

## Original Research Article

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# Development of problem based learning training module in nursing education

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## ABSTRACT

**Background:** Problem based learning (PBL) is an innovative way of delivering instruction in which problems are used as the basis of learning. PBL method of teaching enhances the skill of Nursing students and there by improves delivery of patient care. It is a responsibility of Nurse Educators to prepare the Nursing students to face the world of reality. The study, aimed to develop and train the post graduate Nursing faculty on PBL method of teaching.

**Methods:** In Phase I Training module in Problem Based Learning was developed through extensive review of literature, experts' guidance and from the clinical records. In Phase II using pre-experimental one group pretest posttest design two days training on PBL was implemented.

**Results:** PBL training module was developed and validated in the phase I of the study. Content validity index (CVI) was found to be above 0.88 in all the aspects of the module. PBL workshop conducted was found to be effective in terms of improvement in the mean post-test knowledge score ( $13.33 \pm 1.69$ ) compared to the mean pre-test knowledge score ( $9.33 \pm 4.10$ ) though it was not statistically significant. All three-faculty had satisfactory mean score of above 3 in all the areas.

**Conclusions:** Faculty expressed their satisfaction and gave positive feedback on the effectiveness of PBL module in terms of its content, course delivery and the practical session.

**Keywords:** CVI, Knowledge, PBL, Skill, Training module

## INTRODUCTION

Problem based learning (PBL) has been introduced into education in many professional fields including medicine, nursing, dentistry, social work, management, engineering and architecture. It is originated in the late 1960's at McMaster University in Ontario, Canada. Howard Barrows' founder of this educational methodology developed the self-directed model to improve education in the school of medicine. It was developed to improve medical education by shifting from a subject and lecture based curriculum to an interdisciplinary one guided by real-life problems.<sup>1</sup> Traditional medical and nursing curricula were based on conservative method in delivering lectures to the learners.

The students were expected to use memory based learning to pass written examination and went on to be qualified professionals. PBL uses case study, vignette format and scenario, and problems as the starting point for obtaining learning objectives. This approach enables adult learners to challenge others' point of view and use evidences to support their own views.<sup>2</sup>

In PBL environments, students act as professionals and are confronted with problems that require clearly defining an ill-structured problem, developing hypothesis, accessing, analyzing, utilizing data from various sources, revising initial hypothesis, developing and justifying the solutions based on evidence and reasoning.<sup>3</sup>

Effectiveness of PBL as a teaching strategy on critical thinking and clinical reasoning ability was tested and proved in numerous studies. A randomized control study among 46 undergraduate nursing students using PBL strategy was implemented for 36 hours (2 hours per week for 18 weeks). The PBL process involved group clarification, brainstorming, self-directed learning, group discussion, and care planning. PBL students had significantly greater improvement on posttest critical thinking scores than students in the control class lectures.<sup>4</sup> Similar results of significant improvement in critical thinking skills and clinical reasoning ability were observed in numerous studies.<sup>5-7</sup>

A cross-sectional study was conducted to assess the knowledge, attitude, and practice of medical teachers regarding PBL in Northwestern Saudi Arabia. The proportion of staff having good PBL knowledge was 76.5% and PBL practice was 35%, with a statistically significant difference observed between male and female staff. Study concluded that training courses by the college should be considered for the staff who are not practicing PBL as a teaching strategy.<sup>8</sup> Hence effort was taken to develop PBL module that suits the Nursing faculty with theory and practical and train the Nurse Educators in PBL. The present study aimed to develop PBL teacher training module in nursing and train the post graduate nursing faculty on PBL.

## METHODS

The study was conducted in two phases. In phase I Training module on PBL was developed. In phase II module developed was tested for its effectiveness by implementing training programme for faculty in PBL using the module.

### Phase I: Development of training module on PBL

Training module on PBL was developed in the first phase using developmental approach. Researcher underwent training in PBL and the module was prepared after reviewing research based and non-research based literature and seeking opinion of the experts.

The following steps were adopted

- Framing the outline and objectives of the PBL training module.
- Preparation of the first draft of the PBL training module.
- Development of criteria checklist.
- Content validation of the PBL training module.
- Preparation of the final form of the PBL training module

Validation was obtained by submitting PBL training module to the experts in the field along with criteria and content validity certificate. Nine panelists were chosen based on the criteria and who got scored 5/10 (Table1).

Among the reviewers three international reviewers who completed PhD in Nursing, three professors from Medical Education Technology department, three Nursing professors of Community Health Nursing speciality who completed PhD in Nursing. Then the training module was tested for its effectiveness by implementing two days training on PBL for the post graduate Nursing faculty.

**Table 1: Criteria for selection of experts in content validation of PBL module.**

Criteria	Scoring
Specialized in PBL	2
Practice PBL session	2
PhD scholars in Nursing	2
More than 10 years teaching experience in the profession	2
Guiding research work of PhD scholars and Post graduate students	2

### Phase II: Training of faculty in PBL

Using evaluative approach two days training on PBL was conducted for the post graduate nursing faculty using the module. Pre-experimental One group pretest posttest design was used. All three Post Graduate Nursing faculty working in the Department of Community Health Nursing in a selected Nursing college participated in training programme.

### Tools and techniques

It comprised of three sections. Sec A: Demographic data. Sec B: Structured knowledge Questionnaire to assess the level of knowledge of post graduate nursing faculty on PBL. Sec C: Dolman's short tutor evaluation questionnaire to assess skill in conducting PBL. Test-retest reliability was used to assess the reliability PBL knowledge questionnaire and 'r' value was found to be  $r=0.84$ . Informed consent was obtained from the participants. Permission was obtained from the author to utilize Dolman's short tutor evaluation questionnaire. Pretest was conducted to assess the level of knowledge of faculty on PBL. PBL theory session was handled on Day 1. On Day 2 PBL practical session was demonstrated by the researcher to the participants. Then the faculty conducted PBL sessions for three different groups of students. Skill of faculty were assessed by the students using Dolman's short tutor evaluation questionnaire and posttest to assess the level of Knowledge was conducted after attending workshop on Day 2.

## RESULTS

### Phase I

Content validity was obtained for the PBL training module. Among 9 reviewer's percentage of agreement was taken. Content validity index (CVI) was estimated

through the mean inter-expert content validity index - CVI). CVI is the mean index calculated by adding up the items all experts attributed, divided by the total number of experts. Through this method, the items and instruments overall are considered valid if the CVI amounts to 0.90. 100% agreement (CVI:1) was obtained for three aspects namely, Introduction to PBL, Writing

problem/case scenario and the practical session. Other topics such as Steps in PBL, Role of Tutor and students in PBL, Group dynamics, Advantages and Shortcomings in PBL, Assessment in PBL found to have more than 88%(CVI:0.88). Hence the PBL Training Module was finalized with minimal corrections suggested by the experts (Table 2).

**Table 2: Percentage of agreement and CVI for the PBL training module.**

Topic	Percentage of agreement	Content Validity Index (CVI)
Introduction about PBL	100%	1
Steps in PBL	88.88%	0.88
Writing problems/case scenarios	100%	1
Group Dynamics	88.88%	0.88
Role of tutor and student in PBL	88.88%	0.88
Advantages and shortcomings in PBL	88.88%	0.88
Assessment in PBL	88.88%	0.88
Case scenario and PBL practical session	100%	1

#### **Sample case scenario and PBL practical session**

A 35-year-old primi mother is in her 5<sup>th</sup> month of pregnancy complaints of exertional dyspnoea, tiredness, fatigue, pedal oedema (especially at the end of the day). She has family history of diabetes and hypertension. She also had complaints of cramp in the calf muscle especially during night. What care and advice does this mother requires.

#### **Lab investigations**

- Hb: 9.3gm/dl, GCT: 99mgs% Urine R/E: No evidence of infection. Urine albumin and sugar: Nil
- Blood Pressure: 100/70 mm. Hg, GPLA score: G1P0L0A0
- USG: Liquor: Adequate, no anomalies seen.

#### **PBL Process**

Day 1: Split the problem according to these headings. Brain storming will be done among the students and PBL process takes place in four steps.

- Unknown terms
- Identify problem
- Hypothesis
- Learning objectives

At the end of day one learning objectives will be identified and clearly defined among the participants. They will perform self-study and the group reconvenes on day 2 (Preferable gap of 3 to 5 days between the sessions). Participants will present their content and the PBL cycle will complete when all the participants are satisfied with their learning the topic related to the case scenario.

#### **Phase II**

Two days training on problem based learning was implemented. Among three faculty two of them were in the age group of 36-40 years and all of them had 5-10 years of experience. They commonly used Lecture, Discussion, Demonstration, Role play in their regular classes and none of them had undergone workshop on PBL.

**Table 3: Comparison of pre-and posttest knowledge score of faculty on PBL (n=3).**

Level of Knowledge	Pre-test		Post test		Pre-test score	Post test score	Paired 't' test
	No.	%	No	%			
In adequate knowledge	1	33.3	0	0	9.33±4.10	13.33±1.69	3.1* (Table value: 3.18)
Moderately adequate knowledge	1	33.3	1	33.3			
Adequate Knowledge	1	33.3	2	66.6			

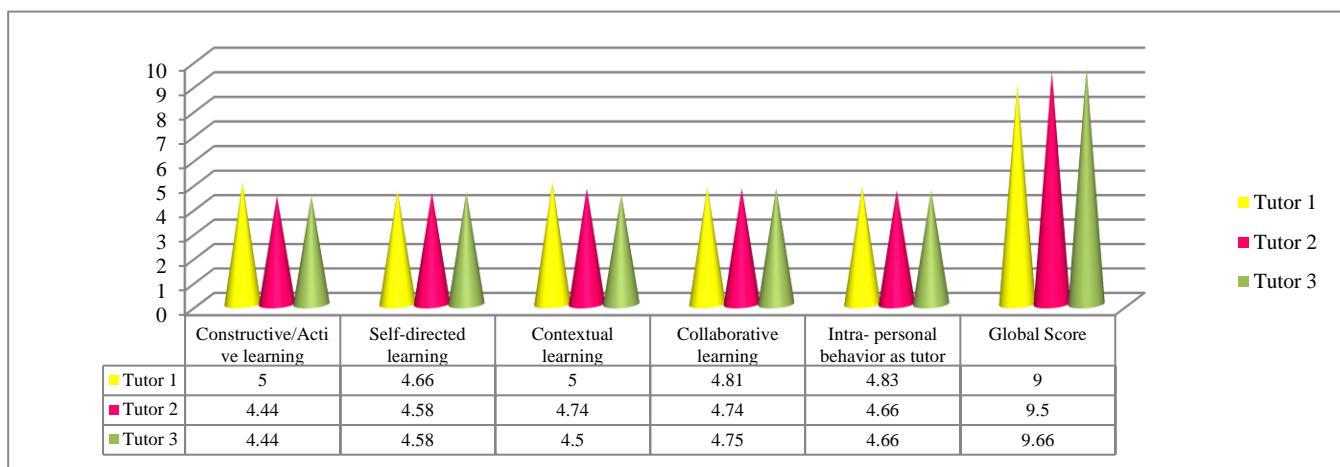
\*Not significant

### Effectiveness of PBL training module on knowledge score of faculty on PBL

In pretest, each one found to have Inadequate, Moderately adequate and adequate level of knowledge. After attending PBL training one (33.3%) was found to have moderately adequate knowledge and two (66.6%) were found to have adequate knowledge. Mean post test score ( $13.33 \pm 1.69$ ) was found to be more than that of the mean pretest score ( $9.33 \pm 4.10$ ). Though there was a difference between mean pretest and posttest knowledge score 't' value was not found to be statistically significant (3.10, table value:3.18). All three of them had improvement in their knowledge scores (Table 3).

### Assessment of skill of faculty in conducting PBL

All three-faculty had an acceptable mean skill score of above 3 in all five areas based on the student evaluation of faculty using Dolman's Short Tutor evaluation questionnaire. Tutor 1 had a maximum of score 5 in the areas of constructive/active learning and Contextual learning. Tutor 2 and 3 had minimum score of 4.44 in the area of constructive / active learning. Mean skill score in all five areas were ranging from 4.86 to 4.58. Overall score was also found to be high. This clearly gives a picture that if faculty are provided training their skill in conducting PBL can be improved (Figure 1).



**Figure 1: Mean score on skill of faculty in conducting PBL.**

### DISCUSSION

PBL training module was developed and validated in the phase I of the study. Content validity index (CVI) was found to be above 0.88 in all the aspects of the module. Two aspects had maximum of CVI-1. Similar methodology was noted in the study which was conducted to develop and validate the problems that guided the application of the PBL educational strategy. The researchers developed four problems in the form of clinical cases. CVI's for the four problems corresponded to 0.90; 0.90; 0.45 and 0.55. The last two problems which had low CVI were revised and got scored as 0.90 and 0.95.<sup>9</sup>

Developmental approach was used in developing PBL module in Nursing to train the faculty in PBL. Effectiveness of the training module was assessed by implementing training programme for the faculty in PBL. In another study using developmental approach study was conducted to assess the effectiveness of the information booklet on health-related issues of global warming. Information booklet on the health-related issues of global

warming was developed based on the area wise knowledge scores obtained by assessing 100 motor vehicle users. Effectiveness of the booklet was tested by administering it to a sample of 30 motor vehicle users.<sup>10</sup>

PBL workshop conducted was found to be effective in terms of improvement in the mean posttest knowledge score ( $13.33 \pm 1.69$ ) compared to the mean pretest score ( $9.33 \pm 4.10$ ) though it was not statistically significant. Skill of faculty in conducting PBL was found to be effective in terms of evaluation done by the students after participating in the PBL with each of the faculty.

Results are consistent with a study conducted to measure the educational effectiveness of implementing a tutor training workshop in PBL at Suez Canal University. The mean of the pretest was 5.42 and the mean of post-test was 7.1, and was statistically significance difference at  $p \leq 0.05$ . The average score for the overall performance of the tutor was ( $7.67 \pm 1.20$ ) in the intervention group compared with the control group ( $6.54 \pm 2.02$ ). The study concluded that the tutor training workshop was effective in improving tutor facilitation skills and increase

educational effectiveness of the PBL sessions from students' points of view.<sup>11</sup>

With regard to skill of faculty in conducting PBL is consistent with the study Using Dolmans short tutor evaluation questionnaire in Tutors' evaluation of the teaching intervention. Overall, the teaching intervention was considered well organized ( $4.44 \pm 0.67$ ) and to provide constructive feedback to students ( $4.21 \pm 0.86$ ).<sup>12</sup>

### Recommendations

PBL method of teaching is not being widely used by Nurse Educators and is in its infancy stage. Training programmes can be organized to prepare them in PBL. PBL will have great impact as for as students are concerned in terms of their critical thinking ability, self-directed learning and also knowledge retention.

### CONCLUSION

PBL is an innovative small group teaching method and is essential to incorporate in the teaching learning process by the Nurse Educators. As a strategy faculty need to be trained and they in turn can adopt this teaching methodology in their class room and clinical teaching. By far training programmes are found to be effective in enhancing the knowledge and skill of faculty.

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