

Validation of the Persian Version of Dental Students' Attitude toward Underserved Populations Questionnaire

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Abstract

Background: Assessing dental students' attitudes toward providing services to disadvantaged populations is essential for improving community-based training programs. Up to now, few scales have been developed to measure dental students' attitudes about deprived groups, among which the "Dental Students' Attitudes Toward Underserved populations instrument" (DSATU) is a reliable questionnaire.

Objectives: This study aimed to assess and confirm the validity and reliability of Persian version of the DSATU questionnaire.

Methods: In this validation study, translation and cultural adaptation were made by translation and back-translation method. A panel of experts assessed the face and content validity qualitatively. The content validity was assessed using a quantitative approach (which included the Content Validity Ratio (CVR) and the Content Validity Index (CVI). The item's impact score was evaluated by dental students. The test-retest method and Cronbach's alpha were used to determine the reliability.

Results: The questionnaire was revised and modified based on the validation results. Regarding CVR, two questions were excluded. Moreover, according to CVI and impact score results, eight questions were modified and corrected. Total cronbach's alpha coefficient (= 0.831) and intraclass correlation coefficient (0.83) were acceptable. The Pearson and Spearman's rank correlation coefficient indicated that the reliability was appropriate.

Conclusion: The introduced Persian version of the DSATU questionnaire is a culturally appropriate, valid, and reliable instrument for Persian researchers who intend to evaluate the attitude of dental students toward underserved populations. Moreover, it can be used to evaluate the effectiveness of community-based training programs in longitudinal studies.

Keywords: Dental student; Attitudes; Underserved Populations; Translation; Validation; Questionnaire

Background

Oral health is one of the most critical aspects of overall health. Oral diseases are widespread and adversely influence the quality of life. The distribution of oral diseases in the population is affected by socioeconomic levels. Studies have shown that underserved people who live in low-income areas are more deprived of access to oral health services due to the increase in social inequalities (1-3). One of the major challenges may be a lack of adequately qualified dental personnel to meet the disadvantaged population's oral health needs (4). Furthermore, a fairly common belief among oral health care providers that these groups are challenging to handle could exacerbate the issue (2, 3, 5-7).

Dentists' willingness or reluctance to treat underserved patients may be influenced by their dental education (8-10). Several studies demonstrated that community-based educational experiences are correlated with dental students' tendency to provide dental services to underserved populations (5, 9, 11, 12). Nevertheless, some other authors documented that student's attitude does not necessarily depend on educational courses (5, 13, 14). It is, however, commonly accepted that dental education must promote access to oral health services and, eventually, close the oral health inequalities gap. Dental schools are supposed to train dental practitioners who embrace a social obligation to provide oral health services for underserved communities (6, 7, 11).

Recently, dental schools have integrated community-based programs into the dental curricula to improve the care of less privileged communities. Overall, the findings of these programs imply a better understanding of oral health disparities among dental students. Moreover, they acquired higher competency in providing oral health services for people experiencing poverty (15, 16).

Assessing students' attitudes toward community-based activities and providing services to vulnerable and underserved populations can help evaluate the achievement of goals and the effectiveness of these training programs (13, 17, 18). A popular instrument was designed to evaluate Medical Students' Attitudes towards Providing Care for the Underserved populations (MSATU questionnaire) by Crandall and Loemker in 1993 (19). In 2011, Habibian et al. modified this questionnaire to introduce a new tool for assessing Dental Students Attitude toward Underserved Populations (DSATU). This tool consists of 23 Likert scale questions divided into four domains that address societal expectations, student responsibility, personal efficacy, and access to care (5). So far, no study has been conducted in this field in Iran, and the appropriate instrument has not been designed in Persian. Therefore, this study aimed to translate and validate the Persian version of the DSATU questionnaire.

Objectives

This study aimed to assess and confirm the validity and reliability of Persian version of the DSATU questionnaire.

Methods

Study design: This validation study was carried out at Mashhad Dental School, one of the major active educational centers in community-based programs among Iranian dental schools.

DSATU questionnaire: This tool consists of 23 Likert scale questions divided into four domains: societal expectations, dental student/dentist responsibility, personal efficacy, and access to care. The choices vary from 1 (extremely disagree) to 5 (extremely agree), giving a total score ranging from 23 to 115. The items 1-7-11-20 were reverse questions, so their scoring was done upside-down.

Translation: In the first step in the transcultural adaptation process, the original version of the questionnaire was translated from English to Persian by two bilingual professionals whose native language is Persian. Afterward, the two translated versions were

merged, and the research team evaluated and agreed on it. The resulting questionnaire was back-translated into English by another language expert who did not know the English context of the questionnaire. Finally, a comparison of the original and back-translated versions showed the accuracy of the translation process.

Qualitative and Quantitative Evaluation of the Content and Face Validity: The questionnaire was introduced to nine academic tutors with PhD in community oral health for qualitative assessment of the content and face validity. They provided written feedback on the accuracy, completeness, scoring system, and placement of the items in the proper order.

The content validity ratio (CVR), based on the Lawshe scale (20), as well as the content validity index (CVI), were used for quantitative validation. The questionnaire was sent to the email addresses of 30 community oral health experts and professors from various Iranian dental schools. Nine experts completed the CVR/CVI checklist. Regarding the CVR formula (20), the panel members classify the necessity of each question based on the Likert scale into three categories: "3 = necessary", "2 = useful but unnecessary", and "1 = unnecessary". The CVR is calculated based on the ratio of the total number of experts who deemed the item necessary to the total number of the expert panel. The Lawshe table determines the minimal acceptable CVR score (Table 1).

Table 1. Lawshe table for minimal acceptable CVR values based on number of panelists

Number of panel members	CVR values
5	0.99
6	0.99
7	0.99
8	0.75
9	0.78
10	0.62
11	0.59
12	0.56
13	0.54
14	0.51
15	0.49

Item-CVI and scale level-CVI approaches were considered to determine relevance, clarity, and simplicity.

I-CVI: panel members rated relevance, clarity, and simplicity based on four- option on the Likert scale. The relevance of each item was defined with the options of 1 (not relevant), 2 (somewhat relevant), 3 (quite relevant), and 4 (highly relevant). The clarity and simplicity of each item were assessed with a similar pattern. The CVI was then determined for each item as the number of experts giving 3 or 4 rankings, divided by the total number of experts. If the items' CVI scores were under

0.79, the item requires further revision and modifications (21).

S-CVI: Average S-CVI was calculated by dividing the sum of I-CVIs by the all of items.

Impact Score: The questionnaire was presented to four dental students as a sample of the target group. They were asked to determine the importance of each item on the Likert scale with five options of 1 to 5 (not important to very important). The impact score for each item was calculated using the formula:

Percent of selected 4 and 5 scores \times mean score of the item. The item is considered important if the impact score is greater than 1.5.

Questionnaire reliability: Finally, the questionnaire reliability was assessed. The questionnaire was emailed to 40 students of Mashhad and Tehran dental schools. They were asked to complete the questionnaire two weeks later again. The internal consistency was assessed using Cronbach's alpha coefficient. The Intraclass Correlation Coefficient (ICC) and Pearson/Spearman's rank correlation coefficient were used to assess reliability. The statistical analysis was performed using SPSS version 22. [Figure 1](#) shows the stages of translation and psychometric assessment of the Persian version of the DASTU questionnaire.

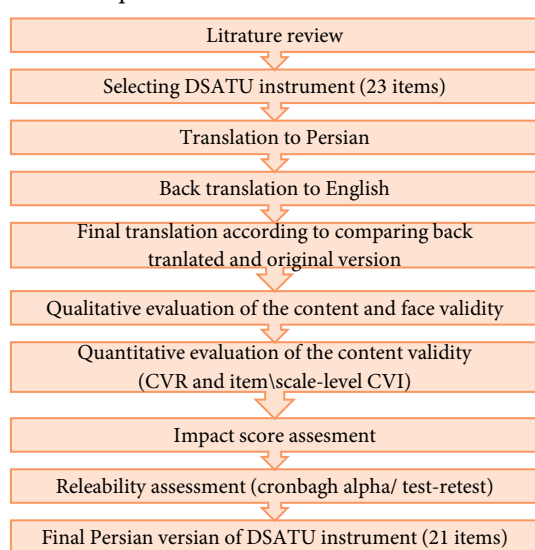


Figure 1. Flowchart of translation and psychometric evaluation of Persian version of DASTU questionnaire

Results

The translated questionnaire was reviewed and modified after receiving the expert panel comments. The questionnaire's items and psychometric properties (CVR, CVI, impact score) are presented in [Appendix 1](#).

Validity: Except for eight items, other items gained the acceptable CVR value. All items, except for items

2 and 6 of the first domain, had a CVI score of 0.78 or higher. Furthermore, Scale-level CVI (S-CVI = 0.98) was excellent. The impact scores showed that 20 questions had acceptable values (a score equal to or greater than 1.5).

Reliability: The test retest method, and Cronbach's alpha were used to evaluate the reliability. Twenty-five students (16 females and nine males) completed the questionnaire. The mean age of participants was 24.52 ± 1.91 years, ranging from 21 to 29 years. The average academic term of students was 10.56 (range 5 to 12).

Cronbach's alpha was used to examine the internal consistency of the items within the questionnaire. The total score of Cronbach's alpha (= 0.831) coefficient was acceptable. The Cronbach's alpha for the questionnaire domains, including societal expectations, student responsibility, personal efficacy, and access to care, were 0.617, 0.633, 0.739, and 0.489, respectively. Cronbach's alpha was assessed in the case of each item deleted too. The results showed that the alpha value of related domains would decrease in the case of deletion of 16 items.

Moreover, in the test-retest method, spearman's correlation coefficient was used to evaluate the correlation between the scores of each item. A significant correlation between 22 items was found that implied acceptable repeatability. The pearson's correlation coefficient was used to evaluate the correlation between each domain's scores and the questionnaire's total score ([Table 2](#)).

Table 2. Correlation values between questionnaire domains in test-retest

	Pearson's correlation coefficient	P-value
Societal expectations,	0.627	0.001
Dental student/dentist responsibility	0.684	0.001
Personal efficacy	0.861	0.001
Access to care	0.678	0.001
Total DSATU score	0.700	0.001

There was a significant correlation between each domain and the total score of the questionnaire. The correlation coefficient of the total scores of the questionnaire was 0.7. The findings of the ICC analysis are presented in [Table 3](#). The intra-class correlation coefficient between all of the domains was acceptable.

According to the results, two questions were removed from the questionnaire after validity evaluation: item 2 in the social expectations domain and

item 1 in the dentist's responsibilities. Also, according to the opinions of the honorable panel, questions 3 and 6 of the first domain, questions 2, 3, 4, 5, and 7 in the second domain, and question 3 in the third domain were revised and rewritten. Also, according to the results of Cronbach's alpha, question 3 was left out of the fourth domain, and the fourth score of Cronbach's alpha elevated to 0.537.

Table 3. Intra class correlation coefficient of each domain and total of the questionnaire

	ICC	P-value
Societal expectations,	0.726	0.001
Dental student/dentist responsibility	0.853	< 0.0001
Personal efficacy	0.801	< 0.0001
Access to care	0.918	< 0.0001
Total DSATU score	0.841	< 0.0001

ICC: Intraclass correlation coefficient

Discussion

Dental students can be positively influenced due to the collaboration engendered by common attitudes. On the other hand, the shared attitudes can be counterproductive to student learning (2, 3, 12). Although there is a lack of instruments to evaluate dental students' attitudes toward providing services to deprived populations, the dental version of the MSATU questionnaire is the most commonly used and comprehensive instrument (2, 5, 10, 19). The DSATU questionnaire includes four domains to measure students' attitudes toward societal expectations, student responsibility, personal efficacy, and access to care (5). Steinberg et al. used the DSATU questionnaire to assess the effectiveness of a medical ethics course in surgery. Findings showed that the ethical course improves students' attitudes toward disadvantaged groups (12). Moreover, Wayne et al. used this questionnaire in the New Mexico School of Medicine. Their study revealed that the attitude scores have dropped for most students during study courses (22). In line with this survey, Crandall et al. concluded that attitude scores of pharmacy students were more stable over time, while the MSATU scores of medical students decreased over four years (15). Although the results of the Habibian study showed that dental students' attitude scores decreased significantly over four years, students with a history of working as social volunteers had a significantly higher responsibility score. Moreover, females scored significantly higher than male students (5).

Dande et al.'s questionnaire was designed to assess students' personal efficacy in providing care for rural

populations (2). Additionally, the Health Professional Attitudes toward the Homeless Inventory (HPATHI) questionnaire was first introduced and validated by Buck et al. (23). All the HPATHI's items limit to provision services to the homeless population. Komaromy, et al.'s questionnaire, was designed and validated to evaluate the willingness of California physicians to provide dental health services for poor patients (10). The Komaromy questionnaire only addresses why some physicians are reluctant to treat poor and uninsured patients. Wieland et al. introduced a questionnaire to assess resident physician attitudes and behaviors regarding care for underserved patients. Although this questionnaire is similar to the DSATU questionnaire, some items (racial disparities) were not culturally appropriate to the Iranian context (24). In conclusion, the DSATU instrument seems to be an appropriate and fruitful questionnaire compared to the other relevant alternatives.

Habibian et al. used the opinions of six dental professors to check the questionnaire's validity qualitatively. So, using qualitative and quantitative assessments of validity could be considered one of this study's advantages (5).

Conclusion

The introduced Persian version of the DSATU questionnaire is a culturally adapted, valid, and reliable instrument for Persian researchers who intend to evaluate the attitude of dental students toward underserved and deprived populations. The coherence of all questions and domains was deemed appropriate. Moreover, it can be helpful to assess the influence of community-based programs in longitudinal studies.

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Conflict of interests: There is no conflict of interest.

Ethical approval: Mashhad University of Medical Sciences granted ethical approval for the study [IR.MUMS.DENTISTRY.REC.1399.106]. Informed consent was obtained from all subjects. Faculty members and dental students who consented to participate in the study, filled out the questionnaire. The questionnaires were anonymous and the data remained confidential.

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Appendix 1. Psychometric properties of translated DSATU questionnaire

No	Item	CVI-Clarity	CVI-Relevance	CVI-Simplicity	CVR	Impact score
Domain 1: Societal Expectations						
1	It is not the responsibility of the federal government to fund programs that provide dental care to the needy	0.78	1.00	0.78	1.00	2.81
2	Communities should be responsible for providing facilities for the care of the needy	0.56	0.89	0.67	0.56	3.19
3	It is the responsibility of church-related organizations to provide some funding for oral health care services	1.00	1.00	1.00	0.78	0.69
4	State government should be responsible for funding programs to meet the oral health care needs of its residents.	0.89	1.00	0.89	1.00	5
5	Churches should provide facilities for dental care of the needy	0.89	1.00	0.89	0.78	2
6	Society is responsible for providing for the oral health care of its members	0.67	1.00	0.78	0.78	1.63
Domain 2: Dentist/Student Responsibility						
1	Dentists should be responsible for providing oral health care to the needy.	1.00	1.00	1.00	0.56	3.19
2	Dentists should volunteer their time working in a free clinic.	1.00	0.89	0.89	0.56	4.5
3	Individual dentists should not be willing to provide care for their patients who cannot pay.	1.00	1.00	1.00	0.78	1.63
4	Dental students should be involved in providing dental care for the needy.	1.00	1.00	1.00	0.56	4.5
5	To care for needy patients, each dentist should allow for 15% of the care he/she provides to be true charity.	1.00	0.78	0.89	0.33	0.56
6	All dental students should become involved in community health efforts.	0.89	1.00	0.89	0.56	1.63
7	Dental students should not be concerned about the problems of the needy	1.00	1.00	1.00	0.33	0.69
8	All dental students should be involved in community activities.	1.00	1.00	1.00	0.78	0.69
Domain 3: Personal Efficacy						
1	I feel personally responsible for providing dental care to the needy.	1.00	1.00	1.00	0.78	3.38
2	I would be interested in volunteering for programs that provide dental care for the needy during my dental school academic tenure.	1.00	1.00	1.00	0.78	4.5
3	I feel I am personally unable to have an impact on the problem of meeting the dental needs of the underserved.	0.78	1.00	0.89	0.56	1.63
4	I personally want to be involved in providing care for the needy during my dental career.	1.00	1.00	1.00	0.78	5
Domain 4: Access to Care						
1	Dental care should be provided without charge for those who cannot pay.	1.00	1.00	1.00	1.00	4.5
2	Not everyone should have access to dental care.	0.78	1.00	0.78	0.78	1.25
3	Access to dental care is a privilege	0.78	1.00	0.89	0.56	4.5
4	People have a right to unlimited dental care regardless of their ability to pay	1.00	1.00	1.00	1.00	4.75
5	Access to oral health care is a right	1.00	1.00	1.00	1.00	5