


Comparison Between Problem-Based Learning and Lecture-Based Learning: Effect on Nursing Students' Immediate Knowledge Retention

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Background: The basic role of teaching at any degree of training is to bring a rudimentary change within the student. To facilitate the method of information transmission, educators ought to apply acceptable teaching strategies that best suit specific objectives and outcomes. Identifying the best method through comparison of problem-based learning (PBL) and the lecture method; so as to improve students' overall academic performance appear to be important.

Objective: The aim of the study was to undertake comparison between problem-based and lecture-based learning methodologies for immediate knowledge retention of nursing students at Dire Dawa University.

Methods: Quantitative research method which used a pre-experimental two group pretest and post-test research design was employed to identify effective teaching methods for immediate knowledge retention on 38 nursing students from June 1 to June 15, 2019. The students were grouped randomly into problem-based learning and lecture methods. The pretest-posttest analysis was done after an intervention made: a two-hour lecture and four-hour problem-based learning accordingly. Content validity ratio and content validity index was conducted for authentication of instruments and Cronbach alpha was computed to verify its reliability. A paired *t*-test was conducted to identify mean score change, and $p < 0.05$ was cut off value to determine if there is a significant mean change in the posttest.

Result: Both methods showed significant knowledge score improvement ($t=13.6$, $p < 0.001$) for lecture-based method and ($t=11.302$, $p < 0.001$) for problem-based learning. But as compared to the lecture method, problem-based learning has little effect on students' immediate knowledge retention, and 63.2% of the nursing students prefer the lecture method as the best teaching method.

Conclusion: The lecture method is the best teaching method for immediate knowledge retention for nursing students; it is also the most preferred method of teaching method by the students.

Keywords: lecture, problem-based learning, nursing, teaching-learning method

Introduction

Education is a constant strategy that includes achieving alluring changes in students using proper techniques. Advanced education staff endeavors to turn out to be more powerful instructors, so that, students can acquire and learn better, and many investigate techniques to improve their educational practice.¹

With the upheaval in innovation, education throughout the years has transformed hugely tremendously from paper-pen to computer. The conventional teaching techniques are supplanted by new progressed educating techniques. Current

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students are technologically progressed, which gives them account everything at a flash of speed. Cooperative learning and classroom teaching help more of practical knowledge.²

The basic role of teaching at any degree of training is to bring a rudimentary change within the student. To facilitate the method of information transmission, educators ought to apply acceptable teaching strategies that best suit specific objectives and outcomes.³

The most acknowledged standard for the mensuration of smart teaching is that the quantity of student learning that occurs. There are reliably high relationships between students' appraisals of the "amount learned" within the course and their general evaluations of the educator and the course. Those who have learned more gave their instructors higher evaluations.⁴ This equivalent standard was likewise advanced by Thomas Angelo when he said; "teaching without learning is simply talking." A teacher's effectiveness is once more all about the presence of a student's learning.⁵

Teaching methods work successfully primarily on the off chance that they suit students' desires needs since each student deciphers and reacts to inquiries in a very distinctive way. As such, the arrangement of teaching strategies with students' desires and the most popular learning influence students' scholastic achievements.⁶

Most universities embrace methods by that students give anonymous feedback at the end of each course they complete. These ratings of teacher effectiveness have been a hotly debated issue since they were initially utilized in the mid-1920, and they produce a vast challenge for nearly every establishment that utilizes them.⁷

Throughout the long-term student assessment of educators has changed considerably particularly in the regions of the purpose and methodology. They have changed from being principally used to help students in the choice of courses, to helping teachers' further advance and improve their instructing abilities and assist managers concerning employees' decisions.⁸

The study conducted by Shahida on effective teaching methods at the university level showed that the majority of the students evaluated the lecture method as the best teaching method. Some of the reasons involved; the teacher gives all the information related to the subject, time-saving, students listen thoughtfully to lectures and take short notes, etc.⁹

Lectures are one of the most broadly used teaching methods in medical and nursing education. It has been recommended that teaching methods that improve participation and boost self-facilitated learning can be ground-

breaking in passing core knowledge and clarifying vague notions inciting augmentation of learning.¹⁰ But currently, lectures are being continuously changed by team-based learning like the introduction of problem-based learning (PBL) which marks the revolution in some medical and nursing education.¹¹

PBL is one of the most regularly utilized instructive strategies in clinical schools. In this technique, students use clinical cases to describe their learning targets. The effectiveness of PBL relies upon the quality of the clinical cases.¹²

PBL surges thorough training and helps students to accomplish better in assessments.¹³ Although allies of PBL express that learning inspiration is one of the benefits of this method, others indicate that it is time-consuming, and does not give a better clinical competence.¹⁴

Numerous investigations were conducted to compare PBL with lecture-based learning. Regarding knowledge acquisition, studies showed various outcomes; In some studies, PBL did not show any tendency over lecture-based learning on the learners' knowledge.¹⁵⁻¹⁷ On the other hand,; various studies revealed that students got an improved result in the PBL method.^{18,19}

A broad inquiry showed that researches in the field of education are very scarce and the same is true in nursing education. Accordingly, this study was conducted to compare the effect of PBL and the lecture methods on the immediate knowledge retention of nursing students at Dire Dawa University.

The finding of this study will give helpful experiences in understanding the effect of PBL and the lecture method on the immediate knowledge retention of nursing students. Additionally, by uncovering the reasons for perceiving any teaching method as the best one, important recommendations will be provided to higher education teachers for improving the quality of nursing education concerning students' insight.

Research Questions

Which teaching method [PBL or Lecture] has a great impact on the students' immediate knowledge retention? And which teaching method [PBL or Lecture] is more preferred by the students? And why?

Methods and Materials

Study Setting

This study was conducted at Dire Dawa University, College of Medicine and Health Sciences (CMHS), Department of

Nursing, from June 1 to June 15, 2019. Dire Dawa is situated in the eastern part of the country with a distance of 515 km from Addis Ababa.

DDU is a young higher institution, established and started its teaching and learning activities in 2007 G. C. academic year. The establishment of the university is in line with the Ethiopian Government's willingness and determination to expand higher education coverage and ensure its equitable distribution across the country to produce competent human resources and research outputs to meet the national development policy and poverty reduction strategy. Now in the 2018 academic year DDU has one Institute of Technology and Five College (College of Natural & Computational Science, College of Business & Economics, College of Social Sciences & Humanities, College of Law, and College of Medicine and Health Science) containing 33 different academic programs. The enrolment has grown to 12,500 regular students in 39 different academic programs.²⁰

Study Design

Quantitative research approach which uses the pre-experimental two groups: pre-test and post-test research design were employed.

Population

First-year nursing students of the 2019 academic year.

Inclusion Criteria

First-year B.Sc. Nursing students who were admitted to the Dire Dawa University Nursing department, and those students who had completed the first year, first semester examination.

Sample Size

All 38 nursing students were included in the study.

Sampling Methods

Simple random technique was used to divide the students into two groups PBL and lecture method.

Data Collection Tools and Techniques

Questionnaire was one of the data collecting tools. Thus, the questionnaire had three sections: Section I comprises demographic data of the students [age, sex]; section II comprises questions that assess knowledge retention of a specific topic (organophosphate poisoning) for lecturing method and PBL; section III comprises questions that assess student's preference of teaching methods using

Likert scale and an open-ended questionnaire was used to assess student's reasons for their preferences.

Quantitative content validity assessment was performed based on the content validity ratio (CVR) and content validity index (CVI = 0.81) and a reliability test was also conducted giving a Cronbach alpha result of 0.86.

Regarding the scoring of the questions, if students answer the question, they will get one (1) mark if not, they will get zero (0) mark.

To prevent any form of intervention/teaching bias; both sessions were given by Adult Health Nursing experts and the learning objectives were also similar as it is seen in the nursing curriculum. The author also approved the entire lesson plan for both teaching methods. Additionally, the instructor who delivers the PBL session was trained to run the session.

First, as a baseline demographic data were gathered and administered the pretest for both groups then after the administration of the intervention/lectures and PBL, a posttest was given for both groups.

Data Processing and Analysis

The data were analyzed using SPSS software version 21 for frequency and percentage and presented using table/descriptive statistics and paired *t*-test was computed to identify mean score change and $p < 0.05$ was cut of value to determine there is a significant mean change in the posttest.

Ethical Consideration

The study strictly followed the principles outlined in the Declaration of Helsinki in addition to obtaining ethical clearance from Dire Dawa University department of Nursing on the date of 12/02/2019 with Ref No: DN/016/19. During the data collection, each respondent was informed about the aim of the study. Participants' consent was obtained from the study participants before study commencement. The data collectors also discussed the issue of privacy, the confidentiality of the information obtained during the interview, and both verbal and written informed consent was obtained from respondents. Respondents were provided with an information sheet which contains the following main points: purpose/aim of the study, procedure and duration of the interview, risks and benefits of participation, confidentiality and rights of the participants, and contact address of the researcher for any questions and finally declaration of informed voluntary consent.

Result

Socio-Demographic Characteristics

From the total of Nurse Student participants, 22 (57.9%) were males and the mean age were 20.45 year (SD 1.20) (see Table 1). When we see students, characteristics based on the two groups; Lecture Method: From a total of 19 participants 31.6% of them were 20 years of age while 68.4% of them were Males; Problem-Based Learning: From those students who participated in PBL 26.3% of them were 20 years of age and 52.6% of them were females.

Table 2 demonstrates that the knowledge score was increased from the pre-test (M=6.68, SD=2.05) to the posttest (M=14.89, SD=2.62). The difference was significant at (95%) confidence interval with (t=13.6, p<0.001) showing that the lecture method has a statistically significant effect on the immediate knowledge retention of nursing students.

Table 3 also shows that the knowledge score was increased from the pre-test (M=6.89, SD=1.82) to the posttest (M=11.79, SD=2.85). The difference was significant at (95%) confidence interval with (t=11.30, p<0.001) showing that the PBL has a statistically significant effect on the immediate knowledge retention of nursing students. But when we compare the Lecture method with the PBL; PBL has a poor impact on

Table 1 Distribution of Participant Nurse Students by Their Characteristics of a Study Conducted on Effective Teaching Methods for Immediate Knowledge Retention Among Nursing Students of Dire Dawa University, Eastern Ethiopia 2019 (n=38)

Participant Characteristics		No	%
Sex	Male	22	57.9
	Female	16	42.1
Age	19	10	26.3
	20	11	28.9
	21	9	23.7
	22	6	15.8
	23	2	5.3

Table 2 Mean Score of Overall Knowledge Retention of Nursing Students in Lecture Method of a Study Conducted on Effective Teaching Methods for Immediate Knowledge Retention Among Nursing Students of Dire Dawa University, Eastern Ethiopia 2019 (n=38)

	Mean	SD	T	df	p-value
Pretest	6.89	2.052	13.620	18	<0.001
Posttest	14.89	2.622			

Table 3 Mean Score of Overall Knowledge Retention of Nursing Students in PBL Method of a Study Conducted on Effective Teaching Methods for Immediate Knowledge Retention Among Nursing Students of Dire Dawa University, Eastern Ethiopia 2019 (n=38)

	Mean	SD	T	df	p-value
Pretest	6.68	1.827	11.302	18	<0.001
Posttest	11.79	2.859			

immediate knowledge retention as compared to the Lecture method.

Nursing Students' Preferred Teaching Method

Regarding nursing students' preferences, 63.2% of them preferred the Lecture method as the most effective teaching method while 36.6% rate PBL as the best teaching method.

Reasons for Nursing Students' Preferred Teaching Method

The Lecture method was regarded as the best method by 63.2% of nursing students for the subsequent reasons:

- Instructors making the lesson simpler.
- Instructors are well organized.
- Instructors use references which are best and relies on their knowledge.
- The use of an LCD projector makes it interesting and easy to follow.
- Absence of alteration.
- Short notes given by instructors are more important and handily comprehended just as it turns out to be simple during an assessment.
- We generally rely upon the short notes of the instructor which we get thoroughly from the instructors.
- Use of instructor's short note is useful during exams.
- Usually, lesson plans are well organized.
- Overall management of classrooms which is mainly done by instructors form a conducive environment for the teaching-learning process.

Problem-based learning is regarded as the best method by 36.6% of nursing students for the subsequent reasons:

- Students are vigorously engaged in the lesson, making it easier for understanding.
- Greatly improves leadership abilities.

- Enhances decision-making capacity.
- Increases the confidence level of students.

Discussion

The finding of the current study revealed that the lecture method has a better statistically significant effect on immediate knowledge retention as compared to problem-based learning. This means lecture method is more helpful for having an immediate knowledge retention than PBL. This finding is similar to other findings from Korea and Asia^{15–17} but it is different from findings from other studies.^{18,19} This might be because lecturing inclines to encourage “surface” learning, which enables the students to recall what was covered in the sessions.

In contrast, PBL encourages “deep understanding” so that students focus on searching for meaning rather than reproduction.^{21,22} Another possible explanation is that Blake also recommended that PBL particularly enhanced students’ capacity on the application of knowledge rather than immediate knowledge retention.²³ Additionally, the variation of different styles of different instructors might affect the outcome of students’ learning.

PBL was prepared for advanced education and for students who already have developed self-directed learning skills, and it is not hard to conclude that those students would do better in a test that only requires simple retrieving of knowledge than in a test that has knowledge application and in-depth analysis (advanced stage).

The other explanation could be that the author believes that; for a long period the Ethiopian education system encourages memorization of knowledge rather than the application; noting the fact that PBL was introduced to the higher education system of Ethiopia too late than the developed world. Pre dominantly starting from lower grade to higher education; the students have been learned through lectures; which could be another factor.

The finding of this study showed that the majority of the students regarded the lecture method as the best method. The reason behind their preference includes; instructors making the lesson simpler, instructors are well organized, absence of alteration, use of instructor’s short note is useful during exams, usually, lesson plans are well organized, etc.

Similarly, a study conducted by Shahida S. revealed that most of the students rated the lecture method as the best teaching method. Reasons included; the teacher gives all the information related to the subject, time-saving, students listen thoughtfully to lectures and take short notes, etc.⁹

Limitation of the Study

The author recognizes the small sample size of the study as a major limitation.

Conclusion

The lecture method has a remarkably good effect on immediate knowledge retention as compared to problem-based learning. Even though both lecture and PBL methods have a statistically significant effect on students’ immediate knowledge retention, nursing students rate the lecture method as the best one. Even though the lecture method is the most traditional, it is still preferred by nursing students over problem-based learning.

Disclosure

The author reports no conflicts of interest for this work.

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