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Evaluation of nursing student's perception of using Team-based Learning (TBL) during teaching process

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Abstract: Today, applying active learning strategies in nursing education is necessary to improve learning and enhance education quality. On the other hand, attracting student's satisfaction and creating a positive attitude toward these strategies are vital to continue implementing this approach. The aim of this study was to evaluate the nursing students' perception of TBL in nursing education. **Method:** This quasi-experimental study was conducted after implementation of TBL in three phases. After the course, the nursing students from two colleges (n=58) completed the Likert scale questionnaire in order to investigate their views on TBL. The collected data were analyzed through SPSS 16.0 using descriptive and analytical statistic. **Results:** Nursing students demonstrated very positive perception on usage of TBL in nursing education. The highest levels of satisfaction were observed in teamwork items, "respect between members" (84/5%), in motivation items "motivation for further study" (87/9%), in learning items, "better learning compared to individual study" (84/5%) and in other benefits items "valuable experience of participating in the TBL" (87/9%). Compared to Urmia's nursing students, Boukan's nursing students had significantly more positive attitudes toward the TBL. **Conclusion:** Positive view and high satisfaction of nursing students as education customers on TBL can help sustain the implementation of this approach in the nursing faculties in order to change the direction from passive learning methods toward active learning approaches to ultimately enhance the quality of learning and healthcare provided by the students in the future.

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Introduction

Teaching programs containing large amounts of learning materials result in passive learning styles, haste in learning, depended on short-term memory, superficial comprehension of the materials, and no opportunity to engage the students in self-directed learning [1]. Therefore, medical education has undergone numerous changes in recent decades so as to further promote complete and integrated curriculum and provide comprehensive support for active learning [2]. One of these changes is the instructors' increasing trust to methods that organize the necessary knowledge in accessible forms that can be learned out of the class [3, 4]. These methods reduce lecturing time and in return increase face-to-face communication in order to implement active learning strategies in which the instructor and the students create a true mutual communication; and learning focus is on knowledge application rather than knowledge acquisition [5]. Moreover, these strategies that promote active learning and develop problem-solving skills are increasingly supported [6].

One of these innovative strategies is Team-based Learning (TBL).

TBL is students-center but instructor-led method that promotes individual and team responding ability through small collaborative student teams [5]. This teaching method was first devised in business faculty, University of Oklahoma by Michaelsen and has been implemented in medical education colleges since then [1]. classic TBL includes three phases: (1) readiness: there is individual pre-class preparation in order to participate in class discussion, (2) readiness assurance: the acquired knowledge in phase 1 is evaluated through Individual and Group Readiness Assurance Tests (IRAT and GRAT), and (3) application: involves a higher level of learning in which students apply the knowledge to solve problems using small group assignment [1, 5]. The primary objective in TBL include maintain a high level of content learning, increasing the knowledge application both quantitatively and qualitatively, and promoting students' interpersonal skills. A positive dimension of preparing students to conduct teamwork in the future is that they ensure that team discussion is an effective approach to perform mental tasks [7]. In addition, TBL has another important dimension which is the students' engagement in class activities and

individual's responsibility for self-directed learning [6]. Different studies have reported positive results for conducting TBL methods; including improvement of students' grades [1, 5, 8-11], increase in mastery of the course content [5], less students' failure in exams and learning improvement in weak students [10], joy of learning [6, 12], support of student-student and instructor-student communication [13], student motivation, better knowledge acquisition and deeper comprehension of the course concepts [7]. Another positive point in TBL approach is to ensure the effectiveness of small group's discussions without missing instructor-centered benefit [1]. In addition, this approach provides frequent opportunities to promote learning through inter-team discussions while arrive a consensus decision [5]. In the field of nursing education, TBL decrease stress and workload and increase students' preparation for class; therefore, there will be more time available to be allotted to class discussions [14]. It has been demonstrated that this approach has enhanced the students' performance in some health-care educational courses [1]. When students learn through teamwork and clinical arguments, they will be able to provide quality clinical healthcare [6]. That is probably why nursing faculties are showing more interest to TBL [15, 16].

However, despite of TBL application in medical education, its evaluation in the view of the students participating in it is limited [6]. Therefore, the purpose of the present study was to investigate the application of this method for nursing students in affiliated faculties of Urmia University of Medical Sciences and evaluate the students' perception in this regard so as to improve the quality of healthcare through new educational methods.

Method

The present study was a quasi-experimental that was aimed at investigating the nursing students' view about TBL usage in two nursing faculties of Boukan and Urmia in 2013-2014. Since the researchers were teaching especial medical-surgical nursing content, Urmia's third-year nursing students (n=35) and Boukan's second-year nursing students (n=32) were invited to participate in the study. Participation was voluntary and students were made assured that their information would be confidential and have no negative effect on their medical-surgical final grades. In both faculties, a modified scheme of TBL was utilized to present the learning materials. In so doing, in the first phase Urmia's students were provided with educational content of nervous system check and Boukan's students were presented with educational content of diabetes through handouts and educational slides that were designed as a module. Moreover, students were given one week to study. In the second

phase, a four-hour workshop intervention was applied in both faculties. As soon as the workshops were held, the students were given the I-RAT that included 40 multiple choice questions (MCQ) taken from the educational module to evaluate their understanding of the materials presented in the first phase. The students needed to study the phase 1 materials in order to be able to answer the questions correctly. Immediately after I-RAT and collection of papers, students were randomly divided into teams of 5 to 6 individuals and the previous test that this time was called G-RAT was given. The instructors encouraged the groups to explain and support their selected options and facilitate discussion whereby to justify the best options. Members of each team needed to reach consensus in order to answer all of the questions. Feedback on G-RAT was given right away; such that after the students answered all of the questions and G-RAT papers were collected, each team was required to present its support and justification for choosing a specific answer. The instructors acted as facilitators and discussed with the students about questions and answers and also explained conceptions that the students have problem with these. At the end of the course, in order to examine the students' views about TBL method, a 5-point Likert scale (1=completely disagree, 2=disagree, 3=not effective, 4=agree, and 5=completely agree) consisted of 22 items and was devised by the researchers based on previous studies was utilized. Moreover, students' information including age and total average grade was collected. To ensure the content validity of the questionnaire, its pilot test was taken by 8 students before being applied for all of the classes. Internal consistency of the questionnaire items was checked through Cronbach's alpha reliability analysis test as 0.96. The collected data were analyzed through SPSS 16.0 using descriptive tests (frequency, mean and standard deviation) and analytical tests (independent T and χ^2).

Results

Out of the 35 Urmia students and 32 Boukan students who were invited, respectively 33 and 25 students (a total of 58) participated in the study and completed the questionnaires. The average age of the students was 22.8 ± 3.73 and their average grade was 15.68 ± 1.22 . The average grade of Urmia's students was 15.37 ± 1.02 and that of Boukan's students was 16.09 ± 1.37 ; in this regard there was a significant difference between two faculties ($P=0.025$). Moreover, Urmia students' average age was 23.15 ± 3.65 and that of Boukan students was 22.52 ± 3.87 , which showed no significant difference ($P=0.528$). In addition, 48.3% (28 students) were male and 51.7% (30 students) were female. The items

of the questionnaire were classified into four categories of teamwork (6 items), motivation (5 items), learning (5 items), and other benefits (6 items). Options "I agree" and "I completely agree" were considered as "agreement and satisfaction" and options "I disagree" and "I completely disagree" were interpreted as "disagreement and dissatisfaction". Results revealed positive views for all of the items. Agreement spectrum ranged from 74.1% to 87.9%. According to categorization of the items, the highest levels of satisfaction were observed in teamwork items, "respect between members" (84/5%), in

motivation items "motivation for further study" (87/9%), in learning items, "better learning compared to individual study" (84/5%) and in other benefits items "valuable experience of participating in the TBL" (87/9%). Moreover, by comparing the students' views in the two faculties, it was concluded that there was a significant difference between all of the items ($P < 0.05$) except for two items of "participation of all of the members in the team" and "respect between members". Details of the students' views are presented in Table 1 below.

Table 1. Evaluation of students' views about using TBL during nursing teaching process

Items	%			Mean & SD			P*
	Disagree	No Idea	Agree	Total	Urmia	Boukan	
Teamwork							
Other team members participated like me.	10.3	6.9	82.7	4.14±1.0	3.88±1.0	4.48±1.0	0.300
Cooperation among team members was good.	3.4	13.8	82.8	4.28±0.8	4.00±0.8	4.64±0.7	0.030
I felt that other members respected me.	5.2	10.3	84.5	4.29±0.8	4.18±0.8	4.44±0.8	0.260
TBL helped me develop my communication skills.	3.4	17.2	79.3	4.24±0.9	3.91±1.0	4.68±0.5	0.001
TBL helped me develop my cooperative leadership skills.	8.6	12.1	79.3	4.17±1.0	3.85±1.1	4.60±0.8	0.006
TBL helped me respect others' viewpoints.	3.4	19	77.6	4.16±0.8	3.85±0.7	4.56±0.7	0.001
Motivation							
TBL helps me identify my strengths and weaknesses.	3.4	15.5	81	4.19±0.9	3.85±1.0	4.64±0.6	0.001
TBL causes motivation to further attempt.	5.2	8.6	86.2	4.22±0.8	3.94±0.9	4.60±0.6	0.004
TBL encourages me to cooperate with others.	8.6	15.5	75.9	4.16±0.9	3.70±1.0	4.76±0.5	<0.001
TBL helps my mental motivation and further readiness for class.	5.2	15.5	79.3	4.17±0.9	3.82±0.9	4.64±0.7	0.001
TBL motivates me to study more.	3.4	8.6	87.9	4.28±0.7	4.00±0.7	4.64±0.5	0.001
Learning							
TBL results in better learning compared to individual study.	6.9	8.6	84.5	4.33±0.9	3.91±0.9	4.88±0.3	<0.001
I learned more through TBL.	3.4	15.5	81	4.22±0.8	3.88±0.8	4.68±0.5	<0.001
TBL helped me solve problems better.	1.7	15.5	82.8	4.29±0.7	4.00±0.7	4.68±0.6	0.001
TBL results in better decision making for every problem.	6.9	19	74.1	4.16±1.0	3.67±1.0	4.80±0.5	<0.001
I was an active learner during TBL.	6.9	12.1	81	4.10±0.9	3.67±0.9	4.68±0.4	<0.001
Other Benefits							
Activity in TBL is a valuable experience.	5.2	6.9	87.9	4.33±0.8	4.00±0.8	4.76±0.5	<0.001
TBL uses the class time well.	5.2	15.5	79.3	4.19±0.8	3.82±0.9	4.68±0.4	<0.001
TBL helps me compare myself with my classmates.	10.3	12.1	77.6	4.05±1.0	3.67±1.0	4.56±0.9	0.001
TBL makes learning enjoyable for me.	6.9	17.2	75.9	4.17±1.0	3.76±1.0	4.72±0.5	<0.001
I think TBL extends learning retention.	3.4	15.5	81	4.29±0.8	3.91±0.9	4.80±0.4	<0.001
TBL improves educational environment of class.	1.7	20.7	77.5	4.29±0.8	3.91±0.8	4.80±0.5	<0.001

* Significance level was set at 0.050

Discussion

High level of students' agreement with the proposed items in the questionnaire indicated complete positive perception of nursing students on TBL usage in nursing education. In addition, the item "Activity in TBL is a valuable experience" particularly deals with examining the students' total view about TBL and was gained the highest level of agreement (87.9%). The results of other related studies indicate students' positive understanding and satisfaction on TBL application during education process, for example 91% of students in Wiener's study and 79.2% in Inuwa's study had completely positive viewpoints about TBL [6, 7].

The item "TBL capability in motivating students to study more" had also received 87.9% of

satisfaction. This can be related to the fact that in TBL, students should acquire more knowledge to be able to participate in teamwork. In Masters' study, 68% of the participants stated that they had to study before class in order to be sufficiently ready for TBL sessions; this can be enough evidence that TBL motivates students to study more [12]. However, in another study conducted by Wiener, the observed increase in students' grades was related to their motivation to study more [7]. The most important characteristic of TBL is probably teamwork. Cooperation and collaboration with team members, mutual respect to others' views, and development of leadership skills are all among characteristics of teamwork, which can be observed while implementing TBL. In the present study, students'

high satisfaction in the teamwork items indicates their positive view about the value of teamwork. Medical professions require the practitioners' ability to carry out teamwork and in this regard, TBL provides an appropriate method to teach complexities of teamwork in the early stages of education [9]. There is also evidence in which students have not showed positive views about teamwork and have not valued it as a part of TBL [6]; But it should be noted that like or dislike of an educational method can be affected by the students' learning styles [6] because some students prefer independence learning [17].

The results of learning items indicated that the students were complete satisfied with learning through TBL. More than 80% of the participants declared that TBL had caused better and more learning and even better problem solving. Based on different studies' findings including increase in students' scores in final exams, greater success in tests, and fewer failure cases, can be expressed that TBL improves learning compared to individual and traditional learning methods [1, 5, 7-10]. The results of Wiener's study showed that mean score of TBL team learning was 25% higher than that of individuals learning [7]. This point becomes more important if we know that weak students benefits from TBL more than strong students [5]. Gaining better grades may be due to better understanding [1]; 63.2% of the students in Inuwa's study stated that TBL had resulted in better understanding and 87.2% declared that TBL had positive effect on learning [6]. On the other hand, a lot of studies support the role of TBL in enhancing the level of mastery of the course contents [5, 7] which can leads to gaining better scores and achieving better learning. Students believe that TBL helps them reach a higher level of learning and has a positive effect on their learning attitudes [7, 12]. Koles has stated that information exchange among students during G-RAT, practical exercises, and intra-team discussion management by the instructor cause the students to gain a basic level of knowledge because they are teaching each other while selection at consensus answer [5]. However, Wiener find out students had hesitation about their learning through TBL and did not have a good view about TBL. They believe that a lot of students do not learn the skills in teamwork; therefore, it is difficult for them to convince themselves and state that TBL had positive effect on their learning. However, it should be noted that implementation manner of TBL can also influence the students' views [7]. Other important effects of TBL which can affect learning and have been referred in different studies include the students' feeling about the retention of the learning material as a result of TBL [1, 7], the effect of TBL on the quality of learning [18], focus on class

discussions, consistency, and adaption in study [6]. In the present study, 81% of the students felt that TBL can cause longer retention of the learning materials, which is under investigation by the researchers of the present study. A large number of the students participating in the present study have referred to the positive effects of TBL in creation of different motivations especially in regard with more attempts to learn. Students' answers in other studies show that TBL strategy are motivating and have positive effect on their motivation [7, 12] such that they were willing to hold more TBL sessions [1], They got disappointed whenever they missed a TBL session [6] and they also recommended TBL to other students [1, 7]. In the present study, 75.9% of the students considered learning through TBL an enjoyable experience. In this regard, different studies have stated that TBL is an enjoyable experience for students [1, 12]. Most of the students in Inuwa's study pointed out that making learning experience as enjoyable is the main strength of TBL [6].

Based on the fact that 84.5% of the students acknowledged that TB compared to individual and traditional methods can lead to better learning and also a student's idea written at the end of one questionnaire that "In my opinion, this method is far better than the current educational method", it should be noted that other studies have also concluded that TBL is an appropriate substitute for traditional lecture-based method and content-based lecturing approach [6]. In Masters' study, the participants stated that TBL was better than lecture [12]. This positive tendency toward TBL has been observed in several other studies [7, 10, 19].

Another finding of the present study showed that Boukan nursing students' satisfaction was more than that of Urmia's students, such that there was a significant difference between the two faculties in regard with most of the items. This can be due to Boukan students' total average grade and the attractiveness of active learning methods for initial year. Although implementation of special methods for students with little or without experience of active learning and teamwork is a challenging issue [6]; application of TBL in early years can be helpful, because students do not still believe PowerPoint-based lecturing is the only method of education [12].

Since in the questionnaire did not requested participant's sex, no comparison was conducted between the two sex in regard with their satisfaction of TBL application, which is one of the limitations of the study. Moreover, the present study was carried out within a short period of time; therefore, TBL's long-term effect on the students' attitude toward a self-directed learning or teamwork couldn't be determined. Nursing students presented positive

views about TBL implementation in nursing education. Most of the students stated that conducting team activity, creating willingness, and further motivating to study are valuable characteristics of TBL and the reason for their satisfaction. Therefore, it can be stated that positive perception and creation of motivation for learning can be considered as main reasons why nursing students agreed with TBL and introduced this active learning strategy as their favorite educational method.

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