

# Effect of team-based learning strategy on the group engagement, knowledge and clinical performance among pediatric nursing students

Heba F Mansy<sup>1</sup>, Zinat I El-Hawashy<sup>1</sup>, Yomn Y Sabry<sup>2</sup>, Shadia R Morsy<sup>1</sup>

<sup>1</sup>Nursing Education Department, Faculty of Nursing, Alexandria University, Egypt

<sup>2</sup>Pediatric Nursing Department, Faculty of Nursing, Alexandria University, Egypt

\*Corresponding author: Shadia R Morsy, E-mail: shadiaramadan7@ gmail.com

---

**Abstract:** Team-Based Learning strategy is one of the innovative teaching strategies that is used in undergraduate nursing education to help students learn how to apply knowledge effectively in a variety of clinical situations. **Purposes:** this study aimed is to determine the effect of Team-Based Learning strategy on the group engagement, knowledge and clinical performance among pediatric nursing students. **Design:** A quasi-experimental research design was used in this study. **Setting:** This study was conducted at the skills laboratories of Pediatric Nursing Department at the Faculty of Nursing, Alexandria University. **Subject:** The subjects of this study comprised 72 nursing students enrolled in Pediatric Nursing Course. **Tools:** Four tools were used: Knowledge Test, Colostomy Care Observational Checklist, Group Engagement Questionnaire and TBL Feedback Questionnaire. **Results:** This study revealed that there were highly statistically significant differences between the study and control groups in relation to their group engagement, knowledge, and performance of colostomy care procedure immediately after and after 4 weeks of applying TBL ( $p < 0.001^*$  and  $< 0.001^*$  respectively). **Conclusion:** TBL is a valuable teaching strategy. It played a crucial role in enhancing pediatric nursing students' group engagement, knowledge and clinical performance of colostomy care procedure. **Recommendation:** Educational workshops should be conducted to all nurse educators to raise their awareness about the TBL strategy.

**Keywords:** Team-based learning-Group engagement- Knowledge-Clinical performance.

---

## 1. INTRODUCTION

Team-Based Learning (TBL) is an innovative learner-centered educational strategy designed to develop high performance learning teams<sup>(1)</sup>. TBL was developed by Michaelsen in 1970 to be used in a large business education course then it was expanded to be used in health professional programs such as medical education and nursing<sup>(2,3)</sup>. There are four essential principles of TBL. These principles are the formation and management of teams, students' accountability to teams, feedback to students and Team-Application Problem design<sup>(4)</sup>.

Team-Based Learning (TBL) facilitates students' progression beyond acquiring facts to the achievement of a deeper understanding of the content. This is accomplished through the application of activities that encourage critical thinking and decision making in problem-solving<sup>(5)</sup>. It helps students gaining proficiency in performing peer evaluation and providing helpful feedback in a safe environment.<sup>(6)</sup> Moreover, small group activities can motivate students to establish connections with the course content and with the group process. Finally, it helps academically at-risk students perform better and succeed in the course<sup>(7)</sup>.

Team-Based Learning consists of four phases; preparation, readiness assurance, application and team evaluation phase. In the preparation phase, students study the assigned learning materials to prepare themselves for the topic that will be discussed during the TBL session<sup>(8)</sup>. In readiness assurance phase, students are tested about the material they had studied

## International Journal of Novel Research in Healthcare and Nursing

Vol. 6, Issue 2, pp: (504-514), Month: May - August 2019, Available at: [www.noveltyjournals.com](http://www.noveltyjournals.com)

at the beginning of the TBL session using the multiple-choice questions. These questions focus on the concepts the students need to master in order to be able to solve the Team Application Problems (TAP). The multiple-choice questions are first administered to each student to answer them individually. This test is called Individual Readiness Assurance Test (IRAT). After answering it, students in each team are asked to answer the same multiple-choice questions as a team. This test is called Team Readiness Assurance Test (TRAT) <sup>(9)</sup>.

In the application phase, the students work in the same teams to solve real-world problems that are based on the materials that have been learned. These problems are called Team Application Problems (TAP). In the team evaluation phase, team members give feedback to the other group members on team performance. Periodic formative and summative team evaluation of each team member's contribution and team behaviors can promote depth of knowledge, problem solving skills and positive personal and team behaviors <sup>(4)</sup>.

Students' engagement is "the time and energy students devote to educationally sound activities inside and outside the classroom and the policies and practices that institutions use to encourage students to participate in these activities" <sup>(10)</sup>. Students' engagement can be assessed by the extent to which college students were participating in educationally effective practices. Engagement is more than involvement or participation. It requires feelings and sense making as well as activity. Acting without feeling engaged is just involvement or even compliance, whereas feeling engaged without acting is dissociation <sup>(11)</sup>.

Team-Based Learning (TBL) is an innovative teaching strategy that promotes active learning and engagement of students with course material and in-magnificence activities <sup>(12)</sup>. Several studies had shown that TBL enhanced students' engagement. A study by Levine et al (2018) found significantly higher levels of students' engagement within the TBL classroom when compared to those learned in a traditional lecture environment <sup>(13)</sup>. Haidet et al (2016) also found that students appeared more engaged when participating in TBL activities in the classroom <sup>(14)</sup>. Additionally, Nieder et al (2015) revealed that during TBL, students engaged in discussion and debate in three separate levels: with team members, with other teams and with faculty members <sup>(15)</sup>.

Educators should take care not to do the thinking for students or tell them what to do because this runs the risk of making students experts at seeking help rather than thinking about and directing their own learning. Instead, effective educators continually prompt students. Students learn by incorporating understanding of the subject into their existing knowledge base, and so must take an active role rather than being passively taught. The educator's job is therefore to facilitate learning <sup>(16)</sup>. One of the active teaching strategies that educators can use to help students to construct their own learning, improve their clinical performance and enhance their group engagement is Team-Based Learning strategy <sup>(17)</sup>.

## 2. AIM OF THE STUDY

This study aimed to determine the effect of Team-Based Learning strategy on the group engagement, knowledge and clinical performance among pediatric nursing students.

## 3. RESEARCH HYPOTHESES

1. Pediatric nursing students who are taught by TBL strategy exhibit more group engagement than those who are not.
2. Pediatric nursing students who are taught by TBL strategy exhibit higher scores in knowledge test about colostomy care than those who are not.
3. Pediatric nursing students who are taught by TBL strategy exhibit higher scores in performing colostomy care procedure than those who are not.
4. Pediatric nursing students who are taught by TBL strategy exhibit more positive feedback about it than those who are not.

## 4. MATERIALS AND METHOD

### Materials

**Research design:** A quasi-experimental research design was used in this study.

**Setting:** This study was conducted at the skill laboratories of Pediatric Nursing Department at the Faculty of Nursing, Alexandria University where the colostomy care procedure is taught.

**International Journal of Novel Research in Healthcare and Nursing**

Vol. 6, Issue 2, pp: (504-514), Month: May - August 2019, Available at: [www.noveltyjournals.com](http://www.noveltyjournals.com)

**Subjects:** The subjects of this study comprised 72 nursing students who were selected randomly to represent 200 students enrolled in Pediatric Nursing Course during the first semester of the academic year 2017-2018. The selected subjects were assigned randomly into two equal groups "study and control" 36 students for each.

**Tools:** Four tools were used for data collection.

**Tool I: Nursing Students' Knowledge Test.**

This test was developed by the researcher after thorough review of related literature<sup>(18-20)</sup>. It was used to measure the pediatric nursing students' knowledge level about colostomy care. It includes two parts; part one consists of 15 multiple-choice questions, while part two consists of two case studies about colostomy care. The total score of this test is 35 scores distributed as follows: 15 scores for multiple-choice questions and 10 scores for each case study.

**Tool II: Colostomy Care Observational Checklist**

This checklist was developed by Pediatric Nursing Department staff (21-23). It was adopted by the researcher to measure the nursing students' skills in performing colostomy care procedure. It consists of 15 steps that should be followed before, during and after performing the colostomy care procedure. The total score of this procedure is 30 scores.

**Tool III: Nursing Students' Group Engagement Questionnaire**

This questionnaire was developed by Schreiner and Louis (2006)<sup>(24)</sup>. It was modified and translated into Arabic by the researcher to be applicable for measuring nursing students' group engagement during team-based learning sessions. It consists of 10 statements with 4 points likert scale ranging from strongly disagree (1) to strongly agree (4). The scoring system of this questionnaire is ranging from 10 to 40. The higher the score, the higher the engagement of the group.

**Tool IV: Team-Based Learning Feedback Questionnaire**

This questionnaire was developed by Mennenga (2010)<sup>(25)</sup>. It was modified and translated into Arabic by the researcher to be applicable for measuring pediatric nursing students' feedback about team-based learning strategy. It consists of 35 statements with 4 points likert scale ranging from strongly disagree (1) to strongly agree (4). It includes four subscales; student's accountability to the team, preference of using the strategy, satisfaction about the use of TBL and evaluation of team effectiveness subscale. The scoring system of this questionnaire is ranging from 35 to 140. The higher the score, the more the positive feedback about team-based learning strategy. Attached to them a sheet that contains personal and academic data about nursing students such as age, gender and their last GPA.

**Method**

- An official permission to conduct the study was obtained from the Dean of the Faculty of Nursing, Alexandria University, and the head of Pediatric Nursing Department.
- Tool I was developed by the researcher after thorough review of related literature.
- Tool II was adopted by the researcher.
- Tool III and tool IV were modified and translated into Arabic by the researcher to be applicable for measuring nursing students' group engagement during team-based learning sessions and their feedback about the strategy.
- Tool I, tool III and tool IV were tested for their content validity by five experts in the related fields, and then the necessary modifications were made.
- Tool I was tested for its reliability using Pearson Coefficient test. The tool was reliable and its coefficient value was 0.75.
- Tool III and tool IV were tested for their reliability using Cronbach's Alpha test. The tools were reliable and their coefficient values were 0.71 and 0.74 respectively.
- A pilot study was carried out on 10 % of nursing students enrolled in Pediatric Nursing Course to test the clarity and applicability of the tools. The tools were clear and applicable. Nursing students included in the pilot study were excluded from the study subjects.

## International Journal of Novel Research in Healthcare and Nursing

Vol. 6, Issue 2, pp: (504-514), Month: May - August 2019, Available at: [www.noveltyjournals.com](http://www.noveltyjournals.com)

- Data was collected over three months from October to December 2017.
- Students were assigned randomly into two equal groups "study and control" 36 students for each.
- The control group was instructed using the routine of Pediatric Nursing Department in teaching colostomy care procedure "demonstration" and the study group was instructed using TBL strategy.
- The study was conducted through three phases; preparation, implementation and evaluation phase.

### I. Preparation phase

- Nursing students' knowledge and group engagement were measured for both groups before the clinical experience using tool I and tool III.
- Students in the study group were asked to read about the colostomy and colostomy care before the beginning of the clinical rotation.
- Students in the study group (36 students) were divided randomly into "6" subgroups, each subgroup included "6" students.

### II. Implementation phase

- During the theoretical part of this phase; students in the study group were asked to answer 15 multiple-choice questions about colostomy care (part 1 of RAT) individually (IRAT) then each subgroup discussed their answers as a team (TRAT) and finally the answers were presented and discussed in front of the other teams with immediate feedback from the researcher.
- Two real world problems about colostomy care (part 2 of RAT) were given to all teams to measure their critical thinking and cooperative decision making skills. The answers were presented and discussed in front of the other teams with immediate feedback from the researcher.
- In the clinical part of this study, the researcher demonstrated the colostomy care procedure in front of the students first then; each student was allowed to re-demonstrate the procedure with direct observation and evaluated from the researcher and from their peers using colostomy care checklist (tool II).

### III. Evaluation phase

- Students' knowledge, clinical performance and group engagement of the study and the control groups were measured twice; immediately after and after four weeks of the clinical experience using tool I, tool II and tool III.
- Study group's feedback about team-based learning strategy was measured immediately after the application of it using tool IV.

### Ethical considerations

- An informed consent was obtained from all nursing students after explanation of the study aim.
- Confidentiality, privacy, anonymity and the right to withdraw from the study at any time without any penalties were assured.

## 5. STATISTICAL ANALYSIS

Data were fed to the computer and analyzed using IBM SPSS software package version 20. Qualitative data were described using number and percent. Quantitative data were described using range (minimum and maximum), mean, standard deviation and median. Significance of the obtained results was judged at the 5% level.

The following statistical tests were used:

**A. Chi-square test:** for categorical variables, to compare between different groups.

**B. Fisher's Exact or Monte Carlo correction:** correction for chi-square when more than 20% of the cells have expected count less than 5.

- C. **Student t-test:** for normally distributed quantitative variables, to compare between two studied groups.
- D. **F-test (ANOVA):** for normally distributed quantitative variables, to compare between more than two groups, and Post Hoc test (LSD) for pair wise comparisons.
- E. **Paired t-test:** for normally distributed quantitative variables, to compare between two periods.
- F. **ANOVA with repeated measures:** for normally distributed quantitative variables, to compare between more than two periods or stages, and Post Hoc test (LSD) for pair wise comparisons.

## 6. RESULTS

Table I shows the distribution of nursing students in the study and control groups according to their personal and academic characteristics. It was found that the age of more than half of the students in both groups ranged from 21 to 22 years. Half of the students in the study group compared to more than half of them in the control group (58.3%) were male. The majority of students in both groups were at their fifth academic semester (83.3% and 77.8% respectively). The last GPA of one quarter of the students in the study group (25.0%) compared to more than one third of them in the control group (41.7%) ranged from B- to B+. No statistically significant differences were found between the study and control groups in relation to their personal and academic characteristics.

**Table I: Distribution of the studied groups according to their personal and academic characteristics.**

Personal and Academic Characteristics	Study Group (N = 36)		Control Group (N = 36)		Test of Sig.	p
	No.	%	No.	%		
<b>Age</b>						
☐ <21	11	30.6	10	27.8	$\chi^2=0.139$	0.933
☐ 21 – 22	20	55.6	20	55.6		
☐ >22	5	13.9	6	16.7		
Min. – Max.	20.0 – 23.0		20.0 – 23.0		t=0.113	0.910
Mean ± SD.	21.19 ±1.04		21.22 ±1.05			
<b>Gender</b>						
☐ Male	18	50.0	21	58.3	$\chi^2=0.503$	0.478
☐ Female	18	50.0	15	41.7		
<b>Academic semester</b>						
☐ Fifth semester	30	83.3	28	77.8	$\chi^2=0.355$	0.551
☐ Seventh semester	6	16.7	8	22.2		
<b>Last GPA</b>						
☐ B- – B+	9	25	15	41.7	$\chi^2=5.782$	<sup>MC</sup> p=0.336
☐ C- – C+	27	75	21	58.3		

$\chi^2$ : Chi square test. <sup>MC</sup>p: p value for Monte Carlo t, p: t and p values for Student t-test

\*: Statistically significant at  $p \leq 0.05$

Table II shows that almost all students in both groups had low group engagement before applying TBL strategy (94.4% and 100.0% respectively). While immediately after the application of it almost all students in the study group (97.2%) compared to none of them in the control group had high group engagement. Moreover, the majority of students in the study group (86.1%) and none of them in the control group had high group engagement after 4 weeks of applying TBL strategy with highly statistically significant differences between them immediately after and after 4 weeks of applying TBL strategy ( $p < 0.001^*$  &  $< 0.001^*$  respectively).

**Table II: Comparison between the studied groups according to their group engagement before, immediately after and after 4 weeks of applying Team Based Learning strategy.**

Group Engagement	Before				Immediately After				After 4 Weeks			
	Study Group (N=36)		Control Group (N=36)		Study Group (N=36)		Control Group (N=36)		Study Group (N=36)		Control Group (N=36)	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Low (0-19)	34	94.4	36	100.0	0	0.0	31	86.1	0	0.0	33	91.7
Moderate (20-29)	2	5.6	0	0.0	1	2.8	5	13.9	5	13.9	3	8.3
High (30-40)	0	0.0	0	0.0	35	97.2	0	0.0	31	86.1	0	0.0
$\chi^2$	2.057				68.667				64.500			
P	<sup>FE</sup> p=0.493				<0.001*				<0.001*			
Min. – Max.	10.0 – 24.0		10.0 – 17.0		26.0 – 40.0		10.0 – 26.0		26.0 – 40.0		10.0 – 26.0	
Mean ± SD	15.14 ± 3.05		14.92±2.09		36.53 ± 2.79		16.08±5.11		35.33±4.18		15.36±4.34	
T	0.360				21.057				19.875			
P	0.720				<0.001*				<0.001*			

$\chi^2$ , p:  $\chi^2$  and p values for **Chi square test**      <sup>FE</sup>p: p value for **Fisher Exact**      t, p: t and p values for **Student t-test**

\*: Statistically significant at  $p \leq 0.05$

Table III shows that more than half of students in both groups had low knowledge about colostomy care before applying TBL strategy (55.6% and 52.8% respectively). While, all students in the study group (100%) compared to only one quarter of them in the control group (25.0%) had high knowledge about colostomy care immediately after applying TBL strategy. Moreover, almost all students in the study group (97.2%) compared to only 19.4% of them in the control group had high knowledge about colostomy care after 4 weeks of applying TBL strategy with highly statistically significant differences between them immediately after and after 4 weeks of applying TBL strategy ( $p < 0.001^*$  and  $< 0.001^*$  respectively).

**Table III: Comparison between students in the studied groups according to their knowledge about colostomy care before, immediately after and after 4 weeks of applying Team Based Learning strategy.**

Knowledge	Before				Immediately After				After 4 Weeks			
	Study Group (N=36)		Control Group (N=36)		Study Group (N=36)		Control Group (N=36)		Study Group (N=36)		Control Group (N=36)	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Low (0 – 20)	20	55.6	19	52.8	0	0.0	17	47.2	0	0.0	24	66.7
Moderate (21 – 25)	11	30.6	5	13.9	0	0.0	10	27.8	1	2.8	5	13.9
High (26 – 35)	5	13.9	12	33.3	36	100	9	25.0	35	97.2	7	19.4
$\chi^2$	5.045				43.200				51.939			
P	<sup>MC</sup> p= 0.096				<0.001*				<0.001*			
Min. – Max.	2.0 – 28.0		3.0 – 28.0		30.0-34.0		6.0-28.0		23.0-34.0		10.0-33.0	
Mean ± SD	15.78±8.73		16.43±10.1		32.42±1.26		18.93±6.5		31.97±2.4		18.33±6.3	
T	0.292				12.075				11.973			
P	0.771				<0.001*				<0.001*			

$\chi^2$ , p:  $\chi^2$  and p values for **Chi square test**      <sup>FE</sup>p: p value for **Fisher Exact**      t, p: t and p values for **Student t-test**

\*: Statistically significant at  $p \leq 0.05$

Table IV shows that the majority of students in the study group (94.4%) compared to only 11.1% of them in the control group had high performance of colostomy care procedure immediately after applying TBL strategy. Moreover, the majority of students in the study group (83.3%) compared to only 8.3% of them in the control group had high performance of colostomy care procedure after 4 weeks of applying TBL strategy with highly statistically significant differences between them immediately after and after 4 weeks of applying TBL strategy ( $p < 0.001^*$  and  $< 0.001^*$  respectively).

**Table IV: Comparison between students in the studied groups according to their performance of colostomy care procedure immediately after and after 4 weeks of applying Team Based Learning strategy.**

Performance	Immediately After				After 4 Weeks			
	Study Group (N=36)		Control Group (N=36)		Study Group (N=36)		Control Group (N=36)	
	No.	%	No.	%	No.	%	No.	%
Low (0 - <18)	0	0.0	5	13.9	0	0.0	11	30.6
Moderate (18-22.5)	2	5.6	27	75.0	6	16.7	22	61.1
High (>22.5-30)	34	94.4	4	11.1	30	83.3	3	8.3
$\chi^2$	55.406				42.234			
P	<sup>MC</sup> p<0.001*				<0.001*			
Min. – Max.	19.0 – 30.0		6.0 – 28.0		19.0 – 30.0		14.0 – 28.0	
Mean ± SD	27.39 ± 2.73		19.92 ± 4.38		26.94±3.54		19.33 ± 3.12	
T	8.691				9.687			
P	<0.001*				<0.001*			

$\chi^2$ , p:  $\chi^2$  and p values for Chi square test      <sup>MC</sup>p: p value for Monte Carlo      t, p: t and p values for Student t-test

\*: Statistically significant at  $p \leq 0.05$

Table V reveals that all students had positive feedback about student's accountability to the team, preference of TBL, evaluation of team effectiveness, team foundations, team performance, team skills and team climate (100.0%). In addition, the majority of them were satisfied about the use of TBL (94.4%).

**Table V: Feedback of the study group about Team Based Learning strategy.**

feedback about team-based learning strategy	Study Group (N=36)				Mean	SD
	Negative		Positive			
	No.	%	No.	%		
Student's accountability to the team	0	0.0	36	100.0	10.33	1.10
Preference of team-based learning	0	0.0	36	100.0	18.06	1.43
Satisfaction about the use of team-based learning	2	5.6	34	94.4	17.47	2.94
Evaluation of team effectiveness	0	0.0	36	100.0	77.61	3.70
Team foundations	0	0.0	36	100.0	27.61	1.69
Team performance	0	0.0	36	100.0	10.72	1.11
Team skills	0	0.0	36	100.0	17.89	1.47
Team climate	0	0.0	36	100.0	21.39	1.64
Feedback total	0	0.0	36	100.0	123.47	5.76

## 7. DISCUSSION

Team-Based Learning (TBL) is an instructional strategy that is based on procedures for developing high performing learning teams. It helps in improving students' skills in teamwork, communication, critical-thinking, conflict-resolution and problem solving. In addition, it enhances their engagement, improves their satisfaction with the learning experience and improves their class attendance <sup>(26)</sup>.

The results of the current study revealed a highly statistically significant difference between the study and control groups in relation to their group engagement in favor of the study group. This result validated the effect of the TBL strategy in improving the group engagement of pediatric nursing students; therefore the first hypothesis was accepted.

This result may be due to the active involvement of students in the application of knowledge during the TBL activities. TBL made them work actively and cooperatively with their teammates in team activities which attracted their attention most of the class time. Students also actively participated in small group discussions and debates with team members, with other teams and with the researcher. In addition, the development of their communication, listening, critical thinking, problem-solving and decision-making skills were enhanced during the TBL sessions.

This result was consistent with Clark et al. (2012) and Chung et al. (2009) who found that TBL enhanced students' engagement and improved their satisfaction with the group learning<sup>(27,28)</sup>. Moreover, Tan et al. (2011) and Cheng et al. (2014) found that TBL significantly increased students' engagement in the classroom. It also increased the value placed on teams, their self-directed learning and their academic performance<sup>(29,30)</sup>.

The results of the current study revealed a highly statistically significant difference were found between the study and control groups in relation to their knowledge about colostomy care in favor of the study group. This result validated the effect of TBL strategy in improving the knowledge of pediatric nursing students about colostomy care; therefore the second hypothesis was accepted.

This result may be due to the interaction that occurred between students and each other while answering the knowledge test about colostomy care as a team during TBL sessions. This interaction increased the opportunities for sharing ideas, proposing alternatives, making explanations in addition to clarifying their uncertainty and misunderstanding about the content through team discussions and collaborative learning.

The result of the current study was in congruence with the results of many researches who reported that TBL facilitated the undergraduate nursing students' mastery of nursing course content. They also found that students taught by TBL scored significantly higher on the course exams, higher critical thinking and higher preference for TBL than traditional lecture<sup>(31-34)</sup>. Mody et al. (2013) and Kyung et al. (2015) added that students who received TBL had significantly higher problem-solving scores than those who received traditional lecture-based learning<sup>(35,36)</sup>.

The result of the current study showed a highly statistically significant difference between the study and control groups in relation to their clinical performance scores of colostomy care procedure in favor of the study group. This result validated the effect of the TBL strategy in improving the clinical performance of pediatric nursing students concerning colostomy care procedure; therefore the third hypothesis was accepted.

This result may be due to the adequate preparation of the skill lab by the researcher to put the students in a situation similar to the real one. In addition to allowing them to re-demonstrate the procedure until mastering it in a non-threatening environment which reduced their anxiety and helped them to be more prepared to perform colostomy care for pediatric patients in different health care settings.

The result of the current study was consistent with Bou Akl et al. (2016) who concluded that introducing TBL in early clinical courses has the potential to improve the clinical performance of medical students and to foster the development of better functioning teams<sup>(37)</sup>. Likewise, Huitt et al. (2015) and Kang (2016) revealed that students received TBL scored significantly higher on the practical examination than those who received traditional clinical teaching methods<sup>(38,39)</sup>.

When evaluating the feedback of the students in the study group about using the TBL strategy, it was found that almost all students had positive feedback about it. Students agreed that the TBL strategy increased their accountability to the team. They were satisfied about the use of this strategy and preferred it as an active teaching method over the traditional method. Moreover, they mentioned that their teams were effective and motivated them to learn.

These findings may be because TBL increased the students' engagement level, enhanced their knowledge acquisition and retention as well as it improved their clinical performance of colostomy care procedure. Also, they enjoyed the TBL activities as they were interesting, interactive, motivated, and attracted their attention most of the time.

**International Journal of Novel Research in Healthcare and Nursing**Vol. 6, Issue 2, pp: (504-514), Month: May - August 2019, Available at: [www.noveltyjournals.com](http://www.noveltyjournals.com)

These findings were in line with Frame et al. (2015) and Vasan et al. (2017) who stated that all students were satisfied with TBL and they had positive feedback about it. They added that; students preferred learning in a TBL environment because it improved their critical thinking and problem-solving skills and it prepared them well for course examinations and patient care in the clinical setting<sup>(40,41)</sup>.

Furthermore, many researchers stated that TBL increased the students' accountability and responsibility for learning as they were better prepared for class and took an active part in their learning process. Students added that TBL made them more satisfied with their learning and felt learning in a team environment surpassed learning on an individual basis<sup>(42-45)</sup>. Finally, Touchet and Coon (2018) reported that team-based learning strategy was an interesting teaching method and it motivated the students to learn<sup>(46)</sup>.

**8. CONCLUSION**

Team-Based Learning (TBL) is a valuable teaching strategy. It played a crucial role in enhancing pediatric nursing students' group engagement, knowledge and clinical performance of colostomy care procedure. It was perceived by pediatric nursing students as an interesting teaching method as it motivated them to learn, improved the spirit of teamwork and enhanced teacher - students' relationship.

**9. RECOMMENDATIONS**

- Educational workshops should be conducted to all nurse educators to raise their awareness about the TBL strategy.
- Team-Based Learning (TBL) strategy should be included in the curricula of pediatric nursing department and all other nursing department at the Faculty of Nursing, Alexandria University.
- Replicate the current study with other and larger populations of nursing students for generalization of results.

**REFERENCES**

- [1] Currey J, Eustace P, Oldland E. Developing professional attributes in critical care nurses using team-based learning. *Journal of Nurse Education in Practice* 2015; 15(4): 232-8.
- [2] Michaelsen L. Team-based learning: a potential solution to the problems of large classes. *The Organizational Behavior Teaching Journal* 1970; 7(4): 18-33.
- [3] Fatmi M, Hartling L, Hillier T. The effectiveness of team-based learning on learning outcomes in health professions education. *Journal of Medical Teacher* 2014; 5(35): 75-88.
- [4] Michaelson L. *Getting started with team-based learning: a transformative use of small groups*. New York: Praeger Publisher Company, 2010; 56.
- [5] Chalk K, Bizo L. Specific praise improves on-task behavior and numeracy enjoyment: a study of year four pupils engaged in the numeracy hours. *Educational Psychology in Practice* 2016; 20(4): 335-51.
- [6] Clark S. District chips a way suspension: are schools calmer? *Catalyst for Cleveland Schools* 2014; 3(3): 4-6.
- [7] Sugia G, Horner R, Gresham F. Behaviorally effective school environments. In: Shinn M, Walker A, Stoner G. *Interventions for academic and behavior problems: preventive and remedial approaches*. Bethesda: National Association of School Psychologists, 2002; 315-20.
- [8] Rotgans I, Rajalingam G. Assessing how students learn in team-based learning: validation of the knowledge re-consolidation inventory. *Journal of Health Professions Education* 2017; 3(5): 118-27.
- [9] Walker M, Zheng G, Mendoza A. Adopting team-based learning for in-service teachers: a case study. *International Journal for the Scholarship of Teaching and Learning* 2017; 11(1): 34-40.
- [10] Zepke N, Leach L. Improving student engagement: ten proposals for action. *Journal of Active Learning in Higher Education* 2014; 11(3): 167-77.
- [11] Harper R, Quaye J. *Students' engagement in higher education*. London: Routledge Company, 2016; 15.

**International Journal of Novel Research in Healthcare and Nursing**

 Vol. 6, Issue 2, pp: (504-514), Month: May - August 2019, Available at: [www.noveltyjournals.com](http://www.noveltyjournals.com)

- [12] Ibrahim I, Sleem W. Team-based learning: an innovative teaching strategy for enhancing students' engagement. *International Journal for Innovation Education and Research* 2018; 6(1): 159-71.
- [13] Levine R, Lynn D, Stone M, Wolf D. Transforming a clinical clerkship with team learning. *Journal of Teaching and Learning in Medicine* 2018; 16(3): 270-5.
- [14] Haidet P, O'Malley K, Richards B. An initial experience with team learning in medical education. *Journal of Academic Medicine* 2016; 77(1): 40-4.
- [15] Nieder G, Parmelee D, Stolfi A, Hudes P. Team-based learning in a medical gross anatomy and embryology course. *Journal of Clinical Anatomy* 2015; 18(3): 56-63.
- [16] Doyle B. Metacognitive awareness: impact of a metacognitive intervention in a pre-nursing course, 2014; 87. Available at: <http://digitalcommons.Isu.edu>. Retrieved on: 09/05/2018.
- [17] Song Y, Lindquist R, Kang S. Effects of team-based learning on problem-solving, knowledge and clinical performance of Korean nursing students. *Journal of Nurse Education Today* 2016; 38(7): 115-8.
- [18] Hokenberry M, Winkelstein M. *Wong's essential of pediatric nursing*. 7<sup>th</sup> ed. St. Louis: Mosby Co., 2007; 312.
- [19] Ashwill W, Droske C. *Nursing care of children: principles and practice*. 2<sup>nd</sup> ed. London: W.B. Saunders Co., 2002; 541.
- [20] Webber R, Ziegler M. *Operative pediatric surgery*. Chicago: Megrow Hill Co., 2003; 548.
- [21] Grosfeld L, Diane E. Care of the child with a colostomy. *Journal of Pediatrics* 2007; 59(3): 163-8.
- [22] Mollitt L. Colostomy complications in infants and children, *Journal of Pediatric Surgeries* 2005; 88(2): 233-7.
- [23] Freund R, Raniel J. Factors affecting the morbidity of colostomy closure. *American Journal of Pediatric Surgeries* 2008; 26(3): 433-8.
- [24] Schreiner A, Louis C. Measuring engaged learning in college students. *Journal of College Student Development* 2006; 32(6): 240-5.
- [25] Mennenga H. A model for easily incorporating team-based learning into nursing education. *International Journal of Nursing Education Scholarship* 2010; 7(1): 356-64.
- [26] Searle N, Haidet P, Adamkelly P. Team-based learning in medical education: initial experiences at ten institutions. *Journal of Academic Medicine* 2013; 78(6): 55-8.
- [27] Clark M, Nguyen H, Bray C, Levine R. Team-based learning in an undergraduate nursing course. *Journal of Nursing Education* 2012; 47(3): 111-6.
- [28] Chung E, Rhee J, Baik Y. The effect of team-based learning in medical ethics education. *Journal of Medical Teacher* 2009; 31(7): 1013-7.
- [29] Tan N, Kandiah N, Chan Y, Umapathi T, Lee S. A controlled study of team-based learning for undergraduate medical clinical neurology education. *Journal of BMC Medical Education* 2011; 11(91): 75-84.
- [30] Cheng C, Liou S, Tsai H, Chang C. The effects of team-based learning on learning behaviors in the maternal-child nursing course. *Journal of Nurse Education Today* 2014; 34(1): 25-30.
- [31] Hickman S, Wocial L. Team-based learning and ethics education in nursing. *Journal of Nursing Education* 2013; 52(12): 696-700.
- [32] Jafari Z. A comparison of conventional lecture and team-based learning methods in terms of students' learning and teaching satisfaction. *Journal of Medical Teacher* 2014; 28(5): 5-12.
- [33] Branson S, Boss L, Fowler D. Team-based learning: application in undergraduate baccalaureate nursing education. *Journal of Nursing Education and Practice* 2015; 6(4): 59-67.

**International Journal of Novel Research in Healthcare and Nursing**Vol. 6, Issue 2, pp: (504-514), Month: May - August 2019, Available at: [www.noveltyjournals.com](http://www.noveltyjournals.com)

- [34] Carmichael J. Team-based learning enhances performance in introductory biology. *Journal of College Science Teaching* 2009; 38(4): 54-61.
- [35] Mody S, Kiley J, Gawron L, Garcia P, Hammond C. Team-based learning: a novel approach to medical students' education in family planning. *Journal of Contraception* 2013; 88 (2): 239-42.
- [36] Kyung C, Jung R, Young B, Ohsun A. The effect of team-based learning in medical ethics education. *Journal of Medical Teacher* 2015; 31(11): 1013-7.
- [37] Bou Akl I, Ghaddar F, Sabra R, Parmelee D. Teaching clinical pharmacology using team-based learning: a comparison between third-and fourth-year medical students. *Journal of Clinical Pharmacology* 2016; 52(3): 1806-14.
- [38] Huitt T, Kilins A, Brooks W. Team-based learning in the gross anatomy laboratory improves academic performance and students' attitudes toward teamwork. *Journal of Anatomy Science Education* 2015; 8(2): 95-103.
- [39] Kang H. The effect of team-based learning on problem-solving, knowledge and clinical performance of Korean nursing students. *Journal of Nurse Education Today* 2016; 38(6): 115-8.
- [40] Frame T, Cailor S, Gryka R, Sheppard L. Students' perceptions of team-based learning versus traditional lecture-based learning. *Journal of Nursing Education Today* 2015; 79(4): 1-11.
- [41] Vasan N, DeFouw D, Compton S. Team-based learning in anatomy: an efficient, effective and economical strategy. *Journal of Anatomical Science Education* 2017; 4 (6): 333-9.
- [42] Conway S, Johnson J, Ripley T. Integration of team-based learning strategy into a cardiovascular module. *American Journal of Pharmaceutical Education* 2018; 74(2): 1-7.
- [43] Dunaway G. Adaption of team-based learning to an introductory graduate pharmacology course. *Journal of Teaching and Learning in Medicine* 2015; 17(1): 56-62.
- [44] Feingold E, Cobb D, Arnold J, Joslin S. Students' perceptions of team learning in nursing education. *Journal of Nursing Education* 2018; 47(5): 214-22.
- [45] Palsole S, Awalt C. Team-based learning in asynchronous online settings. *Journal of New Directions for Teaching and Learning* 2016; 116(4): 87-95.
- [46] Touchet B, Coon K. A pilot use of team-based learning in psychiatry resident psychodynamic psychotherapy education. *Journal of Academic Psychiatry* 2018; 29(3): 293-6.