Original Article

The ethical attitude of dentists scale: development and psychometric properties

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Abstract

One critical tactic that leads to a better understanding of the ethical status of dentists is to assess their ethical attitude by using an appropriate scale. This study aimed to design and evaluate the validity and reliability of the ethical attitude of dentists scale (EADS).

This study was conducted based on a mixed-method design. The first qualitative part of the study was conducted in 2019 and the items of the scale were produced from the ethical codes compiled in a previous study. In this part, the psychometric analysis was conducted. The reliability was evaluated by Cronbach's alpha coefficient and intraclass correlation coefficient. Factor analysis was used to assess the construct validity (n = 511), and the following three factors were extracted with a total variance of 48.03.

1) Maintaining the standing of the profession in relationships.
2) Providing dental services while maintaining trust in the profession, and 3) Providing information for the benefit of the patient.

In confirmatory factor analysis, appropriate values were obtained for the goodness of fit indices, and Cronbach's alpha was 0.68 - 0.84 for the various factors. Based on the results mentioned above, this scale showed an appropriate validity and reliability for measuring the ethical attitude of dentists.

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Received: *18 Apr 2022*
Accepted: *9 Oct 2022*
Published: *28 Dec 2022*

Citation to this article:
Ebadi A, Shojaei A, Larijani B, Akhoundi MS, Khorshidian A. The ethical attitude of dentists scale: development and psychometric properties. J Med Ethics Hist Med. 2022; 15: 12.

Keywords: *Code of ethics; Dentistry; Attitude; Psychometrics.*

Introduction

Dentistry has been moving forward as a profession for several decades. While the characteristics of the profession demand adherence to the codes of ethics, public concerns regarding ethical issues in the field are increasing (1 - 2). Numerous ethical principles and guidelines for professional conduct have been compiled by dental councils that define the obligations and duties of dentists, and meeting these principles is a requirement for membership in the profession (3 - 5). During the past decade, special attention has been paid to the field of dental ethics in Iran and in 2019 the national dentistry ethical codes were proposed (6), but dentists continue to face dilemmas in their daily practice. They may at times undermine the norms and guidelines, and as a result, the entire profession will be harmed (7). It is important to determine why ethical codes are ignored by dentists. Rational and reasoned criticism helps to approach objective realities (8), and therefore, one of the tools that can help to foster values in any profession is self-criticism. Cserzo et al. investigated self-criticism among dentists in the context of professionalism and found four major issues in this regard: "*communication, the cost of treatment, the role of the dental team and consequences of professionalism concerns"* (9). Thus, the dentist-patient interaction plays a critical role in clinical practice, and by combining technical advancements with the humanistic side of the profession, the dentist-patient relationship can be reinforced (8).

Let us take a look at the root of ignoring ethical codes from a different perspective. Psychologists define attitude as an informed tendency to evaluate things, people, issues, objects or events. Previous experience, social roles and norms, long-term observation and classical or operant conditioning are effective in the formation of attitudes (10). Having an ethical attitude and its reflection in clinical practice reduce the gap between science and practice (11). Several questionnaires in the form of self-evaluation scales have been developed to assess the ethical attitude of dentists. Janakiram and Gardens used an adapted questionnaire of a previous study to assess attitudes related to health-care ethics among medical and dental postgraduate students in India. Some issues that were investigated in the above-mentioned questionnaire were: paternalism, medical error, informed consent for treatment and research, necessity of ethical conduct to avoid legal issues, and respect for

patients' decisions and their right to refuse treatments. Responses showed a lower level of adherence to health-care ethics among dental postgraduates than their medical peers (13). A questionnaire survey conducted by Chopra to investigate dentists' attitudes toward health-care ethics showed that the majority of dentists were aware of dental ethics, but needed to rethink about their application of moral values (14). Chatti et al also designed a questionnaire based on a previous study to assess the attitudes of 424 students, dentists and teaching staff at Visakhapatnam University in India about ethical issues (15).

A change in attitude seems to be emerging among upcoming dentists, for example on the issue of marketing. In a questionnaire-based survey conducted by Alsadiya et al., 300 dental interns from different colleges in India commented on marketing dentistry. Although more than half of the interns agreed that marketing has a negative impact on the profession, the majority of them strongly agreed that it has served the society when combined with better clinical skills (16). These questionnaires were perhaps the closest thing to evaluation tools for assessing the attitudes of individual dentists at the time we developed our scale. The COSMIN is a checklist that was created to measure the methodological quality of studies related to the development of tools. (17). According to the COSMIN checklist, previous questionnaires are not valid for assessing dentists' ethical attitudes. The rationale is that ethical attitudes depend on the cultural context of the community. In order to design a questionnaire, it is necessary to bring the cultural concepts of the society and the researcher's views together (18). It is very important to try to evaluate the ethical status of dentists as well. Moreover, being aware of the circumstances under which unethical behaviors occur helps to enable dentists, and one way to provide this awareness is the use of valid questionnaires.

Despite the fact that various questionnaires exist for assessing dentists' ethical attitude, there is no specific tool for evaluating the attitude of Iranian dentists toward ethical codes. Therefore, in this article a culture-based scale was designed and validated for evaluating dentists' attitudes according to the needs of the Iranian dental community. It is hoped that the ethical attitude of dentists scale (EADS) will suit the purpose of monitoring and analyzing dentists' ethical attitudes in their daily practice.

Methods

Study Design:

This cross-sectional, analytical study was conducted between September 2020 and March 2021 in Iran. The aim was to develop a comprehensive scale to assess dentists' stances on all elements of ethical attitude.

This study was based on a mixed-method design. The first part includes findings from a qualitative study conducted in 2019 on codes of ethics for Iranian dentists, the results of which have been published in a previous article (6). The items of the scale were produced based on resources developed by researchers on ethical codes, thus creating a pool of items. In this part, the psychometric analysis was also performed. It should be noted that this scale is completely researcher-made and does not include any items from other questionnaires.

Participants were informed about the aims of the study according to the statement of research objectives at the beginning of the scale. Participation in the study was voluntary, and confidentiality and anonymity of all the obtained data were respected. The questionnaire took approximately 15 minutes to complete, and the data were evaluated only for research purposes.

Participants:

Face validity was confirmed by ten dentists working in dental clinics. Seven faculty members from the Tehran University School of Dentistry and three biomedical ethicists who were experts in scale development were invited to evaluate the content validity. Item analysis was done by 54 dentists and dental students selected from different clinical settings. Three hundred and eleven dentists participated in in exploratory factor analysis (EFA), and 200 dentists in Confirmatory factor analysis (CFA) from different cities of Iran. from different cities of Iran.

Scale Validation:

Assessment of the psychometric properties of the scale was conducted through face, content and construct validity as well as reliability.

Face Validity:

Face validity only refers to the appearance of the scale from the perspective of the respondents. In the present study, qualitative methods were used for face validity assessment. In the previous study (6), the necessity and importance of the items had been evaluated by expert panels, so we skipped the quantitative face validity. Ten dentists were selected through convenience sampling, and face-to-face interviews were conducted. The participants were asked to read the items out loud, and the problematic or ambiguous words were edited and reworded based on their comments. Thus, item clarity and comprehensibility were

improved by rewording and editing for simplification (19).

Content Validity:

We used qualitative and quantitative methods to assess the content validity of the questionnaire. Ten experts in dentistry, medical ethics and scale development from the Tehran University School of Dentistry were invited for this stage. In the qualitative part, the appropriate wording, grammar, items allocation and scaling of the items were assessed, and the scale was edited according to the recommendations (19). The quantitative assessment was done by calculating the content validity ratio (CVR) designed by Lawshe for each item. For this purpose, we used the opinions of experts in the field of the scale content. We began by explaining the objectives of the scale to the experts and then asked them to rate each question on a three-point Likert scale: 1) essential, 2) useful but not essential, and 3) not essential. Based on Lawshe's recommendation, for ten evaluators, a Content Validity Ratio (CVR) value higher than 0.62 was considered appropriate (20).

Item Analysis:

Items were scored on a five-point Likert scale, with a score of 1 indicating "strongly disagree" and a score of 5 indicating "strongly agree". The scale was distributed to 54 participants. In a pilot study, the internal consistency was assessed before measuring the construct validity in order to indentify the problems in the EADS. The Cronbach's alpha and correlation coefficient were calculated. If the correlation coefficient between an item and the whole scale was less than 0.3, the item was deleted. Also, if the correlation coefficient between two items was more than 0.7, one of those items was deleted or merged (21).

Construct Validity:

Factor analysis was used to evaluate the construct validity of the scale.

Exploratory Factor Analysis:

Interpretation of the factor analysis was based on some tests, including the Kaiser-Meyer-Olkin (KMO) Test, which was used to determine sampling adequacy. KMO values of 0.7 - 0.8 and 0.8 - 0.9 are interpreted as acceptable and indicate large sample sizes. The Bartlett's Test of Sphericity was used to examine the null hypothesis that the variables are not correlated. In Bartlett's Test of Sphericity, a significance level of $P < 0.05$ is acceptable. In order to determine the appropriateness of the factor analysis and the number of factors, scree plot and eigenvalues were used. The "elbow" of the graph where the eigenvalues leveled off was found and factors on the left side of the elbow were retained (22). Also,

the variance report of each factor and the cumulative variance were calculated by all factors. Assignment of at least 50% of the variance of the concept by factors was the basis of judgment (23), and latent factors would be extracted through maximum likelihood .The model with Promax rotation had a better fit in terms of item arrangement logic. Factor load is the correlation between the item and its hidden factors, and a minimum factor loading of 0.30 was used as the criterion to retain each item (24).

Finally, the factors were named according to the common meaning of the items, and those that provided the best interpretation were included. Study subjects were recruited based on a random sample of 311 dentists (equivalent to 6 people per item. At this stage, the scale consisted of 51 items. The participants were dentists working in dental schools or those on telegram groups of the dental association in different provinces.

Confirmatory Factor Analysis:

Confirmatory factor Analysis was done on a sample of 200 dentists who were included similarly using exploratory factor analysis. As the next step, the most common goodness of fit indices were evaluated based on the accepted threshold using confirmatory factor analysis (CFA). The indices included: root mean square error of approximation (RMSEA), comparative fit index (CFI), adjusted goodness of fit index (AGFI), minimum discrepancy function divided by degrees of freedom (CMIN/DF), and normed fit index (NFI). Cut-off criteria of model fit indices for latent variable models are presented in Table 4 (24).

Reliability:

The reliability of the scale was evaluated using internal consistency and assessment of stability over time. This study was carried out on 20 dentists with different levels of employment (including faculty members, private practitioners and charity center dentists). The result of internal consistency assessment was reported as Cronbach's alpha, and values higher than 0.7 were considered to have an acceptable level of reliability (21). Stability of the scale over time means obtaining the same results for the same participant if the test is repeated. The important point in the test-retest technique is that the time interval between the two tests be long enough for the subjects to forget the items without the phenomenon changing (21). At this stage, 40 dentists completed the scale twice with a two-week interval. The intraclass correlation coefficient (ICC) and Pearson's correlation coefficient between the test and the retest scores were calculated, and values between 0.8 and 0.9 were considered as good reliability (25). Responsiveness

was also determined by the standard error of measurement (SEM) and the minimal detectable change (MDC) (26). The SEM indicates whether discrepancy in two tests is real or related to measurement errors. The MDC provides a range of values in which the participant's score is expected to remain at a 95% confidence level without really changing over repetitive tests (27). The percentage of MDC can determine the real relative changes between repeated measurements over time and show the relative amount of random measurement error. An MDC lower than 30% is acceptable, and below 10% excellent (28). It should be mentioned that all the statistical analyses were done using SPSS 26 and LISREL 8.8.

The study was approved by the ethical committee of the research council of Tehran University of Medical Sciences (Number: IR.TUMS.MEDICINE.REC.1397.442), Tehran, Iran.

Results

A pool of items was generated based on the ethical codes prepared in the previous study (6). The primary pool consisted of 119 items. The research team did their best to choose the clearest and most relevant items in relation with the concept of dentists' ethical attitude. The item pool was assessed by the research team in 6 sessions. Some items were combined, and the final pool included 75 items. A total of 511 dentists completed the scale online. Table 1 shows the participants' characteristics during the construct validity assessment. The majority of the respondents were general practitioners (48%), females (58%), and in the age group of 25 - 35 years (46%). In addition, 37% of the dentists had less than 5 years of work experience. In order to assess the psychometric properties of the EADS, its face, content, construct validity and reliability were evaluated.

Table 1. Characteristics of participants (n = 511)

Characteristics		N (%)
Gender	Female	295(58)
	Male	216(42)
Age group (Years)	18-24	93(18)
	25-34	356(46)
	35-44	111(22)
	>45	72(14)
Qualification	General dentists	244(48)
	Dental specialist	122(24)
	Postgraduate student	104(20)
	Undergraduate student	41(8)
Years in Practice	<5	189(37)
	5-10	122(24)
	>10	159(31)
	Undergraduate student	41(8)

Table 2. Item analysis

Question number	Cronbach's alpha coefficient in case of omitting items
Q1	*.898*
Q2	*.899*
Q3	*.899*
Q4	*.896*
Q5	*.900*
Q6	*.897*
Q7	*.897*
Q8	*.897*
Q9	*.896*
Q10	*.898*
Q11	*.898*
Q12	*.899*
Q13	*.898*
Q14	*.897*
Q15	*.907*
Q16	*.898*
Q17	*.897*
Q18	*.897*
Q19	*.902*
Q20	*.895*
Q21	*.895*
Q22	*.898*
Q23	*.899*
Q24	*.896*
Q25	*.897*
Q26	*.897*
Q27	*.896*
Q28	*.912*
Q29	*.896*
Q30	*.896*
Q31	*.899*
Q32	*.895*
Q33	*.897*
Q34	*.899*
Q35	*.897*
Q36	*.896*
Q37	*.899*
Q38	*.897*
Q39	*.899*
Q40	*.895*
Q41	*.895*
Q42	*.897*
Q43	*.899*
Q44	*.898*
Q45	*.896*
Q46	*.894*
Q47	*.896*
Q48	*.896*
Q49	*.896*
Q50	*.899*
Q51	*.897*
Q52	*.898*
Q53	*.895*
Q54	*.896*

Face Validity:

Regarding qualitative face validity, the wording of 13 items was changed based on the opinions of the studied target group of dentists.

Content Validity:

In the content validity sessions, the corrections proposed by the participants were applied in the formulation of the 25 items in a way that they would be clear and simple. The content validity ratio was calculated, and according to the Lawshe table, for 10 participants, 22 items that had CVRs lower than 0.62 were not considered necessary, and 54 items were retained.

Item Analysis:

Cronbach's alpha was calculated to be 0.899. According to Table 2, 3 items (5, 15 and 19) were deleted because they had a correlation of less than 0.3 with the whole scale, and based on the loop method, Cronbach's alpha was increased by removing them.

Construct Validity:

In factor analysis, the KMO test result was 0.934, which indicated sampling adequacy. Moreover, the Bartlett's test of sphericity revealed a significant interrelationship between the items ($\chi 2$ value = 2255.27, df = 899, $P < 0.001$), denoting the appropriateness of the factor analysis model. These results confirmed that factor analysis was appropriate.

Table 3. Factors extracted from factor analysis

	Items	Load factors		
		Maintaining the standing of the profession in relationships Var: 32.3%	Providing dental services while maintaining trust in the profession Var: 11.3%	Providing information for the benefit of the patient Var: 4.3%
1.	Dentists should not accept gifts from patients or pharmaceutical companies because this might influence their professional judgment. They should politely apologize to the donor.	.867		
2.	Dentists should not accept or offer rewards and incentives for patient referral.	.839		
3.	If the patient has already been treated by other colleagues, the dentist should make a fair and clear comment on the current status and condition of the patient.	.782		
4.	Upon encountering an adverse reaction to the materials and instruments used, dentists should report the matter to relevant authorities.	.739		
5.	Dentists should practice according to their professional knowledge and expertise and refer the patients to more skilled colleagues if they lack the required skills.	.731		
6.	Dentists should refrain from exaggerating the severity and extent of the disease and should not give their patients false hopes and guarantee of treatment.	.720		

7.	Dentists can use commercials and advertisements to gain the patients' trust and attract them.	-.704	
8.	When a patient is referred to a second dentist for certain treatments, the second dentist should inform the first dentist about the excess treatments and obtain permission.	.697	
9.	When dentists' abilities are weakened by old age, disease, fatigue, drug use or mental health problems, they should not continue to practice.	.687	
10.	Dentists should communicate effectively with the patient through appropriate communication skills.	.678	
11.	In case of referrals, dentists should consider patients' interests and the capabilities of the referral centers.	.675	
12.	Dentists should not establish any non-professional relationships with patients irrelevant to the treatment process (including romantic, sexual and occupational relationships as well as social friendships).	.608	
13.	Dentists' comments in various situations, including practice, the social media and the community, should be evidence-based.	.585	
14.	Dentists should provide real explanations about treatment options and the materials, instruments and equipment being used, and avoid unrealistic advertising.	.577	
15.	At the request of the patient, the dentist can provide futile services (such as unnecessary cosmetic services).	-.545	
16.	When patients' interests conflict with those of patients' companions, other colleagues or dentists, dentists should consider the patients' interests as a priority.	.545	
17.	If the dentists believe that the people visiting their office or other referral health-care centers are at risk of injury for any reason (lack of hygiene of the practice environment, infectious diseases of the colleagues and staff, or their unprofessional conduct), they should resolve the issues or report the matter to relevant authorities.	.542	
18.	Dentists should always try to update their knowledge, skills and performance.	.539	
19.	Dentists should listen to their patients' words and concerns carefully and with empathy.	.519	
20.	If the patient is referred for consultation, the dentist can continue treatment without informing the consulting dentist.	-.517	
21.	Dentists should not be involved in direct sales and marketing or make recommendations to buy dental products.	.449	
22.	In case of dealing with organizational regulations contradicting patients' rights and interests, dentists should provide proper feedback to the related authorities (such as the director of the clinic, etc.).	.420	
23.	Dentists should not start treatment without obtaining the patients' or their legal guardians' informed consent, except in urgent cases.		.922
24.	Dentists should prioritize the proper care of emergency patients over other patients and politely inform other patients.		.851
25.	Disclosure or non- treatment use of patient information should be done with the patient's permission or by judicial order.		.848
26.	Dentists should not discontinue the treatment of a patient unless the patient wishes it and is fully aware of the consequences.		.810
27.	Dentists should not force patients to make decisions and must give them enough time for decision-making.		.800
28.	Disclosure of patient information by law or judicial orders should be limited to the same case in particular and with the least amount of information disclosure.		.785
29.	If dentists refrain from visiting a patient, they should not be discriminatory or disrespectful.		.764

30.	If a patient has already been treated by a colleague, the dentist should not judge the colleague's social, scientific and practical personality.	.721		
31.	Dentists should oblige their staff to observe order and ethics and accept responsibility for their actions.	.683		
32.	Dentists should not accept contracts that lead to violation of patients' rights or disrupt the public trust in professional dentistry.	.613		
33.	During medical consultations, dentists should ask for patients' permission to disclose their information.	.603		
34.	Dentists should keep the relevant and unrelated information about patients' treatment confidential and refrain from disclosing it.	.539		
35.	Dentists should consider building trust as a top priority in all professional relationships.	.521		
36.	Dentists should place the "Patients' Rights Charter in Iran" where patients/clients can see it and adhere to it.	.515		
37.	Dentists should consider their scientific competence and the best interest of patients when cooperating with commercial companies and industrial centers related to the field of dentistry.	.483		
38.	If a dentist makes a mistake during teamwork, he / she should accept the responsibility and compensate for the mistake by offering either free of charge treatment or reimbursement.	.461		
39.	Dentists should have a good and respectful relationship with the patients' companions and provide them with a suitable environment.	.459		
40.	Dentists should provide patients with the information necessary to make decisions and explain the advantages and disadvantages of the patients' choices.	.374		
41.	Dentists should guide patients with complete and understandable answers.			.605
42.	Dentists should inform patients of treatment costs in detail.			.570
43.	Dentists should avoid misleading phrases and statements, and never offer inappropriate treatments.			.548
44.	Dentists should make every effort to support the children who are at risk of child abuse.			.500

Exploratory Factor Analysis:

Exploratory factor analysis was performed using the maximum likelihood method to determine the factor structure of the scale. Interpretation of factor extraction was based on scree plot diagram and the Kaiser criterion for eigenvalue. The "elbow" where the plot drops off was considered in Figure 1. Regarding factor extraction, the results of the initial analysis were obtained based on the Promax rotation. The results listed three factors to explain the dimensions of dentists' ethical attitudes. Table 3 shows the eigenvalues and percentages of variance for each item. The factor loadings represent how much of an item is described by a factor. Items were allocated to the factors with the greatest factor load, and after Promax rotation, the eigenvalues of the three factors were greater than one. Results had identified three factors that together account for 48% of the total variance. Items that did not explain the main factor variance were identified and removed. There were 7 items that had a weak correlation with the factors or were

not clearly loaded on a factor, and therefore, the decision was made to remove them. Thus, the revised scale included 44 items reflecting 3 factors. After extracting the factor structure of the EADS, the conceptual fitness of the factors with the domains and the sub-domains was re-evaluated, and factors were labelled according to their respective items. Table 3 shows the factor structures of the EADS.

• The first factor had an eigenvalue of 32, included 22 items and was entitled "Maintaining the standing of the profession in relationships".

• The second factor had an eigenvalue of 11, included 18 items and was entitled "Providing dental services while maintaining trust in the profession".

• The third factor had an eigenvalue of 4, included 4 items and was entitled "Providing information for the benefit of the patient".

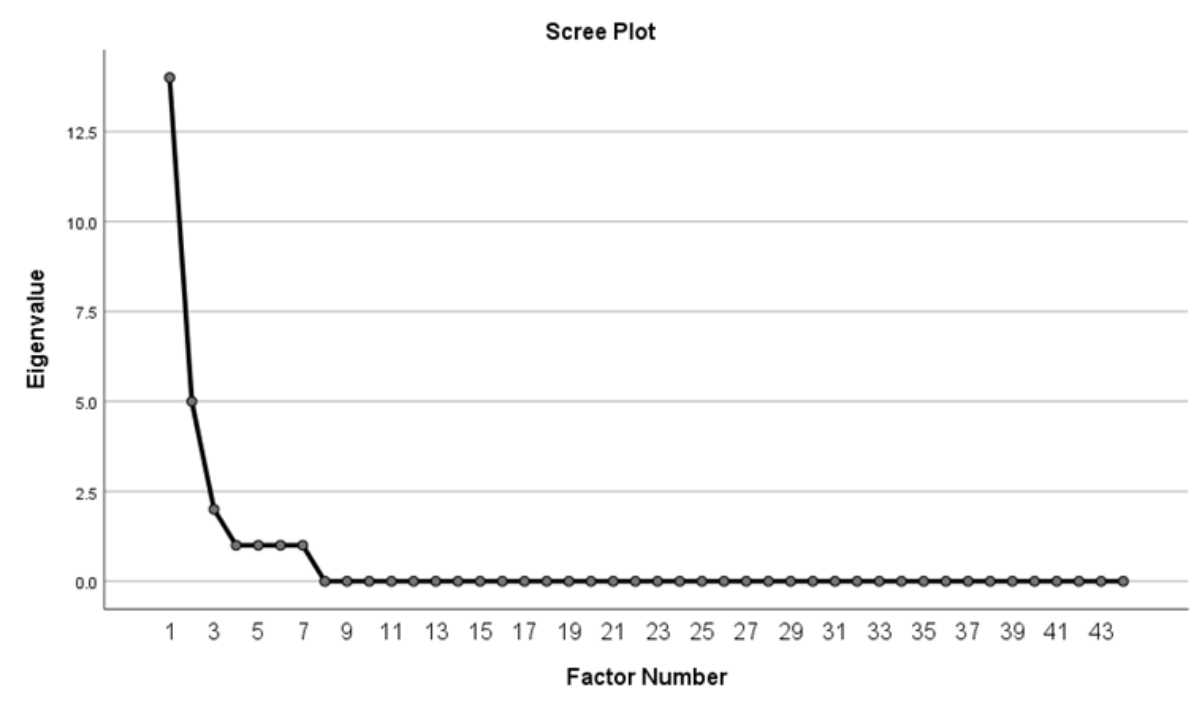

Figure 1. Scree plot diagram explaining factors of the EADS

Table 4. Accepted threshold of common goodness of fit indices of the model based on CFA.

Fit Index (full name)	Accepted Range	Results
X2	-	2255.27
DF	-	899
Root Mean Square Error of Approximation (RMSEA)	Good < 0.08 Moderate = 0.08 - 0.1 Weak > 0.1	0.087
Standardized Root Mean Square Residual (SRMR)	< 0.1	0.09
Parsimonious Normed Fit Index (PNFI)	> 0.5	0.85
Normed Fit Index (NFI)	> 0.9	0.89
Adjusted Goodness of Fit Index (AGFI)	> 0.8	0.83
Goodness of Fit Index (GFI)	> 0.9	0.66
Relative Fit Index (RFI)	> 0.9	0.89
Incremental Fit Index (IFI)	> 0.9	0.93
Comparative Fit Index (CFI)	> 0.9	0.93
Minimum Discrepancy Function Divided by Degrees of Freedom (X2 / DF)	good < 3 Acceptable < 5	2.5
Non-Normed Fit Index (NNFI)	> 0.9 <	0.93

Confirmatory Factor Analysis:

The factor structure extracted by EFA was confirmed through CFA. CFA can evaluate the goodness of fit results of factor structure, which can lead to a more accurate and definitive assessment of latent factors. The characteristics of goodness of fit indices of the model are presented in Table 4. It should be added that the model indicated a good fit as can be seen in Figure 2.

Reliability:

Table 5 shows the results of internal consistency (Cronbach's α) and test-retest reliability (intraclass correlation coefficient/ICC) of 3 factors and the total scale. Cronbach's alpha was found to be 0.86, and the internal consistency was very good**.** The results indicated acceptable levels of reliability and repeatability for the scale. The ICC between these two tests was 0.897 (0.804 - 0.945) at the significance level of 0.0001, which confirmed the stability of the scale over time.

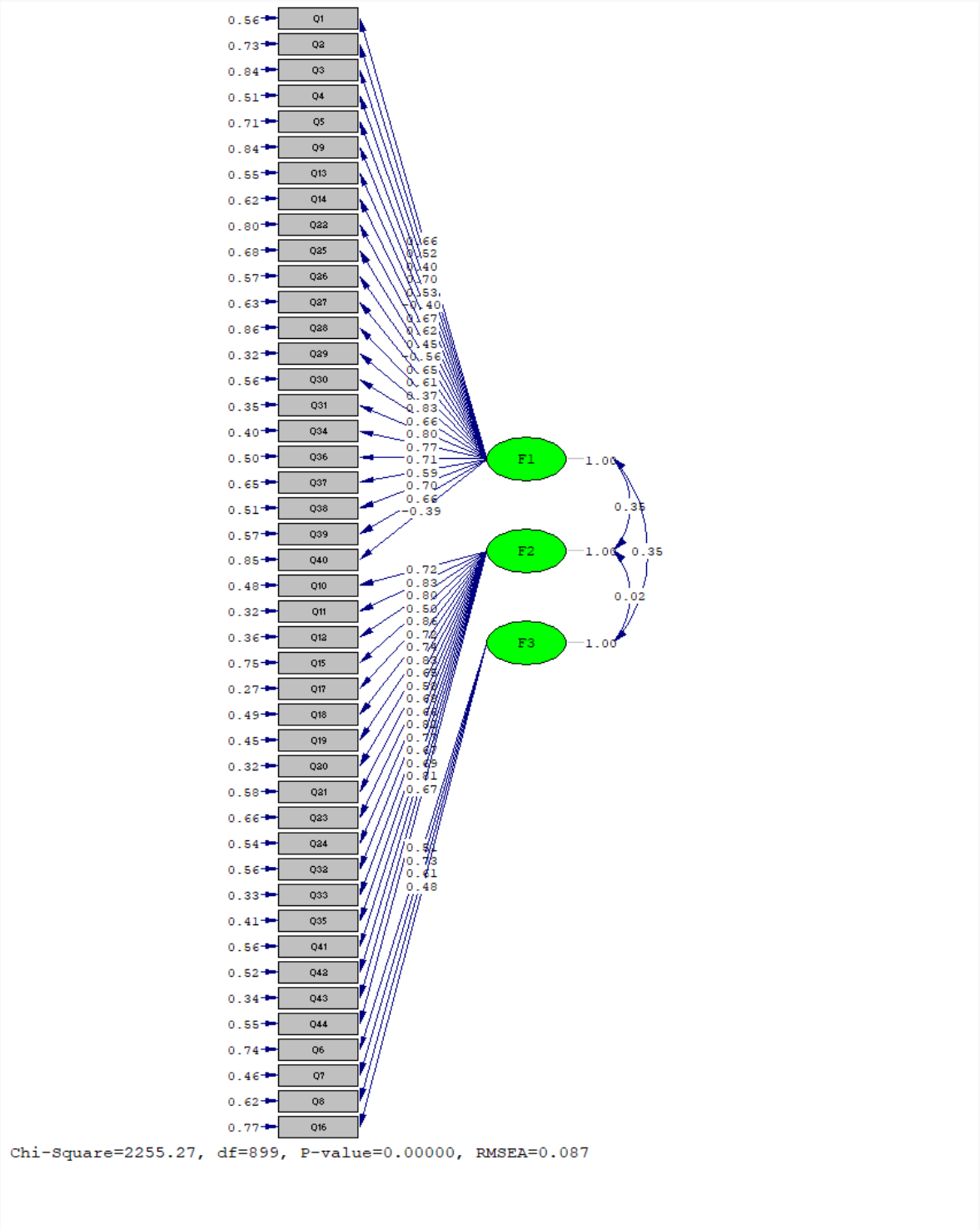

Figure 2. Confirmatory factor analysis of the EADS (n = 200)

Table 5. Cronbach's alpha coefficient, intraclass correlation coefficient and standard error of measurement

Factors	Cronbach's alpha	ICC (Intra class correlation)	CI=95%	SEM	MDC
Maintain the standing of profession in relationships	.688	.824	.667-.907	2.19	6.06
Providing dental services while maintaining trust in the profession	.846	.878	.769-.936	1.92	5.31
Providing information for the benefit of the patient	.689	.786	.599-.886	.55	1.52
Total	.86	.897	.804-.945	3.42	9.47

Discussion

The EADS was found to be a reliable and valid scale for assessment of dentists' ethical attitude. To design this scale, psychometric assessments, including face, content and construct validity, item analysis and reliability were carried out extensively. The final scale consists of three domains. According to the results, the scale has good face and construct validity and very good internal consistency. Moreover, the acceptable level of reliability confirmed the stability of the questionnaire over time. In 1976 Martin Fishbein and Icek Ajzen developed a theory that predicted how a person would act based on their attitudes and behavioral intentions (29). Some studies have reported that the ethical attitudes of health-care professionals are not influenced by ethical codes or oaths, and that the importance of developing a positive attitude in dealing with moral dilemmas is less than claimed (30). Continuing education in ethical practice programs can assist dentists in promoting ethics in their profession. Even as regulators tighten their oversight procedures, until dentists have a more ethical outlook, strict measures on unethical practices are certainly ineffective.

The study findings showed that most of the dentists were acquainted with codes of ethics and patients' rights (31), but in clinical settings, adherence to ethical codes is repeatedly ignored (7). Therefore, there is a gap between knowledge and practice, and attitude can be the missing link in this problem. "*The institutional environment, the health-care setting, professional experience, ethical education and accepted social values"* have all been shown to influence professional attitude (32). Considering the importance of ethical attitude and the need for standardized tools for evaluating it, this study was conducted to provide a standardized, valid and reliable scale for measuring the ethical attitude of dentists.

In this study, a standard, valid and reliable self-administered scale with 44 items was developed.

The findings indicated that this new scale meets the criteria of an acceptable scale for evaluating ethical attitudes as all items fully cover the concept of ethical codes. In fact, all the necessary items are included in the scale and therefore respondents can accurately reflect their attitudes on the codes. By using this scale, dentists' attitudes can be studied objectively and fairly, and they can even be improved through interventions. The strength of this study lies in the fact that it is more comprehensive than other scales related to ethical issues, addresses numerous aspects of clinical ethics, and the qualitative part of the study suitably meets the ethical needs of dentists (6). The final version of the EADS consists of 44 items on 3 subscales, all of which demonstrated good reliability and validity in the development of a new scale. These three domains comprehensively and completely cover all the ethical duties of dentists. The important question is, what strategies can ensure the fulfillment of those duties, including the observance of ethical codes.

The first domain of the EADS has 22 items and is related to maintaining the standing of the profession in relationships. It states that dentists should uphold their status and the social standing of the dental profession, and try to preserve the sanctity of the profession through honest practice by observing professional ethics. Dental practitioners have professional and ethical responsibilities toward their patients, the public and the profession that enable them to care for patients and serve the community. Professional dentists should adhere to ethical values, practice in a scientific manner and consider their own competencies at all times. Such conduct will enable dentists to serve the profession over time and maintain their professional authority.

The second domain of the EADS has 18 items on maintaining trust in the profession, and could help dentists detect and eliminate issues that undermine trust. Trust is a shared understanding between people. Patients are more likely to confide in dentists who have the capacity to communicate effectively (33). This type of confidence helps to alleviate patients' anxiety and fear (34), and lack thereof can destroy their faith in the profession (35). Although few studies have dealt directly with the issue, the Noonan and Evans study has shown some factors that comprise trust, including "*the ethical standards of dentists, the communication between dentists and patients, and their shared responsibilities of decision-making"* (36).

The third domain of the EADS has 4 items on providing information for the benefit of the patient. In the literature, there is emphasis on providing

patients with information. Making patients aware of their condition not only improves their psychological and clinical outcome, but also makes the whole process cost-effective. Patients are particularly preoccupied with quality assurance and costs. Evidence suggests that patients want more detailed information about dental procedures, which can reduce their anxiety levels and inform them to opt for potentially more cost-effective treatments (37). This domain could help dentists develop an effective strategy for expanding such arrangements in the future.

Most previous ethical assessment questionnaires addressed only a specific topic. For example, Gupta et al. measured the ethical attitude of dentists using a researcher-made questionnaire, but only dealt with the subject of informed consent. The sources used to design the questions were not mentioned and the stability of the scale over time and the validity of the structure were not examined (38). Reid et al. designed a tool to measure dentists' attitudes regarding the acceptance of gifts, but the process of validation was not mentioned (39). Some studies evaluated dentists' ethical attitudes toward international ethical codes and guidelines (13 - 14) using previous questionnaires without any changes. Also, there is one questionnaire that was designed for physicians rather than dentists (12).

The strong points of this study are its sequential exploratory mixed-method design, sampling from various cities and a relatively large sample size, and development of a context-bound scale to assess Iranian dentists. In the present scale, a significant number of dentists with different specialties or from diverse fields of practice were employed. The EADS is not long, and is a user-friendly scale, designed to be clear, practical and comprehensive. Due to its simplicity and acceptable validity and reliability, the EADS can be used to evaluate the ethical attitude of dentists in different environments, for instance private and academic settings. However, it is not necessarily without flaws. The questionnaires were administered on all social media of dentistry and online platforms to make it more convenient for respondents. The authors explicitly acknowledge that developing, validating and evolving a new scale are lengthy and ongoing processes. Furthermore, the EADS is a self-declaration scale and therefore also suffers from limitations of such scales. For instance, we did not know to what extent the respondents were honest in answering the questions, and there was no confirmation of the level of subjectivity. Moreover, lack of availability of similar studies at the national level and restrictions in its generalizability were other limitations of the study.

Conclusion

In the present study, we tried to provide sufficient information about the process of evaluating the validity and reliability of the Ethical Attitude of Dentists scale. The results showed that the Persian version of EADS has an acceptable validity and reliability. We hope our scale not only assesses the ethical attitude of dentists, but also raises their ethical sensitivity. This scale can be used to identify areas in need of feedback as well. Therefore, due to a lack of valid and reliable scales and in accordance with the cultural conditions of Iran, the authors suggest that the psychometric properties of the scale be evaluated in different regions of the country and in diverse statistical communities. The results of the present study can be useful in planning and conducting future research related to ethics in dentistry. This may be a potentially useful scale for research and educational programs to identify ways and policies in order to motivate, develop and maintain ethics in dentists. We hope our scale will not only enhance the attitude assessment process, but also help dentists improve their ethical attitudes. The scale of dentists' ethical attitude has been designed by using qualitative methods, and by performing accreditation processes, has appropriate validity and reliability and can be used in various situations by researchers and dental policy makers.

Funding

This study was part of a PhD thesis that was financially supported by the School of Medicine, Tehran University of Medical Sciences, Tehran, Iran.

Acknowledgements

The authors would like to gratefully acknowledge all academic staff and dentists who participated in this study and provided valuable comments.

Conflict of Interests

The authors declare no conflict of interests.

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