Original Article

Implementation of Pediatric Allergic Rhinitis Module as a Part of AETCOM among First-Year Medical Undergraduates: Mixed Methods Evaluation

Nihar Ranjan Mishra, Prakash Y. Peralam[1], Amol R. Dongre[2], Ramji Singh[3], Kalyan Goswami[4], Biswabina Ray[5], Late Major Kuravi Nagaraju[6], Debangshu Ghosh[7], Jayasri Patra[8], Prabrajika Vivekprana[9]

Departments of Pediatrics, [4]Biochemistry, [5]Anatomy, [7]Otorhinolaryngology, All India Institute of Medical Sciences, Kalyani, West Bengal, [3]Executive Director, All India Institute of Medical Sciences, Kalyani, West Bengal, [1]Department of Microbiology, Kasturba Medical College, Manipal Academy of Higher Education, Karnataka, [2]Department of Extension Programmes, Pramukh Swami Medical College, Gujarat, [6]Department of Pediatrics, Saveetha Medical College, Saveetha University, Chennai, Tamilnadu, [8]University College of Nursing, College of Medicine and Jawaharlal Nehru Memorial Hospital, Kalyani, West Bengal, [9]Social Worker, Sree Sarada Ashram, Raghunathpur, Kalyani, West Bengal, India

Abstract

Background: Children suffering from allergic rhinitis (AR) in their earlier days of life, not receiving proper treatment, subsequently develop asthma. To sensitize the first-year medical undergraduates about AR by implementing pediatric allergic rhinitis (PAR) module as a part of their attitude, ethics, and communication (AETCOM) curriculum. **Materials and Methods:** Triangulation type of mixed method study was conducted from January 2021 to June 2021 among 125 first-year medical undergraduate students. The PAR module communication checklist was developed and validated by an interprofessional (IP) team. Twenty multiple-choice questions (MCQs) were framed for both pretest and posttest cognitive assessment of the students. The pretest assessment was done (first 15 min) followed by the teaching of the PAR module (30 min), and lastly the posttest assessment along with open-ended feedback (last 15 min). Objective Structured Clinical Examination (OSCE) communication checklist along with the guidelines was given to the observer during the student-patient encounter to score the learner and to assess the communication skill. Apart from descriptive analysis, paired *t*-test and content analysis were done. **Results:** A statistically significant difference in the mean scores before and after the PAR module and communication checklist ($P < 0.001$). Majority (78/81, 96%) of the students favored this module, while (28/81) 34.6% suggested modifications. Most of the parent's feedback was good about the student's communication skill in terms of empathy (118), behavior (107), and greet (125); however, 33 parents were about the opinion of difficulties in closing the session, 17 parents commented about student's language problem and 27 about feedback. **Conclusion:** The PAR module should be taught in the current medical curriculum as a part of AETCOM in the foundation course as early clinical exposure with some modifications in the existing module.

Keywords: AETCOM, early clinical exposure, first-year MBBS students, pediatric allergic rhinitis module

Introduction

The prevalence of allergic diseases, including asthma, rhinitis, anaphylaxis, food, drug, or insect allergy, is rising worldwide.[1] Allergic rhinitis (AR) is one of the most common allergic diseases worldwide, affecting about 10%–25% of the population.[1] It is one of the top ten reasons for a visit to primary care physicians.[2] In India, the burden of AR contributes to about 55% of all allergies.[3] The reported prevalence of AR in India ranges between 20% and 30%[4] and a rising trend has been observed.[5]

According to the International Study of aSthma and Allergies in Childhood (ISSAC) phase 1 (1998), in India, among the AR patients, the nasal symptoms alone were present in 12.5% of the 6–7-year-old children and 18.6% of the 13–14-year-old

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Address for correspondence: Dr. Nihar Ranjan Mishra, Department of Pediatrics, AIIMS, Kalyani, Nadia - 741 245, West Bengal, India.
E-mail: drnihar.mishra@gmail.com

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children, while allergic rhino-conjunctivitis was observed in 3.3% and 5.6% of the children.[5] AR is a chronic allergen-specific IgE-mediated hypersensitivity disorder characterized by nasal congestion, rhinorrhea, sneezing, nasal itchiness, and postnasal drip.[6] The diagnosis of AR is based on typical history and physical examination findings and classification is done based on ARIA guidelines.[6] The risk of development of asthma is higher among the children with onset early in life and inappropriate treatment, which also reduces the quality of life for these children.[7] Thus, there is a need to detect the AR early for provision of appropriate clinical and preventive care. Inclusion of a teaching module on pediatric allergic rhinitis (PAR) for undergraduate medical students would be useful for gaining the competencies to detect AR.

Teaching medical ethics, behavioral science, communication skills, and managerial skills did not receive due attention in the old medical curriculum.[8-10] The new teaching–learning approaches adopted by the Medical Council of India (MCI) include the attitude, ethics, and communication (AETCOM) module for undergraduate students.[11-13]

There was no module on PAR as part of the undergraduate medical curriculum in India. This study focused on the development and implementation of the PAR module as a part of AETCOM for the first-year medical undergraduates as early clinical exposure during the foundation course and document their AETCOM toward AR children.

Subjects and Methods

This was a triangulation type of mixed-methods evaluation, where both quantitative (quasi-experimental design) and qualitative (open-ended responses) methods were involved simultaneously for implementing and evaluating the PAR module. This study was conducted over a period of six months (January 2021 to June 2021) at one of the tertiary care hospitals of eastern India after approval from the Institutional Ethics Committee (Registration No. ECR/s34llnst/OD 12014/RR-20). Quasi-experimental design was adopted to evaluate the effectiveness of intervention, and qualitative component included content analysis of written feedback given by the students and the parents. All the first-year medical undergraduate students (n = 125) were included. IP team that consisted of [Figure 1] head of the institute, medical educationist, pediatric allergist, pediatrician, otorhinolaryngologist, ethicist, nursing officer, and a social worker. The flow of study procedure for the development, delivery, and evaluation of the module has been explained in Figure 2. Approval from the ethics committee is obtained & the date of the approval was 20.02.2021.

Kern's 6-sep approach[14] was followed for development of the PAR module as a part of AETCOM. The six steps were (1) problem identification and general needs assessment; (2) targeted needs assessment; (3) goals and objectives; (4) educational strategies; (5) implementation; and (6) evaluation and feedback. The content of the module was validated in four steps: (1) module was modified by the principal investigator and reviewed by the subject expert, (2) the module was then modified as per the feedbacks received from members of the IP Team, (3) later the module was first implemented upon 10 students as a short pilot study and based upon comments from students, it was modified, and finally (4) the modified module was reviewed by the research team.

Twenty multiple-choice questions (MCQs) were formulated[15] and modified as per the review by the experts from our faculties and IP team members. These MCQs were used for both pretest and posttest assessments. Nominal group technique (NGT) was used to make OSCE communication checklist for first professional MBBS students to assess their attitude and communication skills with patients or their parents suffering from AR. Out of eight members of IP team, seven were chaired for a face-to-face discussion at our welcome center. Facilitator after formal introduction started the session by sharing the background information about the PAR module as a part of his FAIMER project, updated them with the current status and shared a nominal question on how to assess these students on their attitude and communication skills. The participants responded to the nominal question by recording their ideas independently and privately. Then these ideas were shared with the group in a round-robin format with each participant sharing one item from their list. These ideas were recorded by a facilitator who documented the responses until all participants had no more original ideas. The facilitator then led a group discussion where each idea was discussed in turn, with similar ideas grouped together, and clarification provided. Then the meeting ended after 3 hours of discussion and upon consensus the communication checklist was prepared. Then this checklist was tested as a pilot study over 10 student-patient encounters and final version [Table 1a] was produced.

Before the start of the module, informed written consent was obtained from each student. The pretest Google Form link was shared with the students (first 15 min). Then, the PAR module was taught to them over 30 min via online mode (Google Meet). After the teaching session, the Google Form link for posttest assessment along with the open-ended feedback was sent to the students (last 15 min). The feedback from every 125 students was asked. Eighty-one students submitted the feedback in the form of open-ended questions. During the process of online teaching through Google Meet platform, our social activist gave her reflection toward attitude and communication part to the students. For assessment of communication skill among 125 first-year MBBS students, we used the OSCE communication checklist, by dividing them into 5 groups (25 students per group) and each student encountered with one patient both before and after implementation of the checklist. Total score of the checklist was 12 and any student who scored ≤10 was considered for reassessment. This checklist along with the guidelines [Table 1b] was given to the observer, that is, nursing staff on duty and the parents during the student-patient encounter to score the learner and to assess the communication skill, respectively.

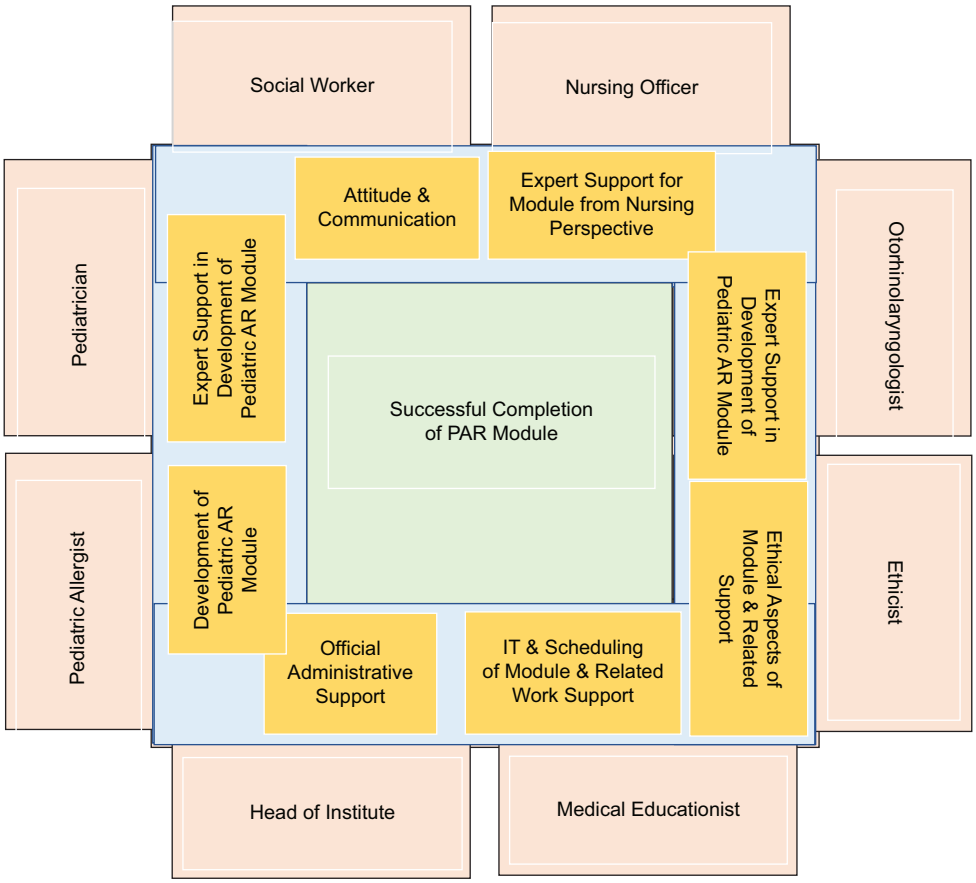

Figure 1: Roles and Responsibilities of Interprofessional Team

Table 1a: Communication Checklist

Checklist Items	Done (2)	Need improvement (1)	Not Done (0)
Greet			
Empathy			
Language			
Behavior			
Feedback			
Closing of the session			

#Highest Score=12, #Score ≤10 need improvement of the learner as a part of PAR module

For the students, demographic variables (age, gender) were collected. Marks obtained before and after the implementation of the module by 125 students were analyzed to assess their knowledge. The feedback from 81 students was taken at the end of the class in the form of open-ended questionnaire by Google Form, which was used as a transcript for analysis to know their opinion about for and against the module and any modifications needed. The student-patient encounter before and after implementation of the checklists and the feedback received from the parents as per the communication checklist guidelines [Table 1b] were also analyzed.

The evaluation of our PAR module was carried out to analyze its effectiveness. As our intervention (PAR module) was evaluated in terms of learning and as it was backward in nature, we have used Kirkpatrick's framework to evaluate it.[16] Pre- and post-analysis was done after both PAR module teaching and implementation of communication checklist, whereas student's feedback about the module and parent's feedback regarding student's communication skill were analyzed in terms of content analysis to decide the effectiveness of the course.

Statistical analysis

Double data checking was done by two separate persons. Data entry and data validation were done manually. Data normalcy was checked by Shapiro Wilk test. Categorical data were expressed in percentages and/or proportions. Continuous data were expressed in mean ± SD. Comparison of continuous data before and after the implementation of module and checklist was analyzed by paired *t*-test. All demographic descriptive data and paired *t*-test were analyzed in SPSS v 25 (IBM, New York, USA). Qualitative data were analyzed with Atlas.ti v8 (Scientific Software Development GmbH, Berlin, Germany) by quoting themes and categories for content analysis. For quantitative data analysis, $P < 0.05$ was considered to be significant.

Results

A total of 125 first-year MBBS students participated in this training program with a mean age of 20.4 years (1.80) and with a male: female ratio of 1.4:1. Those (100%) students

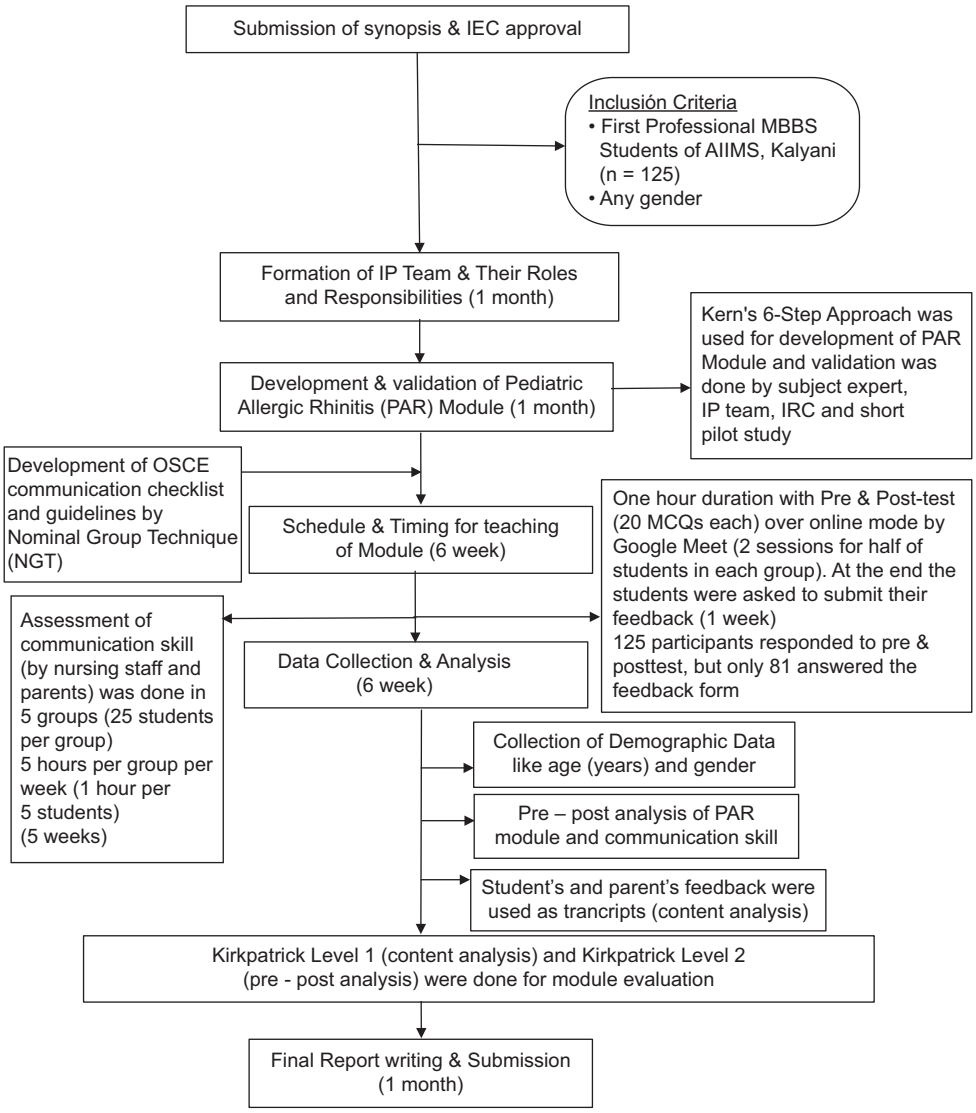

Figure 2: Study Flow Chart

Table 1b: Communication Checklist Guidelines for Observer

Checklist Items	Objective	Done (2)	Need improvement (1)	Not Done (0)
Greet	Learner should able to greet and introduce	Greet and introduce with proper respect which made patient comfortable	Just greet and introduce formally	No greet and introduction at all
Empathy	Learner should be able to be empathetic	Understand patient's health status with paying proper attention and show care and concern	Not paying proper attention	No empathy
Language	Learner should be able to discuss in patient's understandable language	Explained in detail about the disease status in patient's understandable language (Bengali)	Able to tell in Hindi language only	Able to tell in English language only
Behavior	Learner should be able to pay proper behavior toward patient	During the whole encounter the attitude of doctor toward patient was polite and listen to him/her without interruption	Attitude of doctor was interrupting while listening	Doctor was not in a mood to listen
Feedback	Learner should be able to get feedback from patient	The patient has been encouraged to ask questions and give feedback	The patient has been formally told to ask question if any	No feedback at all
Closing of the session	Learner should be able to close the session	Closes the session with summarization and acknowledgment	Abrupt closure with formal summarization or acknowledgment	Abrupt closure only

Table 2: Content Analysis of "For and Against" PAR Module by Students

Feedback for PAR in AETCOM	*n* (%)	Feedback against PAR in AETCOM	*n* (%)
Module is good & should be used as Early Clinical Exposure (ECE)	78 (96)	Case-based discussions	28 (34.6)
Help to give basic knowledge & treatment modalities of allergic rhinitis children	56 (69.2)	Study materials should be shared	17 (21.1)
Excellent method of teaching	34 (42.3)	Methods of assessment	15 (19.2)
Excellent interactions with students	17 (21.1)	Method of teaching	14 (17.3)
Approach the children with allergic rhinitis and their parents regarding social issues	15 (19.2)	Video demonstrations of skills	09 (11.5)
To be taught in other medical colleges	14 (17.3)	Network issues in online mode	03 (3.8)
General awareness for public	10 (13)	Course completion certificate	01 (1.9)

participated in the MCQs and OSCE communication checklist; however, only 81 (65%) students submitted their feedback about the module. Feedback regarding the communication skill with patients was received from 125 (100%) parents.

Student's learning (Kirkpatrick level 2)

There was a significant difference in the mean scores before (40.7 ± 9.4) and after (65.9 ± 18.3) implementation of PAR module; t (124) = -13.85, $P < 0.001$. There was a significant difference in the mean scores before (5.8 ± 1.25) and after (10.5 ± 0.6) implementation of OSCE communication checklist; t (124) = - 31.06, $P < 0.001$. None of the students scored less than 10 out of the total score of 12.

Student's reaction (Kirkpatrick level 1)

Content analysis (a research tool to identify specific words/themes/concepts in a given qualitative data as per the context) was done depending upon the responses received from 81 participants out of the 125 students at the end of the session as feedback [Table 2]. Seventy-eight students (96%) were in support of this module as a part of early clinical exposure. Fifty-six students (69%) said that module is good in giving basic knowledge about AR and how to treat AR children. Thirty-four students (42%) were about the opinion of excellent teaching capabilities of the faculties, and seventeen students (21%) were in favor of excellent interaction during the teaching. Fifteen students (19%) were in support of inclusion of this module as a part of approach and social issues related with AR children and fourteen students (17%) in support of this module to be taught in other medical colleges. Ten students (13%) were in favor of this module as a part of general awareness among public. Twenty-eight students (34.6%) said that it would have been better if it had been something like case-based discussions. Seventeen students (21%) were urged to share slides after the end of the session, so that they can use this as per their reference when needed, and fifteen (19%) were in support of different questions to be formulated for pre- and posttest assessments. Video demonstrations of the procedures like immunotherapy and skin prick tests and slow pace of teaching would have been better for their understanding as per nine students (11%). Fourteen students (17%) were in support of increasing the duration of teaching hours and changing the timing of the class as they are getting tired at the end of the day.

Parent's reaction (Kirkpatrick level 1)

A total of 125 parents were asked to give feedback about the student's communication skill during their encounter, and content analysis was done [Table 3]. Depending upon their response, thirty-three students were explained about the different parts of communication skill again thoroughly.

Discussion

There was a significant improvement in knowledge of students about pediatric AR and their treatments after the implementation of the module as evidenced by the analysis. So, this means there is a significant effect of pretest and posttest assessment system on our teaching learning methodology which is also supported by previous studies.[17-20] One of the studies stated that pretests with MCQs enhance learning.[20] As per the study done by Muthukumar *et al*.[18] posttests normally give instant feedback to the students about their level of understanding of that lecture topic and MCQs also train the students for in-depth learning of the subject. Pre- and posttest designs are widely used in behavioral research.[19] Therefore, our study suggests that introduction of pre- and posttest MCQs in implementing the pediatric AR module supported the achievement of our learning objectives.

Interpretation of parent's feedback on student's communication skills (content analysis based upon supplied checklist guidelines) is a bit interesting as almost every student was in support of this module; however, some modifications are needed. Most of the students had an opinion that the module is good in terms of giving knowledge and treatment about AR. The teaching methods of the faculties were excellent. As per approximately one-fourth of the students, the module should be a part of their early clinical exposure in their medical curriculum. How to approach the parents and the children was well explained. With these responses from the students, this module will help in incorporating new teaching–learning approaches on attitude, ethics, and communication, which is known as AETCOM module[11-13] as a part of medical curriculum established by the Medical Council of India. Several students were in support of sharing the study materials like slides/power points after the end of the session, some were in support of live clinical case demonstration along

Table 3: Content Analysis of Parent's Feedback about Student's Communication Skill

For Students	*n* (%)	Against Students	*n* (%)
Proper greet	125 (100)	They were facing difficulties in closing the session	33 (30.7)
Students were empathetic	118 (94.4)	Not able to ask for feedback	27 (21.6)
Students were paying proper behavior	107 (85.6)	Language problem	17 (13.6)

with the online teaching, and there should be different sets of questions for pre- and posttest. Video demonstrations of the procedures like immunotherapy and skin prick tests, slow pace of teaching, and case-based learning would have been better as per some students. Some students were in favor of increasing the duration of class and changing the timing schedule for better understanding. Giving feedback is an important skill for lecturers in higher education and has a major influence on the quality of the student's learning process.[21,22] The content of feedback will definitely help in improving the teaching–learning methodology.[21]

OSCE communication scale is one of the assessment methods for affective domain of students learning.[22] In our study we have used our own validated communication scale, but there are other prevalidated communication checklists available;[23] however, the scores obtained by the students do not always match with their affective domain.[23,24] Inspite of the increasing demand for communication skill training among medical graduates, there is a lack of a generally accepted definition of adequate physician–patient communication.[24] There are many advantages of OSCE communication checklists; out of which, the following are the most often encountered causes like, students receive immediate feedback on their performance and deficits and it enables educators to identify those medical students with significant deficits and by which relevant remedial measures can be carried out.[25] Furthermore, summative assessments like semester examinations could result in the denial of graduation in case of unqualified students to prevent damage from future patients.[26] To assess communication skills, most medical schools established the OSCE using interactions with standardized patients.[27] Some of the OSCEs address the assessment of communication skills in an integrated way as part of other clinical tasks, whereas some OSCEs exclusively focus on the assessment of communication skills.[27-29]

The PAR module should be included in the current medical curriculum as a part of AETCOM with some modification in the existing module as per the feedback received. This module in its present status will increase the cognitive and affective domain of learning. As a part of early clinical exposure, it will definitely create an awareness among the students which will be circulated with their peers and relatives in a long run and in this way our vision will be a success. This module after modification can be taught in other medical colleges, so that basic knowledge about this common disease can be shared and with that awareness about the long term complication like asthma can be maximized up to a great extent which will indirectly increase the quality of life of children. We have also planned to implement this module among our nursing students (one batch completed with 20 nursing students) and we are in the process of making animated version of this module with modifications as suggested and AETCOM part.

Limitation of the study

Our study was also not devoid of limitations. Major limitation was that this module was totally covered over an online mode and we were not able to receive feedback from all the students. It was not possible to include live case demonstrations due to the COVID 19 pandemic. The different sets of questions for pre- and posttest would have been better, but could not be implemented because of the serious constraint in the manpower and resources due to the pandemic. As per the protocol, the module was taught over 30 min and it would have been better if it was taught over a longer duration so that the active involvement of participants would have been more. Moreover, the timing allotted for online teaching was in the evening hour which was a major concern in itself during this pandemic as the students were getting fatigue after attending their routine lectures.

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Conflicts of interest

There are no conflicts of interest.

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