part included socio-demographic data (age and sex). The second part of the questionnaire was about knowledge and consisted of eight close ended questions. One mark was allotted to each question. In case of no answer from the participant, the response was considered and marked as incorrect and thus the total correct response was calculated. Knowledge score was calculated out of a total score of 8. Knowledge level was categorised as good, average and poor on the basis of their knowledge score. Those interns who scored <3 were classified as poor, score between 4-6 were considered as average and score >7 were marked as good. Third part of the questionnaire contained five close ended questions which included attitude and fourth part contained two close ended question included practices of the interns towards CBNAAT for COVID-19 diagnosis. Attitude and practice was assessed by using a three-point Likert Scale. All the study participants who agreed were marked as positive attitude practice and those, who disagreed, or were neutral; were considered to have negative attitude and practice. After the completion of the questionnaire session, the core committee conducted a training session for those participating MBBS interns. The objective of the session was to train them on the utility of CBNAAT COVID-19 testing on the following points- sample collection and transportation, sensitivity and duration of CBNAAT testing and comparison of CBNAAT testing with RT-PCR.

STATISTICAL ANALYSIS

Data was entered in Microsoft excel. Descriptive data was reported as frequencies and percentages.

RESULTS

Among 102 internees, 84 responded. Rest of the participants (18) did not responded. Most of them were in the age group of 22-26 years, 52.4% were male and 47.6% were female. Subjects' knowledge level was classified into three categories i.e having poor, average or good. Among 84 medical interns, 31% had good, 50% had average whereas 19% had poor level [Table/Fig-1].

Grade	Score	Number of interns	Percentage (%)
Good	≥7	26	31
Average	4-6	42	50
Poor	≤3	16	19

[Table/Fig-1]: Knowledge level of the study subjects regarding COVID-19 CBNAAT testing (N=84).

Among 84 interns, 58 (69%) thought that CBNAAT can be used as a part of rapid diagnosis in SARS-CoV-2 infection. Of them, 50 (59.5%) agreed that CBNAAT is helpful in diagnosis of SARS-CoV-2 infection in hospitals with limited settings. Only 44 (52.4%) accepted that a single CBNAAT positive test is to be considered confirmatory, without any repeat testing. About 54 (64.3%) agreed that CBNAAT significantly reduce the time to detect SARS-CoV-2. About 76 (90.5%) agreed that specimen collection and transfer of sample for CBNAAT must be performed using appropriate Personal Protective Equipment (PPE) [Table/Fig-2].

Question	Agree	Neutral	Disagree
CBNAAT can be used as a part of rapid diagnosis in SARS-CoV-2 infection	58 (69%)	24 (28.6%)	2 (2.4%)
CBNAAT is helpful in diagnosis of SARS-CoV-2 infection in hospitals with limited setting	50 (59.5%)	22 (26.2%)	12 (14.3%)
A single CBNAAT positive test is to be considered confirmatory, without any repeat testing	44 (52.4%)	24 (28.6%)	16 (19%)
CBNAAT significantly reduces time to detect SARS-CoV-2	54 (64.3%)	26 (31%)	4 (4.7%)
Specimen collection and transfer of sample for CBNAAT must be performed using appropriate PPE	76 (90.5%)	8 (9.5%)	0

[Table/Fig-2]: Attitude of medical interns regarding utilisation of CBNAAT for COVID-19 testing (N=84).

Among 84 interns, 75 (89.3%) were sending samples for CBNAAT testing for SARS-CoV-2 detection being the primary patient contact healthcare personnel and 56 (66.67%) thought that CBNAAT should be recommended to others than for tuberculosis [Table/Fig-3].

Question	Agree	Neutral	Disagree
For SARS-CoV-2 detection are you sending samples for CBNAAT testing	75 (89.3%)	2 (2.4%)	7 (8.3%)
CBNAAT should be recommended to others	56 (66.7%)	28 (33.3%)	0

[Table/Fig-3]: Practices of medical interns regarding utilisation of CBNAAT for COVID-19 testing (N=84).

DISCUSSION

The clinical and epidemiological management of the COVID-19 pandemic is dependent on molecular assays with short turn-around time. Goldenberger D et al., validated the novel Xpert Xpress SARS-CoV-2 assay and found an excellent concordance over a range of SARS-CoV-2 loads and across established human coronaviruses [16]. The current study was done among MBBS interns to assess their KAP concerning the application of CBNAAT test with regard to SARS-CoV-2 infection. To the best of authors knowledge, this was

a pioneering systematic KAP study conducted on junior doctors regarding utilisation of CBNAAT for diagnosis of microbial agents other than for tuberculosis. Yadav S et al., conducted a similar study among the junior and senior residents regarding the utility of CBNAAT testing in diagnosis of pulmonary, extrapulmonary and drug resistant tuberculosis. As present study is a novel study, however, authors could only compare present study with the study conducted by Yadav S et al. They showed that knowledge level is on an average of 58.3% in residents without training which is almost similar to present study observation [17]. Similar to this study, majority of the interns showed positive attitude and practices regarding CBNAAT testing in diagnosis of SARS-CoV-2 infection [17]. Medical interns are the first contact health personnel in the hospitals. So, they need to be present study about a method which can accurately detect SARS-CoV-2 infection and is rapid too. The CBNAAT method, though used mostly for rapid and accurate diagnosis of tuberculosis, can be utilised for this purpose with a different cartridge but utilising the same machine. Thus, diagnosis of SARS-CoV-2 can be done very rapidly compared to the more commonly used RT-PCR technique. In case of emergency situations like urgent need to undertake operations or to conduct maternal delivery, the role of CBNAAT for diagnosis of COVID-19 infection is very helpful [18]. The junior doctors should be aware of these facts, though they have not been trained about it. Another KAP study by Gahlot A et al., from UP in 2020 regarding SARS-CoV-2 infection and its control amongst medical students showed positive results in students like present study. They also focused on constant need of updating knowledge of the HCW's concepts about COVID-19. They further stated that periodic educational interventions, training programs and conducting webinars on infection control practices for COVID-19 for all HCWs and students can be pivotal for improvement [19]. Authors regularly conduct training and feedback programs for all categories of HCWs including medical interns. The present study highlighted the importance of training on CBNAAT COVID-19 testing under emergency situations for medical professionals.

Limitation(s)

One of the major drawbacks of the study was the sample size, which was limited to the medical interns of College of Medicine and Sagore Dutta Hospital. So, it could not be generalised. Another limitation was inherent biases of self-reported questionnaire.

CONCLUSION(S)

The ICMR recommends CBNAAT testing for diagnosis of SARS-CoV-2 infection from the beginning of this pandemic. However, knowledge response remained average as reflected in the present study. This demands extra efforts for training and retraining of junior doctors because they act as primary contact of the patients in most cases. This point of care test is needed for quick and precise diagnosis to contain the spread of infection the soonest. The

turn-over time of CBNAAT COVID-19 testing is very short (an hour) compared to the more common RT-PCR test which takes about 24 hours detection time.

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AUTHOR DECLARATION:

- Financial or Other Competing Interests: None
- Was Ethics Committee Approval obtained for this study? Yes
- Was informed consent obtained from the subjects involved in the study? No
- For any images presented appropriate consent has been obtained from the subjects. NA

PLAGIARISM CHECKING METHODS: [Jain H et al.]

- Plagiarism X-checker: Feb 18, 2022
- Manual Googling: Apr 30, 2022
- iThenticate Software: May 02, 2022 (22%)

ETYMOLOGY: Author Origin

Date of Submission: **Feb 15, 2022**
Date of Peer Review: **Mar 12, 2022**
Date of Acceptance: **May 03, 2022**
Date of Publishing: **Jun 01, 2022**