

# Effect of Corona Pandemic on Learning Anatomy Subject among First Year MBBS Students

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## ABSTRACT

**Introduction:** The emergence of Corona Pandemic situation in India during March 2020 forced the institutes to send students to their respective hometowns. Faculty had no option but to continue teaching online in such situation. In comparison to other basic medical science subjects, learning anatomy online was felt difficult as the students were unable to understand the three dimensional spatial orientation of structures in human body. Rising concerns among students urged to evaluate strength and weakness of ongoing online teaching and learning methods.

**Aim:** To compare the effectiveness of teaching anatomy subject online with that of classroom teaching and also to compare Google classroom with Google meet for anatomy theory and practical online teaching.

**Materials and Methods:** The study was done using pre-designed four sets of Multiple choice questionnaires, among first year MBBS students, in Apollo Institute of Medical Sciences

and Research, Chittoor, Andhra Pradesh, India. The opinion about classroom and online teaching were anonymously retrieved through Google forms and analysed on excel sheet to derive descriptive statistical data.

**Results:** Out of 154 students, 98 students submitted their response for the questionnaire. Regarding anatomy theory and practical online sessions, 76 (77%) and 86 (88%), respectively opined that classroom teaching was better. Majority felt the lack of opportunity to develop practical skills (dissection) 78 (79.6%), faced problems due to lack of study materials 68 (69.4%) and felt the lack of study environment 61 (62.2%) and connectivity problems 61 (62.2%). Accessibility 52 (53%) and downloading 78 (79.6%) was good with Google classroom while live interactions 79 (80.6%) and audio-visual quality 45 (45.9%) was better with Google meet.

**Conclusion:** Students preferred classroom teaching over online teaching for anatomy subject. Between the platforms used in online teaching, Google meet has an edge over Google classroom in terms of learning.

**Keywords:** Classroom teaching, Google classroom, Google meet, Online teaching

## INTRODUCTION

As stated by Hippocrates "Anatomy is the basis of medical disclosure" [1]. The fundamental subject to be learnt by a health professional is anatomy, as it is the prime and most important speciality in basic medical sciences that forms the foundation stone for other specialties. Teaching and learning anatomy started during the 300 BC period [2]. In the modern era, anatomy is taught in medical colleges through didactic lectures, dissection of human cadavers, osteology demonstration, radiological images, histology practical and embryology models teaching. Learning anatomy subject by medical students is different in comparison to the other basic medical science subjects, as it includes learning the basic foundation skills like experiencing the texture, exploring tissue planes, learning structural relations, handling of tissues and organs of the human body through dissection and other practical classes. Mastering these skills is must to treat health illnesses medically or surgically [3]. Various methods of teaching and learning anatomy are in existence around the globe. But in countries deprived of resources, virtual learning environment was implemented for cost effectiveness and feasibility [4]. With the emergence of corona pandemic situation and students being away from colleges due to lockdown, online classes were implemented to continue the medical education uninterrupted in India as advised by medical universities. Different online teaching platforms like Zoom, Google meet, Google classroom etc., were introduced in various institutes [5]. Objectives of anatomy teaching appeared to be unfulfilled as the students felt lack of three dimensional orientation towards the structures in human body [6]. Anxiety and stress due to online teaching were exhibited by students during the pandemic [7-9].

Hence, this study was done to explore and evaluate the merits and demerits of online teaching-learning based on student experiences.

Simultaneously, comparison was done to suggest the better online teaching platform among Google classroom and Google meet in the current pandemic situation. Mood disturbances associated with online teaching were also evaluated.

## MATERIALS AND METHODS

This cross-sectional study was conducted among first year MBBS students (regulars and repeaters) of Apollo Institute of Medical Sciences and Research, Chittoor, Andhra Pradesh, India, in the month of July 2020. Informed consent was taken from the students through Google forms. This study was conducted after approval from Scientific Research Committee, (letter dated 01-08-2020: AIMS/R/04-2020).

**Inclusion criteria:** First year MBBS students, who underwent both, classroom teaching from September 2019 till March 2020 followed by online teaching during April 2020 to June 2020.

**Exclusion criteria:** The students that did not consented or did not attend the respective classroom and online teaching sessions.

As per the institute protocol, the classroom teaching includes six hours of theory and 12 hours of practical classes per week. Limbs, thorax, head and neck syllabus is taught through PowerPoint lectures, osteology demonstrations, dissection and histology practical.

Online teaching protocol- During April 2020 to June 2020 Anatomy subject was taught online through Google classroom and Google meet platforms. Six hours of theory and 12 hours of practical classes per week, theory sessions were of one hour each, each dissection and histology practical session was of two-hours duration, in-total 130 hours of anatomy online teaching was done. Abdomen, pelvis and brain portion of anatomy was taught online in three months duration. Theory lecture classes were dealt using PowerPoint with

audio-narration incorporated on Google Classroom, while some of the teachers taught PowerPoint lectures on Google meet. Dissection practical were taught using images and videos of prosected specimens, pictures of tissue slides and bones were posted during histology and osteology online classes, respectively.

**Study tool:** Based on the opinion of anatomy faculty and the concerns of students involved in online teaching and learning, various issues like understanding ability, practical skill development, accessibility, connectivity issues, stress factors etc., were considered. The Multiple Choice Questions (MCQ's) in Google form were framed to obtain the following information from the students.

- Students opinion about anatomy online theory and practical classes;
- Difficulties faced during online learning;
- Comparison between Google classroom and Google meet;
- Learning problems due to mood changes during pandemic lockdown.

Validation of the questionnaire was done by in-house discussions with the authors. The Google form was posted in Google classroom to all 154 students. They were conveyed that the participation in this study was voluntary and instructed not to mention their name or roll numbers, so as to get unbiased response from the students. One week's time was given to the students to submit their response without any reminders sent.

## STATISTICAL ANALYSIS

The data was transferred to excel sheet and analysis was done on various parameters to derive descriptive statistics between classroom teaching and online teaching, here none of the inferential statistics was done. Within the online platform teaching, comparative analysis was done between Google classroom and Google meet.

## RESULTS

Out of 154 students, 98 students submitted their response for the questionnaire which have been tabulated and analysed.

**Opinion on anatomy online theory and practical teaching:** Total of 76 (77%) (average of all type of theory classes) students opined that classroom teaching was better for the anatomy theory teaching. A small group of students 7 (7.1%) had inclination for online teaching, 86 (87.7%) (average of all type of practical classes) students opined classroom teaching better for anatomy practical teaching [Table/Fig-1].

| Type of classes                 | Opinion of students               |  |  |
|---------------------------------|-----------------------------------|--|--|
|                                 | Same as classroom teaching (N=98) | Classroom teaching better than online classes (N=98) | Online classes better than classroom teaching (N=98) |
| Gross anatomy theory classes    | 7 (7.1%)                          | 84 (85.7%)   | 7 (7.1%)   |
| Histology theory classes        | 21 (21.4%)                        | 71 (72.4%)   | 6 (6.1%)   |
| Embryology theory classes       | 19 (19.4%)                        | 72 (73.5%)   | 7 (7.1%)   |
| Gross anatomy dissection        | 1 (0.9%)                          | 87 (88.8%)   | 10 (10.2%)   |
| Histology practical classes     | 5 (5.1%)                          | 86 (87.7%)   | 7 (7.1%)   |
| Osteology demonstration classes | 7 (7.1%)                          | 86 (87.7%)   | 5 (5.1%)   |

[Table/Fig-1]: Student's opinion about anatomy online theory and practical classes.

**Problems faced during learning online anatomy:** Total 78 (79.6%) students felt the lack of opportunity to develop practical skills, 68 (69.4%) faced problems due to lack of study materials, 61 (62.2%) felt the lack of study environment and connectivity problems [Table/Fig-2].

| List of difficulties faced during online learning                  | Students experiencing the difficulties (N=98) |
|--|---|
| Lack of study material (text books)                                | 68 (69.4%)                                    |
| Lack of proper gadgets (laptops or android phones)                 | 24 (24.5%)                                    |
| Lack of proper connectivity  | 61 (62.2%)                                    |
| Economic problems  | 9 (9.2%)                                      |
| Quality of video uploaded and data required to access              | 31 (31.6%)                                    |
| Lack of time due to involvement in household activities            | 41 (41.8%)                                    |
| Lack of communication for combined studies                         | 42 (42.8%)                                    |
| Loss of interest towards studies during lockdown due to loneliness | 46 (46.9%)                                    |
| Studies distracted from members of family                          | 34 (34.7%)                                    |
| Lack of study environment/peer interaction                         | 61 (62.2%)                                    |
| Disturbances in learning due to uncertainty of curriculum schedule | 49 (50%)                                      |
| Lack of opportunity for practical skills development               | 78 (79.6%)                                    |

[Table/Fig-2]: Difficulties faced during online learning.

**Comparison between Google classroom and Google meet:** Accessibility 52 (53%) and downloading 78 (79.6%) was good with Google classroom. While live interactions 79 (80.6%) and audio-visual quality 45 (45.9%) was better with Google meet [Table/Fig-3].

| Criteria  | Opinion of students     |                    |             |
|---|-------------------------|--------------------|-------------|
|   | Google classroom (N=98) | Google meet (N=98) | Both (N=98) |
| Accessibility in-terms of connectivity and data usage was easy with | 52 (53%)                | 8 (8.1%)           | 38 (38.8%)  |
| Downloading lecture file (PPT/ video) and revising was easy with    | 78 (79.6%)              | 6 (6.1%)           | 14 (14.3%)  |
| It is easy to follow the lecture content with                       | 39 (39.8%)              | 43 (43.9%)         | 16 (16.3%)  |
| Live interactions during the lecture was possible with              | 11 (11.2%)              | 79 (80.6%)         | 8 (8.2%)    |
| Audio-visual quality of the lecture was good with                   | 30 (30.6%)              | 45 (45.9%)         | 23 (23.5%)  |
| Which one requires huge amount of internet data                     | 7 (7.1%)                | 80 (81.6%)         | 11 (11.2%)  |

[Table/Fig-3]: Comparison between Google classroom and Google meet.

**Status of mood and its impact on learning anatomy due to lockdown:** Many {56 (57.1%)} felt sad due to lack of social contact and unable to cope up with online teaching [Table/Fig-4].

| Mood disturbances | Students response (N=98) |
|-------------------|--------------------------|
| Feeling happy     | 1 (1%)                   |
| Feeling sad       | 56 (57.1%)               |
| Feeling usual     | 41 (41.8%)               |

[Table/Fig-4]: Mood changes due to pandemic lockdown, online classes and lack of peer interactions.

## DISCUSSION

This study was aimed to know the effectiveness of teaching anatomy subject online during the COVID-19 pandemic and was compared with classroom teaching, which the students underwent during pre-pandemic period. The students anonymously and spontaneously opined that classroom teaching is best for the subject. They expressed that neither theoretical nor practical aspects of anatomy could be learnt effectively online. Theory classes have an edge over online practical classes, because the practical aspects of anatomy are difficult to comprehend and perceive from the online classes. Development of skills among students in the medical field can only happen within the college classroom teaching with live interactions between the teacher and students. In a survey by Roy H et al., using flipped classroom on selected set of topics, mixed response was reported about the online anatomy teaching from the students who

expressed desire for the classroom teaching post-lockdown [5]. In the current study, the responses of the students conveyed that online teaching of both theoretical and practical aspects of anatomy was not as effective as classroom teaching. Inability to learn practical aspects of anatomy on virtual platform was major concern among students. A further and sizeable, challenge of teaching human anatomy online is the absence of tactile/experiential learning through dissection or handling of real anatomical specimen [10]. It has been suggested that the dissection plays an important role in the medical training. This is attributed to the development of cognitive, psychomotor and affective domains of learning [4,10].

Significant percentage of students also had other problems related to insufficient or lack of study materials, network and connectivity issues, lack of study environment at home and affecting their learning capacity of the subject as found in study by Doherty OD et al., [11]. Similar opinion was expressed by Chang CA et al., where they mentioned online teaching depends on a good internet service [4]. Bringing any newer methodology of teaching requires three most important aspects both with the learner or the teacher: motivation, awareness and availability of appropriate resources and tools. In the current pandemic situation with abruptness and uncertainty of the lockdown, students failed to carry the study material and the motivation was at the lowest [10].

Mood changes among students due to online teaching during corona pandemic were a major concern in the study which further diminished their learning abilities. Majority of the students expressed sad mood. Lack of peer to peer interactions further aggravated the mood changes. Saade RG et al., in his study on online learning observed students expressing anxiety [12]. Further Barr B, reported that students that underwent online teaching in higher education were found lagging in mental health and wellness [13]. More than 5% of online students exhibited mental illness and could not complete their degree [14]. Barr B, reported that the mental issues were addressed by the teacher-student interactions and were sorted out in the traditional classroom teaching, which is lacking now [13]. The students gave a divided opinion about Google classroom and Google meet online platforms, as both had pros and cons. Regarding Google classroom positive opinion was expressed for accessibility, downloading of study content and less data requirement, but live interactions and audiovisual quality was missing. Similar observations were made by Dash S, about Google classroom [15]. In case of Google meet, classes were lively and interactive with audiovisual quality, but required lot of data and offline revisions was not possible.

Overall, the present findings indicate online teaching is not the preferred mode for teaching anatomy subject. But Google meet is better platform in comparison to Google classroom during the COVID-19 pandemic.

### Limitation(s)

The limitations of the current study are that, opinion of teachers about online teaching of anatomy subject has not been studied.

Online teaching platforms in this study were limited to Google meet and Google classroom only.

## CONCLUSION(S)

The present study revealed that for anatomy teaching, online platform cannot replace the classroom teaching. But in emergent situation like the corona pandemic, Google meet was the preferred online teaching platform as per the students' opinion, which helped them to understand the anatomy subject better compared to Google classroom. In conclusion, online teaching is just a stopgap option for teaching anatomy subject in the current scenario of Covid-19 pandemic. Students need to be taught the practical aspects once they return back to the college, post-lockdown. During the period of uncertainty or even during normal condition establishing a registered learning management system and video recording facility for lectures, practical, live demonstration of dissection and specimens would facilitate the learning.

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