

Original Article

Applying the American Dental Education Association (ADEA) tool on action on professionalism in dental education in Iran and applying in a cross-sectional study

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ABSTRACT

Background: Professionalism is a multidimensional concept, defined as conducting oneself with responsibility, integrity, accountability, and excellence. This study aimed to contextualize American Dental Education Association (ADEA) tool on action on professionalism in dental education in Mashhad and apply it in a cross-sectional study.

Materials and Methods: This descriptive-analytic study was conducted on all students of Mashhad School during 2018–2019. The ADEA tool for action on professionalism in dental education was applied. It was firstly contextualized, validated, and its reliability was confirmed by test–retest and Cronbach's alpha. Then, it was applied in a cross-sectional study. Data were analyzed using Lisrel, and SPSS: 16. ANOVA and Tukey's honestly significant difference tests were used to compare the study variables.

Results: The tool was valid and reliable for applying in the Iranian context ($\chi^2/df < 3$, RMSEA ≈ 0.1 and indices of comparative fit index, incremental fit index, goodness-of-fit index, and adjusted GFI are > 0.7). In the cross-sectional study for measuring professionalism, the mean score of 1st-year dental students was significantly higher than 3rd-year dental students ($F = 2.75$, $P = 0.002$). Furthermore, the mean score of 1st-year dental students was also significantly higher than 6th-year students ($F = 4.53$, $P = 0.001$). The comparison of the component of professionalism among 1st-to 6th-year students showed that there was no statistically significant difference between the total score of males and females. In addition, no statistically significant difference was found between the total score of local and nonlocal students.

Conclusion: The Tool is valid and reliable for applying in the Iranian context. Dental students need to be trained and also practice professional behaviors during their senior years of college.

Key Words: American dental education association, dental education, dental student, professionalism

Received: 17-Oct-2020
Revised: 13-Apr-2022
Accepted: 09-Oct-2022
Published: 14-Dec-2022

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How to cite this article: Sarabadani J, Amirchakhmaghi M, Nik ZE, Motlagh MK, Zarghi N. Applying the American dental education association (ADEA) tool on action on professionalism in dental education in Iran and applying in a cross-sectional study. *Dent Res J* 2022;19:105.

INTRODUCTION

Professionalism is a multidimensional concept, defined as conducting oneself with responsibility, integrity, accountability, and excellence; in fact, it is a combination of qualities. Professionalism refers to effective communication and finding a way to be productive. Therefore, professional workers should take responsibility for their own behavior and effectively cooperate with others.^[1]

High-quality work standards, honesty, and integrity are essential parts of professionalism. In addition, professionalism is identified as a tool to increase functionality in many domains, such as medical and dental health. In fact, in order to gain public confidence, professionals, including physicians and dentists, need to familiarize themselves with these tools.^[2]

The American Dental Education Association (ADEA) is committed to developing and maintaining institutional environments within the allied, predoctoral and postdoctoral dental education community that foster academic integrity and professionalism.

According to ADEA, the general characteristics of professionalism include competence, fairness, integrity, responsibility, respect, and service-mindedness.^[3] The available evidence suggests that growing consumerism, extreme attention to esthetics, and strong financial incentives of dentists can lead to a decline of professionalism among dentists.^[4]

The main problems related to professionalism are divided into three categories. These problems reported by students include conflict between education and patient care, professional responsibility surpassing one's capabilities, and low quality of patient care. These issues clearly indicate the need for maintaining high standards of professionalism.^[5]

Specifying the dimensions of professionalism is essential to determining the nature of the relationship between physician and patient. In addition, universities, by producing workforce, play a key role in forming professionalism.

The development of professional characteristics is among the most important educational objectives. Evaluation is an important element in achieving the objectives of professionalism. In fact, it provides a valuable feedback to foster people's professional development.

Since a vast majority of dental school graduates work in this field, it is important to determine the rate of students' perception of professionalism.

This study aimed to contextualize ADEA tools on professionalism and compare the concept of professionalism among students of different academic years using it. Another purpose of this study was to determine the relationship between the concept of professionalism, gender, and location. In addition, the practical purpose of this study was to determine the status of professionalism in order to plan for the improvement of professionalism.

MATERIALS AND METHODS

This article is a descriptive-analytic study for confirming the psychometric properties of the ADEA Tool on Action on Professionalism in Dental Education. ADEA tool can help with understanding and defining professionalism and evaluating the performance of people in the field of dentistry. It is composed of 77 items and six values, defining professionalism in dental education, including competence, fairness, integrity, responsibility, respect, and service-mindedness.^[6] It was contextualized and validated following taking the permission of developers from February 2018 to June 2019 at Mashhad University of Medical Sciences.

Following ethical consideration, all 244 undergraduate dental students of Mashhad Dental School, Mashhad, located in the northeast of Iran during 2018–2019, who met the inclusion and exclusion criteria of the study, participated in the study. This sample was selected by census sampling. The dentistry students, who were studying in the 1st to 6th year of the undergraduate program were included in this study. The guests, transferred students, and students who would not like to participate in the study were excluded from the study.

The toolkit on translating and adapting instruments by Chávez and Canino^[7] was applied for the contextualization process. To check validity, first, the instrument was translated by two bilingual expert translators familiar with professionalism concepts separately. Two translation copies were integrated as one Persian copy. Then, the accuracy of the translation was checked by the expert panel. Two Delphi rounds^[8] were conducted for assessing face and qualitative and quantitative content validity, i.e., content validity index (CVI) and content validity ratio (CVR) using

the Lawshe method.^[9] The translated instrument was given to the experts in the first Delphi rounds. The experts were ten people familiar with professionalism, and were members of the MUMS scientific committee of professionalism in this step of the study. Face validity and content validity were also observed through considering comments of experts, in which the statements could be understood well (qualitative) and scored it for CVI and CVR (quantitative). In the second Delphi round, the final copy was given again to professionalism scientific committee members for final confirmation. After reviewing the comments on the ADEA tool, one item of competence, five of fairness, five of responsibility, five of respect, and four of service-mindedness were deleted. In addition, 56 items were selected for evaluation in this study. The final copy was a 56-statement tool.

Factor analysis was carried out to confirm construct validity. The data were collected from 20 experts who were familiar with professionalism concepts; they also were working and researching professionalism. Confirmatory factor analysis was carried out using Lisrel software. According to the literature, if $\chi^2/df < 3$, RMSEA ≈ 0.1 and indices of comparative fit index (CFI), incremental fit index (IFI), goodness-of-fit index (GFI), and adjusted GFI (AGFI) are > 0.7 , the construct validity can be confirmed.^[10]

To confirm reliability, test-retest was calculated. The data were analyzed through the SPSS version 16 (SPSS, Inc., Chicago, IL, USA) using Cronbach's alpha for internal consistency. Lisrel: 8.5 was used for factor analysis in confirming construct validity using Kaiser-Meyer-Olkin (KMO) and Bartlett tests. Ethical considerations were followed as rules and regulations of Mashhad University of Medical Sciences, in which participants were taken informed consent. The Mashhad University of Medical Sciences ethics committee also approved conducting this study (IRB: 901018).

The internal consistency of the modified tool was also assessed due to the deletion of some items by Cronbach's alpha ($\alpha = 83\%$). The modified ADEA tool was designed based on 10-point Likert scale based on statistical consultations. Cronbach's alpha was calculated as 0.83, which is higher than 0.7, i.e., the ADEA tool is reliable for applying in the Iranian context. The test-retest was also done for confirming reliability as well. Ten participants completed the checklist following watching the standard video in two steps at a 2-week interval. The correlation coefficient

was calculated as 0.918. To compare students' perception of professionalism, the ADEA tool for action on professionalism in dental education was applied.

Following ethical considerations, explaining the aims and methods of study for students and taking informed consent, the inventories were distributed among dental students of different years in classrooms. Participants were assured about the confidentiality of data.

Both descriptive and inferential statistics were applied for data analysis, factor analysis, KMO and Bartlett tests, and mean and standard deviation was used. Kolmogorov-Smirnov test was performed to check the normal distribution of variables. In addition, ANOVA and Tukey's honestly significant difference were used to compare the study variables using SPSS: 16.

RESULTS

Confirmatory factor analysis confirmed construct validity of ADEA tool ($\chi^2/df < 3$, RMSEA ≈ 0.1 and CFI, IFI, GFI, and AGFI > 0.7) [Table 1].

To confirm reliability, test-retest was calculated. The data were analyzed through the SPSS version 16 (SPSS, Inc., Chicago, IL, USA) using Cronbach's alpha for internal consistency. Lisrel: 8.5 was used for factor analysis in confirming construct validity using KMO and Bartlett tests.

Of all dental students, 17.33% were studying in 1st, 18.33% in 2nd, 17.33% in 3rd, 16.66% in 4th, 17.66% in 5th and 16.66% in 6th years of dentistry. The mean and standard deviation of the age was 21.48 ± 1.64 years old. Around half of the participants (51%) were aged 18-21 years, 48.67% were between 22 to 25 years old, and 0.33% were in their 25th. In total, 53.7% of students were male and 46.3% were female. In addition, 65.7% were living in Mashhad.

The mean and standard deviation of subjects' professionalism scores are shown in Table 2. According to the findings, the highest mean of professionalism

Table 1: Confirmatory factor analysis

Indexes	Shorthand	Estimated	Cut-off for good fit
Ratio of χ^2 to df	χ^2/df	1.360	≤ 3
Root mean square error of approximation	RMSEA	0.036	≤ 0.1
Comparative fit index	CFI	0.95	≥ 0.9
Incremental fit index	IFI	0.92	≥ 0.9
Goodness-of-fit index	GFI	0.93	≥ 0.9
Adjusted goodness-of-fit index	AGFI	0.94	≥ 0.9

scores was observed among 1st-year students. The mean score of 1st-year dental students was significantly higher than 3rd-year dental students ($F = 2.75$, $P = 0.002$). Furthermore, the mean of 1st-year dental students was significantly higher than dental students of 6th year ($F = 4.53$, $P = 0.001$). However, there was no statistically significant difference between the mean of 1st-year students and others.

The maximum and minimum mean scores of competence were allocated to 4th- and 3rd-year students, respectively. There was a significant difference between the mean of competence in students of 5th and 4th years ($F = 2.75$, $P = 0.019$).

This study indicated that the students who were in the 1st year of dentistry got the maximum mean of fairness and 4th-year students got the minimum mean. There was a significant difference between the mean of fairness among students of 1st and 4th years ($F = 2.48$, $P = 0.032$).

The students who were in the 1st and 6th years of college had the maximum and minimum means of integrity, respectively. There was a significant difference between the mean of integrity in students of 6th and 1st year, 4th and 6th year, and 3rd and 1st years ($F = 4.13$, $P = 0.001$).

There was a statistically significant difference between the mean of responsibility in students of 1st and 2nd, 1st and 3rd, and 1st and 6th years ($F = 3.43$, $P = 0.005$). Furthermore, there was a significant difference between the mean of respect in 1st-year students and other students, except for the 4th-year students ($F = 6.39$, $P = 0.001$). There was a statistically significant difference between the mean of service-mindedness subscale in students of 1st and 3rd years, and 1st and 6th year ($F = 3.56$, $P = 0.004$) [Table 3].

The comparison of professionalism among dental students of 1st to 6th years of the college indicated that women obtained significantly higher scores in the honesty subscale ($P = 0.001$). However, no statistically

significant difference was found between the total score of men and women regarding other subscales [Table 4].

In addition, a comparison of professionalism among dental students from 1st to 6th year indicated that there was a significant difference between local and nonlocal students in the integrity subscale ($P = 0.001$). However, no statistically significant difference was shown between the total score of local and nonlocal students in other subscales ($P = 0.006$) [Table 5].

DISCUSSION

According to the results, 1st-year dental students had

Table 3: Comparison of components of professionalism among dental students, based on educational level

Components of professionalism	Level	Mean±SD	t-test	P
Competence	First year	75.13±23.40	2.75	0.019
	Second year	81.58±19.83		
	Third year	75.11±18.28		
	Fourth year	76±13.82		
	Fifth year	86.11±18.34		
	Sixth year	75.13±17.22		
Fairness	First year	45.32±12.77	2.48	0.032
	Second year	41.50±11.71		
	Third year	39.73±11.11		
	Fourth year	38.20±10.90		
	Fifth year	42.66±13.24		
	Sixth year	38.59±12.45		
Integrity	First year	61.15±13.71	4.13	0.001
	Second year	53.63±14.64		
	Third year	52.34±13.71		
	Fourth year	58.04±10.89		
	Fifth year	54.01±14.42		
	Sixth year	50.04±15.14		
Responsibility	First year	57.59±13.13	3.43	0.005*
	Second year	49.72±15.32		
	Third year	49.73±12.25		
	Fourth year	54.77±9.91		
	Fifth year	52.77±13.80		
	Sixth year	48.56±14.60		
Respect	First year	76.30±20.28	6.39	0.001*
	Second year	75.50±19.15		
	Third year	85.31±14.10		
	Fourth year	80.28±19.98		
	Fifth year	74.25±20.23		
	Sixth year	57.59±13.13		
Service-mindedness	First year	48.45±14.13	3.56	0.004*
	Second year	54.94±14.36		
	Third year	55.77±15.99		
	Fourth year	49.44±10.74		
	Fifth year	50.67±15.70		
	Sixth year	58.03±14.66		

*: Significant, SD: Standard deviation

Table 2: Mean and standard deviation of professionalism in dental students

Level	Mean±SD
First year	392.69±71.12
Second year	353.43±76.11
Third year	341.86±72.37
Fourth year	368.11±55.58
Fifth year	370.79±65.87
Sixth year	335.04±76.05

SD: Standard deviation

higher scores of professionalism in comparison with students of 3rd and 6th years. However, there was no statistically significant difference between the mean of 1st-year dental students and other students. These results were consistent with studies of Quarantelli and Helfrich and Becker *et al.*^[11,12]

Unlike our results, study of Poirier showed that professionalism developed during 5 years of studying at university. However, Poirier believed that the development of professionalism was as a result of the training programs of Illinois University. She also revealed that individual feedback can lead to students' responsibility and development of professionalism.^[13]

These results suggest that curriculum standards need to be reviewed. According to a study by Marino *et al.*,

Table 4: Comparison between components of professionalism among dental students, according to gender

Components of professionalism	Gender	Number	Mean±SD	t-test	P
Competence	Males	139	77.56±18.56	1.30	0.195
	Females	161	80.44±19.58		
Fairness	Males	139	40.23±12.26	1.21	0.229
	Females	161	41.94±12.18		
Integrity	Males	139	52.02±14.40	3.28	0.001*
	Females	161	57.36±13.64		
Responsibility	Males	139	50.87±13.53	1.57	0.117
	Females	161	53.34±13.64		
Respect	Males	139	79.64±19.65	0.69	0.493
	Females	161	81.18±19.12		
Service-mindedness	Males	139	51.80±15.01	1.21	0.228
	Females	161	53.86±14.50		

*: Significant, SD: Standard deviation

Table 5: Comparison of components of professionalism among dental students, based on location

Components of professionalism	Location	Number	Mean±SD	t-test	P
Competence	Local	197	79.33±19.18	0.28	0.782
	Nonlocal	103	78.68±19.14		
Fairness	Local	197	41.24±12.07	0.186	0.852
	Nonlocal	103	40.97±12.58		
Integrity	Local	197	56.53±14.31	2.78	0.006*
	Nonlocal	103	51.77±13.58		
Responsibility	Local	197	52.51±13.78	0.549	0.583
	Nonlocal	103	51.60±13.35		
Respect	Local	197	81.38±19.87	1.12	0.262
	Nonlocal	103	78.73±18.28		
Service-mindedness	Local	197	53.37±15.47	0.75	0.454
	Nonlocal	103	52.02±13.31		

*: Significant, SD: Standard deviation

the majority of students believed that the coverage of sociocultural aspects in the courses is not adequate to meet the desired educational objectives. They also emphasized that these evaluations have a tremendous impact on professionalism.^[14]

The study of Smithers *et al.*, indicated that the highest professionalism scores do not necessarily indicate that 1st-year students are more professional than the rest of the students since the majority of university entrance examinations are predictors of academic behaviors, not behavioral skills and professionalism. Furthermore, there was a difference between academic behaviors and behavioral skills and professionalism.^[15]

Furthermore, other factors are effective in shaping professional behavior. For instance, according to Chamberlin's study, personality is a predictor of professional behavior in dental schools.^[16]

All the subscales of professionalism were assessed in this study. According to the results, a significant difference was found between the mean of professionalism subscales in students of different years. The maximum scores of the competence subscale were obtained by 5th- and 6th-year students. It seems that individual's experience of working in dental clinics leads to gaining higher scores in the competence subscale. Moreover, the maximum score of the respect subscale was obtained by students of 1st, 2nd, 3rd, and 4th year. In total, the minimum scores were related to the fairness subscale. The scores of intern students were significantly lower in fairness and service-mindedness subscales. This may be due to the biased treatment of teachers, unfair policies of university, and financial incentives of dental students.

The study of Crossley, conducted on 80 medical students and 80 dental students, was consistent with the present study. Crossley's study showed the majority of dental students have financial incentives for selecting dentistry as a profession in comparison with medical students.^[17]

Consistent with Tsuen Chung's study (2005), our study indicated that there was a statistically significant difference between integrity, responsibility, respect, and service-mindedness among dental students of different years.

The relationship between professionalism and personal characteristics was also assessed in this study. According to the results, there was no statistically significant relationship between the total score of

professionalism and gender; this finding was consistent with the study of Rowland *et al.*^[18] In addition, the total score of professionalism was not higher in local students compared with nonlocal students.

Findings of Paro *et al.* who conducted their study on medical students, were in agreement with present study. It showed no statistically significant differences between males and females, regarding empathy as the main subscale of professionalism.^[19]

Unlike our study, Chamberlain *et al.* showed a significant correlation between professionalism and dependent variables such as age, gender, academic education, and personality traits.^[16] In addition, a study carried out by Kelly indicated a significant relationship between demographic characteristics and the conscientiousness index.^[20]

The relationship between demographic characteristics and professionalism was different in other studies. This may be due to differences in definitions of professionalism. Moreover, cultural and environmental variations may play a significant role in the observed differences.

Anderson and Irwin studied professionalism in students of physiotherapy through self-assessment. According to Anderson and Irwin, scores of integrity were higher in female students compared with males; these variations may be due to cultural and environmental differences.^[21]

The individuals' personal differences and lack of performance assessment were other limitations of this study.

CONCLUSION

As to the findings, the ADEA tool is a valid and reliable tool for applying in the Iranian context. Dental students should be trained in professional behavior during their study.

Acknowledgment

The authors offer their special thanks to the dentistry students for their active participation in this research.

Financial support and sponsorship

This research was financially supported by the Research Council of Mashhad University of Medical Sciences.

Conflicts of interest

The authors of this manuscript declare that they have no conflicts of interest, real or perceived, financial or nonfinancial in this article.

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