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Influence of the Knowledge and Practices on Dental Students Career Choices of Specialty in Saudi Arabia

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Abstract

Introduction: The dental profession plays a significant role in the service of the society. The selection of dentistry as a career as well as choosing specialty and continuing Postgraduate Dental Education (PGE) is a critical decision in an individual's life, affecting one's social and economic status. The aim of this study is to obtain empirical evidence on views on dental specialty choice and along with the investigation of the influencing and motivating factors that inspire them in choosing a dental specialty.

Methodology: A cross sectional survey was conducted through an online-based questionnaire, distributed on social media to recruit participants including 600 dental students and graduates from different universities in Riyadh, Saudi Arabia with convenience sampling technique to recruit participants from Twitter while cluster simple random technique in targeted colleges. For data management and analysis, SPSS version 16 was used. The arithmetic mean and standard deviation was calculated for quantitative data, chi-square and the Fischer Exact test were used to compare categorical data. The Mann-Whitney test, Kruskal-Wallis test, student`s t-test and ANOVA test were used to as tests of significance for comparing numerical data.

Results: Our study shows that majority of the students decided on their own when choosing their career in dentistry and many of them are interested in pursuing international post-graduation programs. Personal preferences in PGE was oral maxillofacial surgery males as well as in females followed by pediatric surgery, females while Orthodontic, dentofacial orthopedics, restorative and cosmetic surgery in males. The most desired working environment preference was civilian dentist in public sector. The most common influencing factors in decision making for dental career were salary aspects and cost of living expenses. Moreover, the most important motives for dental PGE included encouragement by family, friends, teachers, counselors, and good experience with dentists, job security, earning money, flexible working hours, time for family and availability of jobs.

Conclusion: Postgraduate dental education programs for specialization in dentistry to get either clinical specialty certification or higher academic degrees nationally or internationally should be developed on a planned basis by giving appropriate value to the influencing and motivating factors identified in order to enhance professional development and PGE in dentistry.

Keywords: Postgraduate dental education, Dental students, Oral maxillofacial surgery, Influencing factors.

Introduction

The dental profession plays a significant role in the service of the society, and the selection of dentistry as a career is a critical decision in an individual's life, affecting both one's social status and economic status [1]. Postgraduate Dental Education (PGDE) has been defined by Weaver in 1999 as an elective, personal decision to follow additional education immediately prior to entering practice or within several years after graduation [2]. Bawden reported several purposes of postgraduate dental education programs, which include the preparation of specialty practitioners who meet specific dental health needs of society that cannot be, or are not, met by the general practice segment of the dental Care delivery system; in addition to preparing individuals with advanced knowledge and skill in dentistry that may or may not limit their practice to a particular area of dentistry. Another objective of PGE is to properly staff the faculties of the dental education system by preparing individuals for careers in teaching and research. Last but not the least is to prepare individuals who can contribute to the advancement of the knowledge base of dental science and practice and of the biomedical, physical and behavioral sciences in general [3].

Postgraduate dental education programs for specialization in dentistry to get either clinical specialty certification or higher academic degrees nationally or internationally should be developed on a planned basis by

giving appropriate value to the factors, such as the need, and the stage of professional development and related social and economic factors in a given country [4]. It was believed that high quality patient care can only be based upon a foundation of sound education and training, monitored by strong peer assessment [5]. Furthermore, the dental professional must constantly improve and enlarge his or her skills level to provide the highest quality care [6].

Nowadays, the number of dental graduates in Saudi Arabia is exceeding 2500 from over 30 dental schools every year. However, the general distribution of different working domains have not been studied nor planned [7,8]. Distributing the health care force in the kingdom is one of the most important missions needed in the community. One of the primary steps to do so is guiding the dental students to every single dental specialty available. Dental counseling in its current format is mainly directed towards identifying students' poor academic performance while no counseling was applied to explore students' academic talents and the potential of succeeding a specific postgraduate dental program as described by one study [6,9]. In addition, students are mainly driven to attend local seminars and conferences having speakers from all over the world with different topics in dentistry, but still a direct program mainly designed to guide undergraduate dental students to those specialties is missing.

Currently, PGDE is a field of interest to most dental graduates. Its purpose varies but it always includes optimizing the health care level, escalating research production, distributing the service in a larger surface area in the Saudi Arabia and increasing the specialist to patient ratio around the Saudi Arabia [10].

As exploring student's academic skills and their potentials during the undergraduate preparation can be a basic pillar towards the appropriate specialty. Factors that contribute to this finding can be the lack of knowledge on the way to this career path compared to clinical specialties that are more established and popular. Therefore, the establishment of a "PGDE counseling program" might be necessary. As exploring student's academic skills and their potentials during the undergraduate preparation can be a basic support toward the appropriate specialty. So the present study has been conducted to know the working influence, factors and specialty of choice chosen by the dental graduates and dental students, this study will be the first to combine data from several institutions across Riyadh, Saudi Arabia.

The aim of this study is to obtain empirical evidence on views on dental specialty choice and factors influencing that choice among graduate and dental students along with the investigation of the perceptions that motivate in choosing a dental specialty, previous information about dentistry and personal preference.

Materials and Methods

The study was a cross sectional study in which the survey was conducted through an online-based questionnaire, distributed on social media to recruit participants. Moreover, a number of institutions such as King Abdul Aziz Medical Centre, King Saudi bin Abdul Aziz Health Science College (KSAU-HS), Riyadh Colleges for Dentistry and Pharmacy University Hospital and Namuthajeya and King Saudi University (KSU), Dentistry College etc. These were selected in Riyadh city to recruit participants who agreed to fill the same online-based questioner on the spot. The study population consisted of the current graduates and dental students in Riyadh, Saudi Arabia.

The sample size was 600 subjects based on total population of 500 dental students, 50 current graduates and 50 general practitioner dentists, in order to make inferences to the total population. Factoring in a potential non-response rate of approximately 10% the participants were randomly selected to receive the assessment questionnaires.

The sample size computation assumed prevalence factors influencing graduate and dental students specialty choice to be 50%, with a sampling error of +5% at the 95% confidence level, alpha=0.05, and power=80%. +20% to compensate for non-response.

To transcend barriers to study recruitment such as physical distance, transportation, and limited time and financial resources the sampling technique was mix mode of data collection where both convenience sampling technique and cluster simple random technique were carried out. The convenience sampling technique was used to recruit participants from Twitter, an online social media that which has potential benefit to be cost-effective and efficient. The cluster simple random technique was used in targeted colleges in Riyadh. And participants were selected from each colleges or university using a simple random way of sampling.

After receiving the ethical approval, a link was posted using the Twitter account created to recruit participants and advertise the survey. Tweets were sent directly to both individuals and organizations as a request to re-tweet the survey link. A shorter version of the study's URL was generated to fit within the 140-character limit of tweets. Exclusion of duplicates was completed by reviewing the IP addresses of the respondents using the same electronic survey. All eligible participants were asked to fill the online questionnaire through electronic tablets on the spot.

A pilot study using a random sample (n=6) was conducted to validate the questionnaire. The questions included three parts. First part consisted of demographics and the preference of dental students and dental graduates regarding to PGDE and their most preferred specialty. Second included Dental their practice effects toward PGDE while the third overviewed their knowledge regarding to PGDE and the fourth had behavioral reasons and cultural factors to career choices of specialty. It was validated from several resources.

The second, third and fourth sections were taken from Scarbecz M, study [11] with minor modification. The questionnaire was reviewed by several experts in the fields of ethics and epidemiology for content, validity, appearance, and flow. Data was collected by different research coordinators and researcher assistants who are familiar with survey. For data management and data analysis, the statistical package for social sciences (SPSS version 16, SPSS Inc., Chicago, IL) was used.

The arithmetic mean and standard deviation were used for summary statistic for quantitative data and as a measure of dispersion. The chi-square test and the Fischer Exact test were used as tests of significance to compare categorical data. The Mann-Whitney test, Kruskal-Wallis test, Student`s t-test and ANOVA test were used to as tests of significance for comparing numerical data. For all statistical analysis, a p-value less than 0.05 were considered statistically significant.

Results

Demographics

The demographic data regarding the study population in **Table 1** shows that there were more female respondents (55.6%) as compared to males (44%). Majority (72%) was between 20-25 years of age while only 24% were between 18-20 years of age. Similarly most of the participants were Saudi (92.6%) residents while only 9% were non-Saudi. 92.6% of them were not married. Regarding their education, almost same number of participants was studying in KSU and Riyadh i.e. 27% college while 23% were from KSAU-HS College. A large number of individuals were in their clinical (47%) and preclinical years (39%) while around 14% were recent graduates. Most of them participants had their GPA between 4-4.5 (38%) and 4.5-5 (33%).

When asked about their choice for pursuing their career in dentistry, 68.6% indicated that choosing dentistry was their first choice. Around 49% of these students preferred to continue their post-graduation studies from an International program while 25% wanted to opt for a national program.

Characteristics		Frequency	Percent
Gender	Male	270	44.41
	Female	338	55.59
Age	18-20years	142	23.36
	20-25years	436	71.71
	25-30 years	30	4.93
Nationality	Saudi	554	91.12
	Non-Saudi	54	8.88
Marital status	Married	45	7.4
	Single	563	92.6
Colleges	KSAU-HS college of Dentistry	140	23.03
	KSU college of Dentistry	168	27.63
	PNU college of Dentistry	56	9.21
	Riyadh college of Dentistry	170	27.96
	Dar al Uloom college of Dentistry	24	3.95
	Al Farabi college of Dentistry	50	8.22
Class	Pre-clinical years	238	39.14
	Clinical years	286	47.04
	Currently graduated	84	13.82
GPA	Between 3 to 3.5	59	9.7
	Between 3.5 to 4	117	19.24
	Between 4 to 4.5	232	38.16
	Between 4.5 to 5	200	32.89
Was dentistry your first choice	Yes	417	68.59
	No	191	31.41
Preference for post-graduation	National program	154	25.33
	International program	300	49.34

Table 1: Demographics.

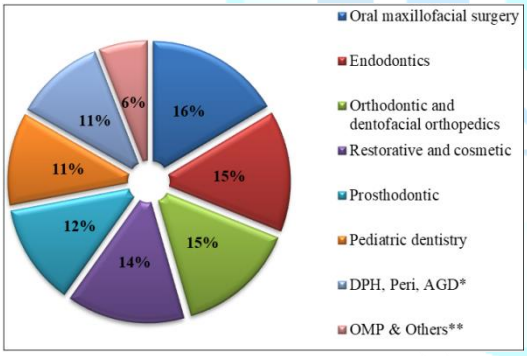

Figure 1: Personal preferences.

As shown in **figure 1**, when the participants were asked regarding their personal preferences for dental subspecialty in which they want to continue their career, the most common responses included oral maxillofacial surgery (16%), Endodontics (15%), Orthodontics and dentofacial orthopedics (15%) and restorative and cosmetic surgery; followed by Prosthodontics, pediatric dentistry and other diplomas respectively.

Considering gender distribution in preferences for specialty choice, oral maxillofacial surgery was found to be the most desired field of study in 17.4% males and 15.7% females. After this, females preferred to continue pediatric surgery (15.38%) while males wanted to carry on with Orthodontic, dentofacial orthopedics, restorative and cosmetic surgery. These findings were significant statistically (**Table 2**).

According to the age distribution, individuals were 18-20 years of age preferred Orthodontic, dentofacial orthopedics (19.7%) followed by oral maxillofacial surgery (18.3%). The most common option picked up by 20-25 years age group respondents was oral maxillofacial surgery (16.7%) followed by restorative and cosmetic surgery (14.9%). Individuals in 25-30 years of age chose restorative and cosmetic surgery as their most desired career choice as shown in **Table 3**. These associations were found to be marginally significant.

Most preferred specialty	Male N(%)	Female N(%)	P-value
Dental public health, Periodontics, Advance general dentistry	34(12.59)	32(9.47)	<0.01 ***
Endodontics	42(15.56)	47(13.91)	
Oral maxillofacial pathology, Oral maxillofacial radiology, Oral medicine and diagnosis, Forensic dentistry	7(2.59)	29(8.58)	
Oral maxillofacial surgery	47(17.41)	53(15.68)	
Orthodontic and dentofacial orthopedics	43(15.93)	45(13.31)	
Pediatric dentistry	16(5.93)	52(15.38)	
Prosthodontics	38(14.07)	36(10.65)	
Restorative and cosmetic	43(15.93)	44(13.02)	

Note: *** Highly Significant.

Table 2: Most preferred specialty according to gender.

Most preferred specialty	18-20 Y	20-25 Y	25-30 Y	P-value
Dental public health, Periodontics, Advance general dentistry	18(12.68)	44(10.09)	4(13.33)	0.05
Endodontics	12(8.45)	72(16.51)	5(16.67)	
Oral maxillofacial pathology, Oral maxillofacial radiology, Oral medicine and diagnosis, Forensic dentistry	12(8.45)	24(5.5)	0(0)	
Oral maxillofacial surgery	26(18.31)	73(16.74)	1(3.33)	
Orthodontic and dentofacial orthopedics	28(19.72)	54(12.39)	6(20)	
Pediatric dentistry	15(10.56)	52(11.93)	1(3.33)	
Prosthodontics	16(11.27)	52(11.93)	6(20)	
Restorative and cosmetic	15(10.56)	65(14.91)	7(23.33)	

Table 3: Most preferred specialty according to age group.

Table 4 summarizes that those respondents who were studying in government universities favored Endodontics (16.2%), Oral maxillofacial surgery (15.4%), Orthodontic and dentofacial orthopedics (15.4%) while many of those studying in private universities wanted to continue their career in either Oral maxillofacial surgery (18%) or by restorative and cosmetic surgery (15.9%). However, the associations were found to be statistically non-significant.

Most preferred specialty	Gov. University N (%)	Private University N (%)	P value
Dental public health, Periodontics, Advance general dentistry	39(10.71%)	27(11.07%)	0.51
Endodontics	59(16.21%)	30(12.3%)	
Oral maxillofacial pathology, Oral maxillofacial radiology, Oral medicine and diagnosis, Forensic dentistry	22(6.04%)	14(5.74%)	
Oral maxillofacial surgery	56(15.38%)	44(18.03%)	
Orthodontic and dentofacial orthopedics	56(15.38%)	32(13.11%)	
Pediatric dentistry	45(12.36%)	23(9.43%)	
Prosthodontics	39(10.71%)	35(14.34%)	
Restorative and cosmetic	48(13.19%)	39(15.98%)	

Table 4: Most preferred specialty according to university.

Marginally significant relationships were found between the years of studies and choice of specialty. According to Table 5, the most desired specialty among the participants who were in their preclinical years was Oral maxillofacial surgery (21.4%), those in clinical years or have currently graduated preferred Endodontics in the proportion of 16.7% and 20.2% respectively.

Most preferred specialty	Preclinical	Clinical years	Currently graduated	P value
Dental public health, Periodontics, Advance general dentistry	26(10.92%)	27(9.44%)	13(15.48%)	0.05
Endodontics	24(10.08%)	48(16.78%)	17(20.24%)	
Oral maxillofacial pathology, Oral maxillofacial radiology, Oral medicine and diagnosis, Forensic dentistry	15(6.3%)	19(6.64%)	2(2.38%)	
Oral maxillofacial surgery	51(21.43%)	42(14.69%)	7(8.33%)	
Orthodontic and dentofacial orthopedics	40(16.81%)	36(12.59%)	12(14.29%)	
Pediatric dentistry	26(10.92%)	34(11.89%)	8(9.52%)	
Prosthodontics	21(8.82%)	40(13.99%)	13(15.48%)	
Restorative and cosmetic	35(14.71%)	40(13.99%)	12(14.29%)	

Table 5: Most preferred specialty according to years of study.

Participants were asked about the working environment preferences for future dentistry career. The most common response was Civilian dentistry in public sector which was highlighted by 39.5% of the participants. The next common responses were civilian dentistry in private sector (24%) followed by Academic services dentist (21%) (**Figure 2**).

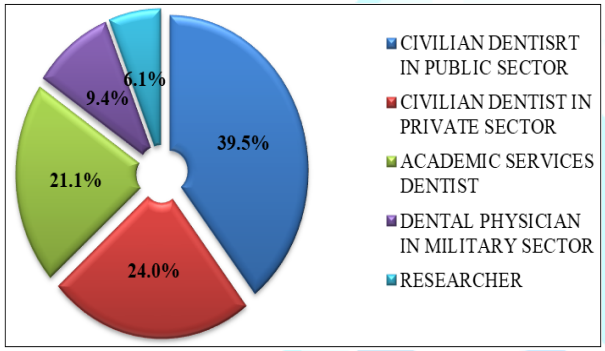

Figure 2: Working environment preferences.

When working environment preferences were evaluated in **Table 6** according to different variables, statistically significant associations were obtained. It was found that being a civilian dentist in public sector (36.5%) and private sector (32.5%) were the most common choices among male which was also found to be stats. While majority of the females even more than males also preferred to continue as a civilian dentist in public sector (42.6%) followed by academic services dentist (26.9%). This choice of working a civilian dentist in public sector was common across all age groups, as well as among the students studying in either government or private universities and the students in their pre-clinical years (47.5%) and clinical years (36.7%) while currently graduated respondents marked of working a civilian dentist in private sector (38.1%) as their most common preference.

As shown in **Table 7**, various reasons were determined from the participants which may influence their decision of choosing dental specialty while deciding for their career. The reasons which were found to be statistically significant included Future salary as professional specialist and Cost of living expenses. In addition to these, among males, inclination was found more towards, length of program, exposure prior to dental school and the Location of program as compared to females who were more concerned about the enjoyment of providing that type of specialty service, type of patient seen in the specialty of service and the faculty influence.

Working environment preference	Civilian dentist in public sector	Civilian dentist in private sector	Dental physician in military sector	Academic services dentist	Researcher	P-value
Male N (%)	96 (35.56)	88(32.59)	38(14.07)	37(13.7)	11(4.07)	<0.01**
Female N (%)	144 (42.6)	58(17.16)	19(5.62)	91(26.92)	26(7.69)	
18Y-20Y	64 (45.07)	35(24.65)	9(6.34)	28(19.72)	6(4.23)	<0.01**
20Y-25Y	163 (37.39)	101 (23.17)	45(10.32)	98(22.48)	29(6.65)	
25Y-30Y	13 (43.33)	10(33.33)	3(10)	2(6.67)	2(6.67)	
Gov. University N(%)	145 (39.84%)	68 (18.68%)	42 (11.54%)	89 (24.45%)	20(5.49%)	<0.01**
Private University N(%)	95 (38.93%)	78 (31.9%)	15 (6.15%)	39 (15.98%)	17(6.97%)	
Pre-clinical	113 (47.48%)	54 (22.6%)	18 (7.56%)	39 (16.39%)	14(5.88%)	<0.01**
Clinical years	105 (36.71%)	60 (20.9%)	33 (11.54%)	67 (23.43%)	21 (7.34%)	
Currently graduated	22 (26.19%)	32 (38.1%)	6 (7.14%)	22 (26.19%)	2 (2.38%)	

Note: ** Highly Significant.

Table 6: Stratification for working environment preferences.

Enjoyment of providing that type of specialty service			
	Male (%)	Female (%)	P value
Agree	204(75.56)	278(82.25)	0.07
Disagree	4(1.48)	7(2.07)	
Neutral	62(22.96)	53(15.68)	
Type of patient seen in the specialty of service			
Agree	113(41.85)	143(42.31)	0.34
Disagree	44(16.3)	69(20.41)	
Neutral	113(41.85)	126(37.28)	
Future salary as professional specialist			
Agree	174(64.44)	180(53.25)	0.02*
Disagree	36(13.33)	59(17.46)	
Neutral	60(22.22)	99(29.29)	
Length of program			
Agree	105(38.89)	108(31.95)	0.06
Disagree	72(26.67)	119(35.21)	
Neutral	93(34.44)	111(32.84)	
Exposure prior to dental school			
Agree	117(43.33)	142(42.01)	0.53
Disagree	63(23.33)	92(27.22)	
Neutral	90(33.33)	104(30.77)	
Faculty influence			
Agree	140(51.85)	182(53.85)	0.64
Disagree	62(22.96)	67(19.82)	
Neutral	68(25.19)	89(26.33)	
Location of program			
Agree	117(43.33)	132(39.05)	0.52
Disagree	68(25.19)	96(28.4)	
Neutral	85(31.48)	110(32.54)	
Cost of living expenses			
Agree	148(54.81)	129(38.17)	<0.01**
Disagree	56(20.74)	99(29.29)	
Neutral	66(24.44)	110(32.54)	

Note: *Significant, ** Highly Significant.

Table 7: Reasons of Influence according to Gender.

The results show that the individuals studying in Government universities as well as private university share a statically significant association with the reasons of influences including the type of patient seen in the specialty of service, faculty influence, location of program, cost of living expenses. Additionally, although statistically non-significant, the private institution students were more agreed the reasons like for exposure prior to dental school, length of program, future salary as professional specialist when compared to the students

studying in government institutes who were more interested in the enjoyment of providing that type of specialty service (**Table 8**).

Enjoyment of providing that type of specialty service			
	Gov. University (%)	**Private University (%)**	**P value**
Agree	293(80.49%)	189(77.46%)	0.24
Disagree	4(1.1%)	7(2.87%)	
Neutral	67(18.41%)	48(19.67%)	
Type of patient seen in the specialty of service			
Agree	143(39.29%)	113(46.31%)	<0.01**
Disagree	57(15.66%)	56(22.95%)	
Neutral	164(45.05%)	75(30.74%)	
Future salary as professional specialist			
Agree	198(54.4%)	156(63.93%)	0.07
Disagree	62(17.03%)	33(13.52%)	
Neutral	104(28.57%)	55(22.54%)	
Length of program			
Agree	122(33.52%)	91(37.3%)	0.3
Disagree	123(33.79%)	68(27.87%)	
Neutral	119(32.69%)	85(34.84%)	
Exposure prior to dental school			
Agree	151(41.48%)	108(44.26%)	0.79
Disagree	95(26.1%)	60(24.59%)	
Neutral	118(32.42%)	76(31.15%)	
Faculty influence			
Agree	182(50%)	140(57.38%)	0.03*
Disagree	90(24.73%)	39(15.98%)	
Neutral	92(25.27%)	65(26.64%)	
Location of program			
Agree	125(34.34%)	124(50.82%)	<0.01**
Disagree	104(28.57%)	60(24.59%)	
Neutral	135(37.09%)	60(24.59%)	
Cost of living expenses			
Agree	140(38.46%)	137(56.15%)	<0.01**
Disagree	102(28.02%)	53(21.72%)	
Neutral	122(33.52%)	54(22.13%)	

Note: *Significant, ** Highly Significant.

Table 8: Reason of Influence V/s Type of University.

Table 9 shows the relationship between the reasons of influence and the level of education. It shows that statistically significant reasons across all the levels of education included future salary as professional specialist, location of program and cost of living expenses. While, when comparing all three levels if education, it can be concluded that the respondents who were still studying had more inclination towards future salary, length and location of the program while those in who have graduated were more influenced by the exposure prior to dental school, faculty influence, cost of living expenses, length of program and enjoyment of providing that type of specialty service.

Table 10 shows the individual motives for choosing dental profession. These are the motives that the study participants nominated which influences them to continue their career in dentistry. These motives are explained according to the gender, level of education and university type.

One of the motives for the dental students to pursue dentistry as described by the study was that "one or more of my relatives are dentists". This statement was found to have statistically significant association with the decision of opting dentistry across both university types (<0.01) and all levels of education (<0.01). However, 37.8% males and 33% females favored this opinion, although statistically non-significant (0.3). When asked about peer pressure, statistically not significant (0.54) but equal distribution of opinion was found among males and females while statistically significant relationship was found in both universities. Similar types of findings were obtained for the idea of "It's easy to find employment" while many male (44%) and female (47%) students belonging to wither government (51%) or private (37.3%) universities disagreed with this statement.

Enjoyment of providing that type of specialty service				
	Pre-Clinical (%)	**Clinical (%)**	**Graduated (%)**	**P value**
Agree	179(75.21%)	234(81.82%)	69(82.14%)	0.37
Disagree	6(2.52%)	4(1.4%)	1(1.19%)	
Neutral	53(22.27%)	48(16.78%)	14(16.67%)	
Type of patient seen in the specialty of service				
Agree	102(42.86%)	119(41.61%)	35(41.67%)	0.08
Disagree	32(13.45%)	60(20.98%)	21(25%)	
Neutral	104(43.7%)	107(37.41%)	28(33.33%)	
Future salary as professional specialist				
Agree	159(66.81%)	148(51.75%)	47(55.95%)	0.01*
Disagree	27(11.34%)	51(17.83%)	17(20.24%)	
Neutral	52(21.85%)	87(30.42%)	20(23.81%)	
Length of program				
Agree	96(40.34%)	83(29.02%)	34(40.48%)	0.05
Disagree	70(29.41%)	100(34.97%)	21(25%)	
Neutral	72(30.25%)	103(36.01%)	29(34.52%)	
Exposure prior to dental school				
Agree	101(42.44%)	114(39.86%)	44(52.38%)	0.15
Disagree	54(22.69%)	80(27.97%)	21(25%)	
Neutral	83(34.87%)	92(32.17%)	19(22.62%)	
Faculty influence				
Agree	126(52.94%)	149(52.1%)	47(55.95%)	0.78
Disagree	46(19.33%)	66(23.08%)	17(20.24%)	
Neutral	66(27.73%)	71(24.83%)	20(23.81%)	
Location of program				
Agree	112(47.06%)	98(34.27%)	39(46.43%)	<0.01**
Disagree	66(27.73%)	75(26.22%)	23(27.38%)	
Neutral	60(25.21%)	113(39.51%)	22(26.19%)	
Cost of living expenses				
Agree	133(55.88%)	95(33.22%)	49(58.33%)	<0.01**
Disagree	46(19.33%)	92(32.17%)	17(20.24%)	
Neutral	59(24.79%)	99(34.62%)	18(21.43%)	

Note: *Significant, ** Highly Significant.

Table 9: Reason of Influence V/s Level of Education.

The idea of helping people was another motive for opting dentistry which showed statistically significant relationship across all the variables. Females (76%), government universities (73.6%) and students in their clinical year (76%) were found more inclined towards this idea. Family encouragement, teachers, counselors and good experiences with family dentist were also thought be the motivating factors for all university students irrespective of their education level. However, dentistry offering job security and flexible working hours was accepted by males and females in almost equal proportions though statistically non-significant as with the university types but all of them disagreed with the benefit of giving enough time to the family. While these three factors showed statistically significant associations with level of education.

Dentistry is caring, prestigious and science based profession, no on-call work as well as do not have to deal with life and death on routine basis and offers financial security. Although, majority of the participants across gender, university types and level of education agreed with this but shared a statistically non-significant association. Only education level was found to be in a statistically significant association with the motive "dentistry pays better than other options available to me" while the intension of earning money was found statistically significant among males and females (0.05).

Discussion

This study provided a better understanding regarding the influencing factors and motives that contribute towards the decision making of future career choices among students as well as the overall apparent necessity of PGE. This is one of the toughest decisions for the students whether to start practicing or to continue with specialization.

The specialty preferences of our study participants are oral maxillofacial surgery was found to be the most desired field of study in 17.4% males followed by Orthodontic, dentofacial orthopedics (15.9%), restorative and cosmetic surgery (15.9%). A study done in a

One or more of my relatives are dentists							
	Male (%)	**Female (%)**	**Govt. university (%)**	**Private university (%)**	**Preclinical (%)**	**Clinical (%)**	**Graduated (%)**
Agree	102(37.8)	112(33.14)	112(30.7%)	102(41.8%)	95(39.9%)	96(33.5%)	23(27.4%)
Disagree	130(48.1)	165(48.8)	211(57.9%)	84(34.4%)	99(41.6%)	158(55.2%)	38(45.2%)
Neutral	38(14.0)	61(18.0)	41(11.2%)	58(23.7%)	44(18.4%)	32(11.2%)	23(27.4%)
P-value	0.3		<0.01**		<0.01**		
One, or more, of my friends are dentists							
Agree	77(28.5)	98(28.9)	83(22.8%)	92(37.7%)	79(33.2%)	73(25.5%)	23(27.4%)
Disagree	145(54)	191(56)	233(64.01%)	103(42.21%)	119(50%)	174(61%)	43(51.2%)
Neutral	48(17.7)	49(14.5)	48(13.19%)	49(20.08%)	40(16.8%)	39(13.6%)	18(21.4%)
P-value	0.54		<0.01**		0.08		
It's easy to find employment							
Agree	68(25.2)	82(24.3)	70(19.2%)	80(32.8%)	74(31.0%)	55(19.2%)	21(25%)
Disagree	118(44)	159(47)	186(51.1%)	91(37.3%)	90(37.8%)	147(51%)	40(47.6%)
Neutral	84(31.1)	97(28.7)	108(29.6%)	73(29.9%)	74(31.0%)	84(29.4%)	23(27.4%)
P-value	0.7		<0.01**		0.01		
Pays better than other options available to me							
Agree	125(46)	146(43)	154(42.31%)	117(47.95%)	115(48.3%)	124(43%)	32(38.1%)
Disagree	67(24.8)	99(29.3)	97(26.65%)	69(28.28%)	51(21.4%)	83(29.0%)	32(38.1%)
Neutral	78(28.9)	93(27.5)	113(31.04%)	58(23.77%)	72(30.3%)	79(27.6%)	20(23.9%)
P-value	0.47		0.14		0.05*		
I want to treat/help people to improve their appearance							
Agree	175(65)	258(76)	268(73.63%)	165(67.62%)	170(71.4%)	219(76%)	44(52.38%)
Disagree	34(12.6)	24(7.1)	25(6.87%)	33(13.52%)	19(7.9%)	22(7.7%)	17(20.24%)
Neutral	61(22.6)	56(16.6)	71(19.51%)	46(18.85%)	49(20.6%)	45(15.7%)	23(27.38%)
P-value	<0.01**		0.02*		<0.01**		
My family encouraged me							
Agree	158(59)	205(67)	198(54.4%)	165(67.62%)	154(64.7%)	166(58%)	43(51.19%)
Disagree	54(20)	48(14.2)	62(17.03%)	40(16.39%)	33(13.87%)	42(14.7%)	27(32.14%)
Neutral	58(21.5)	85(25.1)	104(28.57%)	39(15.98%)	51(21.43%)	78(27.3%)	14(16.67%)
P-value	**0.14**		<0.01**		<0.01**		
I had good experiences visiting my family dental specialist and this lead me to think about a career choice in dentistry							
Agree	106(39)	146(43)	128(35.16%)	124(50.82%)	112(47.0%)	101(35%)	39(46.43%)
Disagree	103(38)	117(35)	145(39.84%)	75(30.74%)	65(27.31%)	127(44%)	28(33.33%)
Neutral	61(22.6)	75(22.2)	91(25%)	45(18.44%)	61(25.63%)	58(20.3%)	17(20.24%)
P-value	0.58		<0.01**		<0.01**		
Offers job security							
Agree	107(40)	151(44)	145(39.84%)	113(46.31%)	113(47.5%)	110(39%)	35(41.67%)
Disagree	73(27.0)	71(21.0)	88(24.18%)	56(22.95%)	38(15.97%)	82(29%)	24(28.57%)
Neutral	90(33.3)	116(34)	131(35.99%)	75(30.74%)	87(36.55%)	94(33%)	25(29.76%)
P-value	0.2		0.26		<0.01**		
Have a flexible work schedule							
Agree	116(43)	147(43)	148(40.66%)	115(47.13%)	128(53.8%)	105(37%)	30(35.71%)
Disagree	82(30)	100(29)	115(31.59%)	67(27.46%)	49(20.59%)	104(36%)	29(34.52%)
Neutral	72(26.7)	91(27)	101(27.75%)	62(25.41%)	61(25.63%)	77(26.3%)	25(29.76%)
P-value	0.98		0.28		<0.01**		
Give me enough time to be with my family							
Agree	100(37)	130(38)	128(35.16%)	102(41.8%)	111(46.64%)	85(29.8%)	34(40.48%)
Disagree	110(40.7)	139(41)	155(42.58%)	94(38.52%)	73(30.67%)	143(50%)	33(39.29%)
Neutral	60(22.22)	69(20.4)	81(22.25%)	48(19.67%)	54(22.69%)	58(20.3%)	17(20.24%)
P-value	0.85		0.25		<0.01**		
Is a caring profession							
Agree	176(65)	244(72)	252(69.23%)	168(68.85%)	171(71.8%)	188(66%)	61(72.62%)
Disagree	32(11.9)	28(8.28)	29(7.97%)	31(12.7%)	20(8.4%)	31(10.8%)	9(10.71%)
Neutral	62(22.9)	66(19.5)	83(22.8%)	45(18.44%)	47(19.75%)	67(23.4%)	14(16.67%)
P-value	0.15		0.1		0.45		
Is a science based profession							
Agree	176(65)	243(72)	257(70.6%)	162(66.39%)	171(71.8%)	194(68%)	54(64.29%)
Disagree	38(14.0)	31(9.17)	38(10.44%)	31(12.7%)	17(7.14%)	38(13.2%)	14(16.67%)
Neutral	56(20.7)	64(18.9)	69(18.96%)	51(20.9%)	50(21.01%)	54(18.8%)	16(19.05%)
P-value	0.11		0.52		0.1		
I would like to make a lot of money							
Agree	168(62)	177(52)	212(58.24%)	133(54.51%)	135(56.7%)	166(58%)	44(52.38%)
Disagree	38(14.0)	57(16.8)	59(16.21%)	36(14.75%)	30(12.61%)	47(16.4%)	18(21.43%)
Neutral	64(23.7)	104(31)	93(25.55%)	75(30.74%)	73(30.67%)	73(25.5%)	22(26.19%)
P-value	0.05*		0.37		0.28		
Is a prestigious profession							
Agree	147(54)	176(52)	196(53.85%)	127(52.05%)	134(56.3%)	142(49%)	47(55.95%)
Disagree	38(14.0)	49(14.5)	48(13.19%)	39(15.98%)	34(14.29%)	42(15%)	11(13.1%)
Neutral	85(31.4)	113(33)	120(32.97%)	78(31.97%)	70(29.41%)	102(36%)	26(30.95%)
P-value	0.84		0.63		0.56		

My family dentist encouraged me							
Agree	82(30.3)	92(27.2)	75(20.6%)	99(40.57%)	87(36.55%)	60(20.9%)	27(32.14%)
Disagree	130(48)	181(53)	217(59.62%)	94(38.52%)	100(42.02%)	172(60%)	39(46.43%)
Neutral	58(21.4)	65(19.2)	72(19.78%)	51(20.9%)	51(21.43%)	54(18.8%)	18(21.43%)
P-value	0.42		<0.01**		<0.01**		
Teachers and/or counselors encouraged me							
Agree	98(36.3)	97(28.7)	89(24.45%)	106(43.44%)	87(36.55%)	78(27.3%)	30(35.71%)
Disagree	114(42)	179(53)	195(53.57%)	98(40.16%)	93(39.08%)	159(56%)	41(48.81%)
Neutral	58(21.4)	62(18.3)	80(21.98%)	40(16.39%)	58(24.37%)	49(17.1%)	13(15.48%)
P-value	0.03		<0.01**		<0.01**		
Offers financial security							
Agree	143(56)	176(52)	189(51.92%)	130(53.28%)	132(55.46%)	143(50%)	44(52.38%)
Disagree	53(19.6)	62(18.3)	68(18.68%)	47(19.26%)	41(17.23%)	54(18.8%)	20(23.81%)
Neutral	74(27.4)	100(30)	107(29.4%)	67(27.46%)	65(27.31%)	89(31%)	20(23.81%)
P-value	0.82		0.87		0.46		
There is not much "on call" work							
Agree	146(54)	214(63)	225(61.81%)	135(55.33%)	135(56.7%)	171(59.%)	54(64.29%)
Disagree	61(22.6)	67(19.8)	64(17.58%)	64(26.23%)	49(20.59%)	58(20.3%)	21(25%)
Neutral	63(23.3)	57(16.9)	75(20.6%)	45(18.44%)	54(22.69%)	57(19.9%)	9(10.71%)
P-value	0.05		0.04		0.21		
Do not have to deal with life and death cases on a routine basis							
Agree	163(60)	219(65)	237(65.11%)	145(59.43%)	148(62.2%)	177(61.9%)	57(67.86%)
Disagree	55(20.3)	65(19.2)	64(17.58%)	56(22.95%)	44(18.49%)	59(20.63%)	17(20.24%)
Neutral	52(19.3)	54(15.9)	63(17.31%)	43(17.62%)	46(19.33%)	50(17.48%)	10(11.9%)
P-value	0.47		0.24		0.61		

Note: *Significant, ** Highly Significant.

Table 10: Motives and Gender, Type of University, Level of Education.

Saudi university in 2007 found that prosthodontics and orthodontics were the most preferred among dental students [10].

In 2011, another Saudi study showed that Prosthodontics followed by Orthodontics was the most preferred specialties among male dental students [7]. Among females, 15.7% preferred oral maxillofacial surgery followed by pediatric surgery (15.38%) whereas; Orthodontics followed by Endodontics was the most preferred among female dental students in 2012 [8]. This shows that the career choices have changed in last 5 to 6 years. Another study from the same university in 2014 stated that Oral Maxillofacial surgery followed by Orthodontics were the most desired career choices among male while in females, Operative dentistry followed by Pediatric Dentistry were the most favored choices which is similar to our findings [12]. One recent study from final year students studying in Saudi Arabia reported that Restorative and Aesthetic Dentistry was the most preferred option in males as well as females followed by Endodontics in male while Oral Maxillofacial Surgery among female students [12]. Moving towards international data, a study done in Canada revealed that most of their residents that they intended to practice orthodontics as an associate in the private sector similar to another study while another study reported Restorative and Aesthetic Dentistry as preferred choices for pursuing career [13-15].

Regarding the future career options, gender difference was found among a study done in Saudi dental students which showed that majority of them want to work as a civilian dentist in the public sector especially female students, which is similar to our study [13]. This gender-related is in accordance with the previous studies, in which females were showed more interest than males in working in public dental careers while in contrast to Iranian students [16,17]. As indicated in our study, many students during their preclinical and clinical years of education decide about their future specialty, a study of Orthodontic residents also described that the decision of pursuing career in orthodontics as a specialty was chosen by them while they were in dental school 42%, 33% decided after dental school while24% knew before entering dental school that they wanted to be an orthodontist [18].

The most important influencing factors for choosing dental specialty in our study population were the future pay scale and the cost of living as well as the location of the program. However, a single institution study conducted in the Unites States described that their respondents cherished the possession of specific skills unique to the specialty, intellectual content and challenging diagnostic problems as the main influencing factors while choosing any dental specialty [19]. Another study showed that the influencing factors were related to family, colleagues or faculty members in the dental profession a comparative investigation between medical and dental students showed that dental students were significantly more likely to be inspired by elements related to their professional status, security, regular working hours, self-employment and independence which are also evident in our study as motives for joining dental career. A qualitative study from UK also suggested the similar findings. In a study, 23% of the total respondents reported program location as an influencing factor as ours [13,20,21].

The strong motivational factors included 'professional status, 'financial benefits', 'job security, flexibility and independence' and 'good quality of life'. Their students also reported that they attracted by these features in addition to the support to a greater or lesser extent by personal experience, family and friends. [21-25].

The two most common motivations among males and females in our study were helping people as well as earning money. Earning money was the strongest motivational factor among males (62%) while helping and treating people in females (76%) which were statistically significant. This may be probably due to the fact that males have the major responsibility of meeting the financial needs of the family while the tradition of females being more involved in rearing children and take care of rest of the family and household [26]. However, flexible working hours and flexibility of hours hence enjoying family time was also one of the motivations, although statistically not significant. Due to the most demanding women by tradition undertake with child-rearing, their immediate career plans may reflect these duties. This may be one of the reasons why dental students prefer government employment rather than the private sectors as reflected by our study also [27,28,29].

Ours study also showed that almost half of the students wanted to continue their post-graduation via international programs which was also highlighted by a previous study in Saudi male dental students describing that the preferred countries were USA, UK, KSA and

Sweden [7]. Majority (68.6%) of the study participants declared that choosing dentistry was their own decision. Similarly, Nadya et. Al [24] reported that the majority of the first year dental students (73%) were self-motivated for choosing dentistry as a career. Many similar findings were obtained from previous literature when compared to our study showing that many of the influencing and motivating factors have remained same irrespective of the number of years and location.

Limitations of the Study

Limitations of the study include the bias in transferring knowledge that may occur while filling a questionnaire on social media. As with any questionnaire-based survey, some elements of under-reporting bias might occur in the study. Secondly, this fact should also be acknowledged that inquiring about future career plans from the students such as in preclinical years might not accurately reflect what these students actually do after their graduation. However, factors that influence such decisions are kept under study. For this, a follow up study is required. Individual significance of the variable has been appreciated in this study however; the effect of covariates and inter dependence of variable as well as their mutual effect cannot be excluded.

Strengths of the Study

National data shows that work has been done on similar topic as ours but this study has stratified dental specialty choice as well as the influencing and motivating factors for making decision while choosing dental career; according to gender, age group, university type and level of education. Additionally, we can now have an absolute idea in a snapshot regarding the career preferences and associated factors across these variables and hence it has become easier to understand the needs of the particular gender, age group or class etc. Moreover, this study will is the first to combine data from several institutions across Riyadh, Saudi Arabia and this data can be generalized on the target population which will ultimately help in establishing post-graduation counseling program as well as designing future education policies.

Conclusion

The summary of the key findings that can be of significance show that majority of the students decided on their own when choosing their career in dentistry. Although different but almost all of them wanted to pursue their post-graduation, around half of them interested in international post-graduation programs. Personal preferences in PGE was oral maxillofacial surgery males as well as in females. Followed by pediatric surgery females while Orthodontic, dentofacial orthopedics, restorative and cosmetic surgery in males. The most desired working environment preference was being a civilian dentist in public sector. The most common influencing factors in decision making for dental career were Future salary as professional specialist and cost of living expenses. In addition to this, type of patient seen in the specialty of service, faculty influence and the location of the program were also found to be significant. Moreover, the most important motives for dental PGE included encouragement by family, friends, teachers, counselors and colleagues, good experience with family dentists, job security, earning lot of money, flexible working hours, ease of spending time with the family and availability of jobs.

Recommendations

Findings of this study show that students wants to continue their PGE in different sub specialty. Therefore it is recommended that considerable time and effort should be devoted towards providing proper guidance and establishing dental PGE counseling programs and mentoring activities in dental schools so that students can get a clear picture of the available options for their PGE. Additionally, information about the expenses, length and location of the programs would help them decide and focus on their selected specialty and wisely decide whether to pursue that career or not even during their preclinical or clinical years, this will ultimately save their time and money. Alumni can aid to a greater extent in such career decision making of their junior dentists. Therefore dental colleges should manage a platform for the same.

It should also be taken into account that not all the graduates select only a few post-graduation programs and so the rest of the sub specialties are left with minimal workforce, A systematic review of population-based studies concluded in Saudi children that dental caries is very common which needs immediate attention from the dental profession officials and the government [30]. The result of our study shows that minority wants to continue their career in pediatric surgery, similar is with career in research. Hence there should be some kind of balance and encouragement of undergraduates to pursue careers which are in shortage of dental staff.

This study can be a baseline for establishing national policies and for the improvement of graduate programs. Follow up studies are required to determine whether the students continue the careers which they selected when they were undergraduates. If not, factors that prevented them to do so should be considered. These suggestions will help in making the pillars for dental PGE strong in future and hence encouraging students in selecting and continuing their desired dental career.

References

1. Sam G, Alghmlas AS, Alrashed MI and Alaskar ZA. Working environment and specialty of choice chosen by the dental students at Prince Sattam Bin Abdulaziz University, Saudi Arabia: A cross-sectional study (2016) J Int Soc Prev Com Den 6: S1-S5. https://doi.org/10.4103/2231-0762.181159
2. Weaver RG. Continued formal dental education or I would like more (1999) J Am Coll Dent 66: 31-35.
3. Bawden JW. The scope and objectives of graduate dental education (1980) J Dent Educ 44: 600-610.
4. Cousins AJP. Specialization in dentistry (1984) Br Dent J 7: 26-27.
5. Barnard D and Pendlebury M. Career pathways (2000) Br Dent J 188: 583.
6. Paquette JM and Sheets CG. The second 'D.D.S' degree a formula for practice success (2004) JADA 135: 1321-1325. https://doi.org/10.14219/jada.archive.2004.0409
7. Aldlaighan Y, Alsadhan R, Alghamdi M, Alshahrani A and Alshahrani M. Postgraduate specialties interest, career choices and qualifications earned by male dentists graduated from King Saudi University (2011) Saudi Dent J 23: 81-86. https://doi.org/10.1016/j.sdentj.2010.11.004
8. Aldlaighan Y, Albarakati S, Alhabeeb F and Alhulaily M. Career characteristic and postgraduate education of female dentist graduates of the college of dentistry at King Saud University, Saudi Arabia (2012) Saudi Dent J 24: 29-34. https://doi.org/10.1016/j.sdentj.2011.10.005
9. Newton JT, Thorogood N and Gibbons DE. A study of the career development of male and female dental practitioners (2000) Br Dent J 188: 90-94. https://doi.org/10.1038/sj.bdj.4800398
10. Ashri NY, Al-Moslem RK and Al-Mujel MH. General dental practitioner's interest in postgraduate dental education, Riyadh, Saudi Arabia (2007) JPDA 16: 82-89.
11. Ross JA and Scarbecz M. Gender differences in first-year dental students' motivation to attend dental school (2002) J Dent Educ 66: 952-961. https://doi.org/10.1002/j.0022-0337.2002.66.8.tb03564.x

12. Halawany HS. Career motivations, perceptions of the future of dentistry and preferred dental specialties among Saudi dental students (2014) Open Dent J 8: 129-135. https://doi.org/10.2174/1874210601408010129
13. Halawany HS, Binassfour AS, AlHassan WK, Alhejaily RA, Al Maflehi N, et al., Dental specialty, career preferences and their influencing factors among final year dental students in Saudi Arabia (2016) Saudi Dental J 29: 15-23. https://doi.org/10.1016/j.sdentj.2016.12.001
14. Drugan CS, Chestnutt IG and Boyles JR. The current working patterns and future career aspiration of specialist trainees in dentistry (2004) Br Dent J 196: 761-765. https://doi.org/10.1038/sj.bdj.4811389
15. Scarbecz M and Ross JA. The relationship between gender and post-graduate aspirations among first-and fourth-year students at public dental schools: a longitudinal analysis (2007) J Dent Educ 71: 797-809.
16. Noble J, Karaiskos N and Wiltshire WA. Motivational factors and future life plans of orthodontic residents in the United States (2010) Ame J Ortho Dento Ortho 137: 623-630. https://doi.org/10.1016/j.ajodo.2008.03.034
17. Baharvand M, Moghaddam EJ, Pouretemad H and Alavi K. Attitudes of Iranian dental students toward their future careers: an exploratory study (2011) J Dent Educ 75: 1489-1495.
18. Noble J, Karaiskos N and William A. Wiltshire, Motivations and future plans of Canadian orthodontic residents (2007) Ame J Ortho Dento Orthop 136: 644-650. https://doi.org/10.1016/j.ajodo.2007.08.037
19. Widstro E, Birn H, Haugejorden O and Martinsson T. Dental students' views on their education and study circumstances in Nordic countries (1989) Swed Dent J 14: 123-129.
20. Saeed S, Jimenez M, Howell H, Karimbux N and Sukotjo C. Which factors influence students' selection of advanced graduateprograms? One institution's experience (2008) J Dent Educ 72: 688-697.
21. Shin JH, Kinnunen TH, Zarchy M, Da Silva JD, Chang BM, et al. Factors influencing dental students' specialty choice: A survey of ten graduating classes at one institution (2015) J Dent Educ 79: 369-377.
22. Crossley ML and Mubarik A. A comparative investigation of dental and medical student's motivation towards career choice (2002) Brit Dent J 193: 471-473. https://doi.org/10.1038/sj.bdj.4801599
23. Gallagher J, Clarke W and Wilson N. Understanding the motivation: a qualitative study of dental students' choice of professional career (2008) Eur J Dent Educ 12: 89-98.
24. Hallissey J, Hannigan A and Ray N. Reasons for choosing dentistry as a career-a survey of dental students attending a dental school in Ireland during 1998–99 (2000) Euro J Dent Educ 4: 77-81. https://doi.org/10.1034/j.1600-0579.2000.040205.x
25. Avramova N, Yaneva K and Bonev B. First-year dental students' motivation and attitudes for choosing the dental profession (2014) Acta Med Acad 43: 113-121. https://doi.org/10.5644/ama2006-124.110
26. Subaita AA, Ali A, Andijania AI, Altuwaijrya MA, Algarni MS, et al. Factors influencing the career choices among medical university students of King Saud bin Abdulaziz University, Riyadh Saudi Arabia; A cross-sectional study design (2017) Saudi J Dent Res 8: 73-78. https://doi.org/10.1016/j.sjdr.2016.05.003
27. Nashleanas BM, McKernan SC, Kuthy RA and Qian F. Career influences among final year dental students who plan to enter private practice (2014) BMC Oral Health 14: 18. https://doi.org/10.1186/1472-6831-14-18
28. Atchison KA, Bibb CA, Lefever KH, Mito RS, Lin S, et al. Gender differences in career and practice patterns of PGD-trained dentists (2002) J Dent Educ 66: 1358-1367.
29. Dhima M, Petropoulos VC, Han RK, Kinnunen T and Wright RF. Dental students' perceptions of dental specialties and factors influencing specialty and career choices (2012) J Dent Educ 76: 562-573.
30. Al-Agili DE. A systematic review of population-based dental caries among children in Saudi Arabia (2013) Saudi Dent J 25: 3-11. https://doi.org/10.1016/j.sdentj.2012.10.002