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Original Article

A comparative study of problem-solving skills training using Goldfried social problem-solving model and problem-solving method on the clinical performance of nurses in intensive care units

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Abstract

Background and aims: Nurses are vital healthcare team members, playing a crucial role in planning and implementing healthcare services within the healthcare system. Providing quality services by nurses, especially in intensive care units (ICUs), depends on strengthening clinical performance and timely and effective patient decision-making. The aim is to determine the effect of problem-solving skill training, utilizing Goldfried's social problem-solving model and the problem-solving method (PSM) model, on the clinical performance of ICU nurses.

Methods: The present study employed a semi-experimental design. The statistical population of this study included nurses from Hajar and Ayatollah Kashani, as well as the ICU of Shahrekord University of Medical Sciences (SKUMS) in 2022. Fifty nurses were selected by convenience sampling and randomly divided into two groups. An educational intervention program designed to develop problem-solving skills, based on the Goldfried model, was implemented in six two-hour sessions. A written educational program for problem-solving skills was developed, also utilizing the problem-solving model. The PSM model was implemented in six two-hour sessions. Before, immediately after, and two months after the intervention, the Nurse's Clinical Performance Questionnaire (NCPQ) was used to assess the clinical performance of ICU nurses.

Results: The study's results showed that the clinical performance of nurses in both groups (Goldfried's model group and PSM group) improved two months after the intervention ($P<0.05$). However, there was no significant difference in clinical performance between the two groups ($P>0.05$).

Conclusion: Medical center managers and officials can utilize problem-solving skills training based on the social problem-solving model to enhance the performance of nurses and other hospital employees, thereby improving overall performance.

Keywords: Clinical practice, Intensive care unit, Goldfried social problem-solving model, Problem-solving method

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Introduction

One of the key members of the treatment team is the nurse, who plays a vital role in providing care and maintaining health within the healthcare system (1). The art of nursing is defined in the intensive care units (ICUs) (2). The three fundamental roles of nurses are functional, leadership, and research; the prerequisite for these roles is establishing effective communication with other healthcare team members, especially with patients, and recognizing and solving problems (3,4). Patients in the ICU need attention due to being in life-threatening conditions for diagnosis, management, and care. There are continuous and persistent specialists and trained nurses. The ICU is one of the most critical departments in hospitals, equipped with advanced technology and staffed by highly skilled treatment professionals, including doctors, nurses, and other healthcare professionals, to manage and treat critically ill patients with impaired vital functions (1,5).

According to statistics, the number of ICU beds in the

US is approximately 15%, while in England, it is around 10%. There has been a 30% increase in the last year. This need in Canada is estimated at 57% for the next 15 years (6). According to statistics, the admission of emergency departments has also increased significantly, so in the US, the admission of ICU departments of emergency departments has changed from 49% to 79% (7). Nurses can directly impact patients' health status if they have clinical skills and enough insight to perform the necessary care, especially in the ICU department, which is particularly important (8,9). Additionally, it is expected that nurses, especially ICU nurses, can adopt the best solutions to address patients' problems and their needs. Problem-solving is an essential skill for today's life. (10) It involves thinking toward the goal, a mental process involving logical and orderly thinking. This helps a person search for several solutions when facing problems and then choose the best one (11).

One of the essential skills for a treatment team, such as nursing, is problem-solving (12). Achieving problem-solving skills and satisfaction in obtaining them enables nurses to perform their roles and duties well and with quality. Macon and Brown believe the nursing process is a problem-solving approach, a common element in many nursing programs. The art of care requires knowledge, skills, and expertise, and the heart of effective performance lies in problem-solving. In most societies, everyone believes that increasing problem-solving skills should be emphasized. Patients' problems are constant. Many nurses enter the clinic, unable to recognize the patients and devise a plan to address their needs. On the other hand, emergencies require quick and courageous assessment and response to increase patient survival (13).In a study by Ay et al, the research results indicate that improving problem-solving in nurses leads to better quality care (14).

Regular and continuous training is necessary to increase nurses' self-efficacy in ICUs. Developing and promoting theoretical and practical training for the medical team, especially nurses, is considered an efficient strategy and a suitable investment in health and treatment systems (15). One way to teach nursing problem-solving skills is to familiarize students with various PSMs. The need to adopt a problem-solving approach stems from the fact that medical education has undergone significant changes in recent years. Many medical schools worldwide are trying to develop new educational methods for graduate students (16).Researchers have proposed several models to teach problem-solving skills. One model for teaching problem-solving skills is Goldfried's. It views social problem-solving as a process in the real world. It has two relatively independent components: a focus on the problem and the skills that problem-solving teaches (9). Another problem-solving model is the PSM model. This model is an easy and effective way to identify the root of problems. This model can be used to identify and solve problems and improve quality. This pattern begins with the question "why" (what? where? when? who? for what reason? and how?) (17).Therefore, for nurses directly present in the clinical environment and faced with patient care problems, this model can help resolve their issues more efficiently in treatment departments, especially in high-sensitivity ICUs.

Problem-solving is the foundation of the nursing process, and the nursing profession is both practical and functional. This skill is an essential component in critical decision-making for ICU nurses. Awareness and knowledge of effective PSMs are crucial for nurses. Thus, this study was conducted to compare the effectiveness of problem-solving skills training on the clinical performance of ICU nurses using Goldfried's and the PSM models.

Methods

The current research was a semi-experimental, two-group study with pre-and post-tests. In 2022, all the nurses of the ICU of SKUMS hospitals (Hajar and Ayatollah Kashani hospitals) were included in the statistical population of the research. The minimum sample size required in each group was determined to be 20 people, and considering a 25% attrition rate, 25 nurses were included in each group for the study.

Sampling was conducted among the list of nurses in ICU departments at each hospital using a random method, with an equal allocation of 25 nurses from each hospital. The inclusion criteria for the study were as follows: no history of taking psychiatric medications, working in the ICU for at least two years, and participating in yoga and stress management courses. Additionally, the exclusion criteria included individuals who were unwilling to continue participating in the study, those who started taking psychiatric medications, those who participated in yoga and stress management classes, those who were transferred to other wards, and those who were absent from more than two classes.

According to the inclusion criteria, the samples were randomly selected from the list of ICU nurses. In each group, 25 nurses were randomly assigned to two groups using permutation block randomization. For the nurses, in addition to mentioning the objectives of the research, observing the ethical considerations, including the confidentiality of information and the possibility of discontinuing cooperation at any stage of the study, and finally, the demographic and NCPQ questionnaires were distributed to the nurses of both groups under the same conditions as a pre-test. After this stage, the nurses of Goldfried's model training groups and PSM model training were trained. It should be noted that the first face-to-face meeting was held after half of the virtual meetings, and the second was held after the virtual meetings concluded, allowing group members to raise their questions and doubts. After completing the training sessions, a post-test was conducted for both groups under the same conditions. Two months after the intervention, the nurses answered the questionnaires again as a follow-up.

Goldfried model training sessions

In this group, for the nurses of the ICU, a regular training program for problem-solving skills was designed using Goldfried's model in six two-hour sessions, each designed separately based on the following goals (Table 1) (18). The following content and topics were taught in each session:

PSM problem-solving model training sessions

In this group, a written training program for problem-solving skills using the PSM model was implemented in six two-hour sessions for the ICU nurses (Table 2).

Demographic and NCPQ questionnaires were used to collect data. After collecting the pre-test, post-test, and follow-up data, the data were analyzed using descriptive statistical tests, such as mean and standard deviation (SD), and inferential statistics for qualitative variables, including Fisher's test and the χ^2 test. For normal quantitative variables, independent t-tests and paired t-tests were employed, along with SPSS 24 data analysis software.

Results

It took about five months from the start of sampling to the implementation of the intervention program. One participant in the intervention group withdrew from the study and was replaced with another participant from the same sample. The results showed no significant difference between the control and intervention groups. In other words, the intervention and control groups were homogeneous and identical regarding these characteristics.

Demographic findings indicated that 68% of participants in both groups were married. The mean and SD of age in the two studied groups were 33.8 ± 8.88 and 32.7 ± 5.28, respectively. The mean and standard deviation (SD) of work experience in the Goldfried model was more than 15 years, at 15.2 ± 7.9 years, and in the PSM model, it was more than 11 years, at 11.16 ± 5.06 years. The remaining demographic information is presented in Table 3.

Also, the mean and SD of each group in Goldfried's model were before the intervention 20.49 ± 86.74, after the intervention 8.45 ± 95.95, and two months after the intervention, 3.32 ± 98.44, and for the PSM model, before the intervention, 7.35 ± 88.96; after the intervention, 3.95 ± 95.94, and two months after the intervention, 3.72 ± 97.01. Additionally, training in the PSM model improved the clinical performance of ICU nurses ($P < 0.05$) (Table 4).

As shown in Table 5, the clinical performance score in the problem-solving training group, in the pre-intervention stage, the mean and SD of each group, respectively, in the Goldfried model group 20.49 ± 86.74 and the post-intervention group 95.95 and 8.45, in the stage two months after the intervention, the mean and SD of the Goldfried model group were 98.44 and 3.32, and for the PSM model group in the stage before the

Table 1. Goldfried model training sessions

First session: general orientation	The second session: definition and formulation of the problem	The third session: generating clear solutions
• The ability to recognize the problem • Accepting the problem as a potentially changeable natural phenomenon • Belief in the effectiveness of the problem-solving framework in dealing with the problem • High self-efficacy expectations to implement the steps of the model It is a habit to stop, think, and then try to solve a problem	• Collecting all available information • Separation of facts from assumptions that require research • Break down the problem Specifying real goals	• Determining a range of possible solutions The possibility of choosing the most effective answer among the answers
The fourth session: decision making	**The fifth session: Implementation of the solution**	**Sixth session: Review**
• Predicting the possible consequences of each action Attention to the usefulness of these consequences	Execute the selected method.	• Viewing the results of the execution • The value of water

Table 2. PSM model training sessions

First session: What	The second session: Where	The third session: When
• what can I do • What is our main value? • What are our needs? • What is our goal? • What do we want to achieve? • What resources do we have? What are the effects?	• Where should I do it? • Where is it going to be used? • Where should I advertise it or unveil it? Where should we be in touch?	• When should I do it? • when does it start • when will it end When should I launch it?
Fourth session: Who	**The fifth session: Why**	**The sixth session: How**
• Who will do it? • Who is involved in doing it? • Who benefits? • Who is responsible for what? • Who can help? • Who are our experts? Who is affected?	• Why should I do it? • Why do we think that happens? • Why don't others do it? Why should you invest?	• How do I do it? • How is it implemented? • How should we communicate? How many other ways could it be done?

intervention, the mean and SD of each group were 88.96 and 7.35 in the PSM model group and 95.94 and 3.95 in the post-intervention group, in the two months after the intervention, the mean and the SD of the PSM group was 97.01 and the control group was 3.72.

The results of the dependent t-test for pairwise comparison between the clinical performance of nurses before and after teaching the PSM model show that the value of the t-test statistic is 2.17, and the significance level is 0.0487. Because the significance level is less than 0.05, it can be concluded that the two samples are statistically significantly different from each other. In other words, there is a difference between respondents' performance before and after training (Table 6). However, the overall results showed that nurses' mean clinical performance scores in the Goldfried and PSM model groups did not differ significantly.

Discussion

This study was conducted to compare the effectiveness of problem-solving skills training on the clinical performance of ICU nurses, using Goldfried's and the PSM models.

The research results showed that problem-solving training with the Goldfried model increases the clinical performance of ICU nurses. In this regard, the research conducted by Mansoori et al showed that the problem-solving approach to education affects students' academic performance. (16). Khoeiniha et al used the synergy model to examine the clinical performance of nurses in ICU departments of teaching and non-teaching hospitals. The results showed that nurses have the highest level of clinical performance in teaching hospitals in the area of support, and the level of clinical performance of nurses in emergency departments, compared to ICU and CCU departments, is lower (19). The results of the Wang et al. study also showed that the more nursing students become familiar with problem-solving strategies, the greater the application of these skills in the clinic, and using problem-solving strategies in patient care plays a significant role in improving nurses' problem-solving abilities in the clinic (20).

According to Firend's study, group discussion and question-and-answer methods and activities in small groups were conducted using Goldfried's written and comprehensive protocol to teach problem-solving skills. Therefore, by teaching this skill, the main feature of which is the application of social problem-solving, it can be expected that the problem-solving skill will be strengthened as a process with social consequences. Because the first stage of this protocol is a general orientation to the problem, which emphasizes the control of human reactions in dealing with problems and the factors that lead to the emergence of these feelings, then in the next steps of this model, with the idea of accepting the problem as a reality of life, by being optimistic about the future and using logical thinking instead of making impulsive and avoidant decisions, one makes a firm decision and learns to recognize its weaknesses and strengths by repeatedly reviewing the path it has taken, and in case of encountering obstacles, finds other ways. Try it. Nursing aims to improve the quality of patients, families, and health care providers. It should also enhance the healthcare system (17). Shahbazi and Heidari research findings indicate the positive effect of teaching Goldfried's model on nursing students' problem-solving skills. The researcher's observations and the analysis of a survey of students in the experimental group show that by learning social problem-solving skills, students have been able to identify and accept problems, how to deal with them, pay

Table 3. Demographic characteristics of ICU nurses

Variable	Sub-group	Goldfried model	PSM model	*P* value
		N	%	
Marital status	Single	8	32	0.77
	Married	17	68	
Education level	Post-diploma	1	4	0.81
	Bachelor	16	64	
	MSc	5	20	
	Ph.D	3	12	
Shift type	Constant	8	32	0.42
	Circulation	17	68	
Employment status	Official	8	32	0.32
	Contractual	17	68	
	Other	0	0	

Table 4. Comparison of the clinical performance score in the Goldfried and PSM model before, immediately, and two months after the intervention.

Group	Before the intervention					Immediately after the intervention					Two months after the intervention				
	M	SD	SEM	t	Level sig	M	SD	SEM	t	Level sig	M	SD	SEM	t	Level sig
Goldfried model	86.74	20.49	4.1	0.51	0.039	95.95	8.54	1.71	-0.006	0.120	98.44	3.32	0.67	-1.44	0.523
PSM model	88.96	7.35	1.5	2.17	0.0478	95.94	3.59	0.72	2.17	0.0478	97.01	3.72	0.74	2.17	0.0478

Table 5. Mean difference test values between Goldfried model training and performance

Variable	t	df	F	Sig level
Before intervention	0.51	48	4.517	0.039
Immediately after the intervention	-0.006	48	2.509	0.120
Two months after the intervention	-1.44	48	0.414	0.523

Table 6. Pairwise comparison test values between the Goldfried and PSM model and clinical performance

Variable	M	SEM	t	Sig level	95% CI	
					Lower limit	Upper limit
Before and after the intervention	4.12	6.25	2.17	0.0487	0.473	7.634

attention to their strengths and weaknesses, and choose the best solutions (18).

Another result of the research is that teaching the PSM model affects the clinical performance of nurses in the ICU of SKUMS. In their review, Keyt et al state that nurses who work in ICUs consider themselves more in need of training than others, and their training will be more effective than other nurses, which is in line with the present study (21). Yilmaz et al believe that the lower the level of knowledge and awareness of nurses, the more unfavorable their performance should be witnessed, and to improve the level of knowledge and awareness of nurses, training based on scientific guidelines is the best method that can improve the performance of nurses and improve their performance level (22). In another research, it was found that practice in evidence-based nursing consultations and the use of nursing clinical protocols, as well as management measures aimed at strengthening nursing performance, are necessary, therefore improving the ability of nurses to solve daily problems through training that can improve clinical performance, strengthens (23).

As previously emphasized, problem-solving is at the center of nursing activities. Therefore, nurses must improve their problem-solving skills to improve clinical performance. The art of care needs knowledge, skills, and expertise, and the heart of effective performance is the ability to solve problems. Most importantly, working in the ICU requires nurses to make quick and accurate decisions, be aware of complex situations, and be more responsible. Therefore, according to the research results, the improvement in the participants' knowledge, perception, and actual performance in problem-solving is done according to the total level of problem-solving skills of nurses through a comprehensive program such as the present study.

Limitations

This research faced limitations such as the lack of time for nurses, the large number of questions, the difficulty in scoring, and the limitations related to selected educational hospitals.

Conclusion

The results of the present study showed that the average clinical performance score in the group with the Goldfried model and the PSM model did not differ. The training and improvement of nurses in different job categories, as well as nursing managers, are responsible for controlling the performance of nurses and providing quality services to clients. Therefore, considering the effectiveness of problem-solving skills training using Goldfried's and the PSM models on nurses' performance, this training model can be taught to hospital educational supervisors through training workshops and ultimately used to train ward head nurses. Also, in nursing education, nursing instructors can familiarize students with teaching problem-solving skills using these two models. Nursing instructors can encourage students in their training classes to prepare authoritative articles in addition to textbook materials and present them as class activities.

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Authors' Contribution

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Competing Interests

The corresponding author is one of the section editors of this journal. The authors declare that there is no conflict of interest.

Ethical Approval

The present study was approved by the Ethical Committee Medical Sciences University of Shahrekord (ethics code: IR.SKUMS.REC.1400.066). After selecting the eligible participants, the researcher was introduced to them, and the study's objectives were elaborated on for them. The informed consent was obtained from the subjects, and they were assured that their information would remain confidential.

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