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# The effectiveness of synchronous online clinics and conventional clinics among medical students: Assessing the influence of e-learning

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## Abstract:

The COVID-19 pandemic presented challenges that led to the development of on-line learning, emphasizing how important it is for students to have access to quality education. This study was conducted to compare the efficacy of synchronous on-line and conventional clinics and the perception of students. This study was conducted over 12 months from November 2020. A total of 78 Phase 4 students were divided into six batches by convenient sampling based on roll numbers; each batch was again subdivided into two: Group A received conventional clinics and Group B received on-line synchronous clinics. Postsession multiple choice questions (MCQs) were conducted immediately after the session and again 2 weeks later to avoid recall bias. Perception was analyzed by Likert scale. The unpaired t-test was utilized for normally distributed continuous data and the Mann–Whitney U test for non-normally distributed or ordinal data to conduct statistical comparisons between the two groups. The assessment of e-learning between the two groups showed no significant difference, although the online group exhibited comparatively lower recall test scores compared to their post-test scores, even if not reach statistical significance. A significantly higher proportion of students in the conventional group expressed confidence in their exam performance and believed that traditional sessions were preferable for future learning endeavors. Most medical students stated that they preferred conventional clinics over e-learning education. Students felt that there was a difference between these two teaching methods' perceived efficacy and general attitudes.

## Keywords:

Conventional clinics, COVID-19 pandemic, medical education, student's perception, synchronous online education

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## Introduction

The novel coronavirus disease (COVID-19) first appeared in Wuhan city of China at the end of last year. The rapid worldwide spreading of COVID-19 prompted the World Health Organization (WHO) to declare it a "pandemic" on 11 March 2020.<sup>[1,2]</sup> On March 24, 2020, India implemented a statewide lockdown as a result of this. The University Grants Commission (UGC) later made e-learning mandatory for medical and nursing students countrywide as an alternate teaching

technique, moving from the prepandemic nonrequired status of online learning in academic institutions.<sup>[3,4]</sup> Medical schools, which are well known for their demanding workload and demanding curriculum, have historically subjected students to an unbroken stream of lectures with few breaks.<sup>[5-8]</sup> In response to the issues the epidemic presented in supporting effective teaching and learning, medical schools worldwide moved to online instruction for both undergraduate and postgraduate programs.<sup>[9,10]</sup>

Global changes were quickly made to the curriculum's delivery strategy and

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methodology to meet the demands of the COVID-19 pandemic.<sup>[11,12]</sup> The hybrid online learning model, which combines synchronous and asynchronous approaches, presents a significant challenge in mitigating risks like cheating and undesirable student behaviors because it allows for less teacher control and lowers student engagement compared to traditional classroom settings.<sup>[13]</sup>

There are two types of online learning: synchronous and asynchronous. Teachers and students engage in real-time communication through synchronous learning platforms like web chats, video conferences, and audio conferencing. Conversely, asynchronous teaching involves making recorded lessons available to students whenever it's convenient for them via email, previous video recordings, and discussion boards. Literature comparing the efficacy of traditional clinics versus internet clinics is conspicuously lacking. One of the main issues with synchronous online learning is that both teachers and students may have limited internet connection. This restriction is being addressed by new e-learning platforms like Moodle, which is acknowledged as the official e-learning platform of Kerala University of Health Sciences (KUHS).

In their final year of the undergraduate course in Medicine and Surgery, De Ponti *et al.*<sup>[14]</sup> found that using virtual reality for training proved advantageous and satisfied the expectations of most students. Their conclusions highlight the value of integrating these resources with conventional bedside training and support the ongoing use of online access to them. According to the findings of Khalil *et al.*,<sup>[15]</sup> preclinical students indicated a greater preference than clinical students for online lectures in the upcoming academic year. Furthermore, as an alternative to traditional quality improvement education, Khurshid *et al.*<sup>[16]</sup> highlighted the viability and effectiveness of virtual quality improvement training for healthcare professionals and students, which is critical in boosting competence and confidence to improve the healthcare system in the post-COVID environment. Considered a disruptor, the pandemic offers a chance to restructure the existing traditional classroom-based educational system.<sup>[17]</sup> To inform educators about the effectiveness and acceptability of these various teaching modalities, this study was conducted to compare the immediate and delayed learning outcomes, as well as student perceptions, between Phase 4 medical students who participated in synchronous online clinics and those who participated in conventional clinics during the COVID-19 pandemic.

## Materials and Methods

The study was conducted over nine months for Phase 4 students posted in Obstetrics and Gynecology (OBG)

at the Amala Institute of Medical Sciences, Thrissur, from January to September 2021. Convenient sampling was used to select the study's sample size of a total of 78 Phase 3 Part 2 students. Only participants who voluntarily consented to the study were included, while nonattending students were excluded from the analysis.

## Study Protocol

All the 78 Phase 4 students gave their informed consent after receiving approval from the Institutional Ethics Committee (11/IEC/21/AIMS-52) and Institutional Review Board (IRB). Subsequently, the students were split into six batches, and they were further split into two groups (Group A and Group B) utilizing convenient sampling based on roll numbers. To limit outside influences on the study, students were informed about its purpose and assured that it would not affect their sessional grades before it. It was stressed to follow instructions. Six sessions of the clinical session on Instrumental Vaginal Delivery were taught by the same teacher (the author), both conventionally and virtually. The sessions included forceps and vacuum demonstrations on the pelvis and fetal skull. Every student either used the traditional mode or the online mode.

Six exposures (six conventional and six online sessions) were made up of Group B's online clinics and Group A's traditional clinical classes. To reduce recall bias, post-session multiple-choice questions (MCQs) were given out twice: once right away and again after two weeks. The two modes of learning scores, which were shown as mean/pass percentage scores, were contrasted. A Likert scale was used to gauge the student's opinions on the value of education, time management, difficulties they had encountered, and their preferences for the future. Learning was assessed using multiple-choice questions (MCQs) on the same day and two weeks later.

## Statistical Analysis

After the data were gathered and organized into an MS Excel spreadsheet, SPSS® was used to perform the analysis. The unpaired *t*-test was utilized for normally distributed continuous data and the Mann-Whitney U test for non-normally distributed or ordinal data to conduct statistical comparisons between the two groups (conventional and online clinics).

## Results

Of the 78 students, 63 students actively participated. They completed the post-test right away, took the recall exam two weeks later, and attended traditional or online classes. A total of 32 students were enrolled in Group B (online classes), and 31 students were in Group A (conventional classes) [Table 1].

### Assessment of Learning

There was no discernible difference in the two groups' assessments of their learning [Table 2]. Though this difference has not yet reached statistical significance, the online group's recall test scores are still somewhat lower than their post-test results. This finding implied that memory retention might be a little lower with online clinics in comparison to traditional clinics.

### Gender Analysis Group A and Group B

Tables 3 and 4 showed that there was no discernible difference between boys' and girls' assessments of their learning in traditional and online clinics. In the context of online clinics, boys appeared to perform better than girls, even though this difference was not statistically significant.

### Perception Analysis

The perception analysis showed that both the groups gained similar knowledge and understanding from discussions, and that they benefited equally from them. Remarkably, both the groups concurred that peer groups had an impact on their educational experiences. The Conventional group, on the other hand, thought that talks were more impressive, saved time and effort, and showed a greater interest in clinical medicine [Table 5]. Significantly, more students in the Conventional group felt that these types of sessions were the best option and expressed confidence in their ability to perform better

**Table 1: Allocation table**

Type of clinic	Girls	Boys	Total
Conventional (Group A)	23	8	31
Online clinic (Group B)	27	5	32

**Table 2: Assessment of learning**

Group	n	Post test	Recall test
Conventional clinic (A)	31	8.55±1.43	7.48±1.50
Online clinic (B)	32	8.69±1.28	7±1.90

Values are expressed as mean±standard deviation. The comparison between the post-test and recall test in Group A and Group B did not yield statistically significant results

**Table 3: Gender analysis group A**

Gender	n	Post test	Recall test
Female	23	8.65±1.11	7.70±1.52
Male	8	8.25±2.19	6.86±1.36

Values are expressed as mean±standard deviation. The comparison between the post-test and recall test among females and males in Group A did not yield statistically significant results

**Table 4: Gender analysis group B**

Gender	n	Post test	Recall test
Female	27	8.67±1.24	6.93±2.02
Male	5	8.8±1.64	7.4±1.14

Values are expressed as mean±standard deviation. The comparison between the post-test and recall test among females and males in group B did not yield statistically significant results

in exams. On the other hand, a sizeable segment of the virtual group stated that difficulties with technology impeded their ability to learn.

### Discussion

Due to the nationwide lockdown, travel restrictions, and other measures implemented to stop the spread of COVID-19, medical education in India has been disrupted since March 2020. Various medical colleges and universities have been attempting to deal with this difficult situation by utilizing a variety of online teaching methods.<sup>[18]</sup> Real-time synchronous learning takes place. On the other hand, asynchronous learning takes place online in the absence of real-time communication, where it does not require daily attention from the instructors. Every form has benefits and drawbacks. Live synchronous learning environments, for example, offer the benefit of instantaneous interactions and individualized attention. Furthermore, synchronous learning avoids misconceptions about the material. Conversely, the benefit of asynchronous learning experiences is their great temporal flexibility. Students do not have to worry about technical difficulties like internet outages to access their coursework. Our research revealed a greater inclination among students towards synchronous learning. This observation demonstrated a significant bias in favor of synchronous learning approaches and was in line with the survey's results.

Research on the effectiveness of online clinics is scarce, despite the abundance of literature on online theory teaching. This study examines the perceptions and assessments of learning of students who attended traditional clinics versus online clinics. Based on test results taken immediately following the session and two weeks later (recall test), it is evident from the results that the online classes are just as effective as traditional clinics in terms of knowledge transfer. This was confirmed by Hensley et al.who found that most students preferred online instruction because it was more convenient and allowed for greater flexibility in the rhythm and pace of learning.<sup>[19]</sup> According to our research, there was a minor difference in the two groups' memory retention, with the conventional approach providing some benefit, but not a statistically significant one. As anticipated, both the groups' recall scores are significantly lower, but there is not a discernible intergroup difference. Our study's findings indicated that boys had a slight advantage in online sessions, but it is important to remember that there were significantly fewer boys than girls in this batch.

Due to the lack of interpersonal interaction and inadequate online infrastructure, the majority of medical students expressed a preference for in-person instruction over online learning. This suggested that

**Table 5: Perception analysis**

No	Questions	Group	Agree	Disagree	Neutral	P
1	Benefited from discussion	A	33	0	1	0.072 <sup>NS</sup>
		B	25	1	5	
2	Improved interest in clinical medicine	A	30	0	4	0.01 <sup>S</sup>
		B	19	4	8	
3	Discussion was impressive	A	34	0	0	0.008 <sup>S</sup>
		B	25	1	5	
4	Gained knowledge and understanding of topic	A	32	0	2	0.280 <sup>NS</sup>
		B	26	1	4	
5	Presence of peer group influence in learning	A	25	3	6	0.727 <sup>NS</sup>
		B	20	4	7	
6	Saves time and effort	A	28	1	5	0.019 <sup>S</sup>
		B	17	7	7	
7	Technical issues hindered by learning	A	11	14	9	0.0001 <sup>HS</sup>
		B	26	2	3	
8	It will help me perform better in my exam	A	28	1	5	0.0001 <sup>HS</sup>
		B	11	9	11	
9	I would prefer such sessions as the way forward	A	29	1	4	0.0001 <sup>HS</sup>
		B	11	11	8	

Perceptions of students obtained via Likert scale: Aggregated analysis of 'Strongly Agree' and 'Agree,' as well as 'Disagree' and 'Strongly Disagree' categories for enhanced analytical clarity. Statistical analysis of A versus B; if P value is 0.0001 and 0.001, it is highly significant (HS); if P value is 0.01, it is significant (S); and NS, not significant

a hybrid learning approach could be included in the medical curriculum to improve student learning<sup>[20]</sup> The two groups' perceptions of the benefits of discussion, knowledge, and understanding, as well as the influence of their peers on learning, are similar in this regard. The students in Group A showed a markedly greater interest in clinical medicine, were more efficient with their time, and thought that the discussion went more smoothly. The vast majority of online students (83.8%) believed that technical difficulties impeded their ability to learn, which may be the primary barrier to e-learning that can be overcome in the future with technological advancements. This is consistent with a study by Alsoufi *et al.*<sup>[21]</sup> that discovered respondents to online medical education programs put in place in Libya in response to COVID-19 had a negative experience with them.

Group A and Group B's differing perspectives highlight their different beliefs regarding the effectiveness of traditional and virtual learning approaches. Online platforms are acknowledged as an excellent teaching tool for undergraduate clinical medicine, even though further research is necessary to fully understand the advantages and disadvantages of e-learning technologies.<sup>[22]</sup> The Pei and Wu<sup>[23]</sup> (2019) study highlights the need for more research data to make definitive conclusions, even though it indicated that online learning is at least as effective as offline learning in undergraduate medical education. The need for more research to provide a thorough understanding of the relative efficacy of online versus offline learning is highlighted by the variability in experimental designs, which includes variations in participants, learning goals, intervention durations,

and forms of online learning. A blended approach to medical education has also been largely supported by other published reports.<sup>[24]</sup>

Online learning has made students feel more alone and disconnected, which is bad for their mental health. This is especially true for educators and students studying medicine who are already under stress, especially those from underrepresented backgrounds who already experience discrimination in their medical education.<sup>[25,26]</sup> In the post-COVID era, 55% of the students supported a hybrid model that combined traditional and online instruction, compared to 32% who preferred conventional instruction and 13% who preferred online or e-learning, according to a study by Hameed *et al.*<sup>[27]</sup>

The previous research, as supported by Damoun *et al.*, indicated that students believed traditional clinics to be more effective than synchronous online clinics.<sup>[28]</sup> Whereas, Sawarkar *et al.* found that the successful introduction of the e-learning model has led to increased student demands for resource material, minimal faculty skill gaps, and technical issues.<sup>[29]</sup> However, there is a pressing need to enhance the existing teaching framework and teacher preparedness through the incorporation of online assignments and assessment methods, bolstering digital infrastructure in medical schools, and providing training support for teachers.<sup>[30]</sup>

### Limitations

The intervention's chosen topic was instrumental delivery; in conventional clinics, all the students participated in hands-on learning activities using the



instruments, which included the pelvis and skull. One challenge for online learning is making an experience that nearly replicates a real-world hands-on experience. Because there are differences in the clinical teaching methods and tools used in different settings, the findings of this study cannot be applied universally.

## Conclusion

Students held the belief that traditional clinics were more effective than synchronous online clinics, as they were perceived as time saving and indicative of a greater interest in clinical medicine. A notable portion of the virtual group reported technological challenges hindering their learning experience. In the near future, uninterrupted network connectivity is expected to be readily achievable and plays a crucial role in facilitating the seamless integration of hybrid teaching methods in medical education.

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## Conflicts of interest

There are no conflicts of interest.

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