The Comparing of Problem-Based Learning and Lecture-Based Learning on Students' Learning Outcomes and Satisfaction for a Family Health Nursing Course

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Abstract

Background: Problem - Based Learning (PBL) is a method of student-centered learning. In PBL, students become centered to the learning process, whereas the teacher is the center of learning in lecture-based learning (LBL).
Purpose: This study aimed to compare the effects of PBL and LBL on students' learning outcomes and satisfaction on an undergraduate nursing course.
Methods: Quasi-experimental study. Participants included 161 students from two different classes of the course; in 2013, as a control group (n = 88) and in 2014 as an intervention group (n = 73). Both groups received LBL, which is practice in the lab and clinic, but the intervention group also received PBL. Secondary data analysis of students' learning outcomes was measured using students' learning progress in tests from lecture (theory, paper, laboratory, and clinical), while students' satisfaction was measured using teaching method evaluation from students.
Results: Students' learning outcomes (theory, laboratory, and clinical) in the PBL group were significantly more than in the control group ($p<0.001$), whereas paper lesson outcomes were higher in control group compared to the intervention group ($t=6.43$; $p<0.001$; 95% CI=1.46-2.76). There was more satisfaction with the PBL method. There was no relationship between students' satisfaction and learning outcomes ($p>0.05$). However, students considered greater satisfaction in PBL compared to LBL.
Conclusion: In problem-based learning, students contributed a lot to solving the problem and getting the skills and knowledge they needed. Students are also expected to be motivated.

Keywords: lecture-based learning, problem-based learning, family nursing

Introduction

Educators must realize that active learning is associated with three types of memory, namely working memory (place of thinking), sensory memory (perception of the world through the senses), and long-term memory (unlimited memory storage) (Wilson, Blake, Taylor, & Hannings, 2013). Therefore, it is necessary to choose the right learning strategy in learning design; consequently, it can help students absorb new information more deeply and connect it with new ideas or new experiences (Xu, 2016). Many variations of teaching and learning strategies can be chosen by educators to facilitate students. This emphasizes the importance of selecting teaching and learning strategies in nursing education, thereby making nursing learning and teaching more exciting and compelling.

Some methods are used for teaching and learning in nursing to increase the student's capabilities. However, the lecture method of learning is highly

dependent on the knowledge base and skills of the teacher, requiring well-organized content preparation and good communication skill from the teacher (Aruna & Thenmozhi, 2014). Lecture-based learning (LBL) is traditionally teaching and learning in nursing which improves critical thinking skills among nursing students (Kaddoura, 2011). The lecture is the most common method of education at all levels in medical groups (Khalili et al., 2016). This method is teacher-centered and the description and explanation of phenomena plays an essential part in it; its primary purpose is to transfer knowledge (Khodaveisi, Qaderian, & Oshvandi, 2017). Among the advantages of the lecture, the following can be referred to: being economical; flexibility; strengthening the power of the lecture; and strengthening students' listening skills (Mareno, Bremner, & Emerson, 2010).

On the other hand, problem-based learning (PBL) has been identified as an approach that improves the training of nurses by teaching them how to apply theory to clinical practice and by developing their problem-solving skills, which could be used to overcome environmental constraints within clinical practice (Shin & Kim, 2013). The PBL approach is more inductive; students learn content as they try to solve the problems. The PBL approach, therefore, facilitates the development of disciplinary knowledge bases, skills, and problem-solving strategies by placing the students in the active role of problem-solvers for issues that are aligned with real-life situations (Amakali, 2013).

Empirically, the family health nursing (FHN) course affects the health status of family members as a client system in nursing care. However, until now, FHN has not been widely developed as an object of systematic study in the field of nursing. This is related to learning systems that have not been effective, such as learning in a class, laboratory, or track practice. Therefore, using the right method for teaching and learning in the FHN course improves practice based on knowledge and skills among nursing students. Thus, the aim of this study is to compare the effects of PBL and LBL on students' learning outcomes and satisfaction in undergraduate nursing students for the FHN course.

Materials and Methods

Design

This study utilized a quasi-experimental study designed to evaluate students' learning outcomes and satisfaction in undergraduate nursing students for an FHN course in the Faculty of Nursing, University of Jember, Indonesia.

Sample and setting

Undergraduate nursing students in third-year from the School of Nursing, J-University - participated, taken from two different classes of years of the course, 2013 as the control group (n=88) and 2014 as intervention (n=73). Both groups received LBL practice in the laboratory and clinic, while the intervention group had the addition of PBL.

Data collection

Family health nursing, a 4-credit course, was selected for this purpose. Secondary data analysis of students' learning outcomes was measured using students' learning progress test from the lecture (theory, paper, laboratory, and clinical). In contrast, students' satisfaction was measured using teaching method evaluation from students. We performed LBL and PBL intervention for 14 weeks in one semester to complete the FHN subject. To evaluate students' learning outcomes, we evaluated using the paper lessons, laboratory practices, and a clinical home visit.

The paper lesson, a test in LBL groups, was conducted using a test of the material of teaching that was taught after 10 sessions (10 weeks) in class with 50 minutes per session, including eight chapters, such as introduction of family, family theory model and conceptual, family structure, family function, family environment, family stress and coping, family environment, and family nursing process (Friedman, Bowden, & Jones, 2003). Meanwhile, a paper test in PBL groups was performed using a test of the material taught that was learned after ten sessions in class with 50 minutes per session to solve five cases. Each case was solved in two sessions. At each session, students were divided into small groups (10-12 students per group) that were facilitated by one teacher per group. The score of the paper lessons was ranged from 0 – 100. Then, after the completed paper test, both the LBL and PBL groups were studied in laboratory practice (two sessions in two weeks) and clinical home visits (two sessions in two weeks).

A laboratory test was performed after two sessions with 100 minutes per session to practice how to do an assessment of the family, nursing diagnosis, make a family intervention, conduct family implementation, and evaluate the family. Furthermore, a clinical home visit was performed in two sessions in which three students visited one family to care for them twice (at least three hours each time for visiting the family) to practice the nursing process. The clinical nurses from a local public health center supervised the students to evaluate their practices. The scores of laboratory practice and clinical home visits ranged from 0 – 100. Finally, the outcomes of the FHN course were determined by the formula of count, including (3 X (theory + lesson paper + laboratory) + 1X (clinical for the home visit) divided by 4).

In the last session, in both the LBL and PBL groups, we measured student satisfaction. We used a questionnaire of student satisfaction with teaching and learning in the nursing course, which was developed by the center of learning of J-University. This questionnaire measured student perception of the teaching and learning process of the FHN subject course performed by teachers. This questionnaire

Table 1. Characteristic of Participants

Variable		LBL (n= 88)	PBL (n= 73)	t/X2	p-value
		n (%)	n (%)		
Age					
	M±SD	20.00±0.79	19.83 0.69	-1.46	0.145
Gender					
	Male	31 (35.2)	18 (24.7)	1.64	0.201
	Female	57 (64.8)	55 (75.3)		

M stands for the middle number; SD stands for the standard deviation; LBL stands for lecture-based learning; PBL stands for problem-based learning; t stands for an independent student t-test; X2 stands for a chi-square test.

Table 2. Comparison Student Score of Theory, Paper Lesson, Laboratory, and Clinical Between Lecture Based Learning (LBL) and Problem Based Learning (PBL)

Indicator student score learning major of FHN	n	M	SD	t	P-value	95% CI	
						Lower	Upper
Theory							
LBL	88	61.02	7.33	-10.81	< 0.001	-12.91	-8.92
PBL	73	71.93	5.46				
Paper lesson							
LBL	88	83.72	2.09	6.43	< 0.001	1.46	2.76
PBL	73	81.61	2.06				
Laboratory							
LBL	88	81.31	2.94	-3.43	0.001	-1.83	-0.49
PBL	73	82.47	1.07				
Clinical for home visit							
LBL	88	82.82	3.11	-12.35	< 0.001	-5.46	-3.95
PBL	73	87.53	1.61				
Total score							
LBL	88	308.87	8.37	-11.18	< 0.001	-17.25	-12.8
PBL	73	323.53	8.19				
Outcome[a]							
LBL	88	76.29	2.28	-12.85	< 0.001	-5.18	-3.80
PBL	73	80.78	2.12				

Note: M= Median; SD= Standard deviation; CI= Confidence interval; FHN= Family health nursing; LBL= Lecture based learning; PBL= Problem based learning.
t= determined using Independent student t-test.
[a]Outcome determined (3x(theory+lesson paper+laboratory) + 1x(clinical for home visit) divided 4).

consists of 11 of questions (Likert scale from 1 – 7), including how the teachers prepare teaching for the topic in class, getting feedback of evaluation results, clearly for communication, responsiveness for the student, readiness for education, opening and closing class on time, effectiveness of teaching class, comprehensive capability topic in class (theory and practice), assignment for students, systematically for teaching quality, and depth and illustration of the topic up to date.

Data analysis

SPSS was used to analyze the data. This study employed descriptive and comparative data analyses. Descriptive statistics, including frequencies and percentages, were used to summarize categorical measures; median and percentile-25 and -75 were used to summarize continuous measures. We used the independent t-test to compare students' learning outcomes and satisfaction between the LBL and PBL method groups. Meanwhile, we performed a Pearson product-moment test to analyze the student satisfaction between the LBL and PBL method. All significance levels are set at $p< 0.05$.

Ethical consideration

Table 3. Comparison Student Satisfaction Between Lecture Based Learning (LBL) and Problem Based Learning (PBL)

Indicators of student satisfaction	n	M	SD	t	p-value	95% CI	
						Lower	Upper
Preparing teaching for topic in class							
LBL	88	4.07	0.84	-6.14	< 0.001	-0.94	-0.48
PBL	73	4.78	0.63				
Getting feedback of evaluation results							
LBL	88	3.73	0.84	-6.02	< 0.001	-0.96	-0.48
PBL	73	4.45	0.69				
Clearly for communication							
LBL	88	4.04	0.94	-4.00	< 0.001	-0.77	-0.26
PBL	73	4.56	0.69				
Responsiveness for student							
LBL	88	3.84	0.81	-6.09	< 0.001	-0.95	-0.49
PBL	73	4.56	0.69				
Readiness for teaching							
LBL	88	4.04	0.83	-5.30	< 0.001	-0.86	-0.39
PBL	73	4.67	0.67				
Opening and closing class on time							
LBL	88	3.84	0.93	-6.56	< 0.001	-1.08	-0.58
PBL	73	4.67	0.68				
Effectiveness teaching class							
LBL	88	3.86	0.70	-5.39	< 0.001	-0.92	-0.42
PBL	73	4.53	0.85				
Capability comprehensive topic in class (theory and practice)							
LBL	88	3.75	0.97	-3.39	0.001	-0.87	-0.23
PBL	73	4.3	1.09				
Assignment for students							
LBL	88	3.85	0.82	-5.15	< 0.001	-0.94	-0.42
PBL	73	4.53	0.85				
Systematically for teaching class							
LBL	88	3.56	0.64	-12.19	< 0.001	-1.42	-1.02
PBL	73	4.78	0.63				
Deeping and illustration of topic by up to date							
LBL	88	3.85	0.94	-5.41	< 0.001	-0.95	-0.44
PBL	73	4.55	0.69				
Total score of student satisfaction							
LBL	88	42.44	5.42	-8.26	< 0.001	-9.86	-6.05
PBL	73	50.40	6.58				

Note: M= Median; SD= Standard deviation; CI= Confidence interval; LBL= Lecture based learning; PBL= Problem based learning.
t= determined using Independent student t-test

Ethics approval for this study was granted by the relevant University Human Research Ethics Committee No. 315/UN25.7/PIU-IDB/2018. The completion of the survey was considered implied consent.

Results

There were 88 and 73 students who used the LBL and PBL methods, respectively. The majority of students were female (64.8% for LBL and 75.3% for

Table 4. Correlation Between Teaching Method and Student Satisfaction

Method	Student satisfaction (r)		p-value
	LBL	PBL	
Theory	0.058	0.021	0.305
Lesson paper	-0.011	-0.092	0.073
Laboratory	0.040	-0.078	0.452
Clinical	-0.070	-0.068	0.631
Total	0.036	-0.033	0.057
Outcome	0.039	-0.024	0.082

LBL= Lecture based learning; PBL= Problem based learning. r= determined using Pearson product moment test

PBL), as illustrated in Table 1.

Table 2 shows that there were significantly different students' learning outcomes in PBL compared to the control group, in particularly theory (t= -10.81; p< 0.001; 95% CI= -12.91 – (-) 8.92); laboratory (t= -3.43; p 0.001; 95% CI= -1.83 – (-) 0.49), and clinical (t= -12.35; p< 0.001; 95% CI= -5.46 – (-) 3.95). However, paper lesson outcome was higher in control group compared ton intervention group (t= 6.43; p< 0.001; 95% CI= 1.46-2.76).

Table 3 shows that there was significantly different student satisfaction in the LBL and PBL method in each indicator (p <0.001). There was more satisfaction among students who attended the PBL method compared to LBL (t= -8.26; p< 0.001; 95% CI= -9.86 – (-) 6.05).

Table 4 showed that there was no relationship between students' satisfaction and learning outcome (p>0.05). However, students considered more satisfaction in PBL compared to LBL.

Discussion

In this study, we found that students' learning outcomes (theory, laboratory, and clinical) in the PBL group were significantly increased compared to the control group. In contrast, paper lesson outcomes were higher in the control group compared to the intervention group. We also identified that there was more satisfaction with the PBL method. However, there was no relationship between students' satisfaction and learning outcome. Contrastingly, students considered more satisfaction in PBL compared to LBL. This finding was consistent with previous studies that found PBL is useful for improving quality teaching and learning in nursing education (Amakali, 2013; Anh Phuong Nguyen et al., 2016; Hamdan, Kwan, Khan, Ghafar, & Sihes, 2014) and improving student satisfaction (González Hernando, Carbonero Martín, Lara Ortega, & Martín Villamor, 2014).

Our results found that the PBL method increased students' learning outcomes. This may be explained that through learning to solve family nursing cases with PBL, students learn independently by linking theory and the results of previous research in providing solutions to the problems of arguments raised in learning. This finding agrees with a previous study that said PBL might help students do better in their first-year medical classes (Sayyah, Shirbandi, Saki-Malehi, & Rahim, 2017), and the students learned critical thinking through PBL (Kaddoura, 2011). Therefore, PBL could be implemented for studying the FHN course that stimulated students' critical thinking to solve a nursing problem in teaching and learning.

The results identified that students are more satisfied with learning in the FHN course using the PBL method. This finding is related to previous study that found PBL improved student satisfaction along with teaching and learning in nursing (González Hernando et al., 2014). This situation explains that students learn by themselves to know more about the phenomena which they have discussed with their lecturer in their group. Therefore, PBL could be used to stimulate the student to learn more about FHN courses.

The author can explain the implications of this research based on the research results

Conclusion

Students in PBL contributed a great deal in their learning process to solve the problem and to help students acquire the necessary knowledge and skills, Also, students are expected be motivated. Students in PBL contributed a great deal in their learning process to solve the problem and to help students to acquire the necessary knowledge and skills. Therefore, PBL could be applied to undergraduate nursing students.

Declaration of Interest

There is no conflict of interest in this study.

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Data Availability

The abstract of this study was presented as oral presentation for book abstract at the 23rd East Asian Forum of Nursing Scholars (EAFONS): Advancing Nursing Scholars in the Era of Global Transformation and Disruptive Innovation for 10-11 January 2020, Chiang Mai, Thailand (https://eafons2020.com).

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