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Effect of Problem-Based Learning on Communication Skills of Undergraduate Nursing Students

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ABSTRACT

Aims The present study aimed to investigate the effects of Problem based Learning strategies on communication skills in pediatric nursing learning among undergraduate nursing students.

Materials & Methods This quasi-experimental study with a nonequivalent control group posttest-only design was conducted on undergraduate nursing students in Kohgiluyeh-Boyer Ahmad province. The sampling method was multistage cluster sampling. The total sample size was 95 in different classes of Traditional Problem Based Learning (TPBL=30), Hybrid Problem Based Learning (HPBL=30), and Conventional Teaching and Learning (COTL=35). The experiment was conducted over eight weeks, during which the participants met one two-hour session and two two-hour sessions each week. The three groups were compared for their communication skills at the end of the instruction. Data were collected using the Bayer-Fetzer Kalamazoo communication skill checklist and analyzed by one-way ANOVA and Tukey's post hock test.

Findings There was a statistically significant difference in the mean scores of communication skills for the three groups evaluated by the simulated patient (p=0.001) and the researcher (p=0.001). TPBL and HPBL instructional strategies enhanced students' communication skills more than COTL.

Conclusion TPBL and HPBL instructional strategies are more effective than COTL, and PBL can be useful where there are shortages of instructors or faculty members to teach PBL groups in a large classroom setting.

Keywords Problem-Based Learning; Communication; Pediatric Nursing; Learning

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Introduction

Communication skills are a necessary component of nursing professionalism and essential to any clinical practice setting where there is interaction with patients and other members of professional teams [1]. Workers in the health field spend much time communicating with others, including patients and their families, visitors to the health agency, other health team members, and supervisors. Therefore, as a health care provider, a nurse needs to have a high level of communication skills. In the health care setting, the graduate nurse should have distinct communication skills to provide client-centered care and respond to health care needs so that he/she can reinforce the patient [2]. Successful communication skills are essential tools with which healthcare experts can transfer knowledge into practice, enable patients to uncover the solutions to their health challenges, and enhance students' self-assurance in taking care of patients [3]. Ineffective communication skills are often cited in cases of dispute or claims of negligence between therapist and patient. It may increase medical faults, cause anxiety, and reduce patient care quality [4].

Evidence shows that nurses lack skills in communication due to inadequate training. Besides, traditional strategies were shown to fail to enable nursing learners to develop these skills. Therefore, new strategies must be used to enhance communication, interaction, and collaboration with one another to co-construct the required information and increase their understanding of nursing concepts and their clinical practices [1, 5]. Therefore, teaching and learning need to include strategies that support interpersonal relationship and communication skills vital in nursing [6]. To develop professional nursing skills, student-centered strategies are deemed necessary to change the teaching center from the teacher and the content to the students [7]. One strategy in which the attention shifts from teacher to student is Problem Based Learning (PBL). This strategy first emerged as an instructional method in the late sixties at McMaster University's Medical School in Hamilton, Ontario. It was initiated as a pedagogical substitute for the traditional lecture-based methods [8]. There are different types of PBL [9]. Some settings use the traditional or pure PBL strategy; some others modify the strategy by incorporating the traditional methods of PBL to address the new demands placed on schools. Some research suggests a hybrid PBL approach when PBL is new to learners [10, 11]. Some institutions have successfully implemented PBL as a hybrid curriculum combined with other learning strategies like lectures, practical classes, etc. [11-13]. In this strategy, the educator, as a facilitator, strives to guide the students. This research addresses a hybrid form of PBL, integrating lecture with the traditional small-group setting.

Instead of large groups, as in conventional instruction, the PBL employs small groups to solve complicated learning problems [14]. Educators need to apply for a tutoring role in the context of small groups. In PBL, educators are full partners in the learning process and not the major holders of knowledge [15]. They struggle to enable students through this partnership to expand their communication skills, group process, and creativity, which tend to be overlooked in how the teacher uses the lecture as the main teaching strategy [16]. Also, critical thinking disposition positively correlates to a students' PBL performance [17]. Thus utilizing PBL in nursing training can prepare potential nurses to deal with the speedy changes in health care [7]. Sometimes using one tutor for each small group is not possible. Pastirik [18], in her study on using traditional problem-based learning in a large classroom, challenged the implementation of this method in conventional course-based curricula due to the lack of additional faculty tutors to facilitate and monitor small group process. However, it has been shown that large group PBL can be managed by one floating facilitator amongst several small groups. According to Pastirik, PBL in large groups appears to be a positive experience, and use can be made of PBL in a large class with one faculty tutor as a feasible alternative to the traditional small group format.

It has been more than 40 years that PBL as a student-centered strategy has been substituted for traditional ones, and there exists empirical research evidence in support of problem-based learning [19, 20]. Nevertheless, the findings of some studies and meta-analyses have revealed several gaps in the PBL literature. For instance, the results were mixed, and the students' performance on basic science examinations were sometimes lower [14, 21]. Recent literature also indicates that little investigation has been conducted on the applications of PBL in the educational system of Iran [19, 22]. In particular, no research has ever compared the application of TPBL and HPBL strategies in Pediatric Nursing education. It should also be pointed out that there appear to be some barriers to the administration of the PBL strategy in Iran, namely, crowded classes and the lack of staff with sufficient skills and experience in PBL [23]. However, as mentioned above, most nursing schools in Iran have not been able to do a complete curriculum change, chiefly because of inadequate evidence that shows the advantages of the PBL methods in Iran. Therefore, an experimental study comparing the impact of PBL variations with one facilitator or floating tutor against the traditional lecture method in the nursing field seems necessary.

To this end, the present study was carried out to investigate the effects of Transdisciplinary Problem Based Learning (TPBL), Hybrid Problem Based Learning (HPBL), and Conventional Teaching and Learning (COTL) instructional strategies on

enhancing students' communication skills in Pediatric Nursing.

Materials and Methods

This quasi-experimental study with nonequivalent control group posttest-only design was conducted on junior nursing students of Islamic Azad University (IAU) in Kohgiluyeh-Boyer Ahmad province who took Pediatric Nursing II at the time of the research in 2017. The sampling method was multistage cluster sampling; so that among the five branches of Islamic Azad Universities in Kohgiluyeh-Boyer Ahmad, only the cities of Yasuj and Gachsaran and consequently two classes were selected. The students had similar socio-economic, ethnic background characteristics, and also common abilities. It should be noted that the nursing faculties under study followed the same curriculum and syllabus as the other nursing faculties in Iran. So, three intact classes were selected and randomly assigned to three study groups: PPBL=30, HPBL=30, and COTL=35. Since all the participants had already passed the Pediatric Nursing (PN) I as a prerequisite course, their PN (I) scores were compared to ensure that they had similar prior PN knowledge. The sample size (N=95) seemed to be adequate for this experimental research based on McMillan and Schumacher [24], which suggest the requirement of at least 15 subjects per group in experimental research.

The Communication Skills Checklist (CSC) was used to measure students' general interpersonal relationships in the face of simulated or standardized patients (SiPs or SP). Recently, patients, SiPs, or SP have adopted assessors' role in educational processes [25]. Simulated Patients (SiPs) are real actors who serve to portray patients' history and play a role within the simulation. They can be reproduced for multiple participants and replicated with different actors to simulate a nurse clinical encounter. Some researchers report SIP and SIPs as alike [26]. In this research, the simulation appeared to be more compatible with simulated patients due to the type of preparation, development, and delivery. In this study, SiP was a trained non-physician person who took on a role and portrayed patients in a standardized and constant style [26]. She was a retired nurse who had worked for many years and owned much experience in this field.

It should be noted that she was trained by the researcher for 3 hours before the interview to prepare the SiPs case. All students interviewed the Sip for 10 to 15 minutes, and this time length proved to be enough for each student to assess their communication skills and feedback [27]. In medical education, SiP encounters have applications for assessing communication skills in various nursing education programs for formative and summative education experience [1].

The CSC was adopted from the Bayer-Fetzer Kalamazoo consensus group [28] to measure the students' competency and sub-competency in communication skills as a baseline. The checklist identifies seven broadly supported essential communication competencies and it can be applied to most medical encounters. Also, it can be adaptable across different medical specializations and health settings[25]. The checklist consisted of 28 items on a five-point Likert scale that evaluated students' ability based on seven main competencies: building relationships, opening the discussion, gathering information, understanding the patient's perspective, sharing information, reaching an agreement, and providing closure after the interaction. In this checklist, the scales ranged from "poor" (scale 1) to "excellent" (scale 5). Scoring for total competency of communication skills ranged from 28 to 140. The researchers also specified students' abilities into seven main competencies and twenty-eight sub-competencies. Since the instrument was in English, it was translated into Persian. It should also be mentioned that possible threats to the instruments' internal and external validity were considered and controlled.

A critique panel of six Iranian nursing experts checked the instrument for content validity. The result of CVR (0.99) indicated that the questions are valid and appropriate for Pediatric Nursing students. The inter-judge reliability was used to gain the reliability of the checklist in the pilot study. In this study, one researcher and SiP were independent observers to judge the communication of the students. Estimating interrater reliability based on the intra-class correlation coefficients was 0.86 and significant ($p<0.05$).

Interventions in the study were carried out over two months (8 weeks) for different groups as follows:

The traditional problem-based learning (TPBL) strategy involved using traditional or full PBL in a small-group setting without any lectures. It began by presenting a problem in the form of a trigger to the students with the tutor. They learned through active participation in small groups in a large classroom where the Pediatric Nursing course problems were facilitated and managed by a floating tutor amongst several small groups. The floating facilitator allotted 5-10 minutes to each small group in each cycle combined with intermittent large group discussions during the PBL process.

The HPBL Strategy involved a combination of TPBL with other learning strategies such as lectures [13]. Armstrong [12] believes that hybrid strategies usually encourage strength and adaptability power. The instruction included general subjects such as biological development and child assessment by highlighting differences between children and adults, providing an example of topic dysfunction

constructively presented through mini-lectures, and specific subjects or diseases presented by the TPBL strategy. Through mini-lectures, the lecturer stimulated prior knowledge to be linked with new information. Also, at the end of each HPBL lesson, a short feedback session and a summarization of 15 minutes were provided to the students.

In the COTL instruction, all the Pediatric nursing course topics were presented to the whole class through lectures without any small group discussion. As part of the study's preparation, a general briefing session about the strategy was held, and then the training sessions on TPBL and HPBL strategies were performed for the two experimental groups. All groups had similar conditions in terms of the content materials and contact hours. Altogether, four main topics were covered during 12 two-hour sessions. The day after the experiment, the researcher and the simulated patient filled out the CSC to evaluate the students' communication skills when interviewing with the simulated patient in the pediatric ward's treatment room. 10 to 15 minutes interview with SiPs were enough for each student to assess the communication skills and feedback. To ensure the accuracy of the data, the interview process was recorded and reviewed.

SPSS 17 software was used to analyze the collected data. In this study, the independent variables were TPBL, HPBL, and COTL instructional strategies, and the dependent variable was communication skills. After conducting exploratory data analysis and running Shapiro-Wilk and Leven's test to assess the normality and homogeneity of variances of the data, one-way ANOVA and Tukey's post hoc test was employed for data analysis. This study's significant or alpha level was set at 0.05 because this level is acceptable for most educational research [29].

Findings

Most students (84.2%) were in the age group 21-23 years, and the rest (15.8%) were over 23 years of age. There was no significant difference between Pediatric Nursing I's mean scores in the TPBL, HPBL, and COTL groups (Table 1).

Table 1) Comparing the mean scores of Pediatric Nursing I before the intervention

Groups	N	Mean±SD	F	df	P
TPBL	30	13.48±1.76			
HPBL	30	13.79±1.88	0.34	2.92	0.71
COTL	35	13.45±1.66			

After the intervention, there was a statistically significant difference between the mean scores of communication skills evaluated by the simulated patient for TPBL, HPBL, and COTL groups with an effect size of 0.30. In comparing two groups, the mean score of communication skills evaluated by the simulated patient for the COTL group was significantly lower than those of the TPBL and HPBL groups ($p<0.05$). The TPBL group did not differ significantly from the HPBL group ($p>0.05$; Table 2).

A statistically significant difference was observed between the mean scores of communication skills evaluated by the facilitator for TPBL, HPBL, and COTL groups after the intervention. The effect size, calculated 0.18 using eta squared. In comparing two groups, the mean score of communication skills for the COTL group was significantly lower than those of the TPBL and HPBL groups ($p<0.05$). The TPBL group did not differ significantly from the HPBL group ($p>0.05$; Table 2).

Table 2) Comparing the mean scores of communication skills evaluated by different raters

Groups	N	Mean±SD	F	df	P
Simulated patient					
TPBL	30	2.99±0.30			
HPBL	30	2.98±0.30	20.09	2.92	0.001
COTL	35	2.60±0.26			
Facilitator					
TPBL	30	2.93±0.17			
HPBL	30	2.85±0.38	10.29	2.92	0.001
COTL	35	2.63±0.23			

Discussion

This experiment's main purpose was to investigate the effectiveness of the use of PBL strategies in teaching and learning the organ dysfunction topics in Pediatric Nursing course on communication skills. Reviews of recent literature indicate that little investigation has been conducted on the applications of PBL in the educational system of Iran. More specifically, no study has ever dealt with comparing the application of TPBL and HPBL strategies in Pediatric Nursing education.

An important finding was that PBL strategies were superior to the COTL strategy in enhancing communication skills. The eta squared indices ranged from 0.18 to 0.30, which indicates a large effect based on Cohen [30], implying that the PBL strategies can effectively improve interpersonal skills. This finding agrees with Jia's findings, who assessed the effectiveness of the combined administration of problem-based learning and lecture-based learning teaching models in Chinese medical education [31]. This study also supports Shorey *et al*., who examined the effectiveness of blended learning pedagogy in a redesigned communication module among nursing undergraduates. Having employed problem-based activities, nursing students were stimulated to believe in the importance of effective communication skills [32].

Other studies mentioned in the literature also proved that PBL curricula could improve learners' communication skills in group work [19, 33]. As it was hypothesized, the PBL strategies had a more noticeable impact on the students' communication skills than the conventional instructional strategy. This is perhaps for the facilitator's constructive role

in PBL strategy and the fact that the PBL sessions offer an environment where the students are inspired by others and strengthen their interpersonal skills [34], which are critical for their future careers. This finding backs up the study conducted by Shorey *et al*., who found that peer feedback during PBL encouraged students to take constructive feedback and create an authentic learning environment and effective communication module [32]. The PBL strategy appears to develop students' communication skills to promote better learning [35], encourage the use of communication skills as a life-long process [36], increase clinical skills like communication [37], enable the students to work together to solve problems, handle clients' conditions in hospital [33], prepare nursing students to address incivility [38], and distribute cognitive load among the members of the group and focus on the construction of schemata [39].

Finally, the present study revealed that PBL strategies effectively drive students to cooperate, especially in small groups, to develop communication skills. This could result in more satisfaction with learning in the PBL strategy [40]. This is also supported by Du *et al*. [41], who found a significant increase in communication skills within teamwork. In their study, the students asserted that the most important skills they gained in PBL were a spirit of teamwork and the skills of communication and collaboration. Similarly, Sahu *et al.* [42] showed that PBL is an effective small group teaching method for medical students to enhance their basic communication skills. Both the TPBL and HPBL strategies created impressive results in students' communication skills.

Nevertheless, assisting learners to elucidate their preconceptions may ease a more complicated view of consistency in PBL-based programs and may reduce early stress and anxiety [43]. Furthermore, as Carriger [44] suggested, the blended approach can facilitate both knowledge attainment and knowledge application. Also, summarization as a method can be an effective learning strategy for students who are already skilled at summarizing, and it can improve students' learning, understanding, and retention of course content [45].

Despite the contribution that this study might have for teaching, it suffers from some limitations. Firstly, although most of the students benefited from PBL strategies, the results can be generalized only to courses of similar contents and levels. Secondly, since the researcher could not change the usual planning of the universities to randomize the assignment of the subjects to different groups, the study included only intact classes of third-year nursing students in a bachelorette program in two Universities of Islamic Azad University in Iran who had nursing students that had enrolled in Pediatric Nursing course at the same time. However, the prior performance test results indicated that the experimental (TPBL and HPBL) and COTL groups were homogenous. Therefore, it should be mentioned that the findings of the study can only be generalized to a similar population and not to the others.

As it was already mentioned, in this research, the simulation patient was used for the evaluation of communication skills; therefore, other combined teaching methods that offer the use of simulation in conjunction with PBL may provide additional insight into the possible effects that strategic use of the mixed methods might have on learning and knowledge transform. Besides, future studies on PBL strategies could involve nursing students and graduated and registered nurses taking part in retraining programs.

Conclusion

In this study, the researchers described a PBL method used in a large classroom setting to instruct a Pediatric Nursing course without additional facilitators. Overall, PBL instructional strategies proved to be able to develop better interpersonal communication skills than COTL strategies. Since interpersonal and communicational skills are vital in the nursing profession, and there is no specific course to teach these skills to the students majoring in nursing, the PBL strategy can be an important vehicle to foster these skills. So, it is suggested that it be included in the education program for nursing students.

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