

Content and concurrent validity of competence assessment for health care giving (level II nursing) in Addis Ababa

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Abstract

Background: Many countries in the world regulate professional teachings through competence-based education and assessment. Ethiopia has developed TVET strategy to be delivered in the competence-based approach which is essentially outcome-based education. Based on this, there are 20 industries currently under the TVET scheme. Among them the nursing sector is under the health industry. It has four levels of occupational standard. The level II occupational standard is referred to as health care giving. Candidates who are to be certified as health care givers (level II nursing) are expected to take Competence Assessment. This assessment is solely practical.

Objective: This research is aimed at checking the content and concurrent validity of the competence assessment for nursing level II (health care giving) in Addis Ababa.

Method: The content validation was done by assessment tool developers and assessors. The concurrent validation was done by comparing the in-school tests result with competence assessment results. All ethical standards were maintained.

Results: Competency rate of level II nursing (health care giving) students in the year 2013 was 86.6%. The competency rate of government colleges (94%) was higher than that of private colleges 84% (66%-93%) with $P < 0.001$, competency rate has no significant difference in sex of candidates (male 87.6% females 86.4%) with $P = 0.74$. The mean score for in-school grade point average for those who were not-yet-competent was 79+10 and 82+10 for competent ones. The difference was not significant with Mann Whitney U test result of $P = 0.042$. The majority (>80%) of the assessors believed that nine (50%) core competence components were represented in the assessment tool. However, more than 60% of the assessors believed that three (16%) core competence components were not represented in the assessment tool.

Conclusion: The concurrence between in-school grade and competence assessment result has shown relationship and most of the core competence units included in the assessment tool, while nearly 16% of the components of competence were not included in the tool. It is recommended to determine inter-rater reliability, follow content validation process and develop assessment tool bank. [*Ethiop. J. Health Dev.* 2014;28(3):185-190]

Introduction

Many countries in the world regulate professional trainings through Competence Based Education (CBE) and assessment. Various tools and assessment procedures are employed to assure the competence of professionals. In most instances, it is observed that assessment tools are developed by experts and the psychometric qualities/properties of tools are subject to continuous validation.

Competence models as an approach to education began to evolve during the 1960s. The advancement of the former USSR by launching Sputnik satellite alerted Americans to revise their education system to mandate competence standards, while in the UK the decline of the industry competitiveness which might be attributed to insufficient training of workforce led them to adopt competency-based training (1).

Competency involves both the ability to perform in a given context and the capacity to transfer knowledge and skills to new tasks and situations. Generally, we can say that competency is about what someone can do. Competency-Based Education (CBE) reflects a pragmatic concern that professionals are able to do a task, rather than simply know how to do a task. Performance criteria

can be used to outline the steps that must be taken to achieve competence (2).

In CBE the evaluation and accountability are shifted to individual's attainment of set of objectives. Assessment in CBE gives the responsibility to the individual. As long as the individual performs what is expected from him/her, he/she is no longer judged by his/her standing relative to the performance of a group or a test population. The assessment is going to be criterion-related and an individual achievement is assessed by the objectives set (3).

Ethiopia has also developed Technical Vocational Education and Training (TVET) program to deliver competence-based education. The objective of the national TVET strategy of Ethiopia, which was revised in 2008, is to create a competent, motivated, adaptable and innovative workforce that plays pivotal roles in poverty reduction and socioeconomic development efforts of the country (4). The country has instituted Center of Competence (COC) to assess and certify core competencies for each industry identified for the TVET program.

The outcome of training delivered in the Ethiopian TVET system is measured through a process of verification of a

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candidate's achieved competencies known as occupational/competence assessment. A candidate, no matter the way she/he achieved the competence, who has proven to be competent through assessment is awarded a certificate. This certificate is an official and nationally recognized proof of the person's competence in the respective level or unit/s of competence of an occupation (5).

The MOE user's manual for developing tools describes that the rules of evidence for assessment should be valid, sufficient, current, authentic and consistent. In addition, the directive provides guidance that competency assessment for levels I and II will only be practical test which integrates knowledge aspect. The assessment result is graded as either competent or not-yet-competent (6).

In Ethiopia, there are several Occupational Standards (OS) developed and implemented. The Nursing sector is one of these occupational standards which is subject to assessment and certification in the health industry. The OS for the nursing sector start from level II. Those who are confirmed competent for level II will be certified for the OS "health care giving".

In Addis Ababa alone, there are 14 health science colleges (one government-owned) providing education in the Nursing sector. All health sciences colleges carry out their own in-school teacher-made tests to evaluate the performance of their students. Those students who have satisfactory (pass) grade in the in-school tests are subject to undergo the competence assessment that is conducted by the COC.

The Ethiopian MOE directive on occupational assessment and certification dictates the tools/instruments to be used during assessment include practical exercises, actual demonstrations, or role plays or simulations, where their practicability and effectiveness should be given prime consideration. However, the methods to assure effectivity are not mentioned in the guideline. Neither the COCs nor the technical experts are doing any form of effectiveness assurance based on the tool, i.e. content or concurrent validation. Up to now there were no studies conducted on the qualities of the tools under use in the assessment of candidates.

The content of the competence assessment currently available needs to be checked whether it really addresses the domain or objective of the OS provided for the levels. Besides the psychometric characteristics of the competence assessment scores should be known to determine the level of acceptance of the assessment.

Based on this background, the objectives of the present study were to:

- Determine the correlation between the in-school testing grades with the competence assessment result for level II Nursing sector;
- Compare in-school testing grade with the competence assessment result across government and private teaching institutions in the nursing sector; and
- Determine the match between content of the competence assessment tests and the expected objectives of the syllabus.

Methods

Population and Sampling:

Following the new TVET model which was introduced in 2012, the new level-based competency assessment was started in June 2013. Beginning June through October 2013, 1,294 candidates were assessed for level II nursing OS competence assessment at the Addis Ababa Occupational Competency Assessment and Certification Center from 14 health science colleges. For this study, nine health science colleges were selected purposively based on willingness to participate in the study and the availability of data. In the selected colleges, every candidate assessed for level two Nursing was included in the study; thus, 672 candidates' data were included in this study. This study covers 52% of all candidates from 64% of the colleges.

Additionally, this research used occupational standards and instructional objective (domain) of the level II nursing and the 2013 assessment questions that were administered to candidates as data source for content validation.

The research also used 15 assessors and test developers to do content validation of the 2013 assessment tool. The sample size required for such content validity was 15 (7).

Data Collection Procedures:

Concurrent validation: A "matrix tool" developed to collect data elements like name of college, sex of candidate, the in-school grade point average and assessment result obtained from the COC was obtained from each TVET institute (college). The colleges that participated in the study provided 100% complete data.

The in-school grade point average was taken from the respective college registrar. This grade was computed as mean value for the grade obtained in the in-school lifetime of the candidates for level II nursing for both practical and theoretical assessments (tests) taken.

Content validation: A self-administered questionnaire that contains competency components and elements of each competency of level II nursing from the OS that was developed by TVET agency was prepared. The tool served to compare whether elements of each component of the core competence is covered by the competence assessment question. This tool was filled by tool developers and assessors. Based on the tool, if the current

assessment tool has a question related to the element of a core competence, the assessor would write down “Yes” in the space provided in front of each element of core competence; if not, he/she would enter “No”.

Out of 20 assessors who are accredited by Addis Ababa Occupational Competency Assessment and Certification Center (AA OCACC) for the nursing sector, 15 participated in the study

The assessors who filled the tool were given instruction about the purpose of the tool, how to fill the tool and other ethical considerations.

Data Analysis:

Concurrent validity: Data were entered into the SPSS software Version 20. Data cleaning was done through double entry mechanism. By running frequency of the two data sets entered in SPSS, errors or mismatch between the two frequency values of the data sets would be corrected.

The uni-variate analysis such as frequency distributions, percentages and appropriate graphic presentations, besides measures of central tendency and measures of dispersion were used for describing the data.

The in-school grade point average of the candidates was checked for normality and the result has shown that it is skewed to the left. The p -value for Shapiro-Wilk test of normality was 0.000, meaning that the in-school grade point average was not normally distributed. Mann Whitney U test was applied to check the mean values of in-school grade point average for those who were competent and those who were not-yet-competent.

Chi-square test was used to find out the competency rate difference among the TVET colleges and between sex of candidates. Based on the findings, the corresponding P value was calculated to look into the significance of the relations observed.

Content Validity: Data were entered into the SPSS software version 20. Data cleaning was done through double entry mechanism. The inter-rater agreement was done by comparing the results of all assessors with one senior assessor. Among 15 assessors who performed content validation of the competency assessment tool, one senior assessor who received training in content validation by the investigator was taken as a model for the other assessors. The assessment result which the assessors provided (Yes/No) for each element of core competence components was checked against the model assessor using Kappa score. The result ranged from fair to substantial agreement. All assessor values were taken for analysis because there was no agreement observed below fair.

Five of the fourteen (36%) assessors had substantial agreement (>0.6 kappa value) while five had moderate agreement (36%) and 21% (4/14) had fair agreement. The overall inter-rater correlation was found to be 0.454, which is considered as moderate agreement between each rater.

First, level of representation for each element in the assessment tool was computed, taking 80% agreement between raters as substantial for content representation (8). Then the overall content representation for the core competence was calculated, taking the mean scores of the elements in one core competence. A summary table composed of mean scores of each core competence was prepared following the analysis of the elements of each core competence and content of the assessment.

Ethical Considerations:

Addis Ababa University’s School of Psychology provided permission to conduct the research. Permission was also obtained from Addis Ababa Occupational Competency Assessment and Certification Center and each TVET college selected for this study. Confidentiality was ensured throughout the process. A consent form that describes the research purpose, address of researcher, benefits and risks of the research, confidentiality and voluntary participation was prepared and provided to all study participants.

Results

Concurrent Validity:

Out of a total of 14 health science colleges that provide nursing training in Addis Ababa City Administration, 9 have participated in the assessment. From these colleges the “in-school grade point average” and competency assessment results of 672 students were collected; among them the majority 585 (85.5%) were females and most 497 (74%) were from private colleges.

As shown in table 1 below, the competence assessment competency rate of level II nursing (health care giving) students in the year 2013 was 86.6%. On the other hand, the competency rate for private colleges was 84% (66%-93%) while it was 94% for government colleges. Therefore, the difference in competence assessment rate observed between private and government colleges was significant ($p=0.001$) which denotes that government colleges’ competency rate is higher than that of the private colleges. When looking at the competency rate in relation to sex, male competency rate was found to be 87.6% whereas that of females was 86.4%. The difference observed between the two sexes was not significant ($p=0.749$).

Table 1: **Level II nursing competency assessment results in Addis Ababa 2014.**

Variable (N=672)		Total Assessed	Competency Rate	P- value (chi- square)
Type of Institution	Government College	175	164 (93.7%)	0.001
	Private College	497	418 (84.1%)	
Sex	Female	585	497 (86.4%)	0.749
	Male	87	85 (87.6%)	
Over all	Total	672	582 (86.6%)	-----

The mean value for the in-school grade point average was 81 with standard deviation of 10.1. The mean value of in-school grade point average for those who were not-yet-competent was 79 ± 10 while it was 82 ± 10 for those who were competent. The result of the Mann Whitney U test shows that the difference observed in the mean in-school grade point average value among “competent” and “not-yet-competent” candidates was statistically significant ($p=0.042$).

Content Validity:

The assessment questions that the Addis Ababa Occupational Competency Assessment and Certification Center (AA OCACC) prepared could not be accessed by the investigator as it was restricted for confidentiality reason. Given this situation, content validation was done by the assessors and tool developers who had access to the assessment tool. The validation was done by checking the elements of each core competence for level II nursing (health care giving) against the assessment tool. The

assessors were asked to confirm if the elements of each core competence were included in the assessment tool.

When we look at the core competence content representation in the assessment tool, the majority (>80%) of the assessors believed that 9 (50%) components of core competence were fully represented in the assessment tool. However, more than 60% of the assessors believed that 3 (16%) components of core competence were not represented in the assessment tool.

In addition, there were 6 components of the core competence (33%) which were considered to be represented or not represented by 50-60% of assessors. This might be due to the nature of the components of the core competence which are very difficult to assess through a practical tool or it could be that an imprecise assessment tool through which the elements are assessed was employed.

Table 2: **Summary of content validation of the COC assessment tool with the core competence for level II nursing in Addis Ababa, 2014**

Components of core competence	*Mean Score – out of 15
Work effectively in the health industry**	13.5
Comply with infection control policies and procedures**	15
Follow the organization's OHS policies**	12.2
Handle waste in a health care environment**	12.6
Perform general cleaning tasks in a clinical setting**	14
Prepare and maintain beds**	15
Collect and manage linen stock at user-locations	10
Undertake routine inventory maintenance	1.3
Follow safe manual handling practice	11
Respond effectively to difficult or challenging behavior	6.3
Transport clients/ patients**	15
Assist with client/ patient movement**	15
Provide care and support special needs	11
Provide basic first aid**	14.7
Demonstrate work values	11.5
Participate in workplace communication	9.4
Work in team environment	10
Apply continuous improvement processes (Kaizen)	1.8

*Mean score – the average scores of the elements in each core competence as reported by the assessors.

** Satisfactorily represented by the assessment tool.

Discussion

Concurrence Validity:

There is a general consensus that if two tests of the same construct are administered to the same individual, as long as the psychometric test characters are high and known, the assessment scores of the two or more assessment tools correlate (9-11). In testing theory, the importance of reliability is related to generalization of test outcomes. In other words, success in a particular test ensures success in future tests or demonstrations of the tested skill (12). However, one of the main challenges in criterion-related validity is to get a successful criterion test. As the assessment tools compared in this study (in-school testing and competence assessment) are not standardized, one cannot be able to know the psychometric characteristics of each of the tools which indicated that there is no best available criterion test to predict the next one. In line with this, it is difficult to conclude that the in-school test is a predictor for the competence assessment.

As can be observed in this assessment, the mean in-school grade point average difference between the competent and not-yet-competent group is statistically significant. This means that those who have better in-school performance that is reflected by their high grade point average are likely to be competent in the competence assessment than those who perform low the in-school grade. This result is consistent with many other studies. However, this result has to be taken into account with caution. As long as the psychometric qualities of the two tests assessed in this research are not known, there is a possibility of acquiring the same biases in both tests. There is also a possibility that a test and criterion could correlate for the wrong reason (13). One could rather say that the two tests are comparable and highly correlated.

Despite the correlation observed between the in-school performance and the competence assessment result, it is, however, noticed that there were instances where high performing students in the in-school learning were found to be incompetent in the assessment and low performers in the in-school learning to be competent. This could be attributed to factors other than difference in in-school grades. In test theory there are true scores where it is the ideal version of what the examinee has to score. Though there is no true score in reality, a score is observed with an error component. This error component could, thus, happen for so many reasons such as examination settings, candidates' emotional and health condition, assessors' judgment, etc. Internal inconsistency of the examinee is part of the error component (12). However, it should also be noted that only candidates who score 50% and above in the in-school testing are eligible to sit for the competence assessment, denoting that all candidates are somehow fit to be competent.

The nature of the current competence assessment is liable to subjectivity bias. Even if it could be possible to reduce this bias, it is, however, impossible to avoid subjectivity in ratings of practical assessments. As noted by the assessors, some candidates, irrespective of their in-school grade performance, might be convincing while explaining and presenting themselves in a way that justifies the rating of poor performers.

The result observed in this assessment has also revealed that the competency rate of government colleges is higher than that of private colleges. The sole reason for the difference observed is not studied. However, the assumption is that government colleges have been engaged in delivering training for more than 50 years; that may put them in a more favorable position to access well equipped demonstration room to deliver better quality courses, including many years accumulated experience in teaching. It has also been observed that the selection of the candidates and placement in the government colleges is more rigorous and highly competitive that it might have allowed highly competent candidates to be enrolled in government institutions as compared to private ones.

Content Validity:

The competence assessment currently in use in Ethiopia is purely criterion-referenced and the need to determine its content validity remains crucial. From the findings of this investigation, it was evident that the majority of the core competencies for the OS level II nursing are assessed by the competence assessment tool. However, many more are also not assessed by the assessment tool. There are also six components of core competence on which the assessors' agreement was not well defined to the extent that makes it possible to fathom if they are contained or not contained in the assessment question. This might be due to the nature of the components of the core competence which is very difficult to assess through a practical assessment tool or it may be due to the assessment tool which is not clear enough about the elements assessed.

The content validation analyses revealed that significant proportion of the components of core competence was not included in the assessment tool. There are many more skills in the core competence that are not yet assessed by the tools. This may affect the quality of the assessment.

With regards to the tool development process, the tool developers consider the OS developed by the TVET agency during tool preparation, such a practice an important and good step in assuring content validation. However, other widely known methods of assuring content validation like table of specification were neither in use nor designed as a special procedure. Moreover, none of the tool developers have gone through special

training in assuring assessment tool reliability and validity. This may lead to missing some of the important components core competence in the assessment tool.

Limitations of the Study:

The content validation which was done by the assessors and tool developers was expected to encounter a socially desirable bias.

Conclusions:

The correlation between the in-school grade point average and the competence assessment result has a positive relationship. Competency rate of government health science colleges is greater than that of private colleges, and competence was not influenced by sex of candidates.

The assessment tool content for level II nursing candidates was good, yet above 16% of the components of core competence were not captured in the assessment tool.

Recommendations:

Based on the findings of the study, one can recommend the need for developing and materializing tool effectiveness assurance guidelines and a system of periodic checking for inter-rater reliability.

Content validation procedures should also be properly applied, and an assessment tool bank should be developed where the COC should have multiple assessment tools with well-known psychometric characteristics.

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