



Effects of Problem, Intervention, Evaluation (PIE) Training on the Quality of Nursing Documentation Among Students of Hamadan University of Medical Sciences, Hamadan, Iran

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Abstract

Background: Documentation of nursing care is one of the most important professional responsibilities of nurses and one of the major components of medical care and patient record documentation.

Objectives: The present study was performed to determine the effect of problem, intervention, evaluation (PIE) training on the quality of nursing students' documentation.

Methods: In this semi-experimental single-group study with a pretest-posttest design, a total of 28 nursing students were selected by simple random sampling. The data collection tools included a demographic questionnaire, PIE documentation form, and documentation quality checklist. First, the students were asked to write two reports using the traditional or narrative method. Then, a training workshop was organized about PIE documentation, and the students were asked to use this method and write two more reports about the same patient on two consecutive days; overall, each student presented four reports. A total of 112 reports were analyzed using descriptive statistics and paired *t* test in SPSS.

Results: Based on the results of paired *t* test, there was a significant difference in the mean score of documentation quality between the pretest and posttest ($P < 0.001$). Also, there was a significant difference in the mean score of documentation quality between the pretest and posttest in terms of both report structure and content ($P < 0.001$).

Conclusions: Use of PIE reporting system improves the quality of nursing documentation. Therefore, it can be a suitable alternative for the current narrative or traditional method.

Keywords: Nursing Documentation, Problem-Based Reporting, Nursing Students

1. Background

Nursing documentation is one of the major responsibilities of nurses. Besides establishing an interaction between the medical staff, it is also recognized as an important tool for verifying, assessing, and evaluating medical interventions and an important strategy for protecting the legal rights of patients and nurses (1, 2). An accurate documentation should include information about nursing examinations, patient problems, treatment plan, daily progress of patient, training program, and discharge plan (3).

Nursing documentation is generally divided into

problem-oriented and source-oriented, each with its own advantages and disadvantages. Currently, among various methods of nursing documentation, the narrative or traditional method is the most common source-oriented approach, which is applied by nurses for reporting. In this method, the nurse documents the patient's condition, interventions, and response to interventions descriptively in specific forms (4).

In this regard, the results of a study by Wang et al. showed that in nursing documentation, general and important information of patients, including mental status, pain assessment, and educational needs, is either discarded or partly documented (5). Moreover, the results of

a mixed-method study by Paans et al. on the accuracy and quality of reports showed that the accuracy of documentation in nursing interventions had the lowest score in 95% of reports (6). Also, Ghazanfari and colleagues examined the quality of nursing documentation and concluded that 85% of nurses had a poor reporting performance (7).

Other methods of record keeping include problem-oriented medical recording (POMR). This approach emphasizes on the patient's problem and involves several methods, such as data, action, response (DAR), subjective, objective, assessment, plan (SOAP), and subjective, objective, analysis, plan, intervention, evaluation (SOAPIE) (8). Another problem-oriented method of documentation for nursing reports is problem, intervention, evaluation (PIE), which consists of three major steps.

In the first stage of PIE, the patient's problem is documented based on the North American Nursing Diagnosis Association (NANDA) criteria in the "problem" section, identified by letter P (problem). In the second stage, nursing care in accordance with the nursing diagnosis is documented in the intervention-problem (IP) section, and finally, the patient's reaction to the intervention is documented in the evaluation-problem (EP) section (3).

By using the PIE method, nurses can make sure that their reports encompass the nursing diagnosis, intervention, and evaluation. It is known that integration of the nursing process in documentation increases the accuracy and quality of reports (9). Application of the PIE method can also result in the proper execution of nursing process and improve the nurses' scientific and professional performance. It also increases the students' interest in nursing profession and improves the accuracy of problem-oriented documentation and evaluation of patient response to the nursing intervention. Ultimately, use of PIE can result in the improvement of nursing care and satisfaction with nursing care (10).

Nursing documentation is of great importance from educational, research, and legal aspects and is taken into consideration in the management of healthcare costs and health quality appraisal. On one hand, there is a need for the improvement of healthcare services, and on the other hand, the quality of nursing reports is quite poor (11). Therefore, it is necessary to examine other reporting methods and compare them with the narrative or traditional method of nursing documentation to determine which method can meet our objectives in a more comprehensive, accurate, and logical manner.

2. Objectives

Accordingly, the present study was conducted to determine the effect of PIE training on the quality of nursing students' reporting quality.

3. Methods

In this semi-experimental one-group study with a pretest-posttest design, the sample size was estimated at 28 cases at a dropout rate of 10%, type I error of 5%, and power of 80%, based on a study by Rasulzade et al. (12). The sample size formula was follows (Equation 1):

$$n = \frac{\left(Z_{1-\frac{\alpha}{2}} + Z_{1-\beta}\right)^2 (\alpha_1^2 + \alpha_2^2)}{(\mu_1 - \mu_2)^2} \quad (1)$$

Sampling was carried out randomly among undergraduate students of Hamadan University of Medical Sciences (Hamadan, Iran), who were completing their internship in the pediatric wards of Besat Hospital in Hamadan, Iran. It should be noted that the students had not participated in any PIE training program before the study.

The data collection tools in this study included a demographic questionnaire, PIE documentation form, and quality assessment checklist of nursing documentation, which was designed by the researcher according to the literature (12). The content validity of the data collection tools was confirmed by ten members of the Faculty of Nursing and Midwifery of Hamadan University of Medical Sciences (content validity index, 0.99). After a pilot study, Cronbach's alpha coefficient (0.87) also confirmed the reliability of these instruments.

The checklist for assessing the quality of nursing documentation consists of 21 items. Items 1 - 10 are related to the general description or "structure" of reports, and items 11 - 21 are related to the details or "content" of reports. Items are rated on a four-point Likert scale: no case (0), not observing (score 1), somehow observed (score 2), and completely observed (score 3). Then, the mean quality of narrative documentation (between two reports) and the mean quality of PIE report (between two reports) were determined. Finally, reporting quality was categorized into three levels: Completely desirable with scores > 50 (67% or more), somewhat desirable with scores of 25 - 50 (33% - 66%), and undesirable with scores < 25 (33% or less) (12).

After obtaining the necessary permissions from the Research Deputy and Ethics Committee of Hamadan University of Medical Sciences (code, IR.UMSHA.REC1395.306), the researcher visited Besat Hospital of Hamadan to obtain their approval. The participants were selected via simple random sampling after explaining the study objectives and methods and obtaining informed consents.

The study sample consisted of students who were participating in an internship program in the pediatric wards of Besat Hospital in order to avoid the effects of potential interfering factors in documentation in different sections. Before the intervention and in the first week of internship, the students were asked to write two reports on two consecutive days in a narrative (traditional) manner for one

patient. In the second week of internship, the intervention was held as a PIE documentation workshop, complemented by question and answer (Q & A) and practice.

The content of the program included the importance and principles of reporting, familiarity with different source-oriented and problem-oriented methods, advantages and disadvantages of documentation methods, familiarity with the PIE method, and introduction to the PIE documentation form. Then, the PIE documentation form, consisting of patient assessment and reporting sections, along with the NANDA diagnostic list, was presented to the students. They were asked to write two reports for one patient on two consecutive days in the third week of internship, based on the PIE method.

Finally, four reports were collected from each student, including two reports from the pre-intervention stage and two reports from the post-intervention stage. A total of 112 nursing reports were analyzed using descriptive (frequency distribution, mean, variance, and standard deviation) and inferential (paired *t* test) statistics in SPSS version 16 (SPSS Inc., Chicago, IL).

4. Results

The mean age of the students participating in this study was 22.29 years. The majority of the students were female (71.4%), and 53.6% did not have any work experience.

The analysis of documentation quality showed that the maximum score of report quality was 64.3% before the intervention (somewhat desirable), while the minimum score was 7.1% (completely desirable). After training, the maximum score of nursing documentation quality reached 53.6% (completely desirable), while the minimum score was 0% (undesirable) (Table 1). The results of paired *t* test showed a significant difference in the mean score of general reporting quality before and after training. In addition, a significant difference was found in the mean score of report structure and content before and after training.

The mean quality score of report structure was 16.67 ± 5.73 before the intervention and 25.46 ± 4.51 after the intervention. In addition, the mean quality score of report content was 14.39 ± 5.46 before the intervention and 24.71 ± 3.82 after the intervention (Table 2). Based on the results of paired *t* test, there was a significant difference in the mean quality of report structure before and after the intervention.

5. Discussion

Despite the importance of nursing documentation and multiple applications of nursing reports, studies in

most countries are indicative of the poor performance of nurses in documentation of care records. Similarly, recent research from Iran indicates the poor quality of nursing documentation (13). In this regard, many studies have been carried out to examine the barriers to proper nursing documentation and to provide a solution to improve the quality of nursing reports (14).

One of the strategies for increasing the quality of nursing documentation is the use of problem-oriented reporting methods. In these methods, due to their specific structure and framework, there is no need for over-explaining the sentences. Moreover, it is possible to have a more accurate documentation of nurses' objective and subjective observations and patient's response to care and treatment (8). Nevertheless, among problem-oriented methods for nursing documentation, PIE has been less examined. The framework of this approach is based on the nursing process and involves identifying the patient's problems, recording the interventions, and finally reporting the patient's response to treatment and changes in his/her medical needs (15).

The results of the present study showed that before the intervention, the quality of most nursing reports registered by the students was only somewhat desirable and characterized by multiple errors, especially regarding the nursing process. The results of studies by Rasulzade et al. (12), Jasemi et al. (13), and Nost et al. (16) also confirm this finding. In addition, studies by Sheykhpourkhani and Haghdoost showed that most nurses had poor knowledge about documentation principles (17). Similarly, Jafari Golestan et al. reported that most nursing reports are inaccurate, unclear, and illegible (18).

Based on the results of the present study, PIE training improved the quality of nursing documentation, which is consistent with the findings reported by Rasulzade et al. (12). Nozarpor et al. also reported that problem-based PIE training significantly improved the quality of reports in all areas, including report organization, comprehensiveness, accuracy, timing, and reliability (15). In this regard, Donohoe concluded that problem-based SOAP training led to an increase in the standards of nursing documentation (19).

Hemmati Maslarpak et al. indicated that problem-based documentation training increased the mean scores of nurses' reports (8). Nost et al. (16) and Muller-Staub (20) found that educational interventions, such as problem-based reporting methods, have significant effects on increasing the accuracy and reporting of nurses' diagnoses, interventions, and treatment outcomes and lead to the quality improvement of nursing reports. The results of a study by Abbaszadeh et al. also showed a significant difference in the mean performance score of nurses in documentation between the pretest and posttest (14).

Based on the present results, the quality of nursing

Table 1. Comparison of the Quality of Nursing Documentation Before and After the Intervention

Classification of Documentation Quality Score	Pre-Intervention, No. (%)	Post-Intervention, No. (%)	Paired <i>t</i> Test
Completely desirable	2 (7.1)	15 (53.6)	df = 27; T = -10.503; P < 0.001
Somewhat desirable	18 (64.3)	13 (46.4)	
Undesirable	8 (28.6)	0 (0)	
Total	28 (100)	28 (100)	
Mean ± SD	31.03 ± 10.06	50.17 ± 5.67	

Abbreviation: df, degree of freedom.

Table 2. Comparison of the Documentation Quality of Nursing Students Before and After the Intervention

Classification of Documentation Quality Score	Pre-Intervention, No. (%)	Post-Intervention, No. (%)	Paired <i>t</i> Test
Completely desirable	5 (17.9)	21 (75.0)	df = 27; T = -7.328; P < 0.01
Somewhat desirable	16 (57.1)	13 (25.0)	
Undesirable	7 (25.0)	0 (0)	
Total	28 (100)	28 (100)	
Mean ± SD	16.67 ± 5.73	25.46 ± 4.51	

Abbreviation: df, degree of freedom.

documentation among students was not desirable before the intervention, either in terms of structure or content, which is in line with the results reported by Rasulzade et al. (12). Mohammad Ghasaby and Masudi Alavi also concluded that the quality of nursing reports was low in terms of content and acceptable in terms of structure (21). These findings are similar to the present study regarding the report content and inconsistent regarding the report structure. The reason for the lack of consistency in the report structure can be differences between the studied groups.

Furthermore, Padilha et al. showed that the quality of report content was undesirable, and most nurses did not adhere to the principles of reporting; also, in terms of structure, there were some cases of incomplete reports or lack of documentation (22). Farzi et al. showed that the highest mean score of nursing documentation was related to medication treatment documentation, and the lowest score was recorded for the interventions. They also concluded that the reporting status of acute cases and nursing interventions, as one of the most important principles of nursing documentation, is not desirable and that nurses are mostly concerned with issues, such as documentation of medication management, since such errors are quickly detected (23).

The results of paired *t* test showed that the quality of nursing documentation, both in terms of content and structure, increased after the intervention, which illustrates the effect of PIE method on the quality of report content and structure; these findings are consistent with the results reported by Rasulzade et al. (12). Also, Khoddam

et al. showed that before training, the content and structure of most reports were poor, especially regarding the patient's general condition, food intake and excretion, sleep and rest, follow-up, and subclinical findings. In most cases, reports either discarded or partially documented the time and date or did not include the name, last name, or signature of the reporter. Nevertheless, the mean post-training scores related to the content and structure of nursing documentation increased significantly (24).

5.1. Conclusions

The results of this study showed that before the intervention, documentation quality was not acceptable among nursing students, who used the traditional or narrative method. This could be related to the nurses' prioritization of patient care over documentation and their lack of knowledge about the principles of report writing and its legal consequences. Therefore, attention to documentation training for nursing students seems necessary in universities, as they are the future nurses of the country. In addition, workshops, including the one used in the present study, can improve these problems for nursing students before graduation. Also, the results of the present study and similar research showed that nursing documentation using the problem-based PIE method could improve the quality of nursing documentation. Therefore, this can be an important finding for future studies implementing the PIE system to improve the quality of nursing documentation and to substitute this method with the current traditional narrative method. It should be noted that in the

present study, only the traditional reporting method was compared with PIE; therefore, in future studies, the quality of PIE documentation should be compared with other problem-based methods among nursing students.

5.2. Limitations

Because of the students' relationship and interaction with each other during the study, it was possible for them to have access to PIE documentation information at the time of the study or before participation, which was beyond the researcher's control and is a limitation of this study. Also, it should be noted that only one method was used to investigate the reliability of our research tools, which can be considered another limitation of this study.

Supplementary Material

Supplementary material(s) is available [here](#) [To read supplementary materials, please refer to the journal website and open PDF/HTML].

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Footnotes

Conflict of Interests: No conflicts of interest were reported by the authors.

Ethical Considerations: IR.UMSHA.REC

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