Original Article:

Medical Students' Accountability, Preferences and Satisfaction with Team- Based Learning

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Received 28.11.2018, accepted 26.1.2019

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ABSTRACT

Background: The study aimed to assess Team Based Learning (TBL) as an instructional method using a validated and reliable TBL-Student Assessment Instrument (TBL-SAI) from female medical students' perspective during their pre-clinical phase (1st, 2nd and 3rd years).

Methods: A cross sectional descriptive design was applied in this study, and a comprehensive sample (n=93) was taken. The TBL-SAI, used to collect data, consists of 33 items and was divided into 3 subscales, namely, Accountability, Preference for Lecture or TBL, and Student Satisfaction. A -5graded rating scale was used, where 1= Strongly Disagree and 5= Strongly Agree.

Results: The students' response rate was 75.26% (n=70). Overall, 77.27% of the students preferred TBL over lectures. This represented 78.94% , 82.75% and 77.27% of the first, second and third-year students, respectively. In addition, 80% of the students expressed a high level of satisfaction

الملخص

خلفية: أصبح لطريقة التعلم القائم على العمل في فرق شعبية كبيرة في التعليم الطبي؛ بسبب قدرته على تعزيز التعلم النشط ومهارات حل المشكلات والاتصال والعمل الجماعي. تهدف الدراسة لمعرفة مسؤولية طالبات كلية الطب وتفضيلاتهم ومدى رضاهم عن التعلم القائم على الفريق.

المنهجية: تم إجراء دراسة وصفية لقطاع من الطالبات بكلية الطب البشري بجامعة الجوف بالمملكة العربية السعودية. تم أخذ عينة شاملة من الطالبات في المرحلة ما قبل السريرية (السنة الأولى والثانية والثالثة) بقسم الإناث وعددهن ٩٣ طالبة. تم استخدام استبيان موثق لجمع البيانات.

النتائج: بلغ معدل الاستجابة لدى المشاركات ٧٥,٢٦٪ (عدد = ٧٠). أظهرت النتائج أن ٧٧,٢٧٪ من الطالبات يفضلن التعلم القائم على العمل في فريق مقارنةً بـ ١٣,٦٨٪ يفضلن المحاضرة كوسيلة للتعلم. بالإضافة إلى ذلك، ٨٢,٧٥٪، ٧٨,٩٤٪ و٧٧,٢٧٪ من طلاب السنة الأولى والثانية والثالثة على التوالي يعتبرن التعليم القائم على العمل في فريق تجربة ممتازة للتعلم؛ و٨٠٪ من الطالبات أبدين مستوًى عال من الرضاء عن هذه الطريقة. أظهرت النتائج أيضاً أن متوسط (± معدل انحراف معياري) الرضا العام في الثلاث سنوات

with TBL, even though there were statistically significant differences between the three-year students (P = 0.004).

Conclusion: According to the findings obtained from the study, the majority of pre-clinical years students are accountable to TBL, preferring it over lectures, and are satisfied with their teamwork experience of TBL activities.

Keywords:

Students' assessment instrument, Accountability, Preference, Team based learning.

هو: ١١٥,٠٧ ± ١٧,٩١، ١٠٣,٢٥±١٢,٠٧ و١٠٢,٥٠ ± ١١,٤٧ لطالبات الفرقة الأولى والثانية والثالثة على التوالي. هناك فروق ذات دلالة إحصائية بين الثلاث سنوات (P = ٠,٠٠٤).

الخلاصة: خلصت الدراسة إلى أن الغالبية العظمى من الطالبات بكلية الطب البشري في جامعة الجوف أبدين مسؤولية تجاه الاستعدادات المطلوبة لطريقة التعلم في فريق من تحضير للمواد وفهمها واستيعابها من قبل جلسة العمل في الفريق. علاوةً على ذلك، فإنهن يفضلن هذه الاستراتيجية على طريقة التعلم عن طريق المحاضرة، وهن راضيات عن تجربتهن من خلال العمل الجماعي في فريق، ويجدنه أكثر إفادة من طريقة التعلم التقليدية.

INTRODUCTION

Team-based learning (TBL) is an instructional strategy that is being implemented increasingly in many medical schools. TBL is defined as a method of active student learning in small-groups; every student is responsible for his/her learning as well as his/her group. It can be described as an expert-led, interactive and analytical teaching strategy.1

The College of Medicine, Jouf University (COM-JU), adopts innovative integrated educational active-learning strategies, and pedagogical approaches that enable students to transition from dependent to self-directed, lifelong learners, that include: Problem-Based Learning, Team-Based Learning, Community-Oriented Education, Student-centered seminars, interactive lectures, and, Simulation-Based Learning (SBL) and early hands-on training in a safe learning environment through the clinical skills laboratories.

In Problem-Based Learning (PBL) system at COM-JU, students use scenarios to define their own learning objectives. Students think critically about the nature of the problem, generate ideas, and acquire the knowledge and skills required to become a doctor.2

Lecture based learning (LBL) at COM-JU is an efficient and organized method for delivery of a large body of knowledge, lecturers use power point presentations to deliver information to many students in a relatively short period. Lecturers try to make it more interactive; they activate the involvement and participation of the audience by questioning them, providing quizzes and short answers and using audience responses.

TBL in the College of Medicine, Jouf University (COM-JU), Kingdom of Saudi Arabia (KSA) is a part of a hybrid teaching method that enhances the learning quality by using high-performing learning teams. TBL appears to improve academic performance and students' attitudes toward teamwork.3, 4 Also; it improves student performance and increases student engagement and satisfaction.5

TBL effectively uses the time of its session to stress on applying the learned concepts.6

The main challenges are successfully planning for TBL session and providing a timely and active constructive feedback to students to ensure learning. 7, 8

In TBL, only one single instructor can

manage multiple students' small groups simultaneously in one classroom. The principle behind team-based learning is that students working together as a team can achieve a higher level of learning than individual students alone can achieve.3

TBL has three steps:

Step one: students should pass through study in advance assignment defined by faculty, learners read and study material independently outside class. 4

Step two: faculty should be sure that his students have already studied and understood the assignment by making learners demonstrate knowledge through individual readiness assurance tests (IRATs), then pre-assigned teams of 5–7 learners re-take the same test, forming a consensus about each answer in group readiness assurance tests (GRATs) 4, These answers are scored for immediate feedback. In TBL, there is peer evaluation by students and their colleagues' learners; they assess the contribution of peers within their group.

Step three: students start application of knowledge when learners apply course concepts to solve realistic, authentic problem designed by faculty and analyzed by teams. 4

Teams also work on group application exercises (GAE), solving the problems before engaging in inter-team discussion and debate on finding solutions.

There is a flexibility of implementing TBL in medical education; instructors can use selectively one or more of the phases, depending on the contextual demands of the course or session. Unlike the role of tutor in Problem based learning, instructor in TBL work as a facilitator as well as a subject area expert. He helps students to apply the knowledge learned to solve the problem. 9

Leadership roles in TBL session:

Each team member is required to assume each role at least once, after which teams will have the freedom to manage leadership roles as they wish.

- accurately record GRAT answers;
- coordinating team's submission of GRAT appeals;
- facilitating intra-team GAE discussion;
- serving as a team spokesperson in the inter-team discussion of GAE problems;
- leading a team huddle to debrief group performance; and
- Collecting and returning of materials. 10

The challenge that faces all of us as medical educators is to enhance medical students higher order cognitive skills by moving from traditional, passive methods of teaching to more active methods.11 TBL helps to prepare medical students to be effective health care providers in the healing environment such as the clinical training setting. 2

A number of studies providing empiri-

cal evidence of students' benefits from TBL such as increased student engagement and higher-quality communication processes.4

Our school has successfully implemented Team-Based Learning in all our preclinical blocks and most of our clerkships.

Although TBL was introduced as a medical education strategy in 2001, a few studies in the Middle East have explored its impact on learning outcomes. As medical educators considering implementing TBL, we need supporting evidences of its educational effectiveness. This study aimed to assess Team Based Learning (TBL) as an instructional method using a validated and reliable TBL-Student Assessment Instrument (TBL-SAI) from female medical students' perspective during their pre-clinical phase (1st, 2nd and 3rd years).

MATERIALS AND METHODS

Setting and participants

This study was conducted in the COM-JU, KSA in 2018, and adopted the descriptive cross section survey research design. A total number of 93 female students (30, 28 and 35 students from the 1st, 2nd, and 3rd years, respectively) participated in this study. To select study groups from the target population, purposive sampling (non-probability sampling (was used, the individuals are selected deliberately based on the main criteria which are assumed by the researcher to be representative of the population. The main criteria consisted of: 1-being a female medical student, 2-being at the basic sciences phase (1st, 2nd and 3rd years), 3-using TBL as instructional method in their educational courses and 4—having consent to be enrolled in the study.

This study was expected to measure the female students' perception towards TBL as a method for teaching. The study is expected to answer the questions; Are female students in COM-JU accountable to TBL? Do they prefer TBL or lecture-based learning (LBL)? Are they satisfied with TBL? Female students are novice; they graduated from high school as passive learners, who lack experience of students centered educational strategies, that enable them to be active learner participating in their learning process. The alternative hypothesis is "female students in COM-JU are satisfied with TBL, and they consider it a rich learning experience, it enhances their learning, they are accountable to TBL, and prefer it over LBL".

Data collection & Statistical Analyses:

The validated TBL-Student Assessment Instrument (TBL-SAI) was used to collect data, it consists of 33 items, and is divided into 3 parts: First part: Accountability subscale, which assesses students' preparation for class and contribution to the team. Second part: preference for lecture or TBL subscale, which assesses student ability to recall material and student attention level in lecture and TBL. Third part: Student Satisfaction Subscale, which assesses students' satisfaction with TBL. The rating scale ranges from 1 to 5 where 1= strongly disagree and 5= Strongly Agree.

Data were collected anonymously, and the study was approved by the Permanent Bioethical Committee of JU with an approval number of 5-16-8/39. Statistical analyses of the TBL-SAI were calculated in accordance with the guidelines given by the developer of the instrument. Descriptive statistics were used for each component, and comparative statistics were undertaken to compare statistically significant differences between the three years. Data generated was analyzed using percentage, mean and standard (SD). Null hypotheses were tested using One-Way Analysis of Variance (ANOVA) test with Post-Hoc Test. A p value <0.05 was considered statistically significant, and consequently reject the null hypothesis. The desired level of confidence will be 95%.

RESULTS

In the academic year of 2018, 70 out of 93 students of the female students in the 1st, 2nd and 3rd year consented to participate in the TBL-SAI survey. Response rate was 75.26% (70/93); distributed as 96.7% (29/30), 67.85% (19/28) and 62.85% (22/35) from the 1st, 2nd and 3rd year students, respectively.

The TBL-SAI consists of 33 questions using a 5-option symmetric disagree-agree rating scale. Percentages of students' responses of "agree and strongly agree", "neutral", and "disagree and strongly disagree" options were calculated.

Concerning female students' accountability for TBL, Table 1 shows that 79.31%, 42.1% and 77.27% of the students in the 1st, 2nd, and 3rd year, respectively, are accountable for TBL.

Table 2 shows that the mean scores in the three subscales and the overall for all three years are 25.7, 49.54, 31.7 and 106.94, respectively.

Regarding students' preferences for LBL or TBL, Figure 1 shows that 72.4%, 84.2% and 77.3% prefer TBL compared to 17.2%, 10.5% and 13.6% of the 1st, 2nd and 3rd-year students, respectively, prefer lecture.

Regarding students' favorable experience with TBL, Figure 2 shows that 82.8%, 78.9% and 77.3% of the 1st, 2nd, and 3rd year students, respectively, have favorable experience with TBL. Most of the female students in basic sciences phase have favorable experience with TBL activities.

Concerning overall satisfaction with TBL as an educational method, Figure 3 shows that 80% of the participants have a higher level of satisfaction with TBL.

Regarding the participants' accountability for TBL, Table 3 shows that the mean ± SD for the 1st, 2nd and 3rd-year students, respectively, is 27.34±6.95, 23.77±5.34 and 26.16±3.58. There are no statistically significant differences between the three years.

Regarding female students' preference, for Lecture or TBL, Table 3 shows that mean ± SD for students' preference is 52.76±9.39, 50.45±4.05, and 45.41±6.44 for the 1st, 2nd, and 3rd year, respectively. There are statistically significant differences between the three years (P = 0.003).

Regarding female students' Satisfac-

tion with TBL, Table 3 shows that mean ± SD for students' Satisfaction is 34.97±7.51, 29.32±8.45, and 31.10±5.40 for the 1st, 2nd, and 3rd year, respectively. There are statistically significant differences between the study years (P = 0.025).

In terms of the overall satisfaction with TBL, Table 3 reveals that the mean ± SD for that scale is 115.07±17.91, 103.25±12.07 and 102.50±11.47 for the 1st, 2nd, and 3rd year, respectively. There are statistically significant differences between them (P = 0.004)

RESULTS

Table 1: Assessment of the accountability for Team-Based Learning.

Accountability Subscale level	First Year %	Second Year %	Third Year %	Total	% of Total
Low	13.79%	52.63%	9.09%	16	22.85
Neutral	6.89%	5.26%	13.63%	6	8.57
High	79.31%	42.1%	77.27%	48	68.57
Total	100%	100%	100	70	100

Table 2. TBL-SAI Survey Result.

Subscales	Possible Range	Neutral Point	Mean	SD	p
Accountability	8-40	24	25.75	5.29	
TBL vs. lecture	16-80	48	49.54	6.62	
Satisfaction	9-45	27	31.70	7.12	*0.000
Overall	33-165	99	106.94	13.81	
Grand mean	11-55		35.66	12.38	

* p<0.05 indicates statistically significant differences. SD = Standard deviation. TBL-SAI = Team-based learning student assessment instrument

Table 3: Comparing the accountability, preference, satisfaction and overall satisfaction of participants for TBL based on the year of study

Subscale	1st year (n = 29)	2nd year (n = 19)	3rd year (n = 22)	Grand Mean (n = 70)	P value
Accountability	27.3 ± 7.0	23.8 ± 5.3	26.2 ± 3.6	25.8 ± 1.8	0.107
Preference of lecture over TBL	52.8 ± 9.4	50.5 ± 4.1	45.4 ± 6.4	49.5 ± 3.8	0.003
Satisfaction with TBL	35.0 ± 7.5	29.3 ± 8.5	31.1 ± 5.4	31.8 ± 2.9	0.025
Overall satisfaction with TBL experience	115.1 ± 17.9	103.3 ± 12.1	102.5 ± 11.5	106.9 ± 7.1	0.004

Data are expressed as Mean ± SD. P value by One-Way ANOVA. * p<0.05 indicates statistically significant differences. TBL = team-based learning,

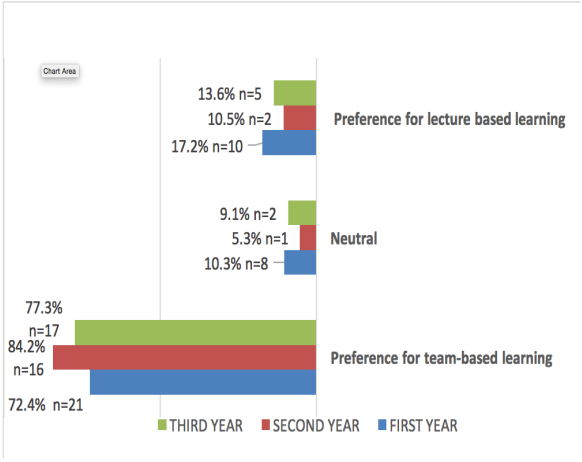


Figure 1: Frequency distribution of female students' preference for Lecture or Team-Based Learning

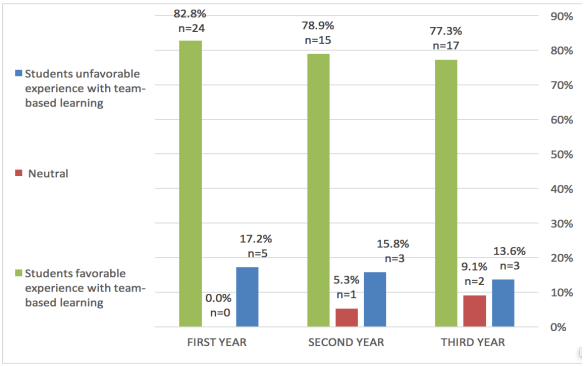


Figure 2: Frequency distribution of female students' favorable experience with Team-Based Learning.

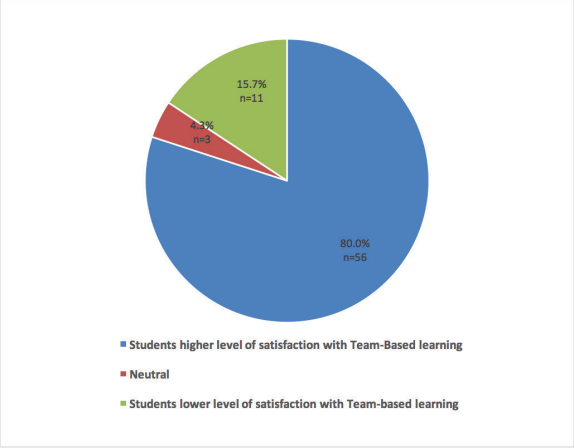


Figure 3: Frequency distribution of the overall Satisfaction with Team-Based Learning.

Discussion:

Although team-based learning (TBL) is widely used in medical education, evaluation of students' accountability, preference and satisfaction with it needs further assessment. The main aim of this study was to assess the implementation of TBL in newly established female section at COM-JU using TBL-SAI survey. As male section in the same college was found before and TBL was implemented for a long time, college was receiving feedback from male students but female students were not investigated before about this point. TBL-SAI measures female students' responses in three categories: their accountability, preference for lecture or TBL and their satisfaction with it. Assessment results showed that 80% of our students surveyed had favorable experience with TBL which is in keeping with the study held by Chao & Mott (2015), they found that over 86% of students surveyed using the same tool had favorable experience with TBL. 3

Concerning female students' accountability for TBL, our results showed that 79.3% and 77.3% of the First-year and Third-year students, respectively, are accountable for TBL compared to the second-year students where 52.6% showed low accountability for TBL as shown in table 1. In COM-JU, the First-year and Third-year students were more responsible and motivated to their own learning through individual preparation, such as spending time in preparing for the course and immersion in understanding of the material, team work and students' engagement in the development of a high-quality team.

First-year students showed a high degree of accountability, as it was their first time to be exposed to such an innovative educational strategy. They felt more motivated to TBL than their colleagues in the second year who apparently lost their motivation due to burning out during the 1st year and dependence on each other on group work, or secondary

to acquisition of score-oriented character as TBL being assessed formatively rather than summative. First-year students showed more interest in favor of TBL, their role as only passive recipient of information has dramatically changed with provision of frequent feedbacks from quiz performance, peers and faculty. This allows a constant cycle of identifying knowledge gaps, addressing these deficits and thereby fostering abilities for self-assessment.

In the first year, teams tend to be politer and cooperative because of their new constitution (i.e., at the forming stage of group dynamic cycle). Over time, in the second year, teams are likely going to face more conflict, which may negatively affect their perceptions of TBL. We recommend giving more instruction and guidance in conflict resolution and the use of constructive feedback. In the third year, they may regain their motivation and build up more self-confidence because of their progression in their study.

In a study held by Su Allan (2007), he explored the impact of teacher grading methods on students' attitudes towards TBL and revealed that students tend to project a more positive attitude toward TBL when the contingent grading method was used.13

Second-year students didn't perceive the value of TBL. Mean ± SD (23.8±5.3) for the second-year accountability subscale was near the neutral point (i.e., 24) as shown in table 3. In a study held by Feingold et al. (2008), they stated that "students appreciated the need for increased individual accountability for learning and identified value in learning through discussion".14 Also, in a study held by Nagaswami et al. (2009), they documented that students resisted implementation of TBL or any type of active learning as it's a shift from the passive process of lecture-based settings.15 Britta et al., 2007 stated that "Students spent most of TBL classroom time in discussion, analysis and problem solving». The instructor must organize the session with no problems like social idling.16

Comparing female students' preference for Lecture or Team-Based Learning, figure 1 showed that 72.4%, 84.2%, and 77.3% of the 1st, 2nd and 3rd-year students, respectively, preferred Team-Based Learning to lectures; students in lecture play passive role whereas team interactions in TBL allow more active student participation that fosters both activation of prior knowledge.17 and active knowledge construction.18

In a study held by Tracy et al. (2015), their results found there is significant differences between TBL and traditional lecture (p=0.001).19

This study results indicated that 82.75%, 78.94% and 77.27% of the 1st, 2nd and 3rd-year students, respectively, have favorable experience with TBL as shown in figure 2.

In a study held by Chao & Mott (2015), they found that mean score of accountability, TBL vs. LBL, preference, satisfaction and overall satisfaction subscales for their study sample were 30.7, 48.6, 33.3 and 112.6, respectively 3. We can notice that our students less accountable for TBL than their sample

population. Student accountability should increase significantly from year to year because students must work independently to prepare for team sessions, in which they will work to solve problems with their teammates.20 Second step of TBL process "Readiness Assurance" is the one that test students' accountability to TBL, faculty should be sure that his students are ready, study and understand the assignment.21, 22

One of the potential limitations of this study is that it did not determine whether student performance on examinations is affected by participation in TBL and whether TBL benefits lower or higher performing students. This needs to be addressed in future studies. In addition, male students were not involved in the study, which negatively affects the generalizability of the results of this study, although it applies to communities of similar situations. Furthermore, this study did not rationalize the low accountability of the second-year students for TBL and did not evaluate the positive impacts of TBL on students' learning experience, grades and educational outcomes.

In conclusion, most pre-clinical years students included in this study are accountable to TBL, preferring it over LBL, and are satisfied with their teamwork experience of TBL activities. Further studies on TBL involving larger numbers of both male and female students in both the clinical and pre-clinical years with longitudinal arm looking at their performance in exams are warranted and recommended.

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