



Development and Psychometric Testing of an Instrument to Assess the Role of Working While Studying

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Abstract

Background: A large number of nursing students work while studying to gain clinical experience, but there is not a standard tool to evaluate the clinical competence areas affected by working while studying.

Objectives: The current study aimed at explaining the role of clinical work while studying in the clinical competence of novice nurses and the development of a valid and reliable instrument to measure it.

Methods: The current study employed an exploratory sequential mixed method design in two steps. First, qualitative research was conducted using conventional content analysis on 45 participants. The semi-structured, in-depth interviews (nurses, head nurses, and nurse managers) were performed, and data were analyzed using the eight steps of Elo and Kyngas. Second, based on the categories extracted from the first phase of the study and review of literature, 215 items were designed and analyzed in a methodological process.

Results: The results of the first phase consisted of three themes, including task rearing role, personality rearing role, and knowledge rearing role. Exploratory factor analysis leads to the formation of three factors: professional abilities with 18 items, individual abilities with seven items, and scientific and educational abilities with six items. Calculating Cronbach's alpha coefficient confirmed high internal consistency in the scale (0.94).

Conclusions: This tool could be used in teaching hospitals to evaluate the situation of working while studying in hospitals at different levels. With this tool, nursing managers can optimize educational environments and plan the workshops and training courses for nurses working in the departments in order to strengthen the qualifications of nursing students while working and graduating.

Keywords: Clinical Activity, Clinical Competence, Instrumentation, Nurses, Nursing Education, Psychometric, Reliability and Validity

1. Background

Many nursing students are engaged in full-time clinical education (1, 2). Statistics show that 50% to 60% of students in Asian countries are doing student work (3). Based on the results of various studies, factors such as financial motivation, personal satisfaction, increased experience, increased probability of employment after graduation, and acquaintance with new friends motivate the students to work while studying (4). Studies suggest that working patterns and their effects on students vary in professions such as nursing. In fact, some factors motivate students to work while studying. Students believe that work experience is useful for their future success. Based on var-

ious studies, student work can have benefits such as increased self-confidence, improved skill, and understanding of real work problems (1, 2).

In addition to the income, this experience can affect the socialization, values, attitudes, and behavior of students. Reports indicate that working while studying can have positive and negative effects on the learning and experiences of students, and how they can enter the clinic after graduation, get adapted to the work environment, and acquire clinical competencies (1, 5, 6). Nowadays, students show a higher tendency toward increasing their experiences. However, working while studying affects their educational achievement; therefore, many students report the adverse effects of working while studying, such as missing

the classes and being absent from lectures (5). Despite the numerous studies conducted to explore the factors affecting the socialization of nursing students, the study of the consequences of acquiring work experience during the education for the professional development of nursing students is underestimated (3), and there is no law to prevent the work of nursing students during education (1).

Various studies show that one of the factors influencing the clinical competence of nurses is the possession of work experience (7). But, the question remains whether, despite all the negative consequences of work while studying (3), student experience can play a role in the clinical competence of novice nurses. On the other hand, due to the shortage of nursing workforce in the hospitals in Iran and the urgent need for nurses, one of the new policies of the Ministry of Health, Treatment, and Medical Education is to use the nursing student services as student work (5).

There is not much literature and research on working while studying in Iran and, despite the employment of a large number of students in the clinics, there is still no proper tool to determine the extent of the role of working while studying in their clinical qualifications after graduation. The review of various studies shows that several instruments are used to assess clinical competence, but none of them examines the role of a specific factor in clinical competencies. Meretoja et al. (8), identified the importance of an instrument to assess clinical competence and emphasized that the lack of psychometrically-validated information creates problems for nursing managers and clinical nurses that cannot benefit from competence-related research. They designed an instrument to assess the nurse competence level. It included 73 items in seven valid and reliable categories (8). The six dimension scale of performance is also an instrument used to assess the competence including 52 items and six categories (9).

Some instruments are also designed to assess the clinical competence of nursing students. Liou and Cheng (10) conducted a study to design and psychometrically validate the nursing student clinical competence questionnaire in Taiwan and designed the initial version using the Benner novice to the expert model. After completing the psychometric stages, the final version of the instrument with 46 items and four domains, including professional behaviors in nursing, overall practice skills, core nursing skills, and advanced nursing skills, was introduced. The researchers interviewed clinical instructors to complete the items obtained from literature reviews and did not merely use the student experiences (10).

Most of the studies are quantitative and do not examine the impact of student work on academic achievements.

There is a need to design a valid and reliable tool to investigate this issue; therefore, it can be used to assess the current status of working while studying and its existing deficiencies to take steps to improve the conditions.

Since the subject of clinical work while studying has a variety of psychological, economic, social, cultural, and professional aspects, the quantitative or qualitative measurement alone cannot comprehend such dimensions in depth. In fact, the role of working while studying in clinical competence cannot be investigated only by quantitative research since this phenomenon is multidimensional and has different external and internal impacts. To explain the issue that is somehow associated with human interactions, quantitative studies do not have the required flexibility and depth (11). Therefore, there is a need for a qualitative investigation to examine the nurses' views and experiences in order to understand the role of working while studying in the clinical competence of novice nurses. There was a need for an integrative study; first, using a deep qualitative investigation, the nurses' experiences, and the role of working while studying in the clinical competence of novice nurses had to be defined and the phrases of the desired tool extracted. A quantitative investigation on the psychometrics of the designed tool should be performed after completion of the bank of the items with a review of the texts. It can be used to improve the status of the work using a valid and reliable tool and upgrade the clinical competence of novice nurses, which could be one of its consequences. Therefore, an integrative study was designed to answer the following question: What is the role of clinical work while studying in the competence of novice nurses, and how can it be measured?

2. Objectives

The current integrative study aimed at explaining the role of clinical work while studying in the clinical competencies of novice nurses and designing a valid and reliable tool in this field.

3. Methods

In the current study, an exploratory sequential mixed method design was applied. First, the researcher employed a qualitative approach with the content analysis method and the inductive approach of Elo and Kyngas (12) to identify the categories and structures related to the subject of the study and extend the relationships between them. Then he analyzed the concept with some

contributors since it was assumed that the role of clinical work while studying in the clinical competencies of novice nurses was not fully understood yet. Then, using the findings of the qualitative section and other texts and resources, the items of the tool were extracted to examine the role of clinical work while studying in the clinical competence of nurses.

3.1. Phase One: Qualitative Study

The first phase aimed at explaining the perception of nurses of the role of clinical work while studying in the clinical competencies of novice nurses. The research population included all nurses, head nurses, and nursing managers working in teaching hospitals affiliated to Hormozgan University of Medical Sciences and other medical universities in Iran. The study site included hospitals, homes of participants, and green space.

The inclusion criteria were willingness to participate in the study, having at least a bachelor's degree in the nursing field, employment in one of the hospitals affiliated to the university, and having at least one year of work experience. The exclusion criteria were unwillingness to participate in the study at any stage and moving to other cities. The purposeful sampling method was used in the study. The participants were selected among the male and female nurses. Then, given the objectives of the quantitative investigation, in order to ensure the applicability of the valid and reliable instrument in other university hospitals, several head nurses and nursing managers working in the hospitals affiliated to different universities were also selected and interviewed. The universities included Shahid Beheshti, Mashhad, Bushehr, Tehran, Hamedan, Yasuj, and Kermanshah Medical Sciences universities. The selection of the participants with the highest diversity in order to obtain comprehensive information resulted in gaining a better understanding of the nature and dimensions of the phenomenon. The data collection continued without restriction in participation until reaching the data saturation. Finally, in-depth, face-to-face, semi-structured interviews were performed with 38 participants working in teaching hospitals affiliated to Hormozgan University of Medical Sciences and seven staff working in teaching hospitals affiliated to other medical sciences universities. This phase of the study was completed after interviewing with 45 participants. The interview guideline pursued in the interviews. It was a set of multiple-choice, open-ended questions designed based on the research objectives, opinions of professors, and the results of the first five interviews. It was reviewed with each interview if needed. The simultaneous recording and analysis of the interviews helped the

researcher revise and reform the interview guideline. During the interviews, some questions irrelevant to the interview guideline were asked, but the utilization of the guideline allowed the researcher to have more control over the content of the interview and its duration. The researcher referred to four participants for further exploration and re-interviewed them because of ambiguity in their statements or a defect in the information. The subjects were asked to specify the desired time and place of the interview. Most of the interviews were performed in the instructors' room and staff room in hospitals, and the rest were performed in homes of participants or green space. The interviews were performed before the work shift, after the work shift, and in most cases, outside the work schedule.

The purposeful sampling was performed in the current study with maximum diversity. Participants were selected among the male and female nurses and interviewed individually in a profound, face-to-face, and semi-structured manner.

At the beginning of each interview, the participant was asked to provide a brief description of their age, level of education, position, work experience, and workplace. Then, some open-ended questions were asked. Then, the questions on the desired concept were asked, and their views on the role of clinical work while studying in the clinical competence of the novice nurses were obtained under the interviewer guidance. They discussed up to the stage where the interviewer ensured that they understood the desired concepts. At first, the necessary permissions were obtained from the University and the Ethics Committee.

Before the interview, the reasons for recording the interview, voluntary nature of participation, and confidentiality of the information and identity of the interviewee were explained, and then permission for recording the voice, as well as the written consent for participation in the study, was obtained from the participant.

The semi-structured interview form with open-ended questions to guide the interview, including two sets of questions was developed. The first set consisted of the basic questions of the interview, and the second set had the follow-up questions. Each interview had open-ended questions, such as "what departments have you worked, have you had a student work, have you seen working students, and how is the student work in the hospital?" The main questions included "what are your experiences with the consequences of the student work and what memories do you have in your mind on the student work?" The follow-up questions included "can you explain more or what do you mean when you say...?" These questions were used to provide further explanations by the participant.

The follow-up questions were asked to clarify the concept based on the information provided by the participant. The interviews lasted about five months and continued until the data saturation. The duration of each interview was 40 - 90 minutes, depending on the response rate of the participants. All interviews were performed by one person and continued until achieving sufficient and in-depth data. The conversations were recorded with the permission of the participants using an MP3 recorder and immediately transcribed after the interview on the same day, and after listening several times, they were copied to provide the necessary feedback for the next interviews and data sufficiency. The transcriptions were re-matched to the recorded conversations, and keywords and related codes were extracted from the texts and analyzed. Content analysis was used to analyze the qualitative data derived from the semi-structured interviews. The qualitative data were analyzed simultaneously with the data collection and in accordance with qualitative data analysis and the Elo and Kyngas (12) inductive approach in the stages of the unit of analysis selection, making a general sense of the data, open coding, data entry into coding sheets, grouping, classification, and abstraction. The unit of analysis in the current study included parts of the transcripts of the interviews related to the research question. After selecting the units of analysis, the data analysis began by repeatedly reading the text to find a general sense. In the open coding stage, basic ideas were extracted from the textual data and listed. All codes that could be relevant to the objective of the research were noted at the margin of the text, following reading each text verbatim and line-by-line and pausing sufficiently on the data obtained from the interview. After the initial note-taking, the researcher re-listened to the recorded interviews and took notes on the probably neglected points and reviewed the manuscript several times. This process continued until the extraction of the codes and assigning them to the relevant classes (13). In the qualitative content analysis, coding can be related to explicit or implicit content (14). For the initial coding, participants' words and implicit codes (researchers' understanding of what stated) were used. The units of the analysis were written as compact units, and the meaning units were extracted from them. Then, by eliminating the redundancies, the meaning units were coded. The data analysis was performed simultaneously and continuously with the data collection.

After encoding, the similar codes were merged into one class over several times of rereading. The set of extracted codes was classified according to the initial codes, based on their differences or similarities, and after the ex-

planation of the tag, the codes were classified as subclasses. More specific tags were used to categorize the data. Named classes and subclasses were categorized under the main classes, and then the themes were identified. By abstracting concepts, in order to describe the phenomenon under study, a comprehensive definition of "the role of clinical work while studying in the clinical competence of novice nurses" was presented. Finally, for each concept, evidence of the data was quoted.

To confirm the validity and accuracy of the research in the qualitative phase of the study, four criteria given by Lincoln and Guba, including credibility, dependability, confirmability, and transferability were investigated. Increasing the number of interviews was the first step that the researcher took to increase the credibility of the data. After conducting interviews and initial coding, the study findings were presented to the participants, and they expressed their views on coordinating the findings with their experiences to the researcher and evaluating their validity. To ensure dependability, a number of qualitative research expert colleagues were also asked to examine the texts in order to assess the authenticity of the analysis process. Other activities contributing to dependability during the course of the research included guiding the research based on the research plan and recording the participant statements and transcribing them. The researcher's interest in the study subject, continuous engagement with the data, and the review of supervisors and qualitative research specialists were other factors of confirmability. In the research, to increase the data transferability at sampling time, the purposeful sampling method was used, and the interviews with different participants were made with a maximum variation, and direct quotes and examples were presented.

3.2. Phase 2: Quantitative Study

The quantitative study aimed at determining the items and psychometrics of the tool "investigating the role of clinical work while studying in the clinical competence of novice nurses". The research population included all nurses, head nurses, and nursing managers working in the teaching hospitals affiliated to Hormozgan University of Medical Sciences. The study site included all hospitals affiliated to Hormozgan University of Medical Sciences. At this stage, the design and psychometrics of the tool were carried out, according to the methodological studies in the following seven steps (13):

3.3. Step 1: Defining the Role of Clinical Work While Studying in Clinical Competence of the Novice Nurses

First, the role of clinical work while studying in clinical competencies of the novice nurses was defined based on the information obtained from the qualitative study and the opinions of the nurses, head nurses, and nursing managers.

3.4. Step 2: Identifying the Items of the Instrument Investigating the Role of Clinical Work While Studying In Clinical Competence of the Novice Nurses

First, the instrument items were identified based on the analysis of the opinions of the nurses, head nurses, and nursing managers. It should be noted that the dominant approach in formulating the items was the inductive approach and the results of the qualitative research. In addition to the qualitative findings for full content coverage, texts were also used to produce the items. The instrument items were formulated according to the themes, classes, and texts, and a deductive-inductive approach was used to develop the instrument. For this purpose, an extensive literature review was performed using the Persian keywords such as clinical competence, clinical work, instrument, and novice nurses in Iranian databases such as Academic Jihad Database, Iranian Journal of Medical Sciences Database, Specialized Medical Articles Database, Iranian Journals Database, and Information Science and Technology Research Institute, and using the keywords of clinical competence, clinical work, instrument, and novice nurse in international databases such as Proquest, CINAHL, Pubmed, Google Scholar, and Scopus.

The objective of the current study was to find items that might not have been extracted in qualitative research. To include the items extracted from the literature into the classes formed in the qualitative study and fit these two classes, the items extracted from the literature were provided to five nurses not being interviewed. According to these people, a number of the items were excluded considering the overlap with other concepts, and other items were included in the qualitative study classes, and no new class was added. After defining the role of the clinical work while studying in the clinical competence of the novice nurses and identifying the instrument items, the information collected during the sessions was reviewed by the research team. Some items were merged or deleted, and some were modified. Accordingly, the initial instrument investigating the role of the clinical work while studying in the clinical competence of the novice nurse was designed with 79 items scored based on a five-point Likert scale, and its psychometric properties were determined.

3.5. Step 3: Determining the Face Validity of the Instrument

Two qualitative and quantitative methods were used to determine the face validity. In the face validity of the qualitative method, a total of 10 nurses, head nurses, and nursing managers and five experts evaluated the instrument in terms of fitness and relevance of the items to the dimensions of the instrument and the presence of words reflecting the desired concept, simplicity, fluency, and comprehension of the items. The experts included the professors skillful in the instrumentation and qualitative research in nursing, midwifery, health education, epidemiology, and health care management fields. The quantitative method for analyzing the item impact was used to determine the importance of each item and eliminate the less-important items. Accordingly, items of the instrument were scored based on a five-point Likert scale (quite important, relatively important, important, moderately important, slightly important, and not important at all). Then, 10 nurses, head nurses, and nursing managers examined the items based on their experiences and identified the importance of each item based on the designed Likert scale. In the item impact method, if the impact score of each item was equal to or greater than 1.5, the item was retained.

3.6. Step 4: Determining the Content Validity of the Instrument

Quantitative and qualitative methods were used to determine the content validity of the instrument. In the qualitative method, the instrument was placed at the disposal of 10 experts and they were asked to leave comments on the content coverage, grammar compliance, the use of appropriate phrases, and appropriate placement of the items in each dimension. The content validity ratio (CVR) and content validity index (CVI) were used to evaluate the content validity quantitatively. In order to determine CVR, 12 experts were asked to score each item based on a three-point Likert scale (necessary, useful but not necessary, not necessary). According to the Lawshe table, the minimum CVI value of items with CVR higher than 0.56 (according to the evaluation of 12 experts) was considered significant and the items were retained. The Waltz and Bausell method was employed to assess CVI. For this purpose, the instrument was placed at the disposal of 20 experts, and they were asked to determine the relevance, clarity, and fluency of each item in the instrument based on the Waltz and Bausell CVI with a score of 1 to 4. In this method, items scored higher than 0.79 are appropriate, items scored 0.70 - 0.79 need to be modified, and the ones scored lower than 0.70, are unacceptable. In this step, the necessary changes (the item deletion or the item review) were applied. Then, the mean CVI was estimated based on the mean CVI scores

of all items of the instrument. A score of 0.90 and above is considered as accepted CVI (13).

3.7. Step 5: Determining the Construct Validity of the Instrument

In the present study, exploratory factor analysis was employed to determine the construct validity of the instrument. The sample size in this step was 200 subjects (five times greater than the number of the items). In this section, the samples, including nurses, head nurses, and nursing managers of the hospitals affiliated to Hormozgan University of Medical Sciences, were selected through stratified random sampling and completed the questionnaire after signing the written consent form.

3.8. Step 6: Determining the Instrument Reliability (the Type of Internal Consistency)

Since the instrument was designed based on the Likert scale and included the sum of the scores of the items, it was necessary to evaluate it in terms of internal consistency. In the present study, the internal consistency was investigated by calculating Cronbach's alpha coefficient. For this purpose, the reliability of the data of 200 subjects that completed the questionnaire was assessed twice, before and after the exploratory factor analysis.

3.9. Step 7: Determining the Reliability of the Instrument (the Type of Stability)

In order to determine the stability type of the instrument reliability, the test-retest method with a two-week interval was employed, and the scores obtained in the two tests were compared using the intra-cluster correlation test. For this purpose, 20 nurses completed the final questionnaire twice with a two-week interval, and the reliability of the instrument was determined by calculating the intra-cluster correlation between the two tests.

4. Results

4.1. Phase 1: Findings of the Qualitative Study

Totally, 45 nurses, head nurses, and supervisors participated in the study, most of them were female (66.7%). The age range of the study participants was 23 to 40 years, with a mean of 29.77 ± 5.02 . Their work experience ranged from 1 to 18 years and their average work experience was 6.57 ± 4.79 . After analyzing 45 interviews, 1450 initial codes were extracted; after several revisions, and reduction, deletion, and merging in different stages, the number of codes was reduced to 1225. The codes associated with the research objectives were finally subdivided into 18 subclasses, seven

classes, and three themes with the titles of the role of task rearing, the role of personality rearing, and the role of knowledge rearing.

After analyzing the data, the role of clinical work while studying in the clinical competence of novice nurses was defined as clinical experience during the education can improve personality traits, sense of responsibility, self-efficacy, socialization, managerial abilities, and develop critical thinking in communication processes and strengthen the personality of the novice nurse. This phenomenon contributes to the development of knowledge by improving learning and increasing scientific information of nurses and also plays the role of knowledge rearing by increasing the ability to recognize the educational needs and improve the performance of teaching to the patient. Also, considering its role in improving care and professional performance, increasing job accuracy, reducing the incidence of nursing errors, increasing awareness of professional issues, and increasing efficiency, it has some functional and conclusive effects, and by improving the views of nurses on professionalism and enhancing their success in the future, it can foster the efficiency of the duties of the novice nurses. The quotations from the participants that led to the formation of the classes were as follows:

4.1.1. The Theme of "the Role of Task Rearing"

Nurses believe that work experience while studying can improve the performance and duties of novice nurses. Since nurse performance is very extensive and involves all aspects of patient care, the clinical experience can affect all of such aspects, including performance and professional roles.

"Certainly, a nurse with student work is more professional. He is more accurate, has fewer errors, and the quality of his work is higher because once he worked in the department, his problems were fixed and got a lot of experience" (participant 11).

"Student work improves the permanent work of nurses. It enhances their experience and self-confidence and can encourage them to learn more. It makes them successful in the future" (participant 31).

4.1.2. The Theme of "the Role of Personality Rearing"

According to nurses, work experience in clinical settings during student life can contribute to the development of personality and strengthen personal characteristics and communication skills.

"It has an effect on the personality and self-confidence of the students. Possession of experience in different prac-

tices gives the individual more self-confidence, and he is not embarrassed by his amateur practices and insufficient knowledge. A stronger personality is formed in the individual" (participant 27).

"Student work makes them familiar with the workplace. It helps them know how to work in different situations and how to treat the staff and patients and see how nurses cooperate when there is a shortage of staff" (participant 22).

4.1.3. The Theme of "the Role of Knowledge Rearing"

According to the nurses participating in the current research, working while studying affects the performance of novice nurses both in acquisition and conveyance of knowledge.

"Student work makes them skilled since during student life, in addition to the internship, they encounter a variety of things, enhance their information, gain more experience, and improve their learning" (participant 13).

"Nurses with a student work experience teach the patients better than the ones without such an experience. They know patient problems and their educational needs, and how to provide training for them. They know what to train and when to train; therefore, the quality of their training is higher" (participant 22).

4.2. Phase 2: Findings on the Design and Psychometrics of the Tool

In this phase of the research, a questionnaire entitled "investigating the role of clinical work while studying in the clinical competence of novice nurses" was designed and validated psychometrically. To design this tool, using a qualitative data collection tool and review of the literature, some proper items were developed that covered each aspect of the concept of the role of clinical work while studying in the clinical competence of novice nurses. Hence, 185 items were extracted from the findings of the qualitative study, and reviewing the texts and articles also added 30 items to this number and finally, the initial tool was designed with 215 items. Some items were merged or deleted, and some were changed. In this way, the original tool was designed with 79 items scored based on a five-point Likert scale. Then, its psychometric properties were determined.

After completing the formal and content validity, the items of the questionnaire were reduced to 39. For determining the structure validity, the heuristic factor analysis was performed on 39 items that remained from the previous stages. In this section, the study subjects included 200 nurses and nursing managers of the hospitals affiliated to

Hormozgan University of Medical Sciences. They were selected using a stratified random sampling method. Most of the participants were female (58.5%), married (53.5%), and had a bachelor's degree (93.5%). Most of them had a contractual employment status (42.5%) and had no history of student work (53%). The mean age of the participants in the study was 31.16 ± 5.70 years; 30.99 ± 5.32 in males and 31.28 ± 5.97 in females. Their average work experience was 7.38 ± 5.53 years; 7.10 ± 5.34 in males and 7.59 ± 5.67 in females. The work position of the participants was as follows: matron (2%), supervisor (5.5%), head nurse (8%), and nurse (84.5%). Their workplace included Shahid Mohammadi Hospital (45%), Pediatric Hospital (22.5%), Dr. Shariati Hospital (20%), and Ibn-Sina Hospital (12.5%).

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Before performing the heuristic factor analysis, the internal consistency of the tool was investigated using Cronbach's alpha coefficient. The reliability of the tool at this time was 0.95, which was acceptable. For heuristic factor analysis, after collecting and transferring the data into SPSS software version 16, the Kaiser-Meyer-Olkin sampling adequacy index test was used and, with an acceptable rate of 0.851, the factor analysis was performed based on the correlation matrix. Then, to ensure that the correlation matrix, as the basis of the factor analysis in the population, was not zero, the Bartlett spherical test was used. The result of the test was significant at an error level of less than 0.001. The main component analysis with varimax rotation was used for the heuristic factor analysis. In order to determine the number of main factors of the questionnaire, the study employed three special value indices and a gravel diagram and determined the share of each factor to explain the sum of the variance of the total items. The turning point of 0.5 was considered as the minimum factor load needed to maintain each expression in the fac-

tors extracted from the heuristic factor analysis. In [Table 1](#), the specific values, the percentage of variance, and the percentage of aggregated variance obtained from the data set are indicated by each factor. In the questionnaire “investigating the role of clinical work while studying in the clinical competence of novice nurses”, among 39 items evaluated for structural validity, 31 items remained.

The data in [Table 2](#) show that in the questionnaire on the role of clinical work while studying in the clinical competence of nurses, three factors had values above 2. Other factors with a specific value of less than 2 were deleted. In sum, all three factors with special values higher than 2 could explain 57.71% of the variance of 31 items in the questionnaire. Regarding the interpretability of the items, after the six-item displacement conducted by the research group, based on the degree of variance and the opinion of statisticians, the items were distributed into three factors.

[Table 1](#) shows the correlation matrix between the items and the factors of the questionnaire “investigating the role of clinical work while studying in the clinical competence of novice nurses” after rotation. According to this table and based on the largest factor load of each item, the researcher categorized the items according to the degree of correlation with each other and the existing theoretical knowledge. In this respect, the 31 items of the questionnaire that remained at this stage were arranged in three domains of professional capabilities (18 items), personal capabilities (seven items), and scientific and educational capabilities (six items).

In the current research, two methods were employed to determine internal consistency and stability to assess the reliability of the tool. To measure the internal consistency, Cronbach's alpha was calculated; and with regard to the obtained value of 0.94, no expression was deleted at this stage. To assess the reliability and stability of the tool, a two-week interval test-retest was performed ([Table 3](#)). The intra-cluster correlation index of the tool was 0.99 showing a significant agreement between the first and second test scores confirming the repeatability of the sub-scales and the total questionnaire and indicating a high degree of stability in the tool. After completing the psychometric stages, the final tool with three dimensions and 31 items scored based on a Likert scale was prepared. The first domain with 18 items entitled professional capabilities. The second domain, entitled personal capabilities, had seven items, and the third domain, entitled scientific and educational capabilities, had six items. The five-point Likert scale was designed from it completely decreases to it completely increases to score the items. The overall score of the entire tool ranged from 0 to 124.

5. Discussion

The results of the qualitative phase of the current study showed that getting clinical experience during education could have a role in the clinical competence of novice nurses in terms of functional, career, self-development, communication, knowledge acquisition, and knowledge presentation, and on starting the work in the real clinical setting, it has some positive effects on their qualifications as nurses. These roles were categorized into three themes, including the role of task rearing, personality rearing, and knowledge rearing.

Nurses participating in the current study believed that the clinical experience could improve the performance of novice nurses. Phillips et al. (4), also showed that enhancing the level of clinical experiences, and increasing the hours of attendance at the clinical setting during the education, especially in nursing education programs, lead to developed decision-making skills and professionalization of personal performance and teamwork experience in the real environment.

The results were also consistent with those of the other studies indicating that the students doing clinical work and working in the hospitals are better prepared to play their real roles, and their self-confidence, knowledge, and skills are improved. The study findings showed that increasing the clinical experience helps nurses to become more familiar with their health institutions; therefore, they can well apply their experiences to work settings (6). According to Phillips et al. (4), clinical work experience can help nurses become more familiar with the workplace, and it can be helpful in the socialization of the people with the health institutions; therefore, the process of transferring the experience and knowledge is facilitated. Hasson et al.(1), also claimed that the experience of clinical work while studying can be transferred to nursing practice. Student work can affect the educational experiences of students, identity development, acquisition of values, behaviors, and attitudes, and may change the learning needs. Student work can affect the development of personal and professional skills, improve communication skills, and enhance self-confidence in students. Nurses face difficulties in providing care at the beginning of their work, and sometimes, they get shocked by reality. Leaving novice nurses without supporting them and lack of orientation programs are the major problems in clinical settings. Novice nurses in the clinic often deviate from professional standards and commit errors, which finally leads to malfunction (6). Studies suggested that novice nurses are not adequately prepared for facing clinical challenges and that the undergraduate curriculum cannot well pre-

Table 1. The Values of Factor Loads in the Three Factors Obtained After the Varimax Rotation in the Tool

Item	First Number	Item	Factor		
			Professional Capabilities	Individual Capabilities	Scientific and Educational Capabilities
1	58	Correct completion of patients' files	0.81		
2	63	Ability to correctly manage the department	0.80		
3	64	Ability to communicate with patients, families, and other members of the treatment team	0.78		
4	57	Correctly performing the process of patient admission and discharge	0.76		
5	52	Fixing physiological needs of patients	0.75		
6	68	Being precise during the change of departments	0.75		
7	51	Appropriate caring for patients	0.74		
8	56	Report writing skills	0.74		
9	69	The ability to attract the confidence of departments, colleagues, and patients	0.73		
10	53	Promoting patients' participation in self-care	0.72		
11	48	Careful examination of patients and identification of problems	0.69		
12	49	Careful monitoring of patients' problems	0.69		
13	50	Prevention of complications in patients	0.68		
14	59	Ability to implement the nursing process	0.59		
15	14	Ability to perform new clinical interventions in the work environment	0.57		
16	19	Compatibility with professional problems	0.46		
17	30	Trying to get patients' satisfaction	0.45		
18	13	Mastery in nursing activities	0.44		
19	8	Speed of action in clinical practice		0.80	
20	23	Self-confidence in getting started		0.79	
21	4	Trying to learn and get professional experiences		0.75	
22	18	Sense of responsibility and work conscience		0.63	
23	11	Ability to prioritize tasks		0.63	
24	22	Independence in doing the task		0.61	
25	9	Being accurate in performing tasks		0.59	
26	2	Possession of updated specialized nursing information			0.82
27	3	Having a scientific perspective on patients' problems			0.77
28	1	Level of specialized nursing information			0.73
29	31	The motivation to train patients			0.55
30	37	Ability to train patients			0.55
31	36	Identification of the educational needs of patients			0.47

pare the students for working independently (5). Hartigan et al. (15), reported 44 challenging events for novice nurses. They identified the competencies required to manage these challenges, including patient assessment skills, technical and functional skills, clinical decision-making, and interactions, and communication. The results of their study revealed that work experience while studying can

prepare recently-graduated nurses for facing these challenges. During their student work, they can gain competencies to improve their practice at the beginning of their work. Wangenstein et al. (7), also showed that clinical work experience in novice nurses can be a predictive and significant factor in the clinical competence of the nurses. Competency is vital for nurses to provide care for patients,

Table 2. The Contribution of Each Factor in Explaining the Total Variance of All the Items of the Questionnaire

Component	First Number	Initial Eigenvalue			Extraction Sum of Squared Loadings			Rotation Sum of Squared Loadings		
		Total	Percentage of Variance	Cumulative, %	Total	Percentage of Variance	Cumulative, %	Total	Percentage of Variance	Cumulative, %
1	1	11.72	37.81	37.81	11.72	37.81	37.81	9.13	29.45	29.45
2	2	3.99	12.87	50.69	3.99	12.87	50.69	4.59	14.83	44.28
3	3	2.17	7.02	57.71	2.17	7.02	57.71	4.16	13.42	57.71
4	4	1.82	5.88	63.59						
5	8	1.11	3.60	67.20						
6	9	0.97	3.14	70.35						

Table 3. The Results of Internal Consistency and Stability of Subscales and the Whole Questionnaire^a

Domain	Item	Cronbach's Alpha Coefficient	Intra-Cluster Correlation Index
Professional capabilities	18 (1-18)	0.93	0.98
Personal capabilities	7 (19-25)	0.84	0.98
Scientific and educational capabilities	6 (26-31)	0.81	0.95
The whole tool	31 (1-31)	0.94	0.99

^aValues are expressed as No. (%).

and nursing competence has a direct and significant effect on the health and safety of all patients. Lack of nursing competence causes serious nursing errors and has severe consequences for patients. Hence, clinical practice and competencies of novice nurses are crucial for both the providers and recipients of the nursing services, and it is essential for nurses to provide high-quality care for patients and cooperate with other staff in decision-making (16).

Researchers showed that there is a high emphasis on the overall technical skills in the current nursing training programs, and lack of these skills leaves the graduated nurses not adequately prepared for the real clinical settings. However, despite all these arguments, it cannot be stated that the novice nurses have no competence, and experienced nurses should not expect independent performance from them. The results of the current study showed that student work can prepare students for nursing practice in real conditions from different aspects in order to provide safe care for patients. Despite the importance of clinical competence in providing high-quality and safe care for patients, it is vital to pay attention to the environment and conditions of student work and experiences gained by them. The way of treating the students has a significant impact on nurses' competence and influences

their level of preparedness to enter the real settings.

The tool provided in the quantitative phase of the current study evaluates the role of working while studying in the clinical competence of novice nurses using 31 items in three domains, including professional capabilities, academic and educational capabilities, and personal capabilities. In fact, these three domains are some aspects of clinical competence, which the student work has more effects on them after graduation. In nursing articles, two tools are most commonly used to assess the competency of nurses. The first one was designed in response to this need by Mero-tja et al. (8), to measure nursing competence. The nursing competence assessment tool can be used for the self-assessment of nurses' competencies or be employed by nursing managers to assess the competency of staff. The nurse competence scale uses the beginner-to-expert model of Banner as a theoretical basis to determine the items of the tool. The nurse competency tool consists of 73 items in seven classes and is completely valid and reliable (8). The tool provided in the current study also covers different dimensions of clinical competence and places all these seven dimensions in two domains of professional capabilities and academic and educational capabilities and measures the role of working while studying. In addition, the role of work in the personal capabilities of novice nurses was not neglected. The second tool for the measurement of competence is the six-dimensional scale of nursing performance. It consists of 52 items categorized into six classes. The six-dimensional nursing performance scale can be used for self-assessment and assessment of personnel by the nursing managers based on the tool items. The six-dimensional scale is quite a valid and reliable tool (9). The dimensions of this tool fall somewhat into the two domains of professional capabilities and scientific and educational capabilities of the tool designed in the present study.

Some instruments are also designed to assess the clinical competence of nursing students. Liou and Cheng (10) conducted a study to design and psychometrically validate the clinical competence questionnaire for nursing students in Taiwan and developed the initial questionnaire

using the Benner novice to an expert model. The final instrument was designed with 46 items and four domains, including professional behaviors in nursing, general practice skills, core nursing skills, and advanced nursing skills (10).

The researchers interviewed clinical instructors to complete the items derived from the literature and did not use the student experiences. In the current study, the researcher tried to interview all those who were aware of the novice nurse practice and competencies and evaluated the experiences of nurses, head nurses, and nursing managers.

Employment of the tool “investigating the role of working while studying in the clinical competence of novice nurses” can assess the work status of nursing students and examine its strengths and weaknesses in different hospitals with different facilities and academic levels. The dimensions requiring intervention and promotion can be determined. Nursing students can be used optimally during shifts, so that the lack of force is eliminated following working with incompetent students, without exerting high pressure on nurses in departments; the clinical competence of nursing students is ungraded as they work in hospitals as future nurses. In this way, they can have better personal, professional, scientific, and educational skills and abilities, get prepared for starting better at departments, and provide safer care for patients.

Student work while studying can affect learning and clinical experiences. In addition to causing stress, it disturbs their social, student, and professional life. This experience can have an impact on students’ socialization and affect their learning, personality, and future career. Thus, educational and health policies should be moderated with the awareness of the potential impact of the student work on the personal and professional development of nursing students and considered as one of the important and effective issues in students’ efficiency. A more coordinated and structured approach to clinical education programs is vital for nursing students. The clinical experiences of nurses participating in the current study highlighted three key aspects of clinical competence that provide the clinical work experience for novice nurses during studying. These three aspects included the roles of task development, personality development, and knowledge development. They can change the clinical competence of novice nurses. The final instrument of the current study also categorized these roles into three domains of the professional capabilities, personal capabilities, and scientific and educational capabilities, and could assess the role of working while studying in the clinical competence of the novice nurses in these three domains. Likert scale scoring employed in this in-

strument can also well assess the role of working while studying on each component and domain. Thus, this instrument can assess the affected points and the intensity of the effects.

5.1. Conclusions

The tool “investigating the role of working while studying in the clinical competence of novice nurses” can be useful to assess the status of student work in educational hospitals. This tool can be employed to evaluate the work status of nursing students in hospitals, examine its strengths and weaknesses in various hospitals with different facilities and levels, and identify areas requiring more attention and promotion. A low score in each domain can indicate the less attention paid to it after acquiring the clinical competence during the studentship. Therefore, educational policies should be focused on improving the conditions to enhance the capabilities of nursing students and, consequently, novice nurses in the future. Thus, the status of student work in each hospital can be assessed annually, and the impact of the reforms can be observed. This tool can be used by the nursing managers to optimize educational environments and plan the workshops and training courses for nurses working in the departments in order to strengthen the qualifications of nursing students working and graduating.

According to the results of the current study and the designed valid and reliable instrument, it is recommended that different medical universities assess the student work and its effects on the clinical competence of their novice nurses. It is also recommended that studies be conducted to explore the effects and results of working while studying the role of recently-graduated nursing students. Future studies can assess the opinions of the working and non-working nursing students or evaluate the experiences of the students working in non-nursing related fields, and investigate the opinions of nurses and ward staff.

The current study had the general limitations of qualitative studies, such as the use of a voice recorder in interviews. By explaining the research objectives and suggesting the possibility of withdrawal from the study at any stage, and emphasizing the confidentiality of the information obtained, the researcher tried to assure the participants of the confidentiality of the information and eliminate this limitation as much as possible.

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

Authors' Contribution: Houman Manouchehri did writing the proposal, analyzing the data, writing the final report, and manuscript. Elham Imani did writing the proposal, gathering the data, analyzing the data, writing the final report, and manuscript. Foroozan Atashzadeh-Shoorideh did writing the proposal, analyzing the data, writing the finale report, and manuscript. Hamid Alavi-Majd did writing the proposal, analyzing the data, writing the finale report, and manuscript.

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