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Attitudes of Undergraduate and Postgraduate Dental Students Toward Geriatric Patients

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ABSTRACT

Objectives: The increasing geriatric population highlights the importance of developing appropriate attitudes and competencies toward elderly patient care in dental education. This study aimed to evaluate and compare the attitudes of undergraduate (UG) and postgraduate (PG) dental students toward geriatric patients and to provide insights for future educational strategies.

Materials and Methods: In this cross-sectional study, a two-part questionnaire was administered to UG (n = 215) and PG (n = 200) dental students. The questionnaire assessed demographic characteristics and attitudes toward geriatric patient care, curriculum adequacy, and the need for specialized training. Data were analyzed using descriptive statistics and the Mann–Whitney U test. Psychometric evaluation and multivariable regression analyses were also performed.

Results: A total of 415 dental students participated in the study, with a mean age of 25.34 ± 3.05 years. PG students demonstrated significantly higher scores in several questionnaire items related to geriatric patient management and communication. The questionnaire showed acceptable psychometric properties (Cronbach's alpha = 0.767; KMO = 0.810), and Bartlett's test was statistically significant ($p < 0.001$). However, multivariable regression analysis demonstrated that education level was not independently associated with total questionnaire scores after adjustment for age and gender.

Conclusions: Although PG students demonstrated higher scores in several individual domains related to geriatric patient care, education level was not independently associated with overall attitudes after adjustment for age and gender. These findings emphasize the importance of strengthening structured geriatric education and increasing clinical exposure at the undergraduate level.

Keywords: Geriatrics, dental education, attitudes

Lisans ve Lisansüstü Diş Hekimliği Öğrencilerinin Yaşlı Hastalara Yönelik Tutumları

Araştırma Makalesi

Süreç

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ÖZ

Amaç: Geriatrik hasta popülasyonundaki artış, yaşlı hasta bakımına yönelik uygun tutum ve yeterliliklerin geliştirilmesini diş hekimliği eğitimi açısından önemli hale getirmektedir. Bu çalışmanın amacı, lisans (UG) ve lisansüstü (PG) diş hekimliği öğrencilerinin geriatrik hastalara yönelik tutumlarını değerlendirmek ve karşılaştırmak, ayrıca gelecekteki eğitim stratejilerine katkı sağlayabilecek bulgular sunmaktır.

Gereç ve Yöntemler: Bu kesitsel çalışmada, UG (n = 215) ve PG (n = 200) diş hekimliği öğrencilerine iki bölümlü bir anket uygulanmıştır. Anket; demografik özellikler, geriatrik hasta bakımı, müfredat yeterliliği ve özel eğitim gereksinimine yönelik tutumları değerlendirmiştir. Veriler tanımlayıcı istatistikler ve Mann–Whitney U testi kullanılarak analiz edilmiştir. Ayrıca psikometrik değerlendirme ve çok değişkenli regresyon analizleri gerçekleştirilmiştir.

Bulgular: Çalışmaya ortalama yaşları 25,34 ± 3,05 yıl olan toplam 415 diş hekimliği öğrencisi katılmıştır. PG öğrenciler, geriatrik hasta yönetimi ve iletişimi ile ilişkili çeşitli anket maddelerinde anlamlı derecede daha yüksek puanlar göstermiştir. Anketin kabul edilebilir psikometrik özelliklere sahip olduğu belirlenmiştir (Cronbach alfa = 0,767; KMO = 0,810) ve Bartlett küresellik testi istatistiksel olarak anlamlı bulunmuştur ($p < 0,001$). Ancak çok değişkenli regresyon analizinde, yaş ve cinsiyet için düzeltme yapıldıktan sonra eğitim düzeyi ile toplam anket puanları arasında bağımsız bir ilişki saptanmamıştır.

Sonuçlar: PG öğrenciler geriatrik hasta bakımına ilişkin bazı bireysel alanlarda daha yüksek puanlar göstermiş olsa da, yaş ve cinsiyet için düzeltme yapıldıktan sonra eğitim düzeyinin genel tutumlar üzerinde bağımsız bir etkisi bulunmamıştır. Bu bulgular, yapılandırılmış geriatrik eğitimin güçlendirilmesi ve lisans düzeyinde klinik deneyimin artırılmasının önemini vurgulamaktadır.

Anahtar Kelimeler: Geriatri, diş hekimliği eğitimi, tutumlar

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Introduction

As the population ages, significant demographic changes are occurring worldwide.[1] According to the World Health Organization (WHO), the number of people aged 60 and over is expected to reach two billion by 2050.[2] This increase requires new regulations and perspectives in dentistry, as in all areas of health.[1]

Aging is associated with the emergence of some chronic diseases that often present oral symptoms, which

can lead to difficulties in basic functions such as chewing and swallowing.[3] In addition, the aging process causes physiological changes in the oral cavity, such as increased tooth translucency, loss of surface details, abrasion and erosion.[4] Physical and cognitive limitations can make oral health self-care difficult and lead to deterioration of oral health status among geriatric individuals.[5]

Geriatric dentistry is a specialized field that thoroughly examines the effects of elderly and systemic diseases on oral wellness.[6] In order for dentists to offer a comprehensive approach to geriatric individuals, they need to have a good understanding of the physiological, psychological and social components of aging. Abilities such as effective communication, building trust, and considering patients' individual preferences are among the important factors that enhance patient satisfaction.[7]

It is reported in the literature that the attitudes of dental students towards geriatric patients are generally limited and that this attitude is directly related to the level of education and contact with geriatric content.[8,9] In studies, almost 20% of dentists stated that they were not sufficiently prepared to work with geriatric individuals.[10] Similarly, 37% of senior students stated that they did not want to serve geriatric patients after graduation.[11] This situation may provide significant risks in terms of quality and scope in the provision of services to geriatric individuals.[12] Therefore, including geriatric content in the dentistry curriculum at an early stage can help students develop a positive attitude toward geriatric individuals. It is known that geriatric education not only provides knowledge but also increases the sense of ethical responsibility and the level of empathy.[13] This study aimed to evaluate and compare the attitudes of UG and PG dental students toward geriatric patient care and to provide insights that may inform future educational policies. The null hypothesis was that there would be no significant difference in attitudes toward geriatric patients between UG and PG students.

Materials and Methods

The study was approved by the Clinical Research Ethics Committee of Kahramanmaraş Sütçü Imam University (Protocol No: 2025/08; March 03, 2025). Data were collected through an online questionnaire administered via Google Forms. Participation was voluntary, and electronic informed consent was obtained from all participants before completing the questionnaire. All responses were collected anonymously and used only for research purposes. An a priori sample size analysis was performed using G*Power software (version 3.0; Heinrich-Heine-Universität, Düsseldorf, Germany) for comparisons between two independent groups. Based on a significance level of 0.05 and a statistical power of 95%, the minimum required sample size was calculated as 128 participants. However, to increase the sample size and statistical robustness of the study, the questionnaire was planned to be administered to 400 students, and ultimately 415 students participated in the study. The questionnaire was distributed online to UG and PG dental students. A snowball sampling technique was used, in which participants were encouraged to share the survey link with their peers studying in dental faculties. The survey link was distributed via social media platforms and institutional communication channels, allowing the recruitment of students from different dental faculties. The survey remained open for a defined data collection period, and reminder messages were sent periodically to increase participation. Students who were currently enrolled in UG (4th and 5th year) or PG dental education programs and agreed to participate were included in the study. Students in the first, second, and third years; those who declined to participate in the survey; and responses containing incomplete data were excluded from the analysis.

The study sample consisted of 415 volunteer dental students, including 4th and 5th year UG students (n = 215) and 1st, 2nd, 3rd, and 4th year PG students (n = 200). The questionnaire used in this study was translated and adapted from a previously published survey evaluating dental students' attitudes toward geriatric patient care.[9] The original questionnaire consisted of items assessing students' attitudes toward geriatric patient management, curriculum adequacy, and the need for specialized training. In the original study, the questionnaire underwent pilot testing with 32 dental students and demonstrated acceptable internal consistency (Cronbach's alpha = 0.712). The questionnaire was translated into Turkish and reviewed by two independent researchers to ensure linguistic accuracy and conceptual equivalence. In addition, the internal consistency of the questionnaire in the current study was evaluated using Cronbach's alpha coefficient. Furthermore, sampling adequacy and inter-item correlations were assessed using the Kaiser–Meyer–Olkin (KMO) measure and Bartlett's test of sphericity to support the internal consistency evaluation of the adapted questionnaire. Exploratory factor analysis (EFA) was performed using principal axis factoring with Varimax rotation to explore the underlying factor structure of the questionnaire. Factors with eigenvalues greater than 1 were retained, and factor loadings ≥0.40 were considered acceptable.

The survey form consisted of two parts. The first part included demographic information about the participants (gender, age, education level, etc.). The second section included 12 closed-ended questions assessing participants' views on geriatric patient care, current geriatric dentistry curricula, and specialized training for geriatric patient management. The examination of this second segment of the questionnaire used a Likert scale with a score of 5, comprising the following choices: Strongly Disagree, Disagree, Undecided, Agree, and Strongly Agree (scores ranging from 1 to 5). All responses were analysed anonymously.

Data were entered into a Microsoft Excel spreadsheet (Microsoft Corporation, Redmond, USA) and checked for any discrepancies. Statistical analyses were performed using SPSS software (version 21.0; IBM Corp., Armonk, USA). Descriptive statistics, including median and interquartile

range (IQR), were used to summarize the data. Likert scale responses were treated as ordinal variables. A total questionnaire score was calculated by summing the Likert-scale responses of all questionnaire items, with higher scores indicating more positive attitudes toward geriatric patient care. Normality of the data was assessed using the Shapiro–Wilk test, and since the data did not meet the assumptions of normal distribution ($p < 0.05$), non-parametric tests were preferred. Differences between UG and PG students were evaluated using the Mann–Whitney U test.

In addition, a multivariable linear regression analysis was performed to evaluate the independent effect of education level on total questionnaire scores while controlling for potential confounding variables (age and gender). The total questionnaire score was used as the dependent variable, while education level and gender were included as factors and age as a covariate. Regression coefficients and 95% confidence intervals (CI) were calculated. A p-value of < 0.05 was considered statistically significant for all analyses.

Results

The distribution of participants according to their level of education is presented in Table 1. The questionnaire demonstrated acceptable internal consistency (Cronbach's alpha = 0.767). The questionnaire demonstrated acceptable sampling adequacy for psychometric assessment (KMO = 0.810). In addition, Bartlett's test of sphericity was statistically significant ($\chi^2 = 1415$, $p < 0.001$), indicating sufficient inter-item correlations within the questionnaire. Exploratory factor analysis revealed a three-factor structure explaining 44.1% of the total variance. The first, second, and third factors accounted for 25.6%, 10.5%, and 7.9% of the variance, respectively. Factor loadings ranged from 0.437 to 0.767, suggesting an acceptable underlying factor structure of the questionnaire. The factor loading structure of the questionnaire items is presented in Table 4. Most participants were 4th-year UG students (31.8%), followed by 5th-year students (20.0%), while PG students constituted nearly half of the study population.

Normality analysis using the Shapiro–Wilk test indicated that the responses to all questionnaire items were not normally distributed ($p < 0.001$). Therefore, non-parametric tests were used for further analyses. Comparisons between UG and PG students were performed using the Mann–Whitney U test, and the results are presented in Table 2. Significant differences between UG and PG students were observed for several individual questionnaire items.

Table 1. Distribution of participants according to educational level

Education level	n	%
4th year student	132	31.8
5th year student	83	20.0
1st year postgraduate student	54	13.0
2nd year postgraduate student	61	14.7
3rd year postgraduate student	52	12.5
4th year postgraduate student	33	8.0
Total	415	100

Table 2. Comparison of responses between UG and PG students (Mann–Whitney U test)

Code	Questionnaire item	UG Median (IQR)	PG Median (IQR)	p-value
Q1	I am confident in treating and managing geriatric patients on my own	3 (1)	4 (1)	0.014*
Q2	Aging-related changes impact treatment procedure	5 (1)	5 (1)	0.852
Q3	Communicating with geriatric patients is different from other age groups	5 (1)	5 (1)	0.700
Q4	I am able to communicate with geriatric patients appropriately	4 (1)	4 (2)	0.811
Q5	Geriatric patients require longer appointments for procedures	4 (1)	4 (1)	<0.001*
Q6	Meeting expectations of a geriatric patient is different than other age groups	4 (1)	5 (1)	0.002*
Q7	Geriatric patients tend to take more time adapting to new treatments	4 (1)	4 (1)	0.253
Q8	Patients should be counseled differently regarding new treatments	4 (1.5)	4 (1)	<0.001*
Q9	One should be more sympathetic and attentive while treating geriatric patients	4 (1)	5 (1)	0.005*
Q10	I would like to treat geriatric patients in my upcoming professional years	3 (1)	3 (2)	0.706
Q11	The current dental curriculum helps in treating geriatric patients better	3 (1)	3 (2)	0.067
Q12	There should be specific training for the management of geriatric patients	4 (2)	4 (1)	<0.001*

PG students showed significantly higher scores for the following items: "I am confident in treating and managing geriatric patients on my own" ($p = 0.014$), "Geriatric patients require longer appointments for procedures" ($p < 0.001$), "Meeting expectations of a geriatric patient is different than other age groups" ($p = 0.002$), "Patients

should be counseled differently regarding new treatments“ ($p < 0.001$), “One should be more sympathetic and attentive while treating geriatric patients“ ($p = 0.005$), and “There should be specific training for the management of geriatric patients “ ($p < 0.001$). No statistically significant differences were observed between UG and PG students for the remaining items ($p > 0.05$). Overall, PG students showed higher median scores for several individual items. The distribution of responses to all questionnaire items (Q1–Q12) among UG and PG students is presented in Figure 1. The results of the multivariable linear regression analysis are presented in Table 3. In the multivariable regression model including age and gender, education level was not significantly associated with total questionnaire scores ($p = 0.108$). The regression model explained a limited proportion of the variance in total questionnaire scores ($R^2 = 0.027$, adjusted $R^2 = 0.019$).

Table 3. Multivariable linear regression analysis of factors associated with total questionnaire score

Variable	B (Estimate)	Standard Error (SE)	95% CI Lower	95% CI Upper	t	p-value
Intercept	44.8353	3.847	37.273	52.398	11.656	<0.001
Education level	1.3195	0.818	−0.289	2.928	1.612	0.108
Age (years)	0.0794	0.164	−0.244	0.403	0.483	0.629
Gender	−0.8973	0.585	−2.048	0.253	−1.533	0.126

Model summary: $R^2 = 0.0266$, Adjusted $R^2 = 0.0192$.
Note. B = unstandardized regression coefficient; CI = confidence interval.

Table 4. Exploratory factor analysis of questionnaire items

Item	Factor 1	Factor 2	Factor 3
Q1	-	0.585	-
Q2	0.437	-	-
Q3	0.638	-	-
Q4	-	0.763	-
Q5	0.555	-	-
Q6	0.722	-	-
Q7	0.734	-	-
Q8	0.767	-	-
Q9	0.537	-	-
Q10	-	-	0.691
Q11	-	-	0.474
Q12	0.449	-	-

Extraction method: Principal axis factoring.
Rotation method: Varimax rotation.
Factor loadings <0.40 are suppressed.
Only factor loadings ≥0.40 are presented.
Total explained variance = 44.1%.

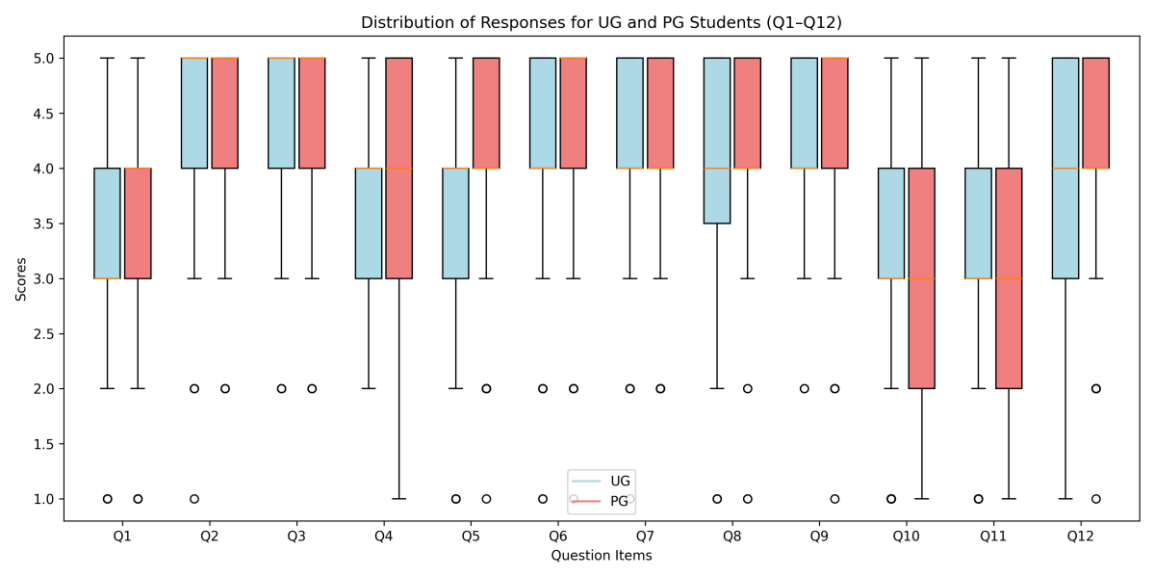


Figure 1. Distribution of responses to questionnaire items (Q1–Q12)
Distribution of responses to all questionnaire items (Q1–Q12) among UG and PG students, presented as boxplots.

Discussion

The increase in the geriatric patient population makes developing appropriate attitudes and competencies in this field critical for dental education.[9,14] This study examined the attitudes of UG and PG dental students towards geriatric patients and whether these attitudes differ according to their level of education. To our knowledge, limited studies have compared the attitudes of UG and PG dental students toward geriatric patients in Turkey.[8,15] The findings of the present study indicate that some attitude items differed significantly between UG and PG students; therefore, the null hypothesis was partially rejected. However, although significant differences were observed in several individual attitude items, multivariable analysis showed that education level was not independently associated with the overall questionnaire score after adjustment for age and gender. This suggests that the observed differences may reflect specific aspects of clinical experience rather than a consistent overall difference in attitudes toward geriatric patients. Therefore, these findings should be interpreted with caution, as item-level differences do not necessarily indicate a consistent or independent effect of education level on overall attitudes. Increased clinical exposure during postgraduate education may contribute more strongly to practical aspects of geriatric patient management, such as confidence and communication with geriatric patients, than to general attitude formation.

Previous studies have suggested that contact with older adults during dental education may influence dental students' attitudes toward elderly patients.[16,17] In a recent study by Singh et al.[9] postgraduate students demonstrated increased confidence in independently managing geriatric patients. Similarly, in the present study, PG students showed significantly higher scores for the item "I am confident in treating and managing geriatric patients on my own" ($p = 0.014$), which may be associated with increased clinical experience, responsibility, and case variety during the postgraduate period.

According to the findings of the present study, PG students demonstrated higher scores in several questionnaire items related to geriatric patient care. Specifically, PG students demonstrated significantly higher scores for the items "Geriatric patients require longer appointments for procedures" ($p < 0.001$), "Meeting expectations of a geriatric patient is different than other age groups" ($p = 0.002$), and "Patients should be counseled differently regarding new treatments" ($p < 0.001$). These findings are partially consistent with previous studies reporting more positive attitudes toward geriatric patients with increasing levels of professional training[9,17]

PG students also demonstrated higher scores for the item "One should be more sympathetic and attentive while treating elderly patients" ($p = 0.005$), which is consistent with the findings of a previous study by Rejeh et al.[18] In the study conducted by Madunic et al.[19] on dentists, the majority (61.9%) stated that greater attention should be given to geriatric patients. Similar results were also reported in a Dutch study conducted among a population of dentists.[20]

In the literature, varied findings have been reported in studies comparing the attitudes of male and female participants towards geriatric individuals.[14,20,21] While some studies suggest that female dentists exhibit more positive attitudes, possibly due to higher levels of empathy,[20] no significant gender difference was observed in the present study after adjustment for age and education level. This finding is consistent with previous studies[14,21] and may reflect the influence of cultural, educational, and social factors.

Another notable finding of this study was the higher agreement among PG students regarding the need for specialized training in the management of geriatric patients ($p < 0.001$). This finding is consistent with previous studies emphasizing the importance of geriatric education.[5,22,23] It may reflect increased clinical exposure and greater awareness of the complexity of geriatric care during postgraduate training.

In addition, the relatively low agreement in both groups for the item "The current curriculum is helpful" suggests potential limitations in the existing curriculum for preparing students to manage geriatric patients effectively. Although this difference was not statistically significant ($p = 0.067$), it highlights the need for more structured and comprehensive geriatric training within dental education programs.

Previous studies have highlighted that many dental students and practitioners do not feel adequately prepared to manage geriatric patients due to insufficient knowledge and training.[10,14] Similarly, studies conducted in European dental schools have shown that structured geriatric education, including dedicated courses and modules, is widely implemented to better prepare students for the challenges associated with an aging population.[23,24] Although Turkey is still in the early stages of integrating geriatric dentistry into the curriculum, interest in this field is steadily increasing.[25] In terms of general knowledge, a previously published review highlighted that insufficient training and clinical experience among dentists constitute a barrier to providing oral health care for geriatric individuals.[26] These findings highlight the importance of dental education in preparing students to competently manage the treatment needs of geriatric patients.

In the present study, both UG and PG students showed relatively low willingness to treat geriatric patients in their future professional practice, although no statistically significant difference was observed between the groups. This finding is consistent with previous studies reporting that a considerable proportion of dental students are reluctant to provide care for elderly individuals.[11] These results suggest that positive clinical experiences and increased exposure to geriatric patients during training may play a key role in improving students' motivation and attitudes.[22] Therefore, strengthening clinical components

of geriatric education should be considered an important priority in dental curricula.[11]

Previous studies have emphasized the importance of clinical exposure and structured educational interventions in improving dental students' attitudes toward geriatric patients. Programs involving direct interaction with elderly individuals have been shown to enhance both awareness and confidence among dental students.[27] In addition, limited knowledge and misconceptions regarding geriatric care may negatively affect students' ability to provide appropriate treatment.[28–30] Therefore, improving both theoretical knowledge and clinical exposure may be essential to enhance students' competence and preparedness in managing geriatric patients.

This study has several limitations. The results cannot be generalized to all dental students because the sample consisted only of UG and PG students from a limited number of dental schools. The use of a non-probability snowball sampling method may limit the generalizability of the findings and introduce selection bias, as it may lead to the overrepresentation of students with similar academic or social backgrounds. Furthermore, because participation was voluntary and recruitment was conducted through online platforms, students with greater interest in geriatric dentistry may have been more likely to participate, which may have influenced the findings.

Although confirmatory factor analysis was not performed, the questionnaire demonstrated acceptable internal consistency, sampling adequacy, and exploratory factor structure. The total explained variance was moderate; however, the obtained factor structure was considered acceptable for an exploratory psychometric evaluation of an adapted attitude questionnaire. However, the questionnaire was adapted from a previously validated instrument and underwent linguistic validation by two independent researchers to ensure conceptual equivalence, which may support the linguistic and conceptual appropriateness of the adapted questionnaire. Therefore, the findings of the present study should be interpreted within this methodological context. In addition, the regression model explained only a limited proportion of the variance in total questionnaire scores, suggesting that additional educational, behavioral, and psychosocial factors may influence attitudes toward geriatric patients.

Future studies should include participants from more diverse educational settings, such as different dental schools and countries, and incorporate comprehensive psychometric validation to strengthen the generalizability and robustness of the findings.

These findings may have important implications for dental education. Although postgraduate students showed higher scores in several specific domains related to geriatric patient care, education level was not independently associated with the overall questionnaire score after adjustment for age and gender.

Therefore, these results suggest that educational level alone may not be sufficient to produce a consistent difference in attitudes toward geriatric patients. Curriculum development should focus not only on increasing theoretical knowledge but also on enhancing clinical exposure and patient interaction in order to improve students' preparedness for geriatric patient care.

Conclusions

Geriatric dentistry is an important component of dental education. Although PG students showed higher scores in several individual items related to geriatric patient care, education level was not independently associated with overall attitudes after adjustment for age and gender. These findings suggest that the observed differences may reflect variations in specific domains, such as clinical experience, rather than a consistent overall effect of education level. Therefore, strengthening geriatric dentistry education and increasing clinical exposure at the UG level remain important priorities. Further multicenter studies incorporating confirmatory psychometric validation procedures may provide additional evidence regarding the determinants of dental students' attitudes toward geriatric patients.

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Conflict of Interest Statement

The authors deny any conflicts of interest related to this study.

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