

Factors Influencing International and Domestic Dentists' Interest in Advanced Periodontal Education

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Abstract

Background: The enrollment of international periodontal students in U.S. dental schools has been increasing in recent years. Interest in applying to a periodontics specialty program may differ between U.S and international dental school graduates. The purpose of this study is to assess, from the perspective of periodontal residents, (1) factors that interest dental students to apply to periodontics programs and (2) differences in background and interest between U.S and international graduates.

Methods: A 20-question survey was sent out electronically to periodontics residents. The survey questions were designed to obtain information on the participants' backgrounds, factors that influenced them to specialize in periodontics, and their preferred features of graduate periodontics programs. The data were analyzed using descriptive statistics for socio-demographic variables, a Wilcoxon two sample test to compare mean Likert scale scores, and Fisher's exact test for associations between comparison groups.

Results: Of the 200 hundred residents invited to participate, 28% responded. The majority of the respondents stated that interest in implantology, previous exposure to periodontal procedures, interest in improving periodontal surgery skills, a good relationship with periodontics faculty, the residency curriculum, advanced program and faculty reputation as influencing factors in selecting periodontics as specialization. The majority of international graduates have up to \$50,000 dollars in student debt; by comparison, half of the domestic graduates have a debt of over \$250,000 dollars ($p \leq 0.05$). Working experience as a dentist was significantly greater among international residents (73%) in comparison to U.S graduates (32%). In contrast with international graduates, U.S graduates more frequent reported that good relationships with the periodontics predoctoral faculty contributed to their interest in periodontics ($p \leq 0.05$). Program cost and location had a greater impact on the decision of U.S. graduates than international graduates ($p \leq 0.05$).

Conclusions: Overall, factors associated with personal finance and predoctoral education have a greater impact on the decision of American graduates than international graduates to pursue an advanced education in periodontics, which may influence the increased enrollment of international students.

1. Background

Fifty-five university- and hospital-based graduate periodontics programs exist in the United States. Forty-five programs admit international students who do not have a U.S dental license. According to the American Dental Association (ADA)'s annual Survey of Advanced Dental Education and the Council on Dental Education and Licensure (CDEL), the number of enrolled international periodontal students in U.S. dental schools increased from 2012 to 2018. In the graduating class of 2012, 27% of graduates from advanced programs in periodontics were international students, compared to 33% in 2020. Moreover, the number of programs accepting international students increased from 39 programs (2012) to 47

programs (2020). However, the percentage of international students who enrolled in other specialties such as endodontics and prosthodontics has remained almost stable [1].

In our previous study, from the periodontics department chairpersons' perspectives reported by Luke Hearty et al., specialty clinic rotations and elective courses appear to increase student interest in a periodontal residency program. Periodontal residencies that offer externships had a greater number of candidates. However, factors such as residency stipends and fellowships did not have great influence on dentist interest in a periodontal program [2]. Data from a survey on graduating dental students, suggested that mentoring influenced students interest in residencies, indicating the significance of exposure to the advanced program educators and residents [3]. Nevertheless, in another study in the U.S., it was reported that graduating dental students with a debt of at least \$100,000 were more likely to start practicing dentistry after graduation than students with lower debt, even after adjusting for the impact of individuals who were influential on students' career decisions [4].

Differences between dental students in terms of social, economic and cultural backgrounds are expected to influence their career plans. Surveyed dental students from different Middle Eastern nationalities in a Jordan Dental school agreed on most factors affecting their choice of a specialty, except for the reputation of the specialty [5]. Authors of a student survey conducted in one dental school in U.K. reported that "having a talent in the field" had the largest positive influence on pursuing a specialist career [6]. Saudi Arabia dental students reported that the influence of family members in the dental profession, and specific interest in patient population as significant factors in choosing a specialty. Other important factors were variety of non-clinical duties, and research opportunities [7].

Interest in applying to a periodontics specialty program may differ between U.S and international dental school graduates. The aim of this study is to assess the perspective of periodontal residents regarding (1) factors that attract dental students to apply to periodontics programs and (2) differences in background and interest between U.S and international graduates.

2. Methods

The research protocol for this study was approved by the Case Western Reserve University Institutional Review Board as exempt from oversight (IRB-2018-1242). In 2018, a 20-question survey was sent out electronically to periodontics graduate program residents. The survey was placed on the Surveymonkey website and the link to participate in the survey was sent out to the residents, who were student members of the American Academy of Periodontology (AAP) and were enrolled in a residency program. The survey contained a cover letter explaining the study purpose; how the data will be used, and stated that the data would be anonymous. The request to participate in the survey was sent three times by e-mail in 30-day intervals. Respondents completed the survey anonymously and voluntarily.

The survey included questions that were dichotomous, had multiple choices, or had a 5-point Likert scale (1 = Strongly disagree to 5 = Strongly agree). Some of the standardized survey questions were derived from previous investigations [3,8], and others were created to address research objectives.

The survey questions were framed to obtain information related to the participants' socio-demographic characteristics, factors in selecting periodontics as an area of specialization (interest in periodontal surgeries, interest in implantology, previous exposure to periodontal surgeries, previous positive interactions with periodontal faculty, periodontology courses in dental school, and previous externship/fellowship), and the preferred graduate periodontics program features (location, cost, curriculum, faculty reputation, and research opportunities). Previous experience before enrolment in the periodontics program and goals after completion of the program was also surveyed.

The data were analyzed using JMP (SAS institute) software, with descriptive statistics for socio-demographic variables, a Wilcoxon two sample test to compare mean Likert scale scores, and Fisher's exact test for associations between comparison groups, and the statistical significance was set at $p < 0.05$.

3. Results

Two hundred residents were invited to participate in the survey, and 58 participants responded to the survey. The response rate was 28%. Fifty percent of the respondents were between 30 and 40 years old, and 77% were male. Half of the respondents had \$0 to \$50,000 in educational debts prior to their attendance in the residency program. Over half of the students (64%) graduated from an accredited dental school in the U.S. (Table 1).

The majority of the international graduates' respondents (73%) were between the ages of 30 and 40 years old. In comparison, 38% of the U.S graduates were between 30 and 40 years old, and the difference in age was statistically significant ($p \leq 0.05$). The majority of the international graduates have up to \$50,000 dollars in student debt. In comparison, approximately one-third of domestic graduates have a debt of up to \$50,000 dollars, and half of them have a debt of over \$250,000 dollars ($p \leq 0.05$) (Table 1).

In a multi-response categorical variable concerning the respondents' dental-associated experience prior to the periodontics residency, 19% of the respondents had a Master's or PhD training, 25% had research experience, 20% had advanced training in general dentistry, 40% had an externship/fellowship, and approximately half had experience practicing dentistry. The response rates for working as a general practitioner (GP) prior to residency enrollment is significantly different across international (73%) versus U.S. graduates (32%) ($p \leq 0.05$) (Table 2).

Survey responders answered questions on factors that may influence the selection of periodontics as an area of specialization. The majority of the respondents stated that interest in implantology, previous exposure to periodontal procedures, interest in improving periodontal surgery skills, and a good relationship with periodontics faculty as influencing factors in selecting periodontics as an area of specialization (Table 3). International students were significantly less frequent than U.S. graduates to report that the reason they chose the field of periodontics was due to a positive relationship with a periodontics faculty member ($p \leq 0.05$). Moreover, unlike U.S. graduates, international graduates reported

that the completion of a periodontics program was one way to obtain a dental license to practice in the U.S.; this influenced their interest in periodontics ($p \leq 0.05$) (Table 3).

The majority of the respondents agreed on the importance of the influencing factors associated with the program characteristics, such as the curriculum, the program and faculty reputation. However, in selecting a residency, cost and location had a greater impact on the decision of U.S. graduates than international graduates ($p \leq 0.05$) (Table 4).

U.S. and international graduates have similar interests pertaining to their future plans. Yet, international graduates were more interested in holding a part-time (40%) academic position than were U.S. graduates (15%) ($p \leq 0.05$). One-third of the international graduates reported that they intend to practice dentistry in their home country (Table 5).

4. Discussion

In the present study, from the perspective of periodontics residents, interest in undertaking a graduate periodontics program is shared among U.S and international graduates. However, there were differences between U.S. and international graduates in terms of background and factors that influenced them to commit to further education in periodontics, such as debt, dental work experience, a good relationship with predoctoral faculty, advance training cost, and location.

In the U.S., the average educational debt for a dental student was \$292,000 in 2019 [9]. This is in agreement with the present study, where U.S. dental graduates, compared with international graduates, represented a significant higher percentage of graduates with a debt of above \$150,000. According to the present survey, in comparison to American graduates, international graduates tend to be older and have more work experience as a general dentist prior to attending a periodontics program, which may contribute to their having less debt. Furthermore, international graduates frequently have financial support from their home country's government. In agreement with the present study, student debt [3,4,8,10], program cost [11] and location [12,13] have been reported as significant factors that influenced the students' decision to specialize in dentistry. In the U.S., the average income for general dentists is lower than that of dental specialists [14]. However, American students may be drawn to this career choice by the ability to enter the workforce earlier. Interestingly, in our previous study, from the perspective of program chairmen, the offering of a stipend does not affect the number of applications to the periodontics programs [2]. Perhaps the increasing numbers of international students over time may be due to the fewer financial responsibilities compared to the U.S. graduates.

In the present study, in comparison to international graduates, U.S. graduates reported that a good relationship with the pre-doctoral faculty had a positive impact on developing interest in a periodontics program. This result ties with a previous study wherein it was found that strong faculty student interaction tended to foster interest in a career in periodontics [15]. In agreement, prosthodontics residents reported that advice from predoctoral mentors was an important influential factor in choosing prosthodontics as a career [16]. However, in a Saudi Arabian study, students reported that the influence of

family members in the dental profession are of high importance in a selection of a specialty [7]. This variance in opinions among international and American graduates may be influenced by differences in predoctoral faculty exposure, periodontal curriculum, social, economic and cultural backgrounds. Interestingly, in the present study, international graduates reported that completion of a periodontics program was one way to obtain a dental license to practice in the United States. Also, approximately 30% of international graduates had plans to practice in the United States. Completion of a CODA accredited specialty program is one of the three educational pathways in order to be eligible for licensing in the U.S. [17]. Therefore, the influential factor of obtaining a license in the U.S. by certain international graduates may hinder other factors.

There were limitations to this study. Not all residents in all U.S. programs could be reached, since their contact information was not accessible through the AAP directory website, which is meant to have residents' contact information. The low response rate (28%) could be partially explained by residents' main focus on completion of their residency program, by the workload needed to successfully fulfill all of a program's requirements, and by a potentially outdated list of e-mail addresses in the AAP directory. However, given the small sample, this study identified interesting and informative factors that describe the choice differences between U.S. and international graduates in selecting periodontal programs. A post-hoc power analysis revealed power ranging from 53.3% to 95.8% for dichotomous variables and 65.8% to 80.5% for continuous variables that were analyzed to detect differences between US and International graduates in this study. Studies with small sample size could potentially reveal important characteristics that could be expanded with larger studies and may be included in systematic reviews [18,19]. Further studies with larger samples are required to increase the power to detect and better understand the differences in influencing factors between U.S. and international graduates' interests in advanced periodontal education.

5. Conclusion

This study found that a good relationship with pre-doctoral faculty had a greater influence in American graduates than international graduates when choosing periodontics as a career. Personal finances and program location had a greater negative impact on American graduates than international graduates when selecting an advanced periodontics program of choice. Hence, the increasing cost of dental education in the U.S. may explain the increased enrollment of international students in postdoctoral programs in periodontics.

Declarations

Ethics approval and consent to participate

The research protocol for this study was approved by the Case Western Reserve University Institutional Review Board as exempt from oversight (IRB-2018-1242). The survey contained a cover letter explaining the study purpose; how the data will be used, and stated that the data would be anonymous. Our local IRB

determined the protocol to be exempt under federal regulation (HHS regulations <https://www.hhs.gov/ohrp/regulations-and-policy/guidance/faq/informed-consent/index.html>) and therefore a formal consent form was not required.

I confirm that all methods were carried out in accordance with relevant guidelines and regulations.

Availability of data and materials

The datasets supporting the conclusions of this article are all included within the article.

Competing interests

The authors declare that they have no competing interests

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Author's contributions

AP, HS and AG have made substantial contributions to the design of the study; AP and HS and AG contributed on the acquisition of data; AP and HS contributed on the analysis and interpretation of data; AP and HS wrote the manuscript. AP, HS and AG reviewed the manuscript and AP did the final revisions.

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Tables

Table 1. Distribution of the Socio-demographic characteristics of International versus US Graduates.

Socio-Demographic Variables	Dental Graduates			p-value
	International N (%)	U.S N (%)		
Age in years:	< 30	2 (10.5)	14 (41.8)	0.0163*
	30-35	2 (10.5)	0 (0)	
	36-40	12 (63.2)	13	
	>40	3 (15.8)	7 (20.5)	
Gender:	Female	5 (26.3)	7 (20.5)	0.4392
	Male	14 (73.7)	27 (79.4)	
Educational debt (US dollars) prior to starting residency in Periodontics: None				
< 50,000	None	13 (68.4)	9 (26.4)	0.0053*
	50,000 – 150,000	2 (10.5)	3	
	150,000 – 250,000	2 (10.5)	(8.8)	
	>250,000	1 (5.3)	4	
		1 (5.3)	1 (2.94)	
			17 (50.0)	

*Significant at p<0.05

Table 2. Comparison between US and International Residents' Experience in dentistry and research prior to periodontal residency program.

Experience in Dentistry / Research		Dental Graduates		p-value
		International N (%)	U.S N (%)	
Worked as General Practitioner:	Yes	14 (73.7)	11 (32.4)	0.0049*
	No	5 (26.3)	23 (67.7)	
Advanced Training in General Dentistry: Yes		5 (26.3)	6 (17.7)	0.4956
	N No	14 (73.7)	28 (82.4)	
Master's Degree / PhD. Training in Related Field:				
Yes		5 (26.3)	5 (14.7)	0.4653
	No	14 (73.7)	29 (85.3)	
Experience in Research:	Yes	5 (26.3)	8 (23.53)	0.5357
	No	14 (73.7)	26 (76.5)	
Experience in Externship/Fellowship in a Periodontics Department prior to Periodontics Residency Enrollment:				
Yes		9 (47.4)	12 (35.3)	0.2836
	No	10 (52.6)	22 (64.7)	
No Previous Experience in Dentistry / Research:	Yes	0 (0)	11 (32.4)	0.0045*
	No	19 (100)	23 (67.7)	

*Significant at p<0.05

Table 3. Distribution of mean Likert Scale scores on factors influencing the choice of Periodontics as a Specialty Career among US and International Graduates.

Influencing Factors for Choice of Periodontics as Specialty Career	US Graduates	International Graduates	p-value
	Mean Score ± sd (n=36)	Mean Score ± sd (n=19)	
Interest in Implantology	4.00 ± 1.23	4.17 ± 1.38	0.3226
Good Relationship with Periodontal Faculty	3.89 ± 1.41	2.38 ± 1.85	0.0149*
To improve Periodontal Surgery capabilities	4.75 ± 0.73	4.89 ± 0.32	0.5243
One way to obtain License to work in the US	1.38 ± 0.96	2.92 ± 1.73	0.0088*
Exposure to Periodontal Work has increased interest in the subject	4.47 ± 1.05	4.56 ± 1.15	0.4977
Periodontal course in my school	3.27 ± 1.48	2.63 ± 1.78	0.2242

*Significant at p<0.05

Table 4. Distribution of Mean Likert Scale scores of Periodontal residents' responses on influencing factors for choosing Periodontal programs.

Influencing Factors for Choosing Periodontal Programs	US Graduates	International Graduates	p-value
	Mean Score ± sd (n=36)	Mean Score ± sd (n=19)	
Curriculum contents	3.91 ± 1.06	4.05 ± 1.14	0.4802
Program and Faculty Member Reputation	3.83 ± 1.34	4.11 ± 1.13	0.4464
Cost of Attendance	4.23 ± 1.14	3.13 ± 1.55	0.0131*
Location of the Program	3.56 ± 1.59	2.53 ± 1.50	0.0322*
Research Opportunities of the Program	2.44 ± 1.56	3.07 ± 1.33	0.1612

*Significant at p<0.05.

Table 5. Distribution of reported choices for Future Career Plans of US Dental Graduates versus International Dental Graduates.

Reported Future Plans of Dental Graduates	US Dental Graduates (n=38)		International Dental Graduates (n=20)		p-value
	YES	NO	YES	NO	
	n (%)	n (%)	n (%)	n (%)	
Staying in the US	22 (57.9)	16 (42.1)	8 (40.0)	12 (60.0)	0.1539
Full time Academic Position	4 (10.5)	34 (89.5)	4 (20.0)	16 (80.0)	0.2706
Private Practice	27 (71.1)	11 (28.9)	15 (75.0)	5 (25.0)	0.5017
Part time Academic Position	6 (15.8)	32 (84.2)	8 (40.0)	12 (60.0)	0.0441*
Further Education	3 (7.9)	35 (92.1)	3 (15.0)	17 (85.0)	0.3372
Practice in Home Country	1 (2.6)	37 (97.4)	6 (30.0)	14 (70.0)	0.0052*

*Significant at p<0.05.