Effectiveness of a Problem-Based Learning Approach in Clinical Teaching of The Undergraduate Nursing Students: An Integrative Literature Review

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Abstract

Aims: To explore the effectiveness of the PBL approach in the clinical teaching of undergraduate nursing students

Methods: An integrative literature review was used to evaluate the effectiveness of PBL in integrating theory and practice among nursing students in clinical practice. The review searched research articles published in English from 2013 to 2023. Medical Subject Headings (MeSH) guidelines were used to identify relevant search terms, which included PBL. Articles that met the inclusion criteria entailed research articles published in peer-reviewed journals, written in English and the population of undergraduate nursing students. A matrix was developed that outlined (1) characteristics of the study population and (2) challenges affecting the implementation and effectiveness of PBL in clinical teaching.

Results: The literature search revealed twenty-one (n=21) studies conducted in various countries. The studies highlighted positive experiences on the effectiveness of the PBL approach in the clinical teaching of undergraduate nursing students. Skills such as critical thinking, problem-solving, and patient diagnosis were attributed to using PBL in the simulation.

Conclusion: This paper contributes to the body of knowledge on the effectiveness of the PBL approach in the clinical teaching of undergraduate nursing students. It also contributes to the body of knowledge on PBL in nursing education, particularly in South Africa.

Keywords: problem-based learning, clinical teaching, nursing students.

Introduction

The origins of PBL can be traced back to the late 1960s when it was first introduced to the health professions at McMaster University in Canada (Ku & Ha, 2016; Zhang, 2014). In 1971, the PBL approach was adopted by the Maastricht faculty of Limberg University in Europe (Hassanpour Dehkordi & Saeed Heydarnejad, 2008) and spread to other universities worldwide in 1982. PBL was originally designed to respond to the criticism that traditional teaching and learning methods fail to prepare medical students for solving problems in clinical settings (Hung, et al, 2019).

PBL is a student-centered approach that enables students to work cooperatively in small groups to find solutions to problems (Ku & Hu, 2016). The PBL curriculum aims to develop critical thinkers who can base their practice on evidence and respond effectively to the challenges of a rapidly changing health sector (Ku & Ha, 2016). To achieve the overall goal of PBL, students are presented with a real-life problem to stimulate their critical thinking (Badeau, 2010). PBL is facilitated by lecturers with strong clinical backgrounds and a commitment to evidence-based practice (Ku & Ha, 2016). Nursing students work in small groups to analyze a problem, identify their learning issues and then develop solutions for problems that occur in real life (Gabr & Mohamed, 2011).

These experiences later translate into practice during weekly placement in hospital and community settings to link theory to practice. Although the PBL strategy has been used in both nursing and medicine, there is a paucity of evidence confirming its effectiveness in enhancing the integration of theory and practice in nursing education. This review purported to describe the effectiveness of PBL in integrating theory and practice in clinical settings, focusing on nursing education.

Methods

An integrative literature review was used in the study. According to Whittemore and Knafl (2005), integrative review comprehensively encompasses synchronized inclusion of experimental and non-experimental research to comprehend a phenomenon of concern.

Problem identification stage

The first stage of any literature review method is identifying the problem. Therefore, this integrative review seeks to explore the effectiveness of the PBL approach in clinical teaching of undergraduate nursing students. The review was guided by the following question: *"What is the effectiveness of the PBL approach in the clinical teaching of undergraduate nursing students"?*

A systematic search of the literature using predetermined criteria

The authors ZMM and SHK determined the search terms per the research question. Medical Subject Headings (MeSH) guidelines were used to identify relevant search terms (Table 1). The authors searched electronic databases, namely MEDLINE, Google Scholar, EBSCOhost, PubMed, Psych Info, Science Direct and Emerald for articles published in English from 2013 to 2023. A review of abstracts and articles focused on the effectiveness of PBL among nursing students in clinical practice was carried out.

Table 1: Search strategy

Steps	Search terms
1	Nursing student; Nursing students; Pupil nurses
2	Undergraduate Baccalaureate
3	Effectiveness; Effect; Effects
4	Problem based learning learning; problem-based Experiential learning;
5	Teaching; Teaching method;
7	Learning: Interactive learning
8	Clinical competence; Clinical competency; Clinical skills
9	1 and 2 and 3 and 4 and 5 and 6 and 7 and 8

The inclusion criteria entailed the following: research articles published in peer-reviewed journals between the years 2013 and 2023; written in English; population of the undergraduate nursing students; and relevant search key terms. Articles that did not meet the inclusion criteria were excluded. The Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) were employed to determine the appropriate 21 research articles (Figure 1 and Table 1).

Critical appraisal

The rigor of the evidence was determined by applying the GRADE guidelines process (Balshem et al. 2011), which serves to rule out any form of bias about the study results, sample selection, methods, study design, setting and the participant's withdrawal from the study (Balshem et al. 2011). The grading about the quality of the studies was scored as A=High quality; B=Good quality; C=Low quality or Major flaws. Figure 1 depicts the quality of the studies, which met both inclusion criteria and quality dimensions.

Data analysis

The data were arranged, summarised and integrated into the conclusion (Whittemore & Knafl, 2005). The data analysis included data comparison which involves an iterative process to identify patterns, themes, or relationships. The two authors collaborated to reach an amicable consensus regarding the themes. A matrix was developed that outlined the characteristics of the study population and challenges affecting the implementation and effectiveness of the PBL in clinical teaching of undergraduate nursing students. The results from the reviewed articles were then extracted to populate the matrix, and integrated and analysed using a constant comparative method to organize and categorise the data.

Review presentation stage

During this stage, data are presented to elucidate the specifics of each data source in support of the conclusions from the review (Whittemore & Knafl, 2005). In this review, studies were synthesized under the following subheadings: (1) author, (2) year of publication, (3) country, (4) study design, (5) study sample and (6) findings (Table 2). The final summary of the findings is then presented in themes, sub-themes and

categories for better clarity of the support needs of the nurse mentors in the mentoring role (Table 3).

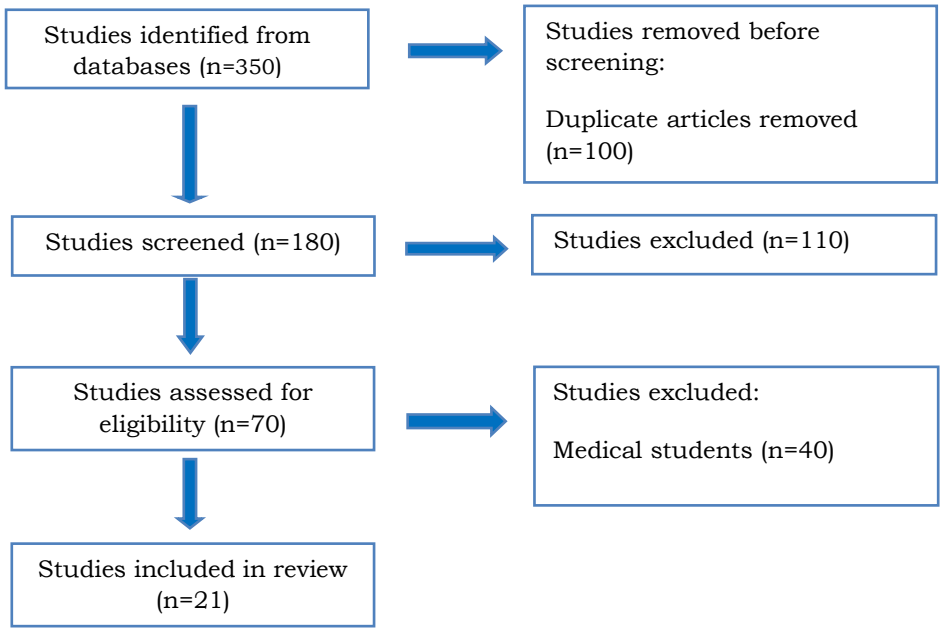

Figure 1: Studies that met the inclusion criteria

Results

Sample characteristics

The literature search identified 21 eligible studies (Figure 1) that met the quality appraisal standards. In all twenty-one studies, the aim, objectives, design and methods were clear with consistent results. Nineteen (n=19) studies applied the quantitative approach, one study used the mixed methods design while one followed the qualitative approach. These studies were done in various countries depicted (Table 2).

Table 2: Characteristics of studies, including the quality (A = High quality; B = Good quality; C = Low quality)

Author/s; year; country	Methods	Sample size (Undergraduate nursing students)	Quality appraisal	Summary of Results
Lu et al (2022) TAIWAN	Quantitative	(n=322)	Quality=High (A)	Students exposed to PBL for a longer time scored more on all the key competencies but low on skill application
Roh et al. (2013) KOREA	Quantitative	(n= 185)	Quality=High (A)	Nursing students view PBLwith simulations-based learning favorably.
Sohn et al. (2013) KOREA	Quantitative	(n=25)	Quality=High (A)	After SIM-PBL education, all areas of the nursing process presented statistically significant improvements of SE.
Son (2020) KOREA	Quantitative	(n=78)	Quality=High (A)	The experimental group's learning attitude and critical thinking increased significantly ($p < 0.01$). S-PBL was an effective strategy for improving nursing students' learning transfer
Cecily & Omoush (2022) SAUDI ARABIA	Quantitative	(n=60)	Quality=High (A)	The PBL method was more effective than the lecture method in improving critical thinking and problem-solving.
Khatiban & Sangestani (2014) IRAN	Quantitative	(n=70)	Quality=High (A)	PBL strategy can increase skills in diagnosing patient problems, applying theory to practice, and improving confidence and competency.
Arrue et al. (2017) SPAIN	Quantitative	(n=117)	Quality=High (A)	PBL is a satisfactory tool for acquiring competencies desired and knowledge to provide effective nursing care for depressed patients
Fung et al. (2023) ASIA	Quantitative	(n=61)	Quality=High (A)	Both virtual simulation and PBL were effective in promoting students' perceived clinical and cultural competence

Author/s; year; country	Methods	Sample size (Undergraduate nursing students)	Quality appraisal	Summary of Results
Jamshidi et al. (2021) IRAN	Quantitative	(n=78)	Quality=High (A)	The mean scores of students' knowledge, attitudes, and perceptions of patient safety increased significantly in the intervention group
Hamdan et al. (2014) MALAYSIA	Quantitative	(n=94)	Quality=High (A)	Students' level of satisfaction towards PBL correlated with effectiveness of PBL
Moradi & Taghadosi (2016) IRAN	Quantitative	(n=36)	Quality=High (A)	PBL clinical education strategy was more effective than the conventional one
Keshk, et al. (2016) EGYPT and SAUDI ARABIA	Quantitative	(n=214)	Quality=High (A)	PBL improved the ability to expand the knowledge and ability to interact with patients and their families
Penjvini & Shahsawari (2013) IRAN	Quantitative	(n=29)	Quality=High (A)	Positive attitudes and improved psychomotor skills in the PBL intervention more than in the lecture-based group
Xing et al. (2021) CHINA	Mixed method study	(n=102)	Quality=High (A)	Effective principles and strategies of problem-solving.
L'Ecuyer et al. (2015) OKLAHOMA	Qualitative	(n=20)	Quality=High (A)	Nursing students can articulate the roles of other professions, and interprofessional teamwork
Huang, & Wang (2020) TAIWAN	Quantitative	(n=58)	Quality=High (A)	Nursing students who received integrative training that combined team-based PBL scenario simulation had stronger mastery over core nursing competencies.
Sangestani & Khatiban (2013) IRAN	Quantitative	(n=56)	Quality=High (A)	PBL improved the application of theory in clinical practice, and increased learning motivation

Author/s; year; country	Methods	Sample size (Undergraduate nursing students)	Quality appraisal	Summary of Results
Choi et al. (2013) KOREA	Quantitative	(n=90)	Quality=High (A)	Students in the PBL group improved in problem-solving and self-directed learning. Critical thinking was positively associated with problem-solving and self-directed learning
Lee & Son (2021) KOREA	Quantitative	(n=105)	Quality=High (A)	S-PBL was found to be an effective strategy for improving learning transfer, applying learned nursing knowledge to simulated nursing situations
Thabet et al. (2017) EGYPT	Quantitative	(n=84)	Quality=High (A)	PBL plays a crucial role in improving nursing students' decision-making skills; however, it does not affect decision-making style
Zhang (2014) USA	Quantitative	(n=168)	Quality=High (A)	Students generated more learning objectives in addressing broader and holistic nursing care

Themes

Three themes emerged from the study:1) the benefits of PBL in clinical teaching (2) the positive impact of PBL on teaching and learning (3) challenges affecting the effectiveness of PBL in clinical teaching (Table 3)

Table 3: Themes, subthemes and categories

Themes	Subthemes	Categories
1. Benefits of PBL in clinical teaching and learning of undergraduate nursing students	Skill development	Problem-solving and critical thinking Decision making Clinical reasoning
	Professional competency	Communication skills Quality patient care Application of theory to practice
2. Positive impact of PBL on teaching and learning among undergraduate nursing students	Student satisfaction	Self-directed learning Positive learning experience Motivation to learn
	Collaboration	Teamwork
3. Challenges affecting the effectiveness of PBL in clinical teaching among nursing students	Workload	Stress time-consuming

Benefits of PBL in clinical teaching of undergraduate nursing students

Fourteen articles revealed the benefits of PBL in the clinical teaching of undergraduate nursing students (Table 3). The following subthemes reinforce this theme: (1) Skill development and (2) professional competency.

Skills development

This study highlighted that PBL enhanced the skill development of undergraduate nursing students. These skills entailed problem-solving, critical thinking, decision-making, and clinical reasoning (Table 3). In this regard, Lu et al. (2022), Hamdan et al. (2014), Cecily and Omoushu (2014), Xing et al. (2021), Moradi et al. (2016), Choi et al. (2014), Son, (2020) and Khan et al. (2015) revealed that nursing students acquired problem-solving skills from the application of a PBL approach. This could be attributed to the fact that during PBL facilitation, nursing students are provided with real-life patient problems to handle on their own. Furthermore, this study revealed that the PBL approach boosted decision-making among nursing students, which is crucial in the profession (Hamdan et al., 2014; Khan et al., 2015; Thabet et al., 2017). The nursing students were equipped with critical thinking and clinical reasoning skills (Roh et al., 2013; Moradi et al., 2016; Son, 2020; Cecily & Omoushu, 2014; Hamdan et al., 2014; Xing et al., 2021; Khan et al., 2015; Choi et al., 2014). It is conceivable that all these skills are somehow interrelated in that one skill would contribute to another.

Professional competencies

Most studies revealed that nursing students developed professional competencies due to the PBL approach to clinical teaching. These competencies are communication skills, quality patient care, and applying theory to practice. Substantially, Lu et al. (2022), L'Ecuyer et al. (2015), Lee and Son (2022) and Khan et al. (2015) agree that nursing students can competently communicate with patients and colleagues. Additionally, the nursing students were able to ensure quality patient care (Cecily & Omoushu, 2014; Hamdan et al., 2014; Sohn et al., 2013; Khatibani & Sangestani, 2014; Arrue et al., 2017; Jamshidi et al., 2021; Moradi et al., 2016; Lee & Son, 2022; Zhang, 2014). Furthermore, the nursing students had many opportunities to apply the theory learned into practice (Khatibani & Sangestani 2014; Fung et al., 2023; Sangestani & Khatiban, 2013; Zhang, 2014; Arrue et al., 2017; Sohn et al., 2013; Hamdan et al., 2014; Penjvini & Shahsawari, 2013).

Positive impact on teaching and learning

Fifteen out of the 21 studies identified the positive impact of PBL on teaching and learning among the undergraduate nursing students (Table 3). This theme is supported by the following subthemes: student satisfaction and collaboration.

Student satisfaction

Overwhelmingly, studies suggested that undergraduate nursing students experienced satisfaction due to the PBL approach. Lu et al. (2022), Khan et al. (2014) and Hamdan et al. (2014) concurred that PBL enhanced self-directed learning. Similarly, PBL contributed to positive learning experience and motivation (Khatibani & Sangestani, 2014; Fung et al., 2023; Jamshidi et al., 2021; Moradi et al., 2016; Sangestani & Khatiban, 2013; Khan et al., 2015) and motivation (Cecily & Omoush, 2014; Xing et al., 2021; Penjvini & Shahsawari, 2013; Sangestani & Khatiban, 2013; Keshk et al., 2016; Khan et al., 2015)

Collaboration

Jamshidi et al. (2021) and L'Ecuyer et al. (2015) highlighted that PBL enhanced teamwork among undergraduate nursing students, peers and the multidisciplinary team.

Challenges affecting the effectiveness of PBL in clinical teaching

The findings posited that challenges impacted the effectiveness of the PBL approach among the undergraduate nursing students (Roh et al., 2013; Xing et al., 2021). Moreover, data abstraction revealed the following categories: stressful and time-consuming (Roh et al., 2013; Jamshidi et al., 2021; Xing et al., 2021).

Discussion

This literature review aimed to synthesize the existing evidence on the effectiveness of the PBL approach in the clinical teaching of undergraduate nursing students. The 21 studies reviewed exposed three broad themes, namely (1) benefits of PBL in clinical teaching and learning of undergraduate nursing students, (2) the positive impact of PBL

on teaching and learning among undergraduate nursing students and (3) challenges affecting the effectiveness of PBL in clinical teaching (Table 3).
This study highlighted the development of skills attributable to PBL. The ability to solve problems is a key competency in the nursing profession. According to Ku and Ha (2016), critical thinking is essential in nursing education, especially when students must effectively manage patients with psychological and physiological needs. The assertion is that, during PBL, the nursing students are expected to deal with and provide solutions to simulated patients' situations. Al-Najar et al. (2019) posit that PBL is an inquiry-based method of solving problems, thus encouraging students to learn and contribute actively to their learning. Other authors have also publicized this notion (Ku & Ha, 2016; Ali et al., 2019; Yew & Goh, 2016; Kousar & Afzal, 2021). In that regard, Yew and Goh (2016) found that every step of PBL has a bearing on learning and critical thinking. D'Sa and Bhaduri (2013) and Tseng et al. (2011) also revealed thatPBL produced critical thinkers, self-directed and motivated learners. PBL motivates nursing students to brainstorm, analyze the situation critically and try to solve problems (Svensson et al., 2021).

This literature review cited professional competencies acquired by nursing students from the PBL. In this regard, the competencies gained by the students occasioned increased communication skills, quality patient care and application of theory to practice. Understandably, nursing students are engaged in discussions thus sharpening their communication skills. Similar studies reckoned that PBL facilitates students' skills and capacity to ensure patient safety (Sahota,2020).

Collaboration has been identified as contributory to enhanced teamwork. One of the key aspects of PBL is that nursing students are grouped to address problems (Allert et al., 2022). Zhou et al. (2016) emphasize that PBL will likely enhance team performance, learning motivation and student satisfaction. According to Svensson et al. (2021), group interface is pivotal to learning because students work, gather information and study together to resolve an issue. Baran and Sozbilir (2017) consistently indicate that PBL group work led to the students contributing to their learning. Additionally, group interaction increases knowledge gaining and retention (Baran & Sozbilir, 2017; Ali et al., 2019). According to Ali et al. (2019) and Shazly and Saad (2019), the motivation and excitement of students to learn in small groups help them attain essential communication and leadership skills while learning. On the same line, Yew and Goh (2016) and Yadav et al. (2018) confirmed that PBL increased students' feeling of accountability for their learning, and fostered reasoning skills, active participation, group interaction and teamwork.

Some challenges affecting the effectiveness of PBL in clinical have been identified. Irrespective of the overpowering benefits of PBL on clinical teaching, nursing students experienced challenges with this approach. This study revealed heavy workload, further described as stressful and time-consuming. Othman and Shalaby (2014) consistently opine that many students still reckoned time consumption and stress as the focal downsides of PBL. According to Othman and Shalaby (2014), Søndergaard (2016) and Yuan et al. (2011), this may be attributed to the time spent searching for the information

in preparation for the group work and discussions. Moreover, the group discussions, debates and reflections might require much time.

Despite being cited as an effective teaching and learning strategy, several studies have reported that implementing PBL remains stressful during the clinical training of nursing students (Roh et al., 2013; Jamshidi et al., 2021). In agreement, Yuan et al. (2011) state that students experienced stress, confusion and a lack of confidence in clinical settings. These claims are supported by Yuan et al. (2011), who found that clinical practice can be anxiety-provoking when dealing with real patients. Maginnis and Croxon (2010) state that students found it difficult to relate well to real patients, compared to their practice on each other in the clinical laboratory. These feelings of uncertainty were also attributed to workload, the time-consuming nature of PBL, a lack of guidance and intimidation, and doubts about their knowledge.

Limitations

Limited studies are conducted in resource-poor settings. Adequate time and resources are required to effectively implement the PBL strategy.

Contribution to Global Nursing Practice

The review recommends that for the PBL curriculum to be implemented in clinical settings, students and clinical lecturers must be thoroughly prepared before the strategy is introduced. Furthermore, adequate time and resources should be available for students to undertake self-directed learning. Strategies such as questioning sessions, demonstrations, role-playing and case studies with appropriate clinical scenarios are also recommended. Some form of reflection and emotional support can be provided to the students to help them deal with stress more constructively. It would be imperative to conduct the research in resource-impoverished countries. Guidelines can be developed to inform curriculum development about the use of PBL.

Conclusion

This article reviewed the literature on the effectiveness of the PBL approach in the clinical teaching of undergraduate nursing students. The findings of this review suggest that even though a substantial number of authors advocate for PBL, there are some critics of the strategy. These include the extra time needed to prepare scenarios, guiding students costs in training simulated patients and lecturers to facilitate PBL classes. The review suggests that more rigorous research is needed to explore the implementation of PBL in clinical settings, particularly in resource-poor settings. This paper contributes to the body of knowledge on the effectiveness of the PBL approach in the clinical teaching of undergraduate nursing students.

Author Contribution

ZMM conceptualized the study and searched for relevant literature. The SHK carried out confirmation and validation of the methods. Both authors analyzed the data and contributed to the finalization and proofreading of the manuscript.

Conflict of interest

The authors declare that they have no financial or personal relationships that may have inappropriately influenced them in writing this article.

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