Original Article

Attitudes of dental students toward underserved populations: A survey of an Iranian dental school

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Abstract

Background & Objective: It is essential to cultivate dentists who are not only technically proficient but also socially sensitive in order to reduce oral health disparities. Assessing attitudes has been emphasized in dental education within this context. This study aimed to assess dental students' attitudes toward less privileged populations.

Material & Methods: This cross-sectional study utilized the valid Persian version of the "Dental Student Attitude Toward Underserved Population" (DSATU) questionnaire to evaluate the attitudes of first and final year dental students at Mashhad dental school toward deprived populations. The questionnaire consists of 21 Likert scale questions across four domains addressing social expectations, student responsibility, personal efficacy, and access to care. The outcome variables were the overall and domain-specific scores of the DSATU questionnaire. Independent variables included students' gender and academic year. Statistical analysis was performed using SPSS version 22.

Results: The questionnaire was administered to 52 first-year and 58 final-year students, yielding a response rate of 90%. The majority of participants were final-year students (55.7%) and female (59.6%). First-year students generally exhibited a more positive perspective, scoring 8 points higher than final-year students in the total survey: 85.53 (81%) versus 76.66 (73%) out of a maximum of 105 points. The decline in attitudes among final-year students was statistically significant in total and all domain scores ($p < 0.05$). There was no statistically significant gender difference in total DSATU and subdomain scores, except for access to care ($p = 0.037$).

Conclusion: This study suggests less favorable attitudes toward underserved populations among final-year students. Longitudinal rigorous evaluation of students' attitudes provides better insights into the effectiveness of dental education.

Keywords: dental student, attitudes, underserved populations, questionnaire, dental education

Introduction

Dental caries, as the most prevalent infectious disease, imposes a high burden of disease on communities (1). Despite the preventable nature of oral diseases, over 3.5 billion people worldwide are affected. The prevalence of dental caries is increasing in many low and middle-income countries (2). Research has also indicated that socioeconomic inequality affects all health outcomes, including oral health (3, 4). Limited access to care for underprivileged and minority populations is a significant factor contributing to oral health inequality (5).

Today, there is a decreasing tolerance for health disparities, and caring for underprivileged patients is now considered a civic responsibility of healthcare providers. Therefore, it is essential to cultivate dentists who are not only technically competent but also socially sensitive in order to reduce oral health disparities. Within this context, the assessment of attitudes has been emphasized in dental education (6, 7). While healthcare professionals' attitudes toward disadvantaged groups may be rooted in personality characteristics, educational experiences also play a significant influential role (8, 9). Unfortunately, there are limited studies examining dental students' attitudes toward the underprivileged, which indicate a decline in attitudes compared to the beginning of their studies. Little is known about why student attitudes decline during the educational course. It is essential to highlight that students undergo a transition from idealism to pragmatism during their educational

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period. Additionally, the predominant biomedical approach in dental education provides limited opportunities to interact with the reality of society. From this perspective, Community-Based Dental Education (CBDE) offers the possibility of deeper communication with diverse less privileged groups and a better understanding of the socioeconomic determinants of health (6, 8, 10). These extramural experiences take place outside of the faculty settings and have a positive effect on clinical and communication skills, as well as adaptability in challenging situations (11).

Another study examined the impact of CBDE on the career choices of final-year dental students. The study revealed that 47% of CBDE participants expressed an inclination to work in public health settings (12).

A recent study conducted in Iran investigated the implementation of CBDE in Iranian dental schools. This study revealed that 47% of dental schools incorporate community-based education (13).

It is noteworthy that the interaction of healthcare providers with such populations significantly influences their future willingness to engage with underserved communities (14-16). Upon reviewing the benefits of CBDE, it becomes evident that without such training, dentists' participation in voluntary actions, their communication skills, and their desire to provide services to these groups and work in public health settings will be negatively impacted.

Despite the necessity of assessing students' attitudes to address deficiencies in dental education (6), only a few studies have been conducted in this regard. Furthermore, most of these studies have been carried out in developed countries. In this context, a widely used and popular instrument was introduced in 1994 by Crandall et al.: The Medical Students' Attitudes Towards Providing Care for the Underserved questionnaire (MSATU) (17). They concluded that senior students have less favorable attitudes toward disadvantaged groups than freshmen. The mentioned questionnaire is culturally appropriate for various communities. In 2011, Habibian et al. modified the questionnaire to introduce the dental version: Dental Students Attitude Toward Underserved Populations questionnaire (DSATU) (18). Their findings showed a decline in attitudes among senior dental students toward underserved populations. The valid Persian version of DSATU has been introduced in another study. Mashhad Dental School is one of the progressive educational centers providing CBDE. Assessing students' professional socialization and ethical sensitivity toward vulnerable and underserved populations reveals deficiencies in dental education and enables health policymakers and dental educators to gain better insight into the effectiveness of CBDE (7, 19, 20). However, no study has been conducted in Iran so far. Therefore, this study aimed to investigate the attitudes of dental students toward underserved populations using a valid Persian version of the DSATU questionnaire.

Material & Methods

Design and setting(s)

A cross-sectional survey was conducted at the dental school of Mashhad University of Medical Sciences. The study was approved by the Ethics and Research Committee of Mashhad University of Medical Sciences (IR.MUMS.DENTISTRY.REC.1399.106).

Participants and sampling

Inclusion criteria: Using census sampling, all 52 first-year students and 58 final-year students of Mashhad dental school were invited to participate in the study. The questionnaire was administered to the students in June 2019 through the Mashhad University of Medical Sciences Virtual Learning Platform (NAVID). Incomplete questionnaires were excluded from the study.

Tools/Instruments

A review of the literature was conducted to identify a suitable instrument. However, no Persian questionnaire was found. Among the existing tools, only the DATU questionnaire, a popular and culturally adaptive instrument for dental students, was identified for the target population. The DSATU instrument was developed by Habibian et al in 2011. The original questionnaire comprises 23 Likert scale questions divided into four main domains addressing social expectations, student responsibility, personal efficacy, and access to care. The responses range from 1 (extremely disagree) to 5 (extremely agree), providing a total score ranging from 23 to 115. **Appendix 1** displays the DSATU questionnaire. A draft of the Persian version of the questionnaire was prepared using the forward and backward translation method (21). A panel of experts qualitatively assessed the content and face validity. The quantitative approach was utilized to determine content validity (Content Validity Ratio (CVR) and the Content Validity Index (CVI)) and item impact score. The test-retest method (Pearson/Spearman's rank correlation coefficient) and Cronbach's alpha indicated acceptable reliability.

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15 items obtained an acceptable CVR value, meeting the minimal acceptable CVR value based on the number of panelists (nine persons) of 0.78. Additionally, 21 items had a CVI score of 0.78 or higher. Furthermore, the Scale-level CVI (S-CVI = 0.98) was excellent. The impact scores showed that 20 questions had acceptable values (a score equal to or greater than 1.5). The total Cronbach's alpha coefficient was 0.831, and the intraclass correlation coefficient was 0.83, both of which were deemed acceptable. Spearman's correlation coefficient was used to assess the correlation between the scores of each item, revealing a significant correlation among 22 items, indicating acceptable repeatability. The correlation coefficient of the total scores of the questionnaire was 0.7. Based on the validation and reliability findings, the items that needed modification were revised. The detailed process of the validation study has been reported elsewhere.

Data collection methods

The validated Persian version of the instrument was administered to dental students through the NAVID in June 2019. The students completed the questionnaire voluntarily, and all participants were assured about the confidentiality of the results. The data was collected anonymously.

Data analysis

The data were analyzed using SPSS software (version 22). The independent variables included the students' gender and academic year of education, while the DSATU total and domain-specific scores were the outcome variables. Based on the Kolmogorov-Smirnov test, the distribution of DSATU scores was found to be normal. The t-student test was utilized to examine the overall and subdomain attitude scores (outcome variables) across the independent variables (gender and year of study).

Results

The questionnaire was completed by 42 first-year students and 54 final-year students, resulting in a response rate of 90%. Three incomplete questionnaires were excluded from the analysis. The majority of participants were final-year students (55.7%) and female (59.6%). Freshmen scored 8 points higher than seniors in the total survey, with scores of 85.53 (81%) versus 76.66 (73%) out of a maximum of 105 points. First-year students obtained a mean score of 20.88 out of a maximum score of 25 in social expectations (83%), indicating higher expectations of dental students from the government and social structures in providing the necessary facilities and measures to meet the dental needs of the needy. The mean score for dental students' responsibility was 26 out of a maximum score of 35 (74%). Among the four domains, the item's mean score of the mentioned domain was the lowest, while personal efficacy gained the highest score. The average score of the third domain was 17.88 out of 20 points (90%), and the total score for access to care was 19.88 out of 25 maximum score (80%). The average score of the final domain's item was 3.97. Seniors scored 18.64 (75%), 24.12 (69%), 16.03 (80%), and 18.07 (72%) points in the first to last domains, respectively, with personal efficacy and dentist responsibility scoring the highest and lowest values among seniors. The detailed total and domain-specific DSATU scores were presented in **Table 1**. **Figure 1** illustrated that first-year students generally had a more positive perspective, with this difference being statistically significant in total and all domain scores. However, there was no statistically significant gender difference in total DSATU and subdomain scores, except for access to care (p = 0.037), indicating that female students had a more positive attitude towards providing dental care to the indigents. The overall and domain-specific DSATU scores across independent variables were presented in **Table 2.**

Table 1. Mean overall and domain-specific DSATU scores among first and last year students

DSATU score	Minimum			Maximum			Mean ± SD			Item's mean score		
	First	Last	Overall	First	Last	Overall	First	Last	Overall	First	Last	Overall
Overall	52	56	52	99	94	99	85.53 ± 9.84	76.66 ± 8.06	80.59 ± 9.89	4.07	3.65	3.83
Social expectation	12	11	11	28	24	28	20.88 ± 3.03	18.64 ± 2.39	19.63 ± 2.9	4.17	3.72	3.92
Dentist responsibility	15	14	14	34	33	34	26.88 ± 4.55	24.12 ± 4.07	25.35 ± 4.48	3.84	3.44	3.62
Personal efficacy	7	9	7	20	25	25	17.88 ± 2.93	16.03 ± 2.78	16.85 ± 2.98	4.47	4.007	4.21
Access to care	12	14	12	25	23	25	19.88 ± 3.28	18.07 ± 2.21	18.88 ± 2.87	3.97	3.61	3.77

Abbreviations: n, number of participants; SD, standard deviation.

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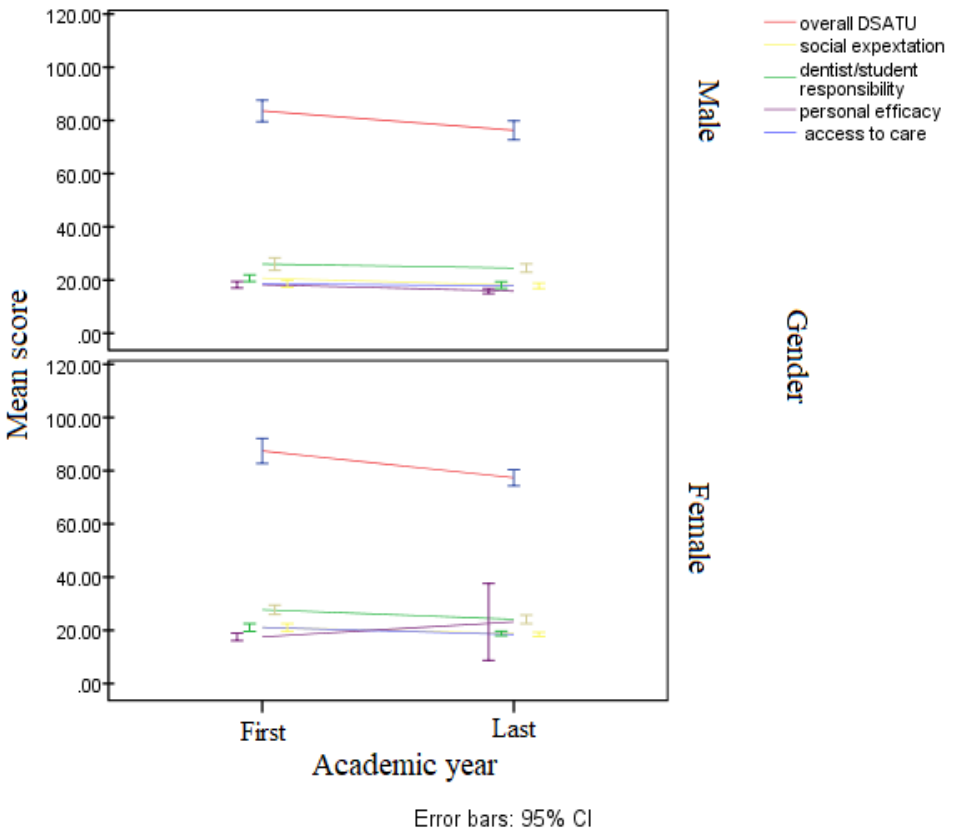

Figure 1. The difference in overall and subdomains DSATU mean score among first and last dental students

Table 2. Mean overall and subdomain DSATU scores across independent variables

Study variables		Social expectations (Mean ± SD)	Dentist/student responsibility (Mean ± SD)	Personal efficacy (Mean ± SD)	Access to care (Mean ± SD)	Overall score (Mean ± SD)
Academic year	First	20.88 ± 3.03	26.88 ± 4.55	17.88 ± 2.93	19.88 ± 3.28	85.53 ± 9.84
	Last	18.64 ± 2.396	24.12 ± 4.079	16.03 ± 2.78	18.07 ± 2.21	76.66 ± 8.063
	p-value	< 0.001	.002	0.002	.002	< 0. 001
	(CI)	(1.14_3.32)	(1.01_4.49)	(0.68_3)	(0.68_2.92)	(5.25_12.47)
Gender	Male	19.55 ± 2.91	25.34 ± 4.34	17.15 ± 2.62	18.26 ± 2.57	80.31 ± 8.74
	Female	19.69 ± 2.95	25.53 ± 4.56	16.87 ± 3.13	19.5 ± 2.93	81.37 ± 10.44
	p-value	0.817	0.837	0.466	0.037	0.608
	(CI)	(-1.37_1.08)	(-2.06_1.673)	(-13.86_6.39)	(-2.41_-0.07)	(-5.14_3.03)

Note: t-test was used to compare participants based on quantitative background variables.
Abbreviations: SD, standard deviation; CI, confidence interval.

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Discussion

themselves as competent to provide care to the deprived, they do not hold a highly positive attitude towards providing services to them as part of their duties as dentists. The use of the applied tool in several studies facilitates comparability of results. To the best of our knowledge, no study has demonstrated an improvement in dental students' sensitivity towards the disadvantaged compared to their first year of study. The worsening attitudes towards the underprivileged and the failure to meet moral ideals also raise concerns in other medical disciplines (21-25). As shown in Furlini et al.'s review study, most studies have only been conducted on final-year students, with only 13% of the studies examining the attitudes of first-year dental students (6).

To promote responsive dental education, CBDE is developing in Iranian dental schools. However, the evaluation of these programs is generally limited to the assessment of needed facilities, while the attitudes of students and their future actions represent the favorable final impact (13). Therefore, the evaluation of students' attitudes using a valid and reliable tool will be essential in assessing the training of socially responsible dentists, as well as in evaluating the effectiveness of CBDE.

In Habibian et al.'s study in the United States, senior students exhibited a more negative attitude toward disadvantaged groups compared to newcomers, as revealed by the DSATU questionnaire (18). Another study in the United States also demonstrated that dental students' attitudes toward providing services to the needy decreased during their academic course (16). Furthermore, a study on medical students indicated a decline in MSATU attitude scores, which varied across different domains (21, 22). The most significant decline in attitude was related to social expectations and professional responsibility (21). Crandall et al.'s study suggested that pharmacy students had a more consistent opinion toward the disadvantaged throughout their academic study (23). It is noteworthy that the pharmacy profession, compared to dentistry and medicine, is relatively non-stressful, with lower burnout and lower physical and psychological stress, which may account for their more stable attitude (21, 26).

In the present study, the highest attitude score was related to personal efficacy and access to care, indicating an increased sense of competence among dental students in providing care to deprived patients. Conversely, the lowest score was assigned to dentist/dental student responsibility, which is consistent with findings from Habibian et al.'s study in the United States (18). Majors' study also indicated that as academic education progressed, dental students experienced a decrease in their sense of responsibility as dentists to treat deprived populations. In a qualitative study, Chen et al.'s argued that, in order to reduce oral health inequality, dentists tend to place more responsibility on government and social structures than on themselves (27).

Researchers have attempted to explore the influencing factors in the attitudes towards the indigent. The gender of students, with the exception of access to care, did not correlate with the attitude score (15, 23). Contrary to our findings, the results of most studies indicate a more positive attitude among female dental and medical students (18, 21, 28-30). This could be attributed to the stronger non-financial motivations for choosing the dental profession among female students (31).

We did not assess the students' socioeconomic background, which is a limitation of our study. However, the extent to which socioeconomic gradients are attributed to the students' professional socialization, empathy, and ethical sensitivity remains unclear. A survey of American generalist physicians found that non-white physicians were more likely than whites to treat uninsured patients (32). Crandall et al.'s study reached a similar conclusion, revealing that non-white medical students had a significantly more positive attitude than whites in the social expectations domain (21). Importantly, in Wieland's study, upper social class residents whose parents had a higher level of education and income had less favorable attitudes and behavior regarding underserved populations (30). This suggests that students' socioeconomic backgrounds may be associated with their desire to serve in underserved communities.

It is noteworthy that a history of clinicians' personal and professional interaction with these potentially challenging underprivileged groups affects their sense of comfort in serving them. This may explain the greater desire of healthcare providers who belong to minorities and lower social classes to engage with deprived communities.

On the other hand, the socioeconomic gradient can be observed in the admission to highly sought-after university programs. Given that dentistry is one of the most popular academic disciplines, it is not surprising that upper-class students are more likely to be accepted (33). It should be noted that admitting students through tuition payment can exacerbate this educational inequality. A study by Neamatollahi et al. at the Mashhad Dental School revealed that the most influential

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motivation for students to choose dentistry was to achieve a higher economic position and earn more income (31). In a 2021 study, the motivations of Indian dental students for choosing dentistry were investigated. The most important reasons cited included helping the poor, attaining a high social status, personal motivation, interest in clinical work, and earning income (34).

Such a profit-oriented perspective contradicts the social responsibility and professional commitment of healthcare providers. Promoting educational equity to facilitate the admission of students from minorities and lower socioeconomic classes may be a step forward in improving healthcare providers' attitudes and practices toward disadvantaged communities.

Also, CBDE can provide significant opportunities to engage with disadvantaged groups. Regardless of financial issues, healthcare providers often find it challenging to communicate with vulnerable groups. As shown in Kuthy et al.'s study, CBDE elevated dental students' sense of comfort in engaging with deprived communities (15). Intolerance of ambiguity in clinical situations is also an obstacle to accepting deprived patients, which can be reduced by exposure to these groups (24). Public health voluntarism provides the opportunity to interact and communicate with the deprived, and it can be considered a predictor of favorable attitudes toward indigents (30).

The applied instrument does not examine disadvantaged groups separately. Acknowledging that attitude assessment toward specific underprivileged populations may be advantageous, such groups should be considered in the community demographic context. In the context of Iranian society, less privileged groups do not exhibit much diversity and mainly include poverty-stricken and low-income patients. However, in developed communities with different disadvantaged groups (such as ethnic and racial minorities, non-English speakers, immigrants, HIV patients, etc.), a population-specific survey may provide more valuable information. Some studies that have examined different vulnerable groups show that students' attitudes are population-specific (15, 16). This study focused on freshman and senior students, and no investigation was found among dental residents in this regard. Most studies have shown that general practitioners, compared to specialists, are more eager to engage with the disadvantaged (32). Interestingly, specialists' attitudes have been reported differently depending on the type of specialty (30, 35). Similarly, the higher MSATU score of medical students was associated with a greater tendency to continue studying in primary healthcare specialties (35). Since many dental graduates enter dental specialties, it would be desirable for future work to examine the attitudes of dental residents towards treating deprived patients.

As a limitation of our study, the impact of socioeconomic background on dental students' attitudes was not assessed. Additionally, since community-based dental education in Iranian dental schools has some differences, the results cannot be easily generalized.

Conclusion

To our knowledge, this is the first study that sheds new light on Iranian dental students' attitudes towards underserved populations. The findings indicate that dental students emphasize the role of government and social structures in providing services to the deprived. Although they consider themselves competent to provide oral health services to the deprived, they do not tend to assume themselves responsible for meeting the oral health needs of the underserved. The gender of the students was correlated with the access to care score. CBDE would be a positive step forward in improving students' attitudes towards the deprived. Further research should deeply explore the neglected role of the hidden curriculum on students' moral obligation and professional responsibility. Considering the limitation of the cross-sectional design of this study, a longitudinal evaluation of students' attitudes during dental training courses would provide better insight into the effectiveness of dental education. Additionally, the post-graduation impact of CBDE might prove to be an important area for future research.

Ethical considerations

Mashhad University of Medical Sciences granted ethical approval for the study [IR.MUMS.DENTISTRY.REC.1399.106]. Informed consent was obtained from all subjects. The questionnaires were anonymous, and the data remained confidential.

Artificial intelligence utilization for article writing

Artificial intelligence was used for grammar check only.

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Conflict of interest statement

The author has no conflict of interest to declare.

Author contributions

ZY proposed the idea, gathered and analyzed the data, and wrote the paper.

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Data availability statement

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

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Appendix 1. Dental Students Attitude toward Undeserved population instrument

	Statements	Completely agree	Agree	Undecided	Disagree	Completely disagree
1	It is not the responsibility of the federal government to fund programs that provide dental care to the needy					
2	Communities should be responsible for providing facilities for the care of the needy*					
3	It is the responsibility of church-related organizations to provide some funding for oral health care services					
4	State government should be responsible for funding programs to meet the oral health care needs of its residents					
5	Churches should provide facilities for dental care of the needy					
6	Society is responsible for providing for the oral health care of its members					
7	Dentists should be responsible for providing oral health care to the needy*					
8	Dentists should volunteer their time working in a free clinic					
9	Individual dentists should not be willing to provide care for their patients who cannot pay					
10	Dental students should be involved in providing dental care for the needy.					
11	To care for needy patients, each dentist should allow for 15% of the care he/she provides to be true charity					
12	All dental students should become involved in community health efforts					
13	Dental students should not be concerned about the problems of the needy					
14	All dental students should be involved in community activities					
15	I feel personally responsible for providing dental care to the needy.					
16	I would be interested in volunteering for programs that provide dental care for the needy during my dental school academic tenure.					
17	I feel I am personally unable to have an impact on the problem of meeting the dental needs of the underserved					
18	I personally want to be involved in providing care for the needy during my dental career					
19	Dental care should be provided without charge for those who cannot pay.					
20	Not everyone should have access to dental care					
21	Access to dental care is a privilege					
22	People have a right to unlimited dental care regardless of their ability to pay					
23	Access to oral health care is a right					

Note: *= according to the validation result, item two of the first and item 1of the second domain were deleted in the final validated Persian version of the DSATU questionnaire. In addition, some items were slightly modified based on the validation results.

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