

Investigation the Psychometric Properties of the Persian Version of Nursing Student Satisfaction Scale for Nursing Program

Abstract

Background: Evaluating the efficacy of educational programs is a good way to assess the current situation, which requires the use of valid tools in this area. Therefore, the purpose of this study was to translate and evaluate the psychometric properties of the Persian version of the Nursing Student Satisfaction Scale (NSSS). **Materials and Methods:** The NSSS was translated from English to Persian using the standard forward-backward method. After face validity, content validity was performed with qualitative method and quantitative method with CVR and CVI calculation for each item. Using convenience sampling, 297 nursing students were selected and completed the questionnaire. Exploratory factor analysis (EFA) and Confirmatory Factor Analysis (CFA) in SPSS and AMOS software were used to evaluate the construct validity of the scale. **Results:** In face validity, some items were modified based on the opinion of the target group. Item impact score for each item was at least 1.7 to 2.5. Moreover, S-CVI/Ave = 0.966, S-CVI/UA = 0.706, and the content validity ratio for each of the items was 0.87-1. According to the results of factor analysis, the three factors introduced in the main tool were approved with acceptable values. All indices of CFI = 0.906, $\chi^2/df = 1.572$, and RMSEA = 0.0609 confirmed the fit of the final model. In addition, the reliability of the instrument obtained using the internal matching method (Cronbach's alpha) for the whole instrument was 0.90. **Conclusions:** The Persian version of the NSSS has acceptable psychometric indicators in the population of Iranian nursing students.

Keywords: Nursing, psychometrics, students, translations

Introduction

Program evaluation has been emphasized in higher education as a way to improve learning and demonstrate accountability.^[1,2] The educational curriculum for nursing students is compiled by the Cultural Revolution Council and is communicated to nursing schools for implementation. The specified educational goals for the field of nursing should be based on the needs of society with the aim to improve the performance and quality of clinical performance of nurses. Therefore, in line with these goals and to improve the level of nursing skills and knowledge, examining the weaknesses of educational programs and new educational needs can be helpful.^[3]

Researches have shown that determination of the satisfaction of students in the evaluation of a comprehensive program can provide a general understanding of students and insight into the expectations of students

for the development and improvement of programs.^[4,5] Therefore, a more reliable and comprehensive tool is required for the evaluation and determination of the problems of nursing education programs. The translation and localization of such a tool, while making the research results more reliable for the target community, also eliminates the need to design and build a new questionnaire in this field.

The Nursing Student Satisfaction Scale (NSSS) is the only tool to measure the satisfaction of nursing students at the bachelor's level with their nursing program, which was psychoanalyzed by Mrs. Hsiu-Chin Chen from the Department of Nursing at Utah Valley University in the United States in 2012.^[6] The NSSS is used to measure nursing students' satisfaction with the nursing program. The NSSS is a 27-item questionnaire and the items are scored using a 6-point Likert scale. A higher score indicates a higher level of student

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satisfaction with the nursing program. The NSSS includes four areas based on the conceptual framework: curriculum content and structure (9 items), professors' teaching strategies (8 items), social interaction between students and professors (6 items), and the educational environment such as a clinical skills center (7 items). Moreover, 1 item is related to the overall satisfaction of students. One of the main goals of the translation and psychoanalysis of a tool is to check its validity, reliability, and factor structure. In other words, the translation and rationalization of a tool is a kind of localization and matching it with the target society. It was not important. Tools become usable through translation into another language and their adaptation in another society. Therefore, the purpose of this study was to translate and evaluate the psychometric properties of the Persian version of the NSSS.

Materials and Methods

This methodological study was conducted between 2020 and 2022. In the first stage, two English professors translated the tool separately. Then, in a meeting attended by the researcher and these professors, the two translations were reviewed and the differences between the English and Persian versions were evaluated and the differences were reduced to the minimum possible through the process of repeated review. The process of combining and matching the translations was conducted with the opinion of a group of experts, which included the main researchers, expert translators, experts in the designing and construction of tools, and people from the target group. Finally, a single translation was selected. The edited questionnaire was then back-translated into English by two other English professors who were proficient in nursing texts.

The face validity of the instrument of this study was investigated using qualitative and quantitative approaches. In the qualitative approach, 10 undergraduate nursing students were asked to review the items of the initial version of the study tool, in addition to expressing their understanding of their meaning, their opinion on the level of difficulty, appropriateness, and ambiguity of the items, as well as state the possible need to delete or merge items. Content validity evaluation was done through both qualitative and quantitative approaches and with a survey of 10 experienced professors in the field of nursing education who were familiar with the subject of the study. To evaluate content validity with a quantitative approach, the Content Validity Ratio (CVR) and Content Validity Index (CVI) were calculated.^[7] The CVI of the items was calculated using the formula proposed by Waltz and Basel. The total CVI values of the remaining items were calculated as the total scale CVI/average (S-CVI/Ave). The scale CVI/universal agreement (S-CVI/UA), which refers to the general agreement and general consensus of all experts, was also calculated. The minimum acceptable sample size for factor analysis was considered proportional

to the number of instrument items and 10 people for each item.^[8] Considering that the tool in this study includes 27 items, a minimum sample of 270 people was calculated, and taking into account a 10% probability of lack of complete response to the questionnaires, the sample size in this research was increased to 297 people.

The reliability of the tool designed in this study was evaluated using the internal consistency method. To evaluate internal consistency reliability, Cronbach's alpha coefficient was calculated for the entire tool and its subscales, and a value greater than 0.7 was considered satisfactory internal consistency reliability. To determine the appropriateness of the data for confirmatory factor analysis, Keizer's criterion and Bartlett's test were used. SPSS software (version 25; IBM Corp., Armonk, NY, USA) and AMOS software (version 24; IBM Corp., Armonk, NY, USA) were used in this study.

The following model fit indices were used: A ratio of Chi-square to the degree of freedom χ^2/df below 3, comparative fit Confirmatory Fit Index (CFI) of 0.95 or higher, Parsimonious Comparative Fit Index (PCFI) of more than 0.5, Parsimony Ratio (PRATIO), and Parsimony Normed Fit Index (PNFI) of more than 0.5 was acceptable. Moreover, a root mean square error of approximation (RMSEA) in the range of 0.06–0.08, more than 0.1, and less than 0.05 was considered acceptable, poor, and excellent, respectively.^[7]

Ethical considerations

This article is the result of a research project with the number 970917 and the code of ethics of IR.MUMS.REC.1398.049 approved by the Research and Technology Vice-Chancellor of Mashhad University of Medical Sciences, Iran. Written permission was obtained from the designer of the questionnaire (Ms. Sunny Chen) to translate her tool. After obtaining the necessary permits and obtaining consent from the participants in the study, a questionnaire was provided to them. All participants were assured that their information would be kept confidential.

Results

The mean and standard deviation of the age of the participating students was 20.85 (1.88) years, 52.30% were women and 47.70% were men. The participants included students in different academic semesters except the first semester. In terms of face validity, items with a coefficient of higher than 1.5 were considered suitable items and had face validity. The obtained coefficients for all items were higher than 1.50.

In terms of qualitative content validity, for example, the item "the equipment in the nursing laboratory was in good condition" was changed to "the equipment in the practical room was well maintained." However, no items were deleted. In evaluating the validity of the content with

a quantitative approach, the CVR, item “M3” according to the Lawshe table, has a validity ratio lower than 0.60, but its CVI was high (0.97). Nevertheless, and with a conservative approach, it was approved. The S-CVI/Ave of the Persian version of the NSSS was 0.966. According to Polit and Beck (2006), the value of this index (0.90) was considered acceptable validity. Moreover, its S-CVI/UA was 70.40%.^[7]

By removing item M5 from the “environment” factor, the alpha coefficient increased by 0.0001. Therefore, its removal was canceled, whereas the overall reliability of the tool was above 0.90. The reliability of the instrument was obtained by calculating Cronbach’s alpha for the entire instrument ($\alpha = 0.905$). This level of reliability confirms the sufficient internal consistency of the instrument.

The sampling adequacy index is the Kaiser–Meyer–Olkin (KMO) rate, which was equal to 0.825 and Bartlett’s sphericity test was significant ($p < 0.001$), which showed the ability to categorize the items and form the factor [Table 1].

In the exploratory factor analysis, three factors were extracted. After a varimax rotation with eigenvalues of greater than 1 and factors above the break line in the scree plot, the same three factors of “curriculum and teaching,” “environment,” and “professional and social interactions” accounted for 54.02% of the variance; thus, the desired concept was explained. The factor loading was higher than 0.3 in all the items.

To check the goodness of fit of the final model of the factorial structure of the 27-item NSSS, the goodness-of-fit test of the Chi-squared confirmatory factor analysis was examined and $\chi^2 = 468/48$ ($p < 0.001$). Table 2 shows the extracted factors with the factor load of the items. Next, the fit of the model was examined using other indicators. All indices (CFI = 0.90, PCFI = 0.65 PNFI = 0.59, PRATIO = 0.91, $\chi^2/DF = 1.57$, and RMSEA = 0.06) confirmed the fit of the final model [Figure 1].

Discussion

In this study, the NSSS and the psychometric features of its Persian version were investigated and confirmed. Therefore, with this native tool and in accordance with the educational and cultural system of Iran, it is possible to examine the quality of nursing programs from the students’ viewpoints.

In this study, Chen’s 27-item questionnaire was examined. The examination and confirmation of the psychometric characteristics of the tool in Iranian Nursing students indicate that the Persian version of this tool with finalized items and questions has a suitable validity and reliability in the nursing education system of the country. Based on the students’ views, a number of sentences and phrases in the subjects were modified. Moreover, in terms of importance, all items were approved. In terms of content validity, all

Table 1: Keyser–Meyer–Olkin and Bartlett test results

Kaiser–Meyer–Olkin (KMO) and Bartlett’s test		
Kaiser–Meyer–Olkin measure of sampling adequacy		0.83
Bartlett’s test of sphericity	Approx. Chi-square	2942.54
	df	351
	<i>p</i>	<0.001

Table 2: Item factor load and factor variance percentage after varimax rotation of 27-item instrument for measuring nursing students' satisfaction for nursing program

Factor (variance percentage)	Item	Factor load
Curriculum and Teaching (23.69)	B1	0.775
	B2	0.805
	B3	0.689
	B4	0.515
	B5	0.603
	B6	0.668
	B7	0.665
	B8	0.779
	B9	0.715
	B10	0.781
	B11	0.364
	B12	0.721
	B13	0.526
Environment (17.77)	M1	0.675
	M2	0.842
	M3	0.890
	M4	0.781
	M5	0.588
Professional Social Interactions (12.56)	T1	0.683
	T2	0.738
	T3	0.609
	T4	0.769
	T5	0.719
	T6	0.712
	T7	0.730
	T8	0.752
	T9	0.579

the items in the Persian version of this tool were consistent with measuring the quality of nursing education. According to the construct validity results with the exploratory and confirmatory factor analysis test, 27 items in the 3 subscales of curriculum and teaching (13 items), environment (5 items), and professional social interactions (9 items) were obtained. All items were maintained in the tool and no items were removed, and this indicates that to a large extent, the context of the Iranian nursing education program is consistent with the American educational system. It can be claimed that this tool is largely compatible with the nursing education system of Iran. Karimi *et al.*^[8] compared the undergraduate nursing curriculum in Iran and several American universities and found some differences in the curriculum of the two educational systems. Previous studies

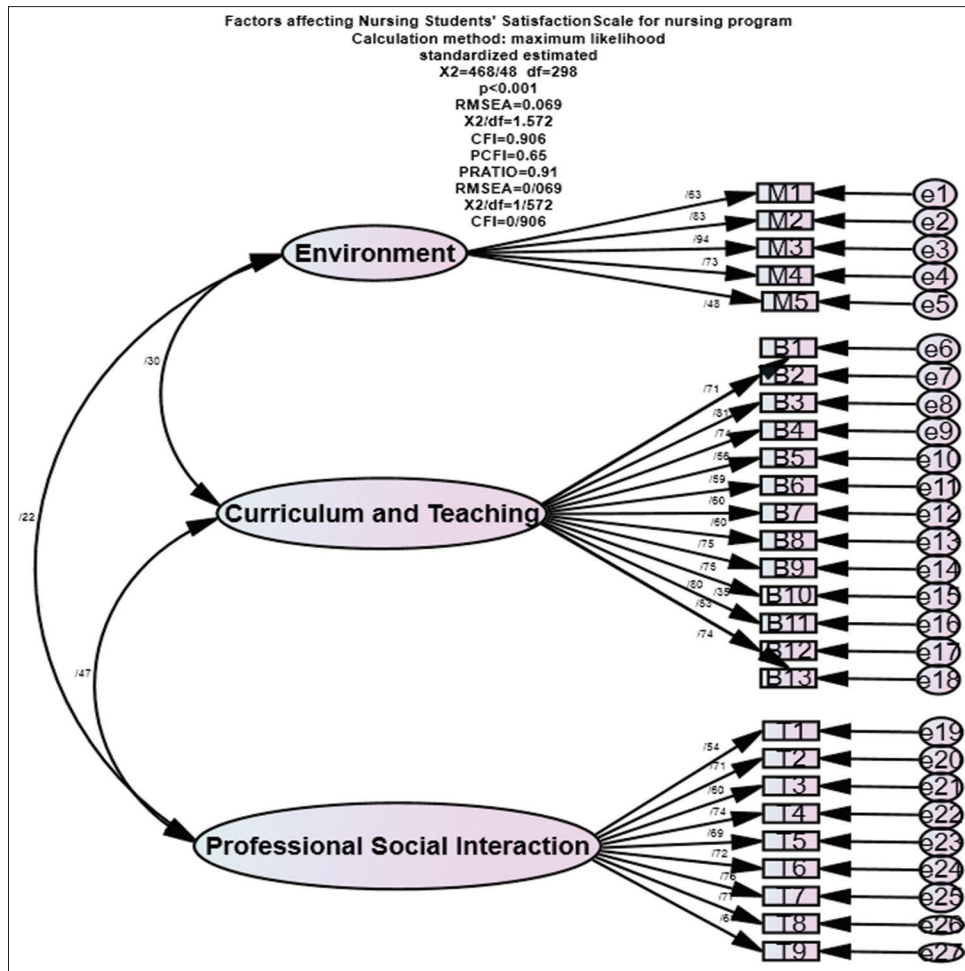


Figure 1: Confirmatory factor analysis of the three-factor scale of students' satisfaction with the nursing program (NSSS)

show that the nursing program in Iran was derived from the American nursing education program and was affected by rapid social and political changes.^[9]

Hadizadeh *et al.*^[10] evaluated the clinical education situation from the point of view of nursing and midwifery students using a clinical education evaluation tool consisting of four dimensions. It included the dimensions of performance of trainers, staff–student–patient cooperation, hospital environment facilities and equipment, and clinical evaluation system. Compared to this tool, the field of clinical evaluation systems has three separate items. In the present tool, the tenth item of the first factor and the seventh item of the third factor are in the evaluation field.

In the present study, using the test–retest method with a 2-week interval, the Intra-Cluster Correlation index (ICC) to estimate the reliability of the tool in each area confirmed the reproducibility of this test. Furthermore, the internal consistency of the subscales was checked using Cronbach's Alpha Index; Cronbach's alpha for the whole tool was 0.9. The final three-factor instrument accounted for 81% of the total variance. Although other researchers have approached measuring student satisfaction in different ways, the total

variance explained by our instrument was reported to be very close to optimal.^[4] Therefore, according to the results of the present study and similar studies, it can be said that the NSSS is a reliable, repeatable, and stable instrument.

Faye, *et al.* developed a student satisfaction instrument that was not specific to the academic aspects of a nursing program.^[11] Instead, it included items that measured a wide range of academic and non-academic factors.^[11] Ligler examined the predictors of nursing students' satisfaction from a broader perspective, whereby satisfaction measures included factors not related to the university, such as social interactions with peers and professors, and satisfaction with organizational facilities.^[12] Norman *et al.*^[13] used a survey that included open-ended qualitative questions focusing on the overall satisfaction of nursing students and did not provide any reliability or validity data from the survey in the quantitative section.

One of the limitations of the study was the lack of a similar study with this tool in an educational and cultural system different from Iran. Moreover, in terms of measuring criterion validity, a tool that has many similarities with the studied tool in any respect has not been designed or

translated and psychometrically tested in Iran. As with all self-report measures, this study is subject to the potential for response and self-selection bias. Another limitation was the lack of survey items with negative wording. Some authors recommend the use of positive and negative items to avoid response bias^[14,15]; however, several researchers, including Torabi and Ding, do not recommend this practice.^[16-18] In the present study, no item with negative wording was included in the instrument.

Conclusion

According to the psychometric results obtained for the Persian version of the NSSS, this tool has acceptable psychometric indicators in the population of Iranian nursing students and it can be used as a reliable tool in various fields including teaching and evaluating the quality of nursing education, and thus, it can be concluded that the Persian version of this questionnaire can be used as an acceptable tool in research.

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Conflicts of interest

Nothing to declare.

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