



The Impact of Tacit Knowledge Transfer Through Storytelling on Nurses' Clinical Decision Making

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Abstract

Background: Clinical Decision Making (CDM) is the foremost aspect of caring for patients. Storytelling can enhance skills such as judging, and problem-solving among people, especially in clinical education environments.

Objectives: The current study aimed at investigating the impact of tacit knowledge transfer through storytelling on CDM by nurses. **Methods:** The current quasi-experimental study was conducted on 61 nurses. The participants were selected by convenience sampling method and randomly assigned into experimental and control groups. An eight-hour storytelling session was held for the experimental group, but not for the control group. The assessment tool was the Jenkins' CDM in nursing scale.

Results: The mean scores of CDM pre-intervention were 146.80 ± 12.68 and 138.42 ± 12.64 in the experimental and control groups, respectively ($P = 0.012$). The mean scores of CDM post-intervention were 163.43 ± 18.45 and 139.10 ± 11.78 for the experimental and control groups, respectively ($P < 0.001$). The gain scores were 28.74 ± 38.90 and 0.78 ± 3.84 in the intervention and control groups, respectively. The difference was statistically significant ($P < 0.001$).

Conclusions: The obtained results showed that the transfer of knowledge and experiences through storytelling significantly enhanced CDM score.

Keywords: Clinical Decision-Making, Knowledge, Narration, Nursing, Tacit, Transfer

1. Background

Nursing is considered as a caring profession (1) and CDM is the foremost aspect of caring for patients (2). The World Health Organization (WHO) also emphasizes the transfer of decision-making powers to nurses as being in the frontline of health service delivery (3).

In some texts, CDM corresponds with different terminologies such as diagnostic reasoning and clinical judgment (4). Decision making is the process of choosing the best option among the available options in order to achieve desirable goals (5).

Decision making in the nurse practice environment is a dynamic conceptual process that may affect patient outcomes (6). Studies reported that 34% of undesirable outcomes for patients occurred due to wrong decisions made by nurses (7, 8). In fact, health care workers including nurses still do not receive comprehensive training on such basic skills (9).

Dabirian showed that nurses described their rate of

engagement in decision-making processes in weak and medium level (10). Moreover, in the study by Sharif et al. participants admitted their weak ability in CDM. Meanwhile, training CDM skills always have some problems, and no specific solutions are proposed for education in order to improve CDM skills (11, 12).

Evidence suggests that training can enhance the nursing skills such as CDM; for example, a significant increase in clinical decision-making among nurses was reported by Manzari et al., about education through standardized patient encounters (13). Also, according to the Nouhi et al., evidence-based education leads to improve the CDM skills (14).

Application of clinical knowledge or tacit knowledge of experts is proposed as another method to improve nursing skills. Tacit knowledge is an aspect of knowledge rooted in individuals' personal experiences, beliefs, opinions, and values and could be gained through non-formal education and work experience in workplaces and also

through interaction with others (15-17).

According to the studies, 80% of individual's capabilities, skills, and knowledge of an organization are intangible and tacit, and educational organizations are not aware of the importance of tacit knowledge (15). Therefore, the nursing system is dealing with the issue of using tacit knowledge (18, 19). Tacit knowledge could mainly be traced and captured by sharing and transferring it via diverse media (20).

A survey conducted by Dehghani et al., on 215 nurses in Bushehr, Iran, showed that the most important technological factors influencing the transfer of tacit knowledge are the independent physical environment and education technologies (21). As a result, education is a way that includes transfer of tacit knowledge and consequently leads to improvement of skills such as CDM.

On the other hand, it seems that the decision is an experienced skill, based on the study by Hruska, with activations in the left hemisphere neural regions associated with factual rule-based knowledge in novices, whereas the right hemisphere activation of experts in neural regions is associated with experiential knowledge (22).

Currently, storytelling is the simplest and most effective educational method (23, 24) practiced by all. It can be used as a dimension of tacit knowledge transfer (25) or as an effective way to capture such knowledge (20).

Organized stories can transfer tacit knowledge from managers to employees. Storytelling can enhance skills such as listening, speaking, establishing sensory and motor connection in the body, judging, and problem-solving among people, especially in clinical education environments (23).

In a study by Ghasemi et al. on 16 nurses recruited from the Intensive Care Unit (ICU), storytelling meetings were held to evaluate the effect of tacit knowledge transfer on nurses' clinical competence and the results showed that the transfer of experiences and knowledge through storytelling could improve various aspects of clinical competence among nurses (18). In a similar study conducted by Tamimi et al., to assess the impact of anecdotal narration of clinical experiences on professional communication skill in nurses, the assessed skill increased by 71.4% following the intervention (23).

Although the major responsibility of nurses in CDM and also the need to train such skills are very important, few studies and training are performed in this field. Regarding tacit knowledge and the role of storytelling in education in Iran, the impact of tacit knowledge transfer through storytelling on clinical decision makings by nurses was studied by researchers in Bushehr Specialized Heart Center.

2. Methods

The current quasi-experimental study with pre- and post-test design was conducted in 2017 in Bushehr, Iran. The sample size was 61 using the following formula and based on the study by Nouhi et al. that the mean scores of clinical decision-making before and one month after the intervention were 81.81 ± 10.72 and 88.74 ± 4.87 , respectively (14); with the type one error level of 5% and the test power of 80% and the expected difference of six units in the mean scores before and after the intervention, the sample size was set to 30 subjects in each group. There were 30 subjects in the experimental and 31 in the control groups.

$$n_1 = n_2 = \frac{\left(z_{1-\frac{\alpha}{2}} + z_{1-\beta}\right)^2 (S_1^2 + S_2^2)}{(\mu_1 - \mu_2)^2} \quad (1)$$

2.1. Participants

The study population consisted of all nurses working at Bushehr Specialized Heart Center, Iran. Bushehr Specialized Heart Center is a state hospital exclusively for patients with cardiac disease. The hospital has five departments including the emergency, coronary care unit (CCU), ICU, angiography laboratory, and post-angiography and 122 nurses work in it. In the current project, a sample of 61 nurses were conveniently selected for the study and randomly divided into experimental and control groups. Inclusion criteria were at least a bachelor's degree in nursing and one year work experience. Exclusion criteria were unwillingness to participate in the study or previous participation in similar workshops or training courses.

2.2. Ethical Considerations

The current study protocol was approved by the Ethics Committee of the Bushehr University of Medical Sciences (IR.Bpums.Rec.1394.90). The study objectives were explained to the participants and they had the right to withdraw from the study at any time, and they were assured that their data remain confidential. The subjects signed informed consent forms. The obtained results were provided to the subjects.

2.3. Data Collection Tools

Valid and reliable tools employed in the current study were as follows:

A: A demographic questionnaire consisting of items on age, gender, marital status, level of education, and work experience.

B: The Jenkins Clinical Decision Making in Nursing Scale (CDMNS) was the tool employed to assess CDM (26). This is a standard quantitative tool frequently used to evaluate nurses' perceptions of their own CDM ability (27). The

CDMNS is a 40-item inventory, which is scored based on a Likert scale to rate nurses CDM ability. In other words, items are scored by nurses from 5 (always) to 1 (never), reflecting perception of their behavior when caring for patients.

The scale provides a total score and four subscale scores labeled as follows: searching for alternatives or options; canvassing objectives and values; evaluating and reevaluating consequences; and searching for information and assimilating new information in an unbiased manner (26).

The items scores are summed to obtain a total score. The total score of the tool ranges 40 to 200 with higher scores indicating higher perceived CDM ability.

Content validity was established in several ways. Jenkins maintained that items are developed based on the concepts available in the literature. Then, there was preliminary testing and subsequent revision of an early form of the CDMNS (28). Finally, a panel of five nursing experts rated each item with a specification matrix. The matrix yielded a total score for every item. Those that received a total agreement score of 77% (good) or higher were kept. Items that rated 70% - 75% (fair) were thoroughly scrutinized for inclusion or exclusion, and items that scored less than 70% were not retained. Reliability procedures produced a final Cronbach's alpha of 0.83 (11, 27, 29).

2.4. Data Collection

The experimental group was invited to participate in a meeting where the objectives of the project were explained to them. In addition, participants could stop participation at each stage of the research. At the end of the meeting, informed consent and pre-test were taken from the experimental group. The experimental group was divided into three subgroups of 10 nurses, and an eight-hour session was held for each subgroup. During the session, the nurses voluntarily expressed their anecdotes and stories of events occurred in the past leading them to make new clinical decisions. Each session was managed by people from the faculty and nursing staff who had a clinical and managerial background and good command of guidelines and ethics that could analyze the content of the expressed stories and propose appropriate solutions if necessary. Post-test was also given to the experimental group three months after the session. No meeting was held for the control group, but pre-test and post-test (after three months) were given to this group.

2.5. Data Analysis

The data were analyzed with IBM SPSS Statistics for Windows, version 20.0 (IBM Corp., Armonk, N.Y., USA). Descriptive statistics, Chi-square test, paired samples and independent t-tests, and mean gain score analysis was employed

to analyze the data. The Kolmogorov-Smirnov test was applied to assess the normality of the response variable along with other independent variables in the two groups. P value < 0.05 was considered as the level of significance.

3. Results

There were 61 subjects in the current study among which 10 nurses were male and 51 female. There were no significant differences between the two groups regarding gender distribution. The mean age of participants in the control and experimental groups were 30.07 ± 5.21 and 36.23 ± 7.16 years, respectively.

In terms of age ($P < 0.001$) and work experience ($P = 0.001$), significant differences were observed between the two groups. Moreover, there was no statistically significant difference between the experimental and control groups in terms of education level ($P = 0.519$). Also, the distribution of marital status was similar in the two groups ($P = 0.381$). Table 1 shows the demographic variables of the two groups.

Despite random allocation, the two groups were initially different in CDM score, the mean scores of CDM pre-intervention were 146.80 ± 12.68 and 138.42 ± 12 in the experimental and control groups, respectively ($P = 0.012$).

The mean scores of CDM post-intervention were 163.43 ± 18.45 and 139.10 ± 11.78 in the experimental and control groups, respectively ($P < 0.001$).

According to paired samples t-test, as shown in Table 2, the mean changes of CDM post-intervention were statistically significant in the experimental group compared with pre-intervention ($P < 0.001$), whereas such changes were insignificant in the control group ($P = 0.151$).

The mean CDM score showed changes between the experimental and control groups during the study period. Thus, the effectiveness of education and the comparison of the analysis of mean gain scores in the two groups were measured due to the differences between the two groups in terms of initial scores and lack of observing the assumptions for analysis of covariance (ANCOVA).

The gain score was obtained through the following formula:

Individual's obtained score = 100 multiply by the difference of the score between pre- and post-intervention divided by the maximum obtainable score with respect to the pre-intervention score for the individual

According to Table 3, the difference in the mean gain score (in percentages) was statistically significant between the experimental and control groups ($P < 0.001$).

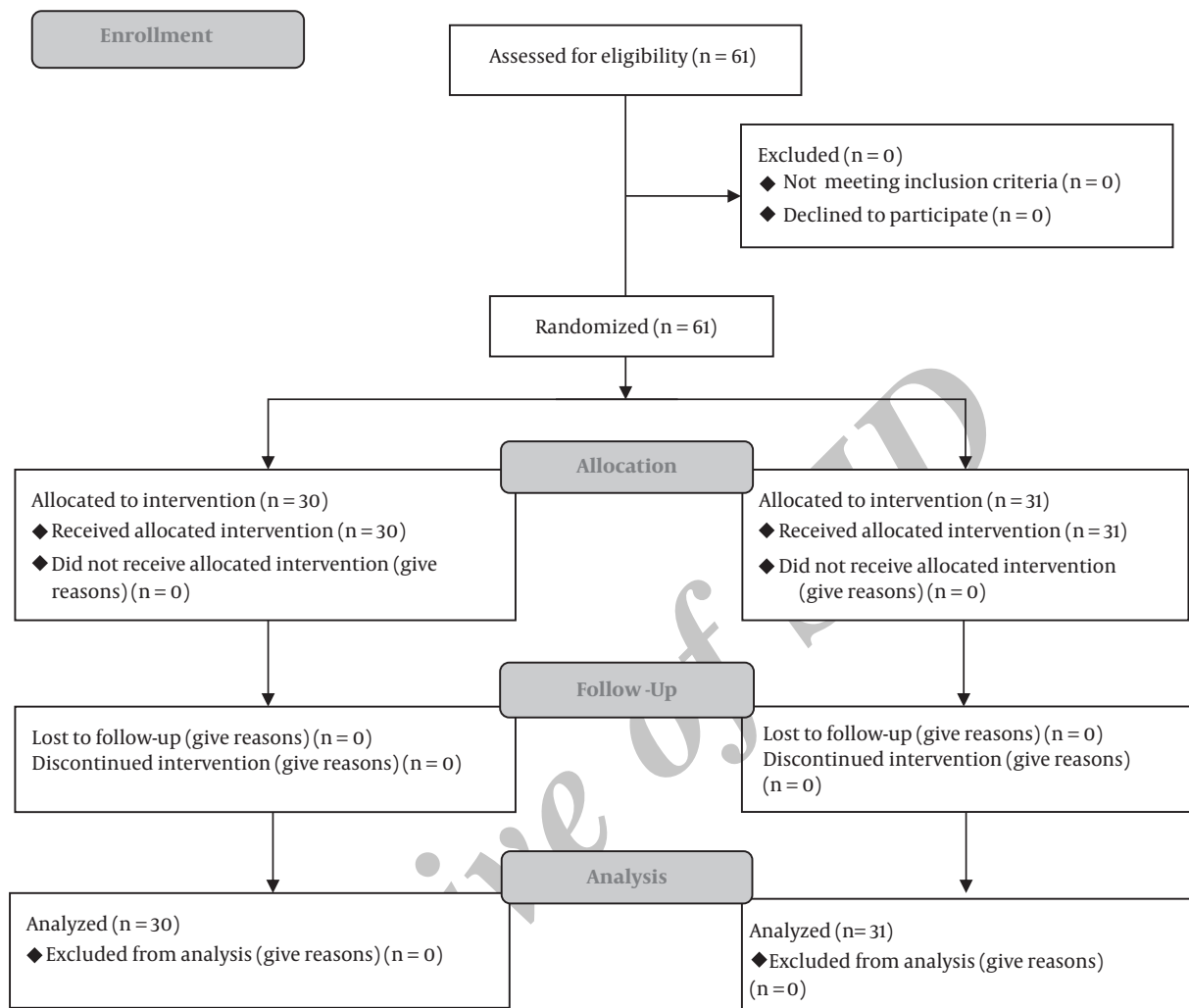


Figure 1. CONSORT flow diagram

4. Discussion

The current study investigated the effect of tacit knowledge transfer through storytelling on nurses' CDM.

Although Jenkins did not define the standards for satisfactory scores, the previous researches used the same instrument and described the total mean score for CDM ($M = 142.61$) that was a moderately high score.

The results of the comparison of the mean obtained scores showed that storytelling led to the significant improvement in the CDM score of the nurses post-intervention. As a result, the research hypothesis confirmed that tacit knowledge transfer through storytelling was effective on nurses' CDM. These findings were consistent with the results of the studies by Ghasemi (18)

and Tamimi (23). In both studies, anecdotal narration of clinical experiences during the workshops held for the nurses led to enhanced clinical competence skill among nurses.

Hunter determined the role of storytelling as an educational policy in which storytelling was included in the curriculum of midwifery students for four years; the midwifery students regarded storytelling as a method to enhance cognitive learning and advance knowledge transfer (30). His finding was consistent with that of the current study. As a result, through storytelling, moral, practical, and aesthetic senses are given to positions, and there is a better perception of knowledge (31).

According to the findings of Nouhi, the clinical decision making score significantly increases after evidence-

Table 1. Demographic Variables of the Study Groups^a

Demographic Variable	Experimental Group	Control Group	P Value
Gender			< 0.045
Male	2 (6.7)	8 (25.8)	
Female	28 (93.3)	23 (74.2)	
Marital status			0.381
Single	6 (20)	9 (29)	
Married	24 (80)	22 (71)	
Educational level			0.519
BS	27 (90)	27 (87.10)	
MSc	3 (10)	4 (12.90)	
Work experience	11.83 ± 7.38	6.23 ± 4.94	0.001

^aValues are expressed as No. (%).**Table 2.** Comparison of Pre- and Post-Intervention Scores in Terms of Clinical Decision Making^a

Variable	Experimental Group	Control Group
Pre-test score	146.80 ± 12.68	138.42 ± 12.64
Post-test score	163.43 ± 18.45	139.10 ± 11.78
Mean changes of pre-test and post-test scores	16.63 ± 20.06	0.68 ± 2.56
Comparison of pre-test and post-test scores	P < 0.001	P = 0.151

^aValues are expressed as Mean ± SD.**Table 3.** Compare of Mean Gain Scores Between the Two Groups

	Control Group			Experimental Group			P Value
	Mean ± SD	Median	IQR	Mean ± SD	Median	IQR	
Mean gain scores	0.78 ± 3.84	0	2.38	28.74 ± 38.9	27.04	31.64	< 0.001

based education, which also corresponds with the findings of the current study (14). It suggests that the novel methods improve skills and increase the survival of nurses' learning (32).

Furthermore, the results of the studies by Nair, Sochaki, Davidson, and Qorbanizadeh support the results of the current study on the effectiveness of educational practices in the form of storytelling (7, 33-35).

Koivisto et al. showed that some strategies such as games can be used successfully for teaching clinical reasoning. Such results encourage the individuals to use innovative methods to teach skills such as decision making (36, 37).

Palese et al. conducted a study to determine the effectiveness of strategies of the supervising professor on diagnostic reasoning of nursing students. The results, however, revealed no significant changes in terms of improvement of diagnostic reasoning skill of the students using the supervising professor strategy (38).

Unlike the current study, using personal digital assistants in the study by Gorelick could not increase the clinical decision-making score. He justified this conclusion as the impact of some demographic variables on clinical decision-making (28).

Lotfi et al. in a quasi-experimental study determined the effect of teaching simulation and critical thinking strategies on CDM of operating room students. No significant correlation was observed in the level of CDM score between the groups under single simulation training and integrated training of simulation and critical thinking strategies among operating room undergraduate students. According to the results, they argued that the students prior to simulation teaching and not after exposure to the simulated environment had an abstract mentality of conditions of dealing with the problem (11).

Storytelling leads to interest and motivation and subsequently to comprehension. Moreover, memory enhancement variables in stories, logical, and harmonious struc-

ture and sequence of events, encouragement of creative thinking, observation of the top-down development, as a major educational rule, distinguishing main contents, and highlighting main points justify the educational effectiveness of storytelling (39).

The limitations of the current study included the small sample size due to the small size of the study population and poor cooperation of nurses due to the busy and compressed work schedule. Thus, it is recommended that further studies be conducted on a larger population. The strengths of the study included evaluation of retention of learning from storytelling for a longer period of time, compared with previous studies, indicating the effectiveness of the teaching method of the current study.

4.1. Conclusion

The results of the current study showed that the transfer of knowledge and experiences through storytelling could lead to improved CDM skill among nurses.

Storytelling as one of the simplest and most effective learning tools is an enjoyable and effective method to teach concepts and skills that create interest and motivation in each level of educational programs. It is hoped that this procedure could lead to enhancement of nursing skills and thus, advancement of the quality of nursing services.

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