



## Psychometric properties of the communication skills attitude scale (CSAS) measure in a sample of Iranian medical students

AFSANEH YAKHFOROSHHA<sup>1</sup>, MANDANA SHIRAZI<sup>2,3</sup>, NASER YOUSEFZADEH<sup>4</sup>, AMIN GHANBARNEJAD<sup>5</sup>, MOHAMMADALI CHERAGHI<sup>6</sup>, RITA MOJTAHEDZADEH<sup>7</sup>, BEHROOZ MAHMOODI-BAKHTIARI<sup>8</sup>, SEYED AMIR HOSSEIN EMAMI<sup>9\*</sup>

<sup>1</sup>Tehran University of Medical Sciences, Tehran, Iran; <sup>2</sup>Educational Development Centre (EDC), Faculty of Medicine, Tehran University of Medical Sciences, Tehran, Iran; <sup>3</sup>LIME Department, Karolinska Institutet, Solnavägen, Sweden; <sup>4</sup>Hasheminejad Kidney Center, Iran University of Medical Sciences, Tehran, Iran; <sup>5</sup>Social Determinant in Health Promotion Research Center, School of Health, Hormozgan University of Medical Sciences, Bandar Abbas, Iran; <sup>6</sup>School of Nursing and Midwifery, Tehran University of Medical Sciences, Tehran, Iran; <sup>7</sup>Virtual School, Tehran University of Medical Sciences, Tehran, Iran; <sup>8</sup>Department of Performing Arts, Tehran University, Tehran, Iran; <sup>9</sup>Faculty of Medicine, Department of Medical Education, Tehran University of Medical Sciences, Tehran, Iran

### Abstract

**Introduction:** Communication skill (CS) has been regarded as one of the fundamental competencies for medical and other health care professionals. Student's attitude toward learning CS is a key factor in designing educational interventions. The original CSAS, as positive and negative subscales, was developed in the UK; however, there is no scale to measure these attitudes in Iran. The aim of this study was to assess the psychometric characteristic of the Communication Skills Attitude Scale (CSAS), in an Iranian context and to understand if it is a valid tool to assess attitude toward learning communication skills among health care professionals.

**Methods:** Psychometric characteristics of the CSAS were assessed by using a cross-sectional design. In the current study, 410 medical students were selected using stratified sampling framework. The face validity of the scale was estimated through students and experts' opinion. Content validity of CSAS was assessed qualitatively and quantitatively. Reliability was examined through two methods including Chronbach's alpha coefficient and Intra class Correlation of Coefficient (ICC). Construct validity of CSAS was assessed using confirmatory factor analysis (CFA) and explanatory factor analysis (PCA) followed by varimax rotation. Convergent and discriminant validity of the scale was measured through Spearman correlation. Statistical analysis was performed using SPSS 19 and EQS, 6.1.

**Results:** The internal consistency and reproducibility of the total CSAS score were 0.84 (Cronbach's alpha) and 0.81, which demonstrates an acceptable reliability of the questionnaire. The item-level content validity index (I-CVI) and the scale-level content validity index (S-CVI/Ave) demonstrated appropriate results: 0.97 and 0.94, respectively. An exploratory factor analysis (EFA) on the 25 items of the CSAS revealed 4-factor structure that all together explained %55 of the variance. Results of the confirmatory factor analysis indicated an acceptable goodness-of-fit between the model and the observed data. [ $\chi^2/df=2.36$ , Comparative Fit Index (CFI)=0.95, the GFI=0.96, Root Mean Square Error of Approximation (RMSEA)=0.05].

**Conclusion:** The Persian version of CSAS is a multidimensional, valid and reliable tool for assessing attitudes towards communication skill among medical students.

**Keywords:** Communication skills, Attitude, Psychometrics

\*Corresponding author:

Seyed Amir Hossein Emami  
Department of Medical  
Education,

Tehran University of Medical  
Science, Tehran, Iran

Tel: +98-21-64053406

Email:

emamiami@yahoo.com

Please cite this paper as:

Yakhforoshha A, Shirazi  
M, Yousefzadeh N,  
Ghanbarnejad A, Cheraghi  
M, Mojtahedzadeh R,  
Mahmoodi-Bakhtiari B,  
Emami SAH. Psychometric  
properties of the  
communication skills attitude  
scale (CSAS) measure in a  
sample of Iranian medical  
students. J Adv Med Educ  
Prof. 2018;6(1):14-21

Received: 02 January 2017

Accepted: 15 August 2017

## Introduction

Communication skill (CS) is an important competency for medical students as well as other health care professionals. The importance of CS as an attribute in health care providers has led to the quality of patient's care and health outcomes (1-3). Therefore, CS has been regarded as one of the fundamental factors for delivering high-quality health care (4).

The importance of teaching and assessment of these skills has been confirmed by the expert bodies, both national and international, such as Institute for International Medical Education (IIME), Liaison Committee on Medical Education (LCME), American Association of Medical Colleges (AAMC), General Medical Council (GMC), and Committee on Accreditation of Canadian Medical Schools (CACMS) (5).

Following the international bodies' recommendation, many of medical schools incorporated CS training in their medical curriculum (6). However, a wide range of educational methods from role modeling in hidden curriculum to several experimental tactics such as role playing and simulated patients have been used in different institutions (7-9).

In spite of the increase in communication skills training that seem to be associated with improvement in the physicians' communication behaviors (10), it has been reported that medical graduates are still poorly prepared for the complexities of clinical settings. There is also no solid evidence to support transferring these skills from universities to workplaces which leads to improvement of health outcomes and organized care for patients with chronic illnesses (2, 11, 12).

Problems may be associated with educators who paid low attention to the link between the learner's attitude and development of communication behaviors, because according to some evidence, attitude is commonly viewed as a notable factor which affects learning in the education process (13-14). In CS training, positive attitudes toward learning can predict acquisition of effective communication behavior (15). It means that when students do not believe in the importance of this competency for their patient care, they may not be motivated to develop it.

In addition, more positive attitudes of health care professionals by fostering human aspect of CS will be more likely to result in improvements in the quality of patient-centered care (13).

Moreover, research on the efficacy of educational intervention in communication skills reports that CS training which focuses on a combination of cognitive, behavioral, and affective components is more likely to produce

more strong effects on developing and transferring of these skills (14).

For this reason, the student's attitude toward learning CS is a matter of concern for medical teachers, curriculum planners, and policy makers (15). Therefore, it is not surprising that considerable efforts have been devoted to development of a valid and reliable tool for assessing the students' attitudes toward learning CS. The "Communication Skills Attitude Scale" (CSAS) is a validated instrument and the most widely used assessment tool for measuring the physicians' attitude toward CS learning. This scale was developed by Rees, Shears and Davies and published in 2002 (16, 17).

CSAS has been investigated in different settings and languages with mixed results (18-22). Differences in the estimation of reliability and validity across countries can affect the significance of comparisons. On the other hand, including communication skills courses in the medical education curriculum in Iran needs adjustment with local needs. Therefore, validation of such a tool would help to gather baseline data for understanding negative attitudes toward communication skill learning and emphasizes the need for designing appropriate educational programs. Furthermore, the psychometric characteristics of the Persian version of the tool have never been examined. However, this study was designed to translate and culturally validate CSAS in a sample of Iranian medical students.

## Methods

### *Participants*

We conducted a cross-sectional descriptive study on 410 voluntary medical students from 3 different levels of training (basic science, clinical clerkship, internship) in Tehran University of Medical Sciences in IRAN. The recommended sample size for factor analysis was estimated at least 10 person per item in the questionnaire (23). However, since there was the probability of incomplete questionnaires, instead of at least a sample of 260, a stratified sample with 410 medical students from each levels of training were selected.

### *Communication Skills Attitude Scale (CSAS)*

The original Communication Skills Attitudes Scale (CSAS) as positive and negative subscale was developed in the UK. CSAS is a 26-item questionnaire in two dimensions that has been developed to measure positive and negative attitudes towards learning communication skills. Each of the two subscales consists of 13 items, the Positive Attitude Scale (PAS) and the Negative

Attitude Scale (NAS). Items are rated on a Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree). By adding scores of items 4,5,7,9,10,12,14,16,18,21,23,25 and reversed score of 22, positive attitude scale will be obtained. NAS, on the other hand, will be measured by adding the scales of items 2,3,6,8,11,13,15,17,19,20,24,26 and reverse score of item 1. Both scales range from 13 to 65, and higher scores in both represent stronger positive or negative attitudes.

#### Translation

The translation procedure was carried out based on the Chavez and Canino's guideline to create a Persian version of the CSAS comparable with the original English version as follows (24). In the first step of the study, after taking permission from the developer, the original CSAS was translated from English to Persian by two qualified English translators. Next, the translated version was sent to the project manager who was fluent in both English and Persian to check for spelling, grammar, and adequate vocabulary. After the suggestions were applied, the Persian version was translated back into the original English language by professional translators. After we adjusted both versions (the original and the back-translated) for quality and accuracy within the group of experts, a consensus version of CSAS was sent to one of the original developers who confirmed its validity.

To assess the content validity of CSAS in qualitative phase, we used a panel of experts including both content experts and lay experts. An expert panel consisting of medical education as potential researcher and work in the field of CS (n=3), CS educators (n=4), and theoretical application experts (n=3). However, in the qualitative stage of content validity, the questionnaire items were evaluated for wording and item allocation. Some minor changes were adjusted to several items. For instance, item 18 from 'when applying for medicine' was adapted to 'after I was accepted and registered to the medical school'. Item 11, "Communication skills teaches the obvious and then complicates it", was omitted because in Iran, formal communication skills courses are not considered in the medical curriculum. Therefore, the modified CSAS with 25-items was finalized.

#### Statistical analysis

Data were analyzed using SPSS, Version 19.0. Additionally EQS, version 6.1, was utilized for the confirmatory factor analysis. The following statistical test was applied in order to assess psychometric properties of the CSAS.

#### Validity

We evaluated content, face, convergent, discriminant validity, and construct validity of CSAS as follows:

1. Construct validity: Exploratory factor analysis (EFA) was applied to determine the factorial structure of CSAS. We applied the Kaiser-Meyer-Olkin (KMO) and Bartlett's test measure to assess the sample adequacy and sphericity of Iranian version of CSAS, respectively. A KMO value equal or above 0.70 and a significant Bartlett's test of sphericity were considered as acceptable criteria for factor analysis on dataset. The criteria for keeping the factor for this study were extraction values above 0.4 and Eigen values above 1.0 (25). The confirmatory factor analysis (CFA) was calculated to examine the assumed theoretical framework behind CSAS and confirm the structure in the data. Several fit indices were carried out to assess the fit of the hypothesized model to the data: the goodness of fit index (GFI), comparative fit index (CFI), the root mean square error of approximation (RMSEA), and the relative chi-square statistic ( $\chi^2/df$ ). Values for a good fit model for our study were: GFI>0.90, CFI>0.90, root mean square error of approximation (RMSEA) value<0.08,  $\chi^2/df$ <3 (26-28).

2. Convergent and discriminant validity were evaluated using Spearman's correlation coefficient. The value of a correlation coefficient of an item with its own scale and other scales were computed. Convergent validity is satisfied if the correlation coefficient for an item and its own scale is  $\geq 0.40$ , while discriminant validity is considered acceptable if the correlation coefficient between an item and its own scale is significantly higher than its correlation with the other scales (29).

3. The Content validity: Qualitative and quantitative content validity methods were used. In the qualitative phase, the item-level content validity index (I-CVI) and the scale-level content validity index (S-CVI/Ave) for each item were determined. We considered items with I-CVI of 0.78 or higher, and S-CVI/Ave score of 0.8 or higher (30).

4. To determine the face validity of CSAS, we used the experts' viewpoints and piloted CSAS on 20 medical students, respectively.

#### Reliability

The reliability of the Iranian version of CSAS was measured through internal consistency, using Cronbach's  $\alpha$  and stability by the test-retest approach. In order to assess the stability, 20 medical students responded to CSAS with a two-week retest interval. [ICC values of 0.40 or

values in the range of 0.81 to 1.00 as excellent, excellent, 0.61-0.80 very good, 0.41-0.60 good, 0.21-0.40 fair, and 0.0-0.20 poor] (31).

### Ethical considerations

The study was approved by the ethics committee of Tehran University of Medical science. All participants were informed of the study and its purpose; then, they signed the informed consent forms.

## Results

### Participants

410 medical students completed the CSAS satisfactorily. Most of the students were female (52.7%) and single (86.7%). About 46.5% of them were at the basic science level, 30.2% at the clerkship level and 23.3% at the internship

level of medical program.

### Validity

#### Content validity

In the qualitative stage, according to the experts' viewpoint some items of CSAS were modified and deleted because it was deemed inappropriate for an Iranian context. In the quantitative content validity stage, the item-level content validity index (I-CVI) and the scale-level content validity index (S-CVI/Ave) were calculated as 0.97 and 0.94, respectively. Out result showed CSAS had an appropriate sample of items for measuring the medical students' attitude toward learning communication skills.

#### Face validity

Based on the students and experts' views,

**Table 1:** Factor loadings (rotated), Cronbach's alpha and ICC, for each subscale of CSAS

	Items	Factor loading	Cronbach's Alpha for each factor	ICC
Important in medical context	1. In order to be a good doctor, I must have good communication skills.	0.522	0.86	0.87
	4. Developing my communication skills is just as important as developing my knowledge of medicine.	0.545		
	5. Learning communication skills has helped or will help me respect patients.	0.755		
	9. Learning communication skills has helped or will help facilitate my team-working skills.	0.509		
	10. Learning communication skills has improved my ability to communicate with patients.	0.557		
	14. Learning communication skills has helped or will help me respect my colleagues.	0.678		
	16. Learning communication skills has helped or will help me recognize the patients' rights regarding confidentiality and informed consent.	0.718		
	19. I don't need good communication skills to be a doctor.	0.650		
	21. I think it's really useful to learn communication skills on the medical degree.	0.755		
	23. Learning communication skills is applicable to learning medicine.	0.589		
25. Learning communication skills is important because my ability to communicate is a lifelong skill.	0.586			
Excuse	2. I can't see the point in learning communication skills.	0.452	0.75	0.77
	6. I haven't got time to learn communication skills.	0.583		
	8. I can't be bothered to turn up to sessions on communication skills.	0.581		
	15. I find it difficult to trust information about communication skills given to me by non-clinical lecturers.	0.427		
	18. After I was accepted and enrolled in medical school, I thought it was a really good idea to learn communication skills.	0.468		
26. Communication skills learning should be left to psychology students, not medical students.	0.422			
Learning	7. Learning communication skills is interesting.	0.543	0.65	0.69
	12. Learning communication skills is fun.	0.454		
	13. Learning communication skills is too easy.	0.575		
	17. Communication skills teaching would have a better image if it sounded more like a science subject.	0.486		
24. I find it difficult to take communication skills learning seriously.	0.429			
Overconfidence	3. Nobody is going to fail his/her medical degree for having poor communication skills.	0.492	0.62	0.67
	20. I find it hard to admit having some problems with my communication skills.	0.530		
	22. My ability to pass exams will get me through medical school rather than my ability to communicate.	0.703		



no suggestions were made regarding difficulties in understanding and responding to questions, so, the face validity of the scale was verified in this study.

#### *Construct validity*

We applied exploratory factor analysis (principal components analysis) followed by a Varimax rotation to evaluate the construct validity. The result of the Kaiser-Meyer-Olkin (KMO) and Bartlett's test indicated that the data were adequate for conducting a PCA (KMO index = 0.89,  $p < 0.001$ ).

The PCA showed four factors with Eigen values greater than 1 and factor loading equal to or greater than 0.4 which explained 55% of the variances. As shown in Table 1, factor 1 was comprised of 11 item-subcales, based on the items with factor loading and expert consensuses labeled as "important in medical context". Items in this factor focus on both the importance of mastery in CS and their outcomes in medical context. This factor mainly focused on patients' respect, team-working, communication with patients, colleagues' respect, recognition of patients' rights which had highly affected learning CS in medical students.

Factor 2 contained six item-subcales called "excuse", since all statements explain the reasons for lack of participation of medical students in CS training courses.

Factor 3 consisted of five item-subcales and was labeled as "learning" because it described attitudes towards learning communication skills and all items except item one included the word "learning".

Factor 4 was made up of three item-subcales and entitled "overconfidence"; all three items refer to the students' perceptions of low importance of learning communication skills. Thus, medical students stated that they had no problems in this issue.

The results of confirmatory factor analysis showed an appropriate goodness-of-fit for the 25-item with four factors structure of CSAS [ $\chi^2/df = 2.36$ , Comparative Fit Index (CFI) = 0.95, the GFI = 0.96, Root Mean Square Error of Approximation (RMSEA) = 0.05].

#### *Convergent and discriminant validity*

The correlation matrix between CSAS items and its total scales are shown in Table 2. Results of the convergent and discriminant validity are presented in Table 3. The results indicated that item-own-scale correlation was higher than the item-other-scale correlation. The scaling success rates on convergent validity were similarly high

for item-to-total correlations (higher than 92%), except for the excuse scale (83.3).

#### *Reliability*

In terms of internal consistency, Cronbach's alpha scores for CSAS subscales ranged from 0.62 (overconfidence) to 0.86 (important in medical context) and the alpha value of global CSAS was 0.84 (reported in Table 1). In terms of reproducibility, intra-class correlation of coefficient (ICC) in the pilot phase ranged from 0.67 (overconfidence) to 0.87 (important in medical context), and the ICC of global CSAS was 0.81, all being acceptable.

#### **Discussion**

The purpose of this study was to investigate psychometric properties for the Persian version of the CSAS. Construct validity and principal component analysis (PCA), revealed a four-component structure named as the following:

- 1) Important in medical context
- 2) Excuse
- 3) Learning
- 4) Overconfidence

In line with previous studies in other settings (18, 32, 33), and as demonstrated above, the original two factor structure of the CSAS were not supported. In our opinion, there are two main reasons for the difference in the result of the PCA. Firstly, validity and reliability of the CSAS, in the original study, as reported by Rees et al. (17), was done based on the qualitative and quantitative procedures. However, in this study, psychometric properties of CSAS was approved through quantitative method, according to the Human Sciences Research Institute (HSRI) guidelines. This guideline was used in previous studies for validation of instruments (34, 35). Secondly, in the development of CSAS, in order to obtain a reliable and valid measurement scale, if necessary, some factors could be revised and restructured. Moreover, this variation may be perceived as a result of cultural differences. Evidently, the new four factors structure has been proven by Laurence et al. (2012) in USA ("learning", "importance", "respect" and "success") (21).

Moreover, results of Cronbach's alpha and ICC (0.84, 0.81, respectively) have shown that administration of CSAS in Iranian context reflected a good internal consistency and stability. In statistics and research, alpha scores over 0.7 are considered as good internal consistency (36, 37). Similar results have been found in a study that measured the internal consistency of the CSAS among 255 dental students by Laurence

**Table 2:** Spearman correlations between CSAS items and its hypothesized scales

		Important in medical context	Excuse	Learning	Overconfidence
Important in medical context	1. In order to be a good doctor, I must have good communication skills.	0.578	0.298	0.212	0.061
	4. Developing my communication skills is just as important as developing my knowledge of medicine.	0.678	0.301	0.312	0.103
	5. Learning communication skills has helped or will help me respect patients.	0.788	0.311	0.304	0.136
	9. Learning communication skills has helped or will help facilitate my team-working skills.	0.695	0.402	0.355	0.135
	10. Learning communication skills has improved my ability to communicate with patients.	0.620	0.317	0.252	0.141
	14. Learning communication skills has helped or will help me respect my colleagues.	0.688	0.312	0.323	0.103
	16. Learning communication skills has helped or will help me recognize the patients' rights regarding confidentiality and informed consent.	0.684	0.238	0.224	0.156
	*19. I don't need good communication skills to be a doctor.	0.657	0.325	0.387	0.103
	21. I think it's really useful to learn communication skills in the medical degree.	0.749	0.402	0.406	0.107
	23. Learning communication skills is applicable to learning medicine.	0.635	0.254	0.276	0.204
	25. Learning communication skills is important because my ability to communicate is a lifelong skill.	0.687	0.330	0.427	0.129
	Excuse	*2. I can't see the point in learning communication skills.	0.401	0.592	0.354
*6. I haven't got time to learn communication skills.		0.416	0.688	0.387	0.152
*8. I can't be bothered to turn up to sessions on communication skills.		0.511	0.673	0.402	0.138
*15. I find it difficult to trust information about communication skills given to me by non-clinical lecturers.		0.132	0.466	0.113	0.097
18. After I was accepted and enrolled in medical school, I thought it was a really good idea to learn communication skills.		0.045	0.401	0.076	0.071
*26. Communication skills learning should be left to psychology students, not medical students.		0.450	0.583	0.312	0.142
Learning	7. Learning communication skills is interesting.	0.553	0.501	0.665	0.101
	12. Learning communication skills is fun.	0.458	0.359	0.568	0.101
	*13. Learning communication skills is too easy.	0.178	0.223	0.478	0.031
	*17. Communication skills teaching would have a better image if it sounded more like a science subject.	-0.003	0.005	0.468	0.034
	*24. I find it difficult to take communication skills learning seriously.	0.473	0.421	0.672	0.200
Overconfidence	*3. Nobody is going to fail his/her medical degree for having poor communication skills.	0.091	0.078	0.028	0.655
	*20. I find it hard to admit having some problems with my communication skills.	0.152	0.229	0.183	0.588
	*22. My ability to pass exams will get me through medical school rather than my ability to communicate.	0.151	0.122	0.032	0.790

\*Items are negative and reverses their score before analysis

**Table 3:** Item scaling tests: convergent and discriminant validity for CSAS

Scale	No. of items per scale	Convergent validity		Discriminant validity	
		Range of correlation	Scaling success (%)	Range of correlation	Scaling success (%)
Important in medical context	11	0.51–0.75	11.11 (100)	0.006–0.48	33.33 (100)
Excuse	6	0.39–0.67	5.6 (83.3)	0.03–0.44	14.18 (77.8)
Learning	5	0.42–0.66	5.5 (100)	0.004–0.59	13.15 (86.7)
Overconfidence	3	0.57–0.79	3.3 (100)	0.04–0.23	9.9 (100)

et al. (21). In the item level test for convergent/discriminant validity, all the scaling success rates in the assessment of both validities were excellent. These results indicate that all items in the questionnaire together represent the underlying construct: “attitude toward learning CS”.

In summary, we concluded that CSAS was a valid and reliable tool for assessing communication skill attitude among Iranian students. It should be mentioned that at the time, there was no published studies for assessing psychometric properties of CSAS in Iran. Fazel et al. (2011) have conducted a study entitled “Attitudes toward Learning Communication Skills among Medical Students of a University in Iran”. They aimed to find out if CSAS is acceptable in Iranian context and whether it is helpful for medical students in order to assess their attitude toward learning communication skills. To this end, they were carried out just in employing translation-back-translation process for measuring psychometric properties of CSAS. However, construct validity as well as its contextualization and standardization according to guidelines of ‘Toolkit on Translating and Adapting Instruments’ seemed to be necessary (24, 38).

A number of strengths and limitations were noted regarding the present study. Having a large number of participants, involving medical students in different levels of training, and designing and performing the study were the strengths of our study. There were also some weaknesses. Firstly, the study was carried out just in medical schools. Therefore, our findings may not be generalizable to other educational setting. Secondly, there was a difference in the length of items in each subscale. It could be inferred from the subscale with small number of items; hence, it will limit the measurement of a single underlying construct accurately compared to those that have more items. However, Iranian version of the CSAS demonstrated good psychometric properties, and it is commended that future studies should incorporate it so that it can be improved.

## Conclusion

The present study confirmed the validity and

reliability of the CSAS for evaluating attitude toward communication skills in an Iranian context. Psychometric properties of this tool in an Iranian context are a new endeavor and we recommend that further research should be conducted in this field.

**Conflict of Interest:** None declared.

## References

1. Joosten EA, DeFuentes-Merillas L, De Weert G, Sensky T, Van Der Staak C, De Jong CA. Systematic review of the effects of shared decision-making on patient satisfaction, treatment adherence and health status. *Psychotherapy and psychosomatics*. 2008;77(4):219-26.
2. Van den Eertwegh V, Van Dulmen S, Van Dalen J, Scherpbier AJ, Van der Vleuten CP. Learning in context: Identifying gaps in research on the transfer of medical communication skills to the clinical workplace. *Patient education and counseling*. 2013;90(2):184-92.
3. Zolnerek KBH, DiMatteo MR. Physician communication and patient adherence to treatment: a meta-analysis. *Med Care*. 2009;47(8):826.
4. Ha JF, Longnecker N. Doctor-patient communication: a review. *The Ochsner Journal*. 2010;10(1):38-43.
5. Rider EA, Hinrichs MM, Lown BA. A model for communication skills assessment across the undergraduate curriculum. *Med Teach*. 2006;28(5):e127-e34.
6. Ullah MA, Barman A, Rahim AFA, Yusoff MSB. Determinants of medical student attitudes to a learning communication skills teaching program. *Journal of Men's Health*. 2012;9(4):245-54.
7. Al Odhayani A, Ratnapalan S. Teaching communication skills. *Can Fam Physician*. 2011;57(10):1216-8.
8. Berkhof M, Van Rijssen HJ, Schellart AJ, Anema JR, Van der Beek AJ. Effective training strategies for teaching communication skills to physicians: an overview of systematic reviews. *Patient education and counseling*. 2011;84(2):152-62.
9. Shield RR, Tong I, Tomas M, Besdine RW. Teaching communication and compassionate care skills: an innovative curriculum for pre-clerkship medical students. *Med Teach*. 2011;33(8):e408-e16.
10. Rao JK, Anderson LA, Inui TS, Frankel RM. Communication interventions make a difference in conversations between physicians and patients: a systematic review of the evidence. *Med Care*. 2007;45(4):340-9.
11. Van den Eertwegh V, Van Dalen J, Van Dulmen S, Van der Vleuten C, Scherpbier A. Residents' perceived

- barriers to communication skills learning: comparing two medical working contexts in postgraduate training. *Patient education and counseling*. 2014;95(1):91-7.
12. King A, Hoppe RB. "Best practice" for patient-centered communication: a narrative review. *Journal of graduate medical education*. 2013;5(3):385-93.
  13. Levinson W, Roter D. Physicians' psychosocial beliefs correlate with their patient communication skills. *Journal of General Internal Medicine*. 1995;10(7):375-9.
  14. Chant S, Randle J, Russell G, Webb C. Communication skills training in healthcare: a review of the literature. *Nurse Education Today*. 2002;22(3):189-202.
  15. Aryal B. Attitude Towards Learning Communication Skills in Medical Students of Chitwan Medical College Chitwan Nepal. *International Journal of Pharmaceutical & Biological Archive*. 2012;3(5):1058-61.
  16. Rees C, Sheard C. Evaluating first-year medical students' attitudes to learning communication skills before and after a communication skills course. *Med Teach*. 2003;25(3):302-7.
  17. Rees C, Sheard C, Davies S. The development of a scale to measure medical students' attitudes towards communication skills learning: the Communication Skills Attitude Scale (CSAS). *Med Educ*. 2002;36(2):141-7.
  18. Ahn S, Yi YH, Ahn DS. Developing a Korean communication skills attitude scale: comparing attitudes between Korea and the West. *Med Educ*. 2009;43(3):246-53.
  19. Busch AK, Rockenbauch K, Schmutzer G, Brähler E. Do medical students like communication? Validation of the German CSAS (Communication Skills Attitude Scale). *GMS Zeitschrift für Medizinische Ausbildung*. 2015;32(1):11.
  20. Harlak H, Dereboy C, Gemalmaz A. Validation of a Turkish translation of the Communication Skills Attitude Scale with Turkish medical students. *Education for Health*. 2008;21(1):55.
  21. Laurence B, Bertera EM, Feimster T, Hollander R, Stroman C. Adaptation of the Communication Skills Attitude Scale (CSAS) to dental students. *Journal of dental education*. 2012;76(12):1629-38.
  22. Molinuevo B, Torrubia R. Validation of the Catalan version of the communication skills attitude scale (CSAS) in a cohort of south European medical and nursing students. *Education for Health*. 2011;24(1):499.
  23. Ferguson E, Cox T. Exploratory factor analysis: A users' guide. *International Journal of Selection and Assessment*. 1993;1(2):84-94.
  24. Chávez LM, Canino G. Toolkit on translating and adapting instruments [Internet]. Human Services Research Institute; 2005 [cited 2001 Mar 2; updated 2005 Feb 6]. Available from: [http://www.hsri.org/files/uploads/publications/PN54\\_Translating\\_and\\_Adapting.pdf](http://www.hsri.org/files/uploads/publications/PN54_Translating_and_Adapting.pdf).
  25. Lee EH, Lee KW, Song R, Snoek FJ, Moon SH. Psychometric evaluation of the Korean version of the Diabetes Symptom Checklist-Revised (DSC-R) for patients with type 2 diabetes. *Health and quality of life outcomes*. 2014;12(1):77.
  26. Browne MW, Cudeck R. Single sample cross-validation indices for covariance structures. *Multivariate Behavioral Research*. 1989;24(4):445-55.
  27. Hu Lt, Bentler PM. Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural equation modeling: a multidisciplinary journal*. 1999;6(1):1-55.
  28. MacCallum RC, Browne MW, Sugawara HM. Power analysis and determination of sample size for covariance structure modeling. *Psychological methods*. 1996;1(2):130.
  29. Jafari P, Ghanizadeh A, Akhondzadeh S, Mohammadi MR. Health-related quality of life of Iranian children with attention deficit/hyperactivity disorder. *Quality of Life Research*. 2011;20(1):31-6.
  30. Zamanzadeh V, Ghahramanian A, Rassouli M, Abbaszadeh A, Alavi-Majd H, Nikanfar AR. Design and implementation content validity study: development of an instrument for measuring patient-centered communication. *Journal of caring sciences*. 2015;4(2):165.
  31. Munro BH. *Statistical methods for health care research*. Philadelphia: Lippincott Williams & Wilkins; 2005.
  32. Anvik T, Gude T, Grimstad H, Baerheim A, Fasmer OB, Hjortdahl P, et al. Assessing medical students' attitudes towards learning communication skills— which components of attitudes do we measure? *BMC Medical Education*. 2007;7(1):1.
  33. Tóth I, Bán I, Füzesi Z, Keszyüs M, Nagy L. Első évfolyamos orvostanhallgatók attitűdjei az orvosi kommunikáció oktatásával kapcsolatban. *Orv Hetil*. 2011;152(38):1535-43.
  34. Beogo I, Rojas BM, Gagnon MP, Liu CY. Psychometric evaluation of the French version of the Clinical Nursing Competence Questionnaire (CNCQ-22): A cross-sectional study in nursing education in Burkina Faso. *Nurse Education Today*. 2016;45:173-8.
  35. Keshmiri F, Ponzer S, Sohrabpour A, Farahmand S, Shahi F, Bagheri-Hariri S, et al. Contextualization and validation of the interprofessional collaborator assessment rubric (ICAR) through simulation: Pilot investigation. *Medical Journal of the Islamic Republic of Iran*. 2016;30:403.
  36. Streiner DL, Norman GR, Cairney J. *Health Measurement Scales: A Practical Guide to Their Development and Use*. USA: Oxford University Press; 2015.
  37. Vaughan B, Mulcahy J, McLaughlin P. The DREEM, part 2: psychometric properties in an osteopathic student population. *BMC medical education*. 2014;14(1):1.
  38. Fazel I, Aghamolaei T. Attitudes toward learning communication skills among medical students of a university in Iran. *Acta Medica Iranica*. 2011;49(9):625-9.