

Online Team-Based Learning for Teaching Antenatal Care during COVID- 19 Pandemic

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ABSTRACT

Background : Covid 19 era bring learning to be more distant via internet. Many students' engagement methods applied in this context. The present study aims to enhance students' engagement in the learning process through application of online Team Based Learning in teaching antenatal care in fourth year medical students during COVID 19 period .

Methods : A pilot intervention study was used to test the online team based learning application for teaching antenatal care partition of Community medicine curriculum during COVID-19 period. Then, the study was implemented on two sessions through two academic years for the large group fourth-year medical students of College of Medicine, University of Mosul, Iraq. Google classroom, Google form, Telegram and Zoom platform was the online platform that used for application of the study .

Results : A total of 389 students were voluntarily participated in the study from two different academic years. There was significant improvement in the students' performance obtained from team readiness assurance test in compares to individual readiness assurance test at each session's application. Students give high satisfaction for TBL as a better way of teaching comparing to traditional teaching methods .

Conclusion : Pear's study has positive impact on students' understanding and when used online make the teaching easier and enjoyable .

Keywords: Team-Based Learning, Maternal and Child Health, Online Teaching, Covid19, Crises .

التعلم القائم على الفريق عبر الإنترنت لتعليم رعاية ما قبل الولادة أثناء جائحة COVID- 19

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الخلاصة

الخلفية : عصر وباء كوفيد جعل التعلم ليكون عن بعد عبر الإنترنت. في هذا السياق تم تطبيق العديد من الطرق لأشراك الطلبة في التعليم. تهدف الدراسة الحالية إلى تعزيز مشاركة الطلاب في عملية التعلم من خلال تطبيق التعلم القائم على الفريق عبر الإنترنت في تدريس الرعاية ما قبل الولادة في طلاب السنة الرابعة من كلية الطب خلال فترة COVID-19 .

الطريقة : تم استخدام دراسة تدخل تجريبية لاختبار تطبيق التعلم القائم على الفريق عبر الإنترنت لتدريس الرعاية الحوامل قبل الولادة من ضمن منهج طب المجتمع خلال فترة COVID-19. بعد ذلك، تم تنفيذ الدراسة على دورتين خلال سنتين دراسيتين لمجموعة كبيرة من طلاب السنة الرابعة في كلية الطب، جامعة الموصل، العراق. تم استخدام البرامج Google classroom و Google form و Telegram و Zoom لتطبيق الدراسة .

النتائج : شارك ما مجموعه 389 طالبًا طوعًا في الدراسة من عامين دراسيين مختلفين. كان هناك تحسن كبير في أداء الطلاب الذي تم الحصول عليه من اختبار ضمان استعداد الفريق مقارنة باختبار ضمان الجاهزية الفردية في تطبيق كل جلسة. اعطى الطلاب درجة عالية من الرضا عن التعلم المعتمد على الفريق عبر الإنترنت كطريقة أفضل للتدريس مقارنة بأساليب التدريس التقليدية .

الخلاصة : دراسة الزملاء لها تأثير إيجابي على فهم الطلاب وعند استخدامها عبر الإنترنت تجعل التدريس أسهل وممتع .

الكلمات المفتاحية : التعلم القائم على الفريق ، صحة الأم والطفل ، التدريس عبر الإنترنت ، Covid19 ، الأزمات .

INTRODUCTION

Covid 19 pandemic exerts a lot of impact on the quality of teaching in different disciplines all over the globe after all the school shut down. Delivering high-quality education materials that ensure high students' engagement and understanding during this period is challenging ¹. This in turn will impede the overall enhancement of health, and affect the United Nations Sustainable Development Goals (SDGs) ². Because all on-campus study was ceased and there was little if any of medical clinical practices at that time that lead to a distinctive rise of E-learning, whereby teaching is undertaken remotely and on digital platforms.

These rapid changes in medical education have a large influence on the demands faced by educators in preparing students for future participation in a multifaceted healthcare workforce ³. However, online teaching and learning providers, undergraduate students say that there is "a lack of interaction with classmates and instructors" as far as online courses are concerned; and online courses make them feel "blown away and intimidated" ⁴. World Health Organization stated that "inter-professional education and collaborative practice can play a major role in modifying a number of the challenges faced by health systems around the world" ⁵. Competencies required by today's medical graduates incorporate the ability to effectively collaborate, communicate and problem solve. The learning needs of Today's medical students have also altered over time; they are highly interconnected, enjoying teamwork and collaborative practice ². There is growing evidence that team-based learning (TBL), a student-centered but teacher-directed flipped classroom strategy, has increased student satisfaction and higher engagement with the promotion of active learning compared to traditional teaching methods ⁶. The nature of Team-based learning (TBL) lends itself to inter-professional education, with the

capacity to foster a culture of collaboration among health professional students ⁷. The application of (TBL) phases stimulates group discussion and critical thinking, which could be useful for learning ⁸. This study aims to incorporate TBL learning through an online platform in teaching undergraduate medical students during COVID-19 pandemics. Antenatal care have been chosen for this study, which is a partition of the Community Medicine curriculum, because of the great impact of this subject to Iraqi community with limited clinical exposure and practice of the students. This research describes the initial experience of TBL application as a teaching method in College of Medicine, University of Mosul.

METHODS

The study was applied at the College of Medicine, University of Mosul, Iraq started from April 2020, till July 2021. Ethical approval has obtained from ethical committee of College of Medicine/ University of Mosul by Ref. No. UOM/COM/MREC/21-22(51).

The initial pilot study done on 25 students to find out possibility of application and acceptability for students with suggested feedback. Data collection tools included Google form from Google classroom. TBL applied on 389 students from two academic year 2020, 2021 during COVID-19 era for teaching antenatal care partition of community medicine curriculum of the fourth-grade medical students at the College of Medicine, University of Mosul, Iraq.

The Preparatory Phase

During first year of application, the researcher introduces the project to Department of family and community medicine's faculty to obtain their acceptance for application. As it is the first time to implement TBL for teaching among all Iraqi universities, besides its totally application online was the unique. Therefore, the researcher held a

preparatory workshop for the faculty staff to take their negative and positive feedback and find solutions for the obstacles that may arise during the application. The Council of Community and Family Medicine Department decided to apply the TBL first to a small group of students to test its acceptability among students and its success as a pilot sample. In the next step, expand its application to all fourth-year medical students. The researcher gave a full explanation of the process and its benefit to the fourth-year medical students of two academic years that consist of 517 students using the Telegram platform and responding to all feedback responses and queries. Then the researcher distributed students into teams with determining of team leader for each.

TBL Implementation Phase During Two Years Period

Earlier to the implementation, the researcher provided all the study materials to the students through Google Classroom by uploading reading PDF and PowerPoint files earlier to the live lecture presentation. The assignments questions were raised on the Google classroom week later. The implementation includes:

In the first year of implementation, as it was the first time to use online TBL for teaching in our college, so the first session included twenty-five students only who divided into 5 groups; each composes of five students with their team leader. In the second session, the whole fourth year medical students included who consist of 158 students with a participation rate of 88%, and participants here have distributed into six teams each consist of about 26 students with their team leader. The latter is responsible for each group to hold the meeting using the Zoom platform and responsible for providing documents needed and recording of their meetings. During the meeting, they discuss with each other about the materials uploaded and possible correct answers to questions.

All students were asked to select the most appropriate answers for the tests which consist of six clinical scenarios raised on Google form to obtain the individual readiness assurance test (I Rat). Second, after each team meet together online and discussed with each other, they raised the team readiness assurance test (T Rat).

After finishing T RAT for each session, the researcher held a live explanatory session using the Zoom platform for clarification of the lecture and answering the students' questions, and a post-explanatory assessment test has taken as well after that. Students were received frequent and timely feedback and they knew that their

participation is accountable for the quality of their individual and group work". In the second year, in order to ensure the sustainability of change and the results obtained in first year are not biased, the researcher reapply the process to the whole fourth years medical students who consist of 359 students to ensure that the result is not biased. The researcher repeats similar procedures except for the staff preparation, as they were already oriented.

All these processes were under the supervision of the faculty staff members of the Family and Community Medicine Department.

Students' Performance and Satisfactory Test

The students earned five points for each correct item, with no penalty for incorrect answers. The same questions used for each station of I RAT/T RAT, post explanatory session. We prepared an anonymous satisfactory survey after finishing the last phase of the TBL application in two sessions which measures students' satisfaction using a five-point Likert's scale (1 = strongly disagree, 5 = strongly agree). Satisfaction rating questions included whether TBL is a better way of understanding teaching materials and their willingness to repeat its application to other lectures.

Statistical Analysis

All test scores were collected for I RAT, T RAT, post clarification session scores and data formulated by Excel for analysis. Statistical analysis performed using Microsoft Excel and IBM SPSS Statistics 24. Percent improvement rate used to compare the difference between I Rat and T Rat students' performance. Nonparametric tests used because scores were not normally distributed and a Z test of two proportions used for finding significance that was set at $p < 0.05$.

RESULTS

The percentage of students who were able to identify the correct answer for each of the I RAT and T RAT questions presented in table 1 for pilot. It is worth noting that the percentage of students in groups that identified the correct answer in the T RAT was higher than individual student's attempts during the I RAT. The percent improvement rate between I RAT and T RAT for pilot session was about 30%.

Table 1: Answers of students according to each phase of applications of TBL (pilot), [n = 25]

Questions	I Rat	T Rat	Percent improvement rate	P-value*	Post clarification session
Q1	85.7 %	96.6 %	12.7 %	0.292	93.8 %
Q2	42.9 %	79.3 %	84.9 %	0.005	81.3 %
Q3	61.0 %	62.1 %	1.8 %	0.896	62.5 %
Q4	38.1 %	56.3 %	47.8 %	0.148	56.3 %
Q5	85.7 %	96.6 %	12.7 %	0.292	93.8 %
Q6	26.2 %	31.0 %	18.3 %	0.757	37.5 %
Overall	56.7 %	70.3 %	29.7 %	0.367	70.9 %

* Z-test of two proportions.

During application of TBL to the whole fourth year medical students (n=139) at the first year 2020, the percent improvement rate between IRAT and TRAT increased to reach 56% with significant difference in the performance where p-value in most of questions is highly significant, (table 2).

Table 2: Answers of students according to each phase of applications of TBL year 1, (N=139)

Questions	I Rat	T Rat	Percent improvement rate	P-value*	Post clarification session
Q1	46.8 %	59.0 %	26.1 %	0.040	94.9 %
Q2	79.9 0%	94.3 %	18.0 %	0.001	97.0 %
Q3	87.8 %	93.4 %	6.4 %	0.098	98.0 %
Q4	30.9 %	99.2 %	221.0 %	0.001	96.0 %
Q5	90.6 %	99.2 %	9.5 %	0.001	100.0 %
Overall	63.8 %	84.0 %	51.2 %	0.000	96.8 %

* Z-test of two proportions.

Table 3 shows higher improvement in the performance of students in finding the correct answers with highly significant difference. Post clarification test was not performed at this level as already all answers reach full mark before even gave the clarification lecture.

Table 3 Answers of students according to each phase of applications of TBL (year 2), (N=359).

Questions	I Rat	T Rat	Percent improvement rate	P-value*
Q1	81.1 %	98.8 %	21.8 %	0.001
Q2	48.7 %	96.8 %	98.8 %	0.001
Q3	78.8 %	98.8 %	25.4 %	0.001
Q4	55.8 %	95.6 %	71.3 %	0.001
Q5	88.1 %	97.2 %	10.3 %	0.003
Q6	55.4 %	96.8 %	74.7 %	0.001
Overall	68.0 %	97.3 %	43.1 %	0.001

* Z-test of two proportions.

A Likert scale was used to express how much the students agree or disagree with the project application. The satisfaction test result, which has performed after finishing the first session. The students agreed in pilot study that TBL was enhancing a better way of understanding of teaching material. Eighty percent of them in the pilot study agreed to re-apply TBL to the other lectures, while in the second time application (N=139) there were about 75% of students were agree that TBL enhance the better way of understanding and about 45% of students agreed to re-apply TBL for other lectures as appear in table 4.

Table 4 Students satisfaction test results about TBL application in first and second session.

Questions	Session	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Does TBL enhance better way of understanding	First	100.0%	0.0%	0.0%	0.0%	0.0%
	Second	19.6%	53.3%	20.7%	3.0%	3.0%
Do you agree to apply TBL for other lectures	First	40.0%	40.0%	20.0%	0.0%	0.0%
	Second	9.8%	37.0%	30.4%	16.3%	6.5%

DISCUSSION

The present study is the first study that implements TBL on small group and large groups completely online with a high satisfactory rate.

COVID – 19 pressured medical schools all over the world to shift to Distance learning (DL) as a substitute way to ensure that the content delivered is satisfactory for student progress⁹.

During COVID-19, every effort all over the world was directed toward making e-learning useful, worthy and allowing the students to be more engaged in the learning process and able to achieve the intended learning outcomes with the potential to foster more active learning and knowledge acquisition⁴. During COVID-19 as there were no on-campus studies and online distant learning forced by many universities to peruse the curriculum. For that, innovation directed to make the online lectures more interactive. As it's known that traditional lectures give more importance to knowledge, content, and examination results¹⁰ but it is one way of passive learning tool where the learners are least involved, mind-numbing for students, and monotonous for teachers, little is engaged or inspired¹¹. The passive nature of the audience and lack of feedback leads to low receptiveness among students in this method.¹² The important role of active learning, clinical application, and group problem-solving in learning has become more recognized in medical education. It is a well-defined instructional strategy to promote active learning with a limited number of faculty.¹³ TBL permits for a single instructor to manage multiple small groups at the same time in a large class, and the class time is shifted away from learning facts to the application of information¹⁴. This method will allow for more faculty satisfaction in delivering the teaching material which is considered as an important factor of quality in online courses¹⁵ The faculty-student relationship was foundational for successful systems improvement work¹⁶. Because of these extraordinary circumstances, efforts made to deliver antenatal care using a combination of distance learning and interactive teaching, and for that, we used online TBL.

TBL is one of the very interactive flipped teaching methods that provide the required environment for active learning which is regarded as superior to other types of learning methods^{17,18}. The present study shows that there was a great achievement of correct answers among T RAT assessment than I RAT at each level of application of TBL. Similar study done in Chandigarh, India medical school who applied TBL on undergraduate third grade medical students and found that the performance as a team during team-based learning was better as compared to individual results. There was

overall improvement in student performance in exams (47 % to 59 %)¹⁹.

T RAT scores at the level of each question were higher than I RAT scores, this reflect on the improvement of answers among students in choosing correct answers between I RAT and T RAT in pilot study, applied session in year 1 and applied session in year 2. The difference of percent improvement rate was statistically significant in almost all the sessions. Keren D, et al reported that social studying and learning is an independent, elective, self-directed, and self-organized approach to learning that involves students working with their peers for study, learning, or revision²⁰. This is in line with literature indicating that peer pressure of small group work encourages students to complete assigned studies²¹. TBL uses strategies that ensure the effectiveness of small groups working independently with high student-to-faculty ratios (e.g., up to 200:1), without dropping the benefits of faculty-led small groups.²²

A similar study done in Lahore Medical and Dental College, Lahore which applied TBL on teaching non-communicable diseases to fourth year MBBS students and comparing them to traditional based methods and found that there was improvement of test scores of students after the TBL session when compared to the test scores after TDL session ($p < 0.001$).²³ Online TBL provides students with a resource-effective and authentic experience of working in a team to solve real-world clinical problems, these circumstances facilitated the application of online TBL to become an insist need to allow delivering learning material in an interesting interactive way. As distant learning provides a good environment for most students but students with financial challenges and special needs may not have equal opportunities to access technology²⁴. In the present study, only 87% of the total student involved in the study were able to participate 139/154, and this related to challenges that faced students from internet quality and availability in our region.

The satisfaction result among students who participated was high; as they had agreed that online TBL is a good enhancement way of learning and improve their engagement in online teaching and they share their willingness to apply TBL to other lectures. This results agree with the results obtained from another study which have done in Turkey which examined the applications of team-based learning in a higher education setting benefits and the initial results indicate that this instructional strategy was beneficial for students' learning²⁵.

CONCLUSIONS

Online TBL is a very promising teaching method especially during the COVID -19 pandemic that ensures students' engagement and solves some of the distant learning issues by ensuring a better way of delivering and understanding flipped teaching materials beside of social engagement of the students that enhance their participation.

Conflict of Interest : None.

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Take Home Message

Team based learning is a very interactive and collaborative method that allow brain storming and its very useful when applied online that allow learner to be active creative lessonner especially when used in sensitive and widely applicable subjects like maternal and child health which enhance their thinking ability leading to better understanding and more improvement in health promotion and provision.

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