

## Assessing the Reliability and Validity of the Mini-Clinical Evaluation Exercise (Mini-CEX) for Nursing Student

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### ABSTRACT

This research was constructed with goal of descriptive and stable investigation for short-term clinical performance assessment test in nursing and among junior students. A total of 100 nursing students from Tehran nursing and midwifery college were chosen as sample that have passed training period in this field. According to scientific board members' opinions of medical science universities located in Tehran, among main skills of nursing, 7 skills were chosen and their assessment checklists were provided. Apparent and content description, criterion description (correlation of average numbers for theoretical and nursing clinical courses in separation of short-term clinical performance assessment test number (Mini-CEX), relation of any case with number of Mini-CEX), structure description (investigation of inside structure, correlation of number for student's satisfaction with number of Mini-CEX), stability (through inside similarity investigation, stability among assessors) were investigated. Correlation of numbers of Mini-CEX was with average theoretical and clinical courses numbers, respectively 0.64 ( $P < 0.001$ ) and 0.842 ( $P < 0.001$ ). Correlation of any skill had a meaningful relation with total number of Mini-CEX ( $P < 0.001$ ) that showed desired inside structure of test. Test stability was measured by Cronbach's alpha coefficient as 0.94. Minimum and maximum value of correlation coefficient in stability was 0.80 and 0.95 among assessors that they were meaningful in all cases ( $P < 0.001$ ). In view of study results, using Mini-CEX test to measure clinical performance of main nursing skills has description and stability.

**KEYWORDS:** Short-Term Clinical, Performance Assessment (Mini-CEX), Description, Stability

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### 1. INTRODUCTION

Since establishment of universities, theoretical and clinical educational methods have changing and developing and the most important goal of educational systems has been improving education and learning effect. One of the important pillars of education in nursing is clinical evaluation that should assess competences and abilities of nursing students [1]. In view of that all learning activities are led through assessment, so they take assessment as learning framework and the clear-sighted emphasize, too that assessment causes promotion of learning [2]. Using different types of assessment methods has been used from 1950 in medical education. Before that time, physicians' clinical knowledge and skills were assessed by written tests, mostly, after that, wide changes have been made in assessment methods related to medical education.

Traditional and common methods of learning measurement (paper-and -pencil or written methods) are used, mostly in relation to goals of cognitive area while new education emphasizes on practical learning [1-5]. Billings and Halsted [2] stated that performance assessment, in addition to awareness of student's performance and individual promotion, provides ranking and decision-making about curriculum, too and its final consequence is safe and desired care of patient. Importance of assessment for clinical performance in some countries is to extent that courses and workshops are designed and held as clinical performance assessment in form of complementary course for all people that engage in field of clinical education and assessment for medical science students. So, clinical performance assessment has been as important and main part in field of education, so that clinical assessment of medical and geriatrics students has been approved by all clear-sighted and programmers of education [4]. Though it is possible that special abilities can be assessed by different tools and methods, using method that has description and stability and also, it can assess student's skill in doing a special action ,really, is especially important, still. Tahernejad [6] has stated 5 criteria to determine rate of usefulness of any assessment methods, in quote of Vander Volton. these five criteria include: descriptive, stability, effects of assessment method on learning and learner's activity in future, capability of learners' and professors' acceptance, and costs. Bougra et al. [7] also believes that assessment methods should have three important criteria that are suitable and valid for people's assessment: descriptive, stability and capability of performance.

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At present, in our educational program, doing some clinical skill are for trainee at first and as a result, in many cases, trainee do them without supervision of higher levels .hence, having primary command is necessary in doing clinical skills . this issue that learners' skills are assessed in doing procedures that they are obliged to do them , is very important and one of academic duties of members for scientific board is to help to reach optimum performance and command in skills. Most of new methods for assessment are related to clinical work and approach to it more ,so that they emphasize on clinical skills assessment, communicative skills, diagnostic – medical and professional actions. As Bougra *et al.* [7] believe that clinical performance should be assessed in “doing “ level. In fact, clinical assessment is a confirmation on learning and education process in nursing work.

So, as teaching methods, and environments are changed from traditional lecture to innovative approaches and learning environments. educators should develop and progress their used programs to assess learning results, so using new methods is necessary in students' assessment by scientific board members, why they by using these methods can assess all learning areas ,especially higher levels of knowing area 1 and critical though 4 and prepare student to receive degree. On the other hand, clinical competence in not knowledge and decision making and or practical ability, but it includes other factors like impersonal skills; professionalism, self-assessment, and ability to improve, too, so traditional tests based on knowledge do not assess these areas, as much. Trust [8] has paid attention to clinical assessment in direct observation method in practical and real situations and writes: this assessment method, assures testers from students' abilities in prediction and confrontation with clinical changes and events and special conditions of patient and thus, they help to determine their abilities. Gray in this relation, states five criteria for a desired assessment that include: descriptive, stability, practicality, cost effectiveness, being satisfaction and usefulness.

Traditional tests based on knowledge; do not assess many of these areas. Tahdernejad [6] stated that making decision regarding how to use different genetic or stable structures and whether it's better that with what sequence, assessments are done and it's better what standards are codified and or performed in field of assessment, are discussed as important challenges in assessment of medical science students ,still.

In view of what was said, the goal of this paper is to determine description and stability of short-term clinical performance assessment test in junior students of nursing for nursing and midwifery college of Tehran medical science university.

## 2. MATERIAL AND METHODS

This research is a descriptive study and research and evaluation. In this study, 100 fourth year students of nursing school who were passing internship during the 2012-1013 in the Tehran University of medical sciences had been evaluated are the students were voluntarily participated in the study. Mini-c-x Checklist format is used as for data collecting tool Mini-CEX questionnaire is used and translated to Persian. After that, this check list had been developed by opinion of masters in Tehran and Shahid Beheshti universities. Mini-CEX Checklist had 7 parts for evaluation the students' skills. So, the validity content Mini-CEX had been Check by statistical analysis such as test retest and Cronbach's alpha tests. This check list had been score between 0 up 9 in each question of skills' parts. All of the examiner (members of academic staff and experienced trainers) and participants (students who were participated in this study should be trained in connection with how to run a clinical performance evaluation of this questionnaire.

For all examiner, a session (for 2 hours) to assess method to using of Mini-CEX is done. Education to fill Mini-CEX questionnaire and the instruction' score and guide the use of the checklist together with the necessary criteria in every part of the checklist for each skill is given for all students who participated in this study, too. At last content validity and reliability had been evaluated and also, the correlation between the score of Mini-CEX questionnaire and clinical score for students in each part of Mini-CEX questionnaire had been evaluated. All data had been analyzed by SPSS Ver. 19.

## 3. RESULTS

In this part, analysis related to descriptive investigation and stability of research tools are provided.

**Question 1:** how is criterion description and test divergent description?

**Table 1.** correlation among numbers of MINI-CEX with average of theoretical courses and clinical courses and correlation among numbers of test “MINI-CEX” with total numbers obtained from Daps test.

Numbers of clinical courses		Numbers of theoretical courses	
Correlation coefficient	p-value	Correlation coefficient	p-value
0.842	0.001	0.64	0.001
Correlation coefficient of numbers for test “mini-cex” with total numbers obtained from Daps test		p-value	
0.78		0.001	

Table 1 shows correlation among numbers of MINI-CEX test with average numbers of theoretical courses and average numbers of clinical courses and correlation among test numbers of MINI-CEX with total numbers obtained from Daps test for 10 people of sample.

For descriptive and criterion investigation of this test, Pearson correlation was used. Correlation among numbers of test was calculated with average numbers of theoretical and clinical courses. As results show, among numbers of MINI-CEX and average theoretical courses, correlation coefficient is equal to 0.64 and correlation among numbers of MINI-CEX with average numbers of clinical courses is equal to 0.842 that indicates desirability of criterion description coincided with it. Correlation coefficient among numbers of test “MINI-CEX” with total numbers obtained from Daps test shows that correlation coefficient of 0.78 is meaningful that shows desirability of structure description in convergence description way of this tool.

**Question 2:** how much stability of test “MINI-CEX” in stability way among observers?

Table 2 shows results of correlation among assessors in any skill and in general, separately. Results have showed that measured Eta coefficients are meaningful and indicate desired stability among number of assessors in all measured skills.

As results in Table 3 have shown, correlation among small tests is meaningful and correlation of total number has been meaningful and more with them that indicate desired theoretical structure of test.

Table 3 shows cronbach’s alpha coefficients to investigate stability.

As Table 4 shows, rate of cronbach’s alpha for MINI-CEX test is desired in any skill, generally. Minimum desired alpha is 0.7.

**Table 2.** Correlation coefficient among number of observers in any skill

Skill	Eta Squared	p-value
<b>Describing</b>	0.9	0.001
<b>Physical examination</b>	0.8	0.003
<b>Human/professional behavior</b>	0.8	0.004
<b>Communication and giving consultancy to patient</b>	0.9	0.003
<b>Clinical judgement</b>	0.8	0.002
<b>Organization of gathered information</b>	0.9	0.001
<b>General competence of all-embracing clinical</b>	0.9	0.002
<b>Total</b>	0.8	0.001

**Table 3.** Correlation coefficients among numbers of small tests with total number of mini-cex test in any skill

Dimensions of small tests	1	2	3	4	5	6	7	8
<b>Describing</b>		0.9	0.86	0.87	0.85	0.86	0.87	0.94
<b>Physical examination</b>	0.9		0.8	0.84	0.83	0.85	0.85	0.94
<b>Professional behavior</b>	0.86	0.8		0.86	0.82	0.8	0.8	0.92
<b>Giving consultancy to patient</b>	0.87	0.84	0.86		0.87	0.88	0.87	0.95
<b>Clinical judgment</b>	0.85	0.83	0.82	0.87		0.9	0.89	0.93
<b>Organization of information</b>	0.86	0.85	0.8	0.88	0.9		0.93	0.93
<b>General clinical competence</b>	0.87	0.85	0.8	0.87	0.89	0.93		0.94
<b>Total</b>	0.94	0.94	0.92	0.95	0.93	0.93	0.94	

**Table 4.** Cronbach’s alpha coefficients obtained in any skill to investigate stability

Title of skill	α-value
<b>Describing</b>	0.9
<b>Physical examination</b>	0.8
<b>Human/professional behavior</b>	0.9
<b>Communication and giving consultancy to patient</b>	0.9
<b>Clinical judgment</b>	0.8
<b>Organization of gathered information</b>	0.8
<b>General all-embracing clinical competence</b>	0.9
<b>Total</b>	0.9

**4. DISCUSSION**

In educational system, previous traditional assessment methods that investigated being all- embracing from one dimension, cannot accountable for new educational needs. So, clinical performance assessment has been important and main part in field of education, so that clinical assessment for medical and genetic students has been accepted by all the clear-sighted and programmers of education affaire. Hence, running MINI-CEX and

investigation of its description and stability in nursing area form main goal of this research. Correlation and criterion deviation show number of MINI-CEX with average numbers of clinical courses and average numbers of theoretical courses of nursing. Findings show that among numbers of MINI-CEX and average theoretical courses, correlation coefficient is equal to 0.64. People who are not able to remind their knowledge in fabled and artificial, it is possible that they weakly perform in tests that have designed to assess communicative skills, their knowledge or reasoning in real environment.

Correlation among MINI-CEX numbers with average numbers of clinical courses is equal to 0.842 that shows its coincident criterion description desirability. In view of nature of all exams that their priorities rely on theoretical knowledge of student, it adapts and approves distance among theoretical and practical courses. This is, while, in addition to knowledge and decision-making and practical ability of students, factors have been measured such as impersonal skills, professionalism, and self-assessment in MINI-CEX test, too. But traditional tests based on knowledge do not assess these areas, extremely. But correlation of number for clinical courses that related to clinical skills is needs to be noticed with MINI-CEX number. Of course, different dimensions of learning such as knowledge, practical skills and attitude cannot be ignored. Clinical assessment though pencils – and- paper test that is done by many trainers at the end of clinical period has been discussed as a part of clinical performance assessment. But as Seif Naraghi and Mary [9] stated that these tests are suitable in cognitive area goals, only. So it should be noted that among written tests used to measure cognitive area goals and written tests used to measure performance, there is difference [10]. In performance tests, it is emphasized on work to extend knowledge and skill in practical situations or simulated ones with practical situations. In this regard, Hassanzadeh and Maddah [11] writes: researches of Newman and Archbald have shown that among numbers of educational development and university students' performance in solving complicated problems, there is not a meaningful relation. Stability of short clinical assessment test of Norcini J. and Burch [12] has been reported about 0.73 that has an acceptable stability with number of more clinical confrontations [13]. Koh [14] have estimated 0.8 stability in short-term assessment test with 12-14 testers. Generally, MINI-CEX in comparison with other performance assessment tools like oral tests and standardized patients has an acceptable stability. In study of Weller et al. [15] to calculate stability, Cronbach's alpha was used. In view of high inside similarity results that were obtained for giving number, high correlation mark was among parts of giving number.

Results of this research showed that in view of existing strengths in MINI-CEX test, from view of running and practicality, stability can be indicated. Correlation coefficients among numbers of small tests are shown with total number of MINI-CEX number in any skill. As results are shown in table, correlation among small tests, are meaningful and correlation of total number with them has been meaningful and is more than small tests that indicates desired theoretical structure of test (maximum rate of correlation has been reported as 0.95 and minimum rate of correlation has been done as 0.8. In study of Weller et al. [15] to calculate stability, Cronbach's alpha was used. In view of high inside similarity results that were obtained for giving number, high correlation mark was among parts of giving number. These studies [16, 17, 18], have reported findings to align with present research findings. Seif [10] writes: one of methods to determine test stability is with emphasis on inside similarity of alpha coefficient method. For this work, test components or parts of test to measure test stability coefficient are used. Test desired inside similarity showed that among assessed skills in test, there is a required correlation and all assessed skills assess performance concept. Generally, getting complete stability is difficult but present research showed partial stability method. Regarding to achieve the goal of determining convergence description with Daps test, correlation coefficient among numbers of MINI-CEX test wit total numbers obtained from Daps test show that this coefficient is 0.78 and meaningful that indicates structure description desirability in convergence description method of this tool.

## 5. CONCLUSION

Results have shown that measured Eta coefficients are meaningful and show desired stability among assessors' numbers in all skills. In sum, this study showed that MINI-CEX in use to assess internship course students of nursing is practical and has description and stability and to respond questions of research, description and stability of MINI-CEX test held can be approved in Tehran nursing and midwifery college.

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