Original Article

The effects of applying an assessment form based on the health functional patterns on nursing student's attitude and skills in developing the nursing process

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ABSTRACT

Objectives: Comprehensive nursing assessment, as the first step in the nursing process, involves the systematic and constant data gathering to facilitate the development of the patient-specific nursing process. The aim of this study is to determine the effects of applying an assessment form based on the health functional patterns on nursing student's attitude and skills in developing nursing process.
Methods: A randomized controlling design was conducted. Of 84 undergraduate nursing students, 42 students were allocated to the intervention or control group. In clinical education, a patient assessment form based on Gordon's functional health patterns was applied to help students in the intervention group to develop nursing process, while the control group received traditional methods. The data were gathered using a demographic information questionnaire, skills in nursing process development checklist, and attitudes towards nursing process questionnaire.
Results: The average scores for students' attitude and skills in developing nursing process in the intervention group were greater than those of the control group.
Conclusion: Applying nursing assessment using the patient assessment form based on Gordon's functional health patterns can improve the students' learning in developing nursing process.

What is known?

- There are currently different nursing patterns for patient care. Likewise, the nursing process is a systematic approach to patient care, with the patient's examination being the most crucial part in the nursing process.

What is new?

- Establishing a patient survey form based on the health functional patterns of nursing model enables collecting the information required for more effective patient care.

- Patient review guide helps with specialized terminology that can contribute to obtaining accurate biographies, as well as the apparent structure and determination of sufficient space for completing the information, which may enrich the first stage of a patient's nursing process.
- A comprehensive review of the feasibility of extracting all nursing diagnoses related to patient's conditions is likely to make the nurse's work more accurate in planning for patient health, and may lead to better results during the evaluation stage.

1. Introduction

The nursing process is considered a highly significant element in improving scientific nursing practice [1]. Also, it is considered as a practical standard for the assessment of nurses' performance [2]. One of the indicators in determining the quality of nursing care is

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the nursing process [3]. In addition, nurses can focus explicitly on patient-specific care [4]. The nursing process can enhance thinking skills by creating nursing taxonomies and better clinical judgment [5,6], so that the students and the clinical trainers, as the active members of the nursing education, are able to come up with strategies and tools for further acquisition of nursing process [7].

In Iran, about 30 credits of undergraduate nursing courses are presented in clinical settings [8]. Clinical education provides an effective opportunity for developing nursing students' ability in caring for patients and learning about inimitable perspectives in nursing [9], and the quality of nursing practice can be remarkably improved by training the nursing process and encouraging nurses to implement it [10]. Given the importance of the training nursing process as a problem-solving method for patients-specific problems, improving nursing students' skills in the nursing process development is absolutely essential [8].

The knowledge and skills in formulating the nursing process, as well as the attitudes toward nursing process application are considered as the barriers in applying nursing process in the clinical settings [11,12]. Nurses faced a series of challenges during the health history taking and data collection during the assessment stage, as well as in the diagnosis, planning and evaluation stages of the nursing process [13]. Nursing students believed that the use of standard practical approaches and care plans, as well as revising nursing processes, can help them improve nursing process application skills [14]. Applying a web-based nursing process, the effectiveness of the internship courses was increased by reducing nursing students' anxiety [15]. A precisely devised support system for nursing process decisions can be employed for gathering patient-specific data, generating nursing diagnoses, individualized care plans, and implementation within the routine nursing workflow [16]. In the same way, providing a computerized tool can contribute to the development of the nursing process application through facilitating data collection, diagnostic reasoning, and identification and grouping of the clinical signs presented by the newborn in neonatal units [17].

In order to improve skills in nursing process application, the North American Nursing Diagnosis Association-International (NANDA-I) offers a national and international standardization of diagnostic classification system to help the development of the nursing process [18,19]. Functional health patterns developed by Gordon are one of the comprehensive models for the assessment stage of the nursing process. It provides a holistic format for patient assessment in 11 health patterns [20]. Each of the patterns consists of different questions to reflect the uniqueness of the individual patient, as well as to assess her/his strengths and weaknesses, which could link to the diagnostic categories. It is emphasized that Gordon's health functional patterns framework can be easily picked up by nurses and nursing students for nursing assessment [21].

In Iran, most of the nurses are competent at planning and implementing stages of the nursing process, however, they face difficulties at the assessment stage. As the nursing process is a dynamic and interconnected cycle, disruption in one stage can disturb the whole process [22]. Difficulties usually originate from the absence of critical thinking and decision-making capability for clinical judgments [23]. In Accra, Ghana, nurses' lack of understanding and skills in developing the nursing process were stated as the main factors that influence the clinical utilization of the nursing process at a hospital [24]. In Spain, despite teaching nursing process since 1970s at nursing schools, the ability to hold interviews, summarize information and issue clinical judgments had been hardly addressed among Spanish nurses. Therefore, they suggested more studies to define the changes in the development of nursing process in the professional practice [25]. Training in nursing process had a positive effect on the nurses' knowledge, attitude, and

skills required for clinical judgment about nursing care [23], however, further studies are recommended regarding the application of the nursing process, [12,26].

Since the existing literature suggests that there is a shortage in the use of advanced nursing processes based on valid assessments and nursing classifications [27], the present study is carried out to identify the effects of applying an assessment form based on the health functional patterns of nursing student's attitude and their skills in developing nursing process.

2. Methods

A randomized pretest-posttest controlled design was carried out at the Nursing and Midwifery School of the Hamadan University of Medical Sciences in Hamadan, the administrative city of Hamadan province in the west of Iran. Data were collected from February 2016 to October 2017. This paper is derived from a research project approved by the Ethics Committee of Research and Technology Vice-chancellor in Hamadan University of Medical Sciences (Code of Ethics: IR.UMSHA.REC.1396.129).

2.1. Participants

All the tertiary undergraduate nursing students who had registered for the internship courses of "Respiratory nursing" and "Hematology-Oncology nursing" participated in this study. The study inclusion criteria were: students who registered for the internship of Respiratory nursing care and Hematology-Oncology nursing care courses for the first time, and who successfully passed the theoretical courses of the Respiratory and Hematology-Oncology nursing care. In case participants were absent more than one day in their internship and/or could not accomplish the required nursing processes for this study, they were excluded from the study. Having been informed about the research aims and method, a total of 84 students voluntarily signed the consent form. All participants were informed that they were able to leave the study without educational consequences. No student was excluded from the study.

2.2. Sample size

The sample size was calculated based on a study in which students' attitudes toward nursing process was measured [8], and the following equation was employed to compare the mean scores. The coefficients of confidence and power were 95% and 80%, respectively.

$$N = \left[\left(Z_{1-\alpha/2} + Z_{1-\beta} \right)^2 \left(s_1^2 + s_2^2 \right) \middle/ (m_1 - m_2)^2 \right]$$

Considering the equation above and 10% attrition rate, the sample size was calculated about 40 people in each control and intervention group. Finally, 84 students took part in the study and accomplished it.

2.3. Study tools

Data gathering was performed using the following tools:

(1) Demographic information form (on students' age, gender, etc.) was designed according to the studies [8,28]. This form was completed at the beginning of the study by the students in both groups.
(2) A 'Nursing Process Skills Checklist' was used to measures the students' skills in formulating the nursing process for their

patients. It was developed according to the 'Coding System Checklist' of a study conducted by Khatiban et al. by which the students' performance in writing the nursing process is assessed [8]. 'Nursing Process Skills Checklist' has 16 questions in which each question is scored from 0 (not considered the aspects) to 4 (considered most aspects); a higher score represents more skill in the development of nursing process. The checklists were completed by the trained assessors accompanying the students according to the first and final written nursing processes.

(3) The Attitude to Nursing Process Questionnaire was developed according to the similar studies in which the students' attitudes toward their learning experiences were assessed [8,28]. The Attitude to Nursing Process Questionnaire consists of 12 questions in a 5-point Likert scale, "I strongly agree" with the highest score and "I strongly disagree" with the lowest score. This questionnaire is completed by the participants. The higher score represents a more positive nursing student's attitude toward the development of the nursing process. The questionnaire was completed by all the participants in the pre and post intervention.

In the present study, the face and content validity of the above-mentioned questionnaires and the checklist were confirmed by the faculty members of the Department of the Medical-Surgical Nursing at Hamadan School of Nursing and Midwifery. Reliability of the 'Nursing Process Skills Checklist' and 'Attitude to Nursing Process Questionnaire' was confirmed by the test-retest reliability, which indicated a strong correlation coefficient above 0.80 ($P < 0.001$).

2.4. Data collection

2.4.1. Stage 1: development of patient assessment form (PAF)

The PAF was initially developed based on Gordon's health functional patterns [29], and then finalized according to the nursing texts such as Bates' guide to physical examination and history taking [30], Ulrich & Canale's nursing care planning guides [31], and Potter & Perry's Fundamentals of Nursing [32]. The expert panel's approval of the face and content validity was obtained after several revisions. The PAF consists of nine categories including: (1) personal profile, (2) Health perception and health management, (3) Nutrition and metabolism, (4) Elimination, (5) Activity and exercise, (6) Cognition and perception, (7) Sleep and rest, (8) self-perception and self-concept, and (9) Roles and relationships. The examples of the possible risks and actual nursing diagnosis related to the gathered data of PAF are provided followed by an empty space. The student is obliged to write the nursing diagnoses based on a comprehensive patient assessment conducted in the nine categories of the PAF.

2.4.2. Stage 2: intervention in the experiment and control group

I Students who registered in the hematology and respiratory courses in two sequential terms were randomly divided into internship groups by the Clinical Affairs of the School. In this way, there were 10 groups of students in which 8–10 interns were trained in the hematology or respiratory wards. As a routine in internship programs, the group of participants who had started their clinical education in the hematology ward was switched to the respiratory ward and vice versa. In order to avoid the contaminant bias caused by two sequential academic term, the students in the first two courses in hematology and respiratory wards were educated through the routine clinical education of nursing process (the control group), and the students of the second two courses were trained as the clinical education of the nursing process based on PAF (intervention group). In this study, all the participants in control and intervention were trained by the main researcher who is a clinical faculty member.

II The internship course lasted three weeks. At the end of the first week of internship, all participants delivered their first written nursing process for the patients without using the PAF. At the same time, they completed the Attitude to Nursing Process Questionnaire on their own and the Nursing Process Skills Checklist accompanied by their assessor. However, the score of the assessor was considered as the final score of the students' skill in developing the nursing process.

III The intervention group was trained on how to use and complete the PAF for their patients. Then, simultaneously with the control group, they were asked to write and deliver their second nursing process for their patients based on the PAF. At the end of the internship course, all participants completed the Attitude to Nursing Process Questionnaire on their own, and the Nursing Process Skills Checklist accompanied by their assessor.

3. Results

A total of 84 undergraduate students participated in this study. Students' age ranged from 20 to 38 years and the participants average age was 22.85 ± 3.97 years old (Table 1).

Based on the independent *t*-test, variations in the mean scores of students' skills and attitude in the intervention and control groups is statistically significant. The results of *t*-test indicate that at the beginning of the study, the mean score of the Nursing Process Skills checklist was similar in both groups ($P > 0.05$), however, the intervention students had a significant improvement at the end of the study compared with the control group ($P < 0.001$) (Table 2).

Table 3 represents the comparison of the attitude of undergraduate nursing students to the nursing process in the control group and intervention group. At the end of the study, the mean score of students' attitudes toward the nursing process in the intervention group was greater than the baseline ($P < 0.001$), and the score of the participants in the control group ($P < 0.001$). Despite a slight increase in the mean score of the control group, the difference was not statistically significant compared to the initial mean scores of attitudes ($P > 0.05$).

4. Discussion

The aim of this study is to determine the effects of applying the PAF on the attitudes and skills of nursing students in the nursing

Table 1
Demographic characteristics of students.

Variables		Number (Percentage)
Gender	Female	48 (57.1)
	Male	36 (42.9)
History of failing the course	Yes	2 (2.4)
	No	82 (97.6)
Guest Students	Yes	2 (2.4)
	No	82 (97.6)
Distance between Diploma to college	With no distance	37 (47.6)
	With distance	46 (55.4)
Interest in the field of study	Low	16 (19.3)
	Medium	35 (41.7)
	High	31 (38.6)
Related work experience	Yes	16 (19.0)
	No	65 (77.4)
Married/Single	Married	15 (17.9)
	Single	69 (82.1)

Table 2
Comparison of students' scores of Nursing Process Skills Checklist between two groups (*Mean ± SD*).

Time point	Intervention Group (*n* =42)	Control Group (*n* =42)	t^a	P
Pre-intervention	10.29 ± 1.44	10.62 ± 1.45	−1.03	0.304
Post-intervention	13.29 ± 1.49	12.16 ± 1.46	3.49	<0.001
t^b	12.57	−5.32		
P	<0.001	<0.001		

Note: [a] Independent *t*-test; [b] Paired *t*-test.

Table 3
Comparison of students' scores of Attitude to Nursing Process Questionnaire between two groups (*Mean ± SD*)

Time point	Intervention Group (*n* =42)	Control Group (*n* =42)	t^a	P
Pre-intervention	7.33 ± 1.32	7.49 ± 1.36	−0.53	0.60
Post-intervention	8.90 ± 0.85	7.88 ± 1.33	4.21	> 0.001
t^b	−5.80	−1.16		
P	>0.001	0.250		

Note: [a] Independent *t*-test; [b] Paired *t*-test.

process development. The results indicated that the nursing students' attitude and skill level in the nursing process significantly increased in the intervention group compared to the control group.

The results of the present study revealed that the application of a patient assessment form based on the health patterns approach increased the skills and attitudes of students in the nursing process, because full examination in the first stage of the nursing process allows determining the patient's problems and, ultimately, the accurate evaluation of the outcomes of nursing interventions. In addition to these results, applying the nursing process simulation could improve the nurses' knowledge, attitude, and skills in the emergency nursing care of mothers and infants in Korea [23]. A PBL planned clinical course derived from the nursing process can develop the undergraduate students' attitudes and skills in the nursing process in Iran [8]. The fifth stage of the nursing process, which involved establishing objective criteria in the evaluation of the nursing process, could lead to the objective guidelines in patient care, as well as the objective evaluation of nursing interventions in solving patient's problems [33]. In Taiwan, the use of the nursing process decision support system (NPDSS) in the urological department made it possible to determine overall nursing diagnoses and nursing diagnosis based on the patient's condition. In fact, the information about the patients and their conditions in the work environment can be helpful to the nurses [16]. Therefore, if we are to facilitate the implementation of the nursing process, one possibility is to use the PAF as a tool for providing nurses with the nursing and patient care approach to increase knowledge, attitude, and skills of nursing students who will definitely work as clinical nurses.

In the present study, the participants had the opportunity to actively participate in their learning nursing process by clinical use of a based-model patient assessment form. Applying an active training method was shown to increase students' skills in patient assessment, nursing diagnosis, nursing implementation, evaluation, and the whole nursing process [34]. Given the fact that the PAF provides students with the opportunity to collect information in a structured way, it is easier to develop a nursing diagnosis based on the patient's current or potential problems, which can have a positive effect on student learning, as well as the nurse care.

In the present study, the change in the mean score of the first stage of nursing process, patient assessment, and the intervention was significantly more considerable than the mean of the other stages of the nursing process (nursing diagnosis, planning, implementation and evaluation), which indicates the effectiveness of using a structured form of patient review in nursing process development skills. As a result, other systematic and pre-determined forms for the subsequent stages of the nursing process need to be considered. Training on the five stages of the nursing process, especially the first stage, patient assessment, could improve students' learning [34]. Writing a nursing diagnosis and evaluating clinical outcomes could increase the quality of care [35]. The use of computer technology in nursing processes helps facilitate data collection and clinical attenuation, identify and categorize clinical symptoms of patients [36].

In a study conducted in Basque, use of the nursing process was studied in 158 nursing centers and it was shown that various nursing models such as Henderson, Gordon, etc. are used in the development of nursing process and patient evaluation. Henderson's model is the most commonly used model; however, there is a tendency to complete or replace the Henderson model with other nursing models [18]. In our school, the theory and practical course in the patient assessment, one credit, is taught mainly on Gordon's health patterns and Bates' physical exam in the first term of the academic year. Therefore, in the current study, PAF was basically developed according to Gordon's nursing model, and then adjusted according to our cultural context, theoretical and clinical educational environments available at the school.

5. Conclusion

The PAF can help students in decision making of nursing diagnoses. Besides, it can help them generate nursing diagnoses based on patient-specific data, and implementation within their program. Thus, the application of the PAF not only facilitates students' learning, but also is proved helpful in nursing process skill and attitude to nursing process.

6. Implications for nursing practice

The PAF based on Gordon's health functional patterns is helpful to gather complete patient information in the first stage of the nursing process, and this information in turn facilitates accurately determining the nursing diagnosis. The form can improve nursing care with structured diagnoses based on scientific evidence and accurate information about the patients.

Acknowledgment

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.ijnss.2019.06.004.

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