Original Article

# Developing a clinical performance logbook for nursing students receiving cardiac care field training

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## ABSTRACT

**Background:** Assessment is one of the teachers' most important activities in teaching process which bears many purposes. With the rapid change of different sciences,old methods and tools are not meeting the present needs. Since in medical sciences, half of the educational course, including nursing courses,occurs at patients' bedside, the assessment of clinical competency is of great importance. In this study the goals , skills and expected level of competency for each skill and procedural skills needed for training nursing studentsreceivingcardiac care field training compiled. **Materials and Methods:** This research was a descriptive measurement study conducted in Esfahan in 2010-2011. Research community was nursing trainers who are responsible for training students takingcardiac care field training coursesin state medical science universities all over the country. Sampling was performed first in the form of the multi-stage cluster and then after selecting the colleges , their trainers entered the study in the form of census. To gather the information, after literature review and performing a focusing group, an initial questionnaire was compiled and survey was conducted using Delphi three-stage method. **Results:** After literature review and focus group, 23 modules and 142 skills in the first section and 14 general procedural skills and 15 special procedural skills in the second stage were compiled. Finally after passing the Delphi stages, 150 skills in the form of 23 modules in the first section and 14 general procedural skill and 13 special procedural skills were obtainedin the second section. The expectancy levels of all the skills were also determined. **Conclusion:** This study has introduced an assessment pattern in the form of clinical performance logbook which can be a valuable tool for assessing the clinical competency of nursing students receiving field training in cardiac care units(CCU).

**Key words:** Student assessment, clinical competency, nursing, cardiac care

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## INTRODUCTION

Assessment is one of the important activities of teachers in training process in which the teacher measures learners' learning and determines their success in achieving educational aims. Among the different cited aims for assessment in different texts, students' coaching for better comprehension of academic contents, self-performance feedback, teacher's feedback about teaching and offering academic contents, feedback to educational management system for the sake of supporting a certain teaching process, and achievement of educational aims have enormous importance.[1,2]

There are various tools and purposes for assessment in different domains (cognitive, affective, and psychomotor). Since different sciences are changing every day, old and traditional assessment methods alone cannot satisfy the current needs. Thus, new assessment methods should be developed and applied.[3]

More than half of the education of medical sciences students occurs in different hospital wards, laboratories, clinics, and other paraclinical centers.

What is expected from a medical science postgraduate is performing high-quality work rather than knowing materials well. Therefore, competency and performance of students is what must be measured in medical sciences, especially in clinical and paraclinical centers. Since skills and performance of students pertain more to psychomotor dimension, special tools for students' assessment must be used in this respect.[4]

Among the different medical sciences, nursing is a growing career and today the significance of nurses' role in nursing care has became more apparent; almost in all countries, nurses are considered the main staff in health care systems. Thus, they greatly influence productivity and organizational development.[5,6]

Making sure that patients receive a high level of care is a supreme aim in nursing career. Therefore, competency assessment in all aspects of such a role can be difficult. Most of the assessment strategies have been criticized for lack of feedback *in vivo*. Assessment tools must be able to defend themselves against current challenges such as feeling of unfair judgment. Most of the current exams merely assess individual's knowledge and hardly assess their competency or merits.[7]

In a study in Cork Nursing and Midwifery Faculty in 2007 in Ireland, 970 nursing instructors were asked to complete the 24-item questionnaires on clinical education assessment criteria. Four hundred and seventy instructors returned the questionnaires. Findings showed most instructors neither had a clear picture of the assessment concept nor did they apply an appropriate method. It also showed that a majority of the instructors were not prepared to use more complicated tools.[7]

In a survey research conducted on 140 students in 1383 in Gonabad Faculty of Nursing and Midwifery, majority (62%) of the students believed that their clinical assessment scores were unreal and 77% requested instructor's reconsideration of assessment procedures and scoring.[7]

However, many efforts have been made for the improvement of medical sciences students' assessment in the world's eminent universities, and since 1950, different assessment methods in medical education have been administered. Prior to this, medical knowledge and clinical skills were mainly assessed through oral and written exams. Since then, many changes have occurred in medical education assessment.[8]

For example, following concerns about nursing student's clinical assessment system in Glamorgan Wales University, a revised system was offered. Results after using this system showed that although the revision was useful, for making sure of maximum impact of this new system, more scrutiny is needed.[9]

In addition, for educational development and better assessment of their residents of internal medicine, Groningen University of the Netherlands replaced logbooks for scoring checklists in 1997, so that logbooks can be used as both educational guides by the students and an assessment tool by the educators.[10]

In 2005, in Colorado School of Nursing, the curriculum was redesigned to allow more focus on clinical capabilities assessment.[11] Similarly, some efforts have been made in Iran and different universities are seeking tools to resolve current defects in clinical assessment in medical sciences.

From 2006 to 2007, logbook was used in Tehran University of Medical Sciences for the assessment of clerckship students. Guilan Nursing School also used logbooks for the same purpose in 2005.[12] Among the strong efforts in this respect, we can refer to development of logbooks to be used in Iranian residency programs of ENT, general surgery, gynecology, neurology, and neurological surgery.

Different assessment tools have been suggested for different levels of competency by Miller. Oral or written exams, multiple-choice questions, matching questions, true–false questions, and Patient Management Programs (PMP) are among the popular traditional tools used for levels one and two. Assessing the third level of competency is not feasible through customary traditional tools such as multiple-choice, written, or oral exams, and more new tools and methods including objective structured clinical tests (OSCEs), Standardized Patient and Simulation have been proposed. Now, OSCEs have found pervasive use in different universities throughout the world. Assessment of the fourth level of Miller pyramid faces many challenges and there are various ideas in this respect. Today, modern tools like portfolios, logbook, direct observation procedure skills (DOPS), and 360° assessment are among the tools that can be used in combination with other old and new methods.[4,13]

As it can be seen, logbook can evaluate high levels of capability in learning. Logbook is derived from log which is a tool used for estimating ship speed and was used to determine the distance a ship traveled within a certain amount of time. Today, logbook application has found widespread use in medical education and is currently being used in clinical assessment.[14] The tool has long been used in residency training programs in different countries. It is also used, to some extent, in general medicine, specialty medical courses, and other medical disciplines. In Iran, its application in residency training programs is quite common; however, it is not commonly used in other fields such as nursing.

Given the significant of logbook in assessing medical students' competency, it can be used for the following purposes:
- Determination of course objectives
- Determination of necessary skills for patient management
- Definition of minimum qualifications required

- Qualification registration
- Helping students attain expected clinical skills
- Review of educational improvements in every course (course assessment)[10,15]

But like the other tools used in medical training, logbooks have their own strengths and weaknesses that must be noticed when using. Thus, to develop efficient logbooks, the following should be considered first:

- Determination of nationwide purposes and rules as the basis of practical courses
- Determination of expected qualifications for every skill on the basis of a given scale
- Feedback to students' performance
- Assessment

Since care and remedy of critical cardiovascular patients is done in CCUs, nursing personnel can play an important role in patient's recovery and decreasing morbidity rate. Therefore, training and assessment of nursing students that might take this role after graduation must be done more accurately. Training and assessment of these students can greatly benefit from logbook development. Hence, by defining educational purposes of psychomotor skills in this field through domestic and foreign literature and then collecting Iranian nursing professors' ideas throughout the country using the Delphi technique, this study was performed with an aim to develop a logbook for nursing students receiving cardiac care field training.

## MATERIALS AND METHODS

This descriptive survey was conducted in 2010–2011 in Isfahan. Participants consisted of nursing professors and instructors teaching clinical courses to nursing students throughout the country. Research sample included 54 faculty members of medical sciences universities of Tehran, Isfahan, Shahid Beheshti, Mashhad, Shiraz, Tabriz, Kerman, Urmieh, Zahedan, Ahvaz, Yasooj, Boshehr, and Shahrekord. Initially, multi-stage cluster sampling method was used, and then after choosing faculties through census, all faculty instructors ($N = 54$) participated in the study.

Data were collected using a questionnaire developed by the researcher following literature review and focus group. The content and face validity of the questionnaire were confirmed by experts. Ancronbach's alpha coefficient of 0.94 confirmed the reliability of the questionnaire.

Data analysis was performed through descriptive statistics and SPSS 16 software. This study included seven stages. The first stage, an extensive and comparative study was done on educational aim of cardiac field training courses in eminent medical universities,both inside and outside Iran, were listed. In the second stage, the essential qualifications and desired skills a nurse must possess in clinical training, based on the perspectives of the above-mentioned students, were classified in the form of 23 modules and 138 skills. Moreover, 14 general procedural skills and 15 specialty procedural skills were recorded

in separate tables. In the third stage, an initial questionnaire was constructed. The first part included question items about the modules and educational skills. Also, in the second part, specialty and general procedural skills were surveyed. In the fourth stage, a focus group session was held in nursing and midwifery faculty of Isfahan, and their comments were used for modification of the questionnaire. In the fifth stage, the questionnaire was distributed during three stages, applying Delphi technique by mail and email. Fifty-four samples participated in the first, 20 in the second, and 14 in the third Delphi stage. At each stage, 36, 18, and 11 completed questionnaires were received, respectively. Each time, the questionnaire was modified in Delphi stages according to the samples' comments and was sent to the next stage for receiving new data. In the sixth stage, the received data from the third level of Delphi were collected by descriptive statistics (Mean). Skills with scores less than 2 on their necessity were omitted from the list. Finally, 150 skills were extracted in the form of 23 modules in the first part and 14 procedural skills and 13 specialty procedural skills for construction of clinical performance logbook in the second part. Finalizing the data in the seventh stage, the suggested clinical performance logbook was constructed in two sections of modules and procedural skills.

## RESULTS AND DISCUSSION

Following literature review and focus group in the first section, 142 skills were extracted in the form of 23 modules, and 14 general procedural skills and 15 specialty procedural skills were extracted in the second stage, which constructed the first stage Delphi questionnaire.

After collecting faculty members' comments in the first Delphi stage, skills increased to 150 with the same 23 modules, 14 general procedural skills, and specialty procedural skills increased to 17. The result of the second stage of Delphi showed the same 23 modules and 150 skills in the first section and 14 general procedural skills. Four specialty skills, which according to faculty members' comments were not necessary, were omitted (exercise test, echocardiography, stenting, and angiography). In the third stage of Delphi, no change occurred in the first and second parts of the questionnaire. And samples' comments were applied to acceptability level of expected qualifications and the number of procedural skills. Finally, 23 modules including 150 skills in the first section and 14 general procedural skills and 13 specialty procedural skills in the second section were included [Table 1].

In this research, a comparative study was performed between the world's outstanding universities and experiences of our country in cardiac field training courses for nursing students. Then, after the collection of the purposes and comments of scholars in medical universities throughout the country, the above-cited purposes were established nationwide. The resultant collection was used as the main content for construction of students' performance assessment tool in cardiac wards, and considering the assumptions of clinical performance logbooks construction, the above-cited tool was designed and offered.

**Table 1: Modules, procedures, and competency level**

| Row | Kind of procedure | Procedure name | Number of skill requirement | Row | Module name | Number of skills | Mean (level of competency) |
|---|---|---|---|---|---|---|---|
| 1 | General procedural skills | Peripheral vein access | 10 | 1 | Admission | 7 | 4.14 |
| 2 | | Blood sampling | 11 | 2 | Health assessment | 4 | 4 |
| 3 | | Vital signs taking | 14 | 3 | Communication | 6 | 4 |
| 4 | | Intravenous injection | 11 | 4 | Heart monitoring | 5 | 4.2 |
| 5 | | Intramuscular injection | 9 | 5 | Blood sampling and vein access | 5 | 4.8 |
| 6 | | Subcutaneous injection | 7 | 6 | Blood test analysis | 4 | 4 |
| 7 | | Oxygen therapy | 9 | 7 | Chest pain management | 6 | 4 |
| 8 | | Suctioning | 8 | 8 | Electrocardiography | 10 | 4.3 |
| 9 | | Airway management | 8 | 9 | Disease and care | 7 | 4 |
| 10 | | Urinary catheterization | 7 | 10 | Resuscitation | 11 | 3.9 |
| 11 | | Nasogastric tube insertion | 7 | 11 | Cardiovergen | 6 | 3.66 |
| 12 | | Enema | 4 | 12 | Temporary and permanent pace maker | 8 | 3.62 |
| 13 | | Lavage | 5 | 13 | Pharmacology and medication | 7 | 4 |
| 14 | | Gavage | 5 | 14 | Delivery of oxygen therapy | 6 | 4.33 |
| 1 | Special procedural skills | Heart monitoring | 7 | 15 | Arterial oxygenation management | 8 | 3.75 |
| 2 | | Electrocardiography | 7 | 16 | Hemodynamic monitoring | 8 | 4 |
| 3 | | Cardiac pacing (temporary) | 5 | 17 | Education | 10 | 4 |
| 4 | | Setting infusion pomp | 5 | 18 | Nursing process | 6 | 4 |
| 5 | | Setting syringe pomp | 6 | 19 | Team working | 3 | 4 |
| 6 | | Obtain arterial blood sample | 6 | 20 | Ethics | 4 | 5 |
| 7 | | Basic cardiopulmonary resuscitation | 5 | 21 | Documentation | 4 | 4 |
| 8 | | Advanced cardiopulmonary resuscitation | 6 | 22 | Safety and infection control | 9 | 4.44 |
| 9 | | Endotracheal tube insertion | 6 | 23 | Discharge planning | 6 | 4 |
| 10 | | Remove endotracheal tube | 5 | | | | |
| 11 | | Defibrillation | 5 | | | | |
| 12 | | Elective cardioversion | 5 | | | | |
| 13 | | Pulse oximetery | 6 | | | | |

Given the research results regarding the objectives of cardiac field training courses for nursing students, 150 skills in the form of 23 modules were included which compare to the course objectives defined in Philadelphia and Colombia universities and Canadian Critical Care Nursing Association. For instance, in Philadelphia University, five general objectives and eight course components have been mentioned in the course syllabus which, although congruent with the defined objectives, are general objectives and do not address more subtle educational skills.

Also, Colombia University has defined general objectives but not skills.[16-18] British Association of Cardiac Nursing has presented its educational objectives in the form of 32 modules and 120 skills in 81 pages, which are more congruent with those defined in our study. However, they were not included among the purposes of the study as the faculty viewed them as unnecessary (radiological interpretation of thorax, wound rehabilitation, wound healing, interpreting respiratory sounds, resource management).[19] Canadian Critical Care Nursing Association has also set seven standards and 37 criteria for teaching critical care to nurses, but again they pertain to general objectives and subtle skills have not been taken into consideration.[18]

With respect to expected competency level of skills it seems from Delphi panel results and collection of them that the resultant competency levels for different skills more expect students to perform skills with indirect supervision of their tutors.

Given that students are in the 7th semester and must gradually become prepared for working independently, this can help with their self-confidence and preparedness.

Generally, the frequency percent of qualifications in the given skills was proposed as follows: Performance of 121 skills with indirect supervision (about 80.07%), performance of 19 skills independently (about 12.07%), and 10 skills with direct supervision (about 6.06%).

In sum, 14 general skills and 13 special skills were extracted in procedural skills section. Also, the number of skills required for qualification attainment was specified.

While none of the available resources addressed this issue properly in their curriculum, this can be an advantage for proposed clinical performance logbook. Through collecting the

required data for construction of clinical performance logbook, considering logbook's essential components and investigating available logbooks both inside and outside Iran, especially the ones that were established in medical sciences university of Isfahan, the authors have replicated in this field after acquiring necessary permissions.[20,21] Efforts were made to take into account the specifications of the field/major and all the other influential factors.

The advantage of this tool is that in addition to specifying the expected competency levels for every skill, it clarifies the student's feedback mechanism in two stages.

## CONCLUSION

Students' competency assessment has always been a concern for clinical instructors. This study introduces an assessment model in the form of logbook that can become a useful tool in order to assess nursing students' competency in CCU.

## ACKNOWLEDGMENTS

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