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Treatment Need as an Indicator for Planning Dental Postgraduate Programs at Umm Al-Qura University, Saudi Arabia

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ABSTRACT

Background: The treatment need is one of the fundamental factors for effective planning of postgraduate dental programs that improve the competency of dental practitioners.

Aims: To assess the treatment need of patients at Umm Al-Qura University, Dental Teaching Hospital utilizing statistically representative sample of patients visiting the clinics.

To use data analyzed to propose the need and design for postgraduate degrees in the college.

Material and methods: Information were retrieved from the electronic database of 4,967 patients' files anonymously including age, gender, treatment needs and referred clinic specialty. The obtained data were subjected to descriptive statistics in the form of mean \pm SD, frequencies, cross tabulations, and percentages using Statistical Package for the Social Sciences (SPSS) software.

Results: The percentage of females' records was significantly higher (52%) than that of males. The mean age of males was higher than females (36.66 versus 35.10) while young adult age category constituted the greatest number (36.6%). The most common treatment need recorded in patients' files were periodontics (73.3%), restorative (60.4%) followed by fixed prosthodontics (54.8%). Nearly half of the patients' (48.9%) were in need of endodontic treatment. The common significantly higher needs in females were restorative and periodontics, while among males, significantly higher treatment needs for surgery, endodontics and prosthodontics were recorded.

Conclusion: Patient treatment needs at Faculty of Dentistry, Umm Al-Qura University reflect a high priority for proposing postgraduate degrees in periodontics and restorative dentistry. Also, devoting considerable time and effort in counseling and providing undergraduates with information that guide in making career decisions and match the treatment needs in Makkah, Saudi Arabia.

Clinical Significance: Establishment of dental postgraduate degrees that meet the treatment needs of the community will lead to more professional diagnosis and management of patients by qualified specialists.

1. Introduction

Postgraduate dental education is a non-compulsory, personal choice for additional education among dental students after graduation, in order to be a specialist before practicing.[1,2] Dental post-graduate programs are available only in few colleges in Saudi Arabia although there are a large number of dental colleges in the Kingdom. Thus, there is an actual need to develop more postgraduate programs in order to improve level of dental care services, patient satisfaction and to reduce the incidence of complications.[3,5]

Choice of specialty in postgraduate education has many motivating factors including individual's enthusiasm, financial status, interest to go through an extended training period, working hours, acceptance of working environments and encouragements by family and friends.[6,7] An important practical factor in choosing a dental specialty, is the community needs that cannot be met by general dentistry practice.[1,8]

A key step in the development and planning of programs is to recognize and quantify the needs of the target population.[9] Thus, treatment need is one of the fundamental factors required for effective institutional planning, provision and evaluation of the health services by providing information about the care required by the service users.[10] Estimating treatment need may also be helpful to develop

sufficient facilities and to determine resources, fees and educational capacities on a countrywide level.[11]

In Saudi Arabia, few number of studies measured dental treatment need, mostly targeting certain need [12] or certain groups, aiming to assess oral health awareness and education in the society. [10]

Saudi Arabia's vision 2030 plans to intensify efforts to ensure the Kingdom's education system outcomes, meet market needs and national priorities. Therefore the aim of this study is to assess the treatment needs among all patients seeking dental treatment at the Dental Teaching Hospital, College of Dentistry, Umm Al-Qura University, in order to determine the postgraduate educational programs required to meet their needs.

2. Material and Methods:

2.1. Study design

This was a retrospective descriptive study, in which dental treatment needs were determined and thereafter recommendations made for the design of postgraduate educational programs required to meet these identified needs. The study utilized records of patients who were seeking dental treatment throughout the academic year 2017-2018. These were determined to be a statistically representative sample of patients visiting the clinics.

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2.2. Setting

This study was conducted in the Dental Teaching Hospital, College of Dentistry, Umm –Al-Qura University, Makkah city, Saudi Arabia. Screening unit interns examined all patients attending the hospital under the supervision of consultants from oral diagnosis, oral medicine and oral radiology. Moreover, on-call consultants of all dental clinical specialties were available for examination of their specialty relevant cases.

According to specific predetermined criteria, patients were referred to the relevant students’ clinics after designing and documenting preliminary treatment plans in a specific file as well as registering their data electronically. Students’ clinics include Restorative dentistry clinic, Comprehensive care clinic, Periodontics clinic, Oral surgery clinic, Prosthodontics clinic and Pedodontics clinic. Comprehensive care clinic includes Periodontics, Endodontics, Restorative as well as Fixed, and Removable prosthodontics disciplines.

2.3. Study sample

All completed electronic files of patients seeking dental treatment throughout academic year 2017-2018 were included. Files of patients who were referred to specialty clinics as well as any record with incomplete information were excluded. The files from this year were chosen as there were the highest number of patients visiting the clinics since they commenced. Data of 4,967 patients fulfilling the criteria for students’ clinical training were included.

2.4. Sample size determination

Sample size of $\geq 4,166$ was calculated based on total population of 19,885 seeking dental treatment at Dental Teaching Hospital, College of Dentistry, Umm Al-Qura University, from 2013 to 2019. The sample size calculation was done at 95% confidence level[13].

2.5. Variables

Information was retrieved from the electronic database of patients’ files anonymously including age, gender, treatment needs and referred clinic specialty. Patients were divided into age groups that covered infants/children (0 to 13 years), teenagers (14 to 19 years), young adults (20 to 35 years), middle adults (36 to 55 years), older adults (56 to 64 years) and geriatric (> 65 years). Each category was given a code.[14,16] The referral to clinics, according to treatment needs recorded in patients’ files, were numerically coded according to preliminary treatment plans.

2.6. Statistical Methods

The obtained numeric data were subjected to descriptive statistics in the form of mean \pm SD, frequencies, cross tabulations, and percentages using Statistical Package for the Social Sciences (SPSS) software version 25. A chi-square test was performed to test the association between reasons of seeking dental care and age group as well as the gender of patients. The significant p-value was set at $p < 0.05$

2.7. Ethical Considerations

This study was approved by Institutional Review Board of Faculty of Dentistry, Umm Al-Qura University, Makkah, Saudi Arabia. Data from electronic patient files were collected not showing any nominative information and were identified by serial study code and initials.

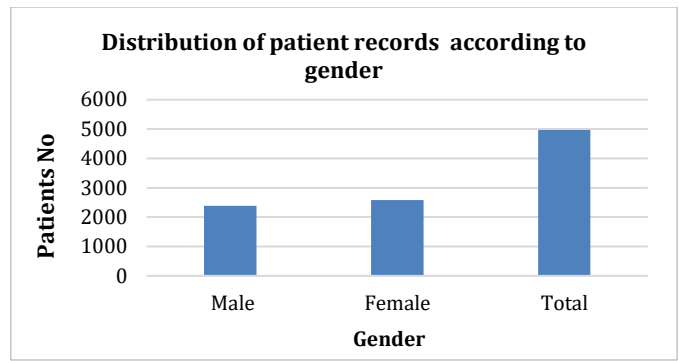
3. Results

The total number of patient records with complete data was 4,967. Patients’ age ranged from 3 to 91 years. Male patients’ records were 2,385 (48%) and females’ records were 2,582 (52%). The mean age of all total patients, of male and female ages were 35.85, 36.66 and 35.10 respectively with the mean age of males significantly higher than that of females ($p < 0.05$) as evident in table 1 and graph 1.

Table 1: Means, standard deviation and T-test for the distribution of patient records according to gender.

Gender	Number (%)	Mean Age	Std. Deviation	P value
Male	2385 (48%)	36.7	18.8	0.004 ^a
Female	2582 (52%)	35.1	19.2	
Total	4967 (100%)	35.9	19.0	

^a $p < 0.05$ significant

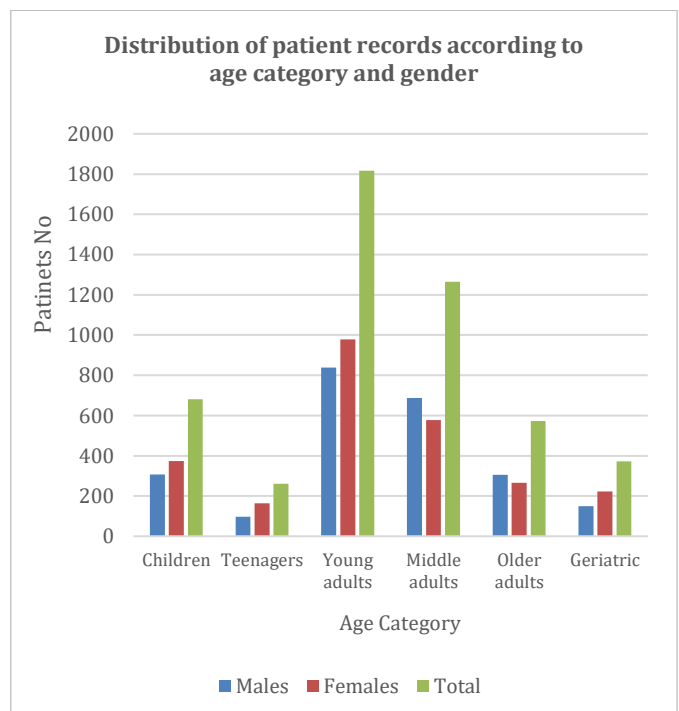


Graph 1: Distribution of patient records according to gender.

Patient records were categorized according to age into 6 groups as well as according to gender. The greatest number of records of all patients, of male and female patients lied in the young adult age category (36.6%, 35.1%, 37.8% respectively), while the least number of records was in the teenager’s category 5.3%, 4%, 6.4% respectively as shown in table 2 and graph 2.

Table 2: Number and percentage of patient records according to age category and gender.

Age category	Males		Females		Total	
	no.	%	no.	%	no.	%
Children	307	13%	374	14.5%	681	13.7%
Teenagers	97	4%	164	6.4%	261	5.3%
Young adults	838	35.1%	978	37.8%	1816	36.6%
Middle adults	687	28.9%	578	22.4%	1265	25.5%
Older adults	306	12.7%	266	10.3%	572	11.5%
Geriatric	150	6.3%	222	8.6 %	372	7.4%



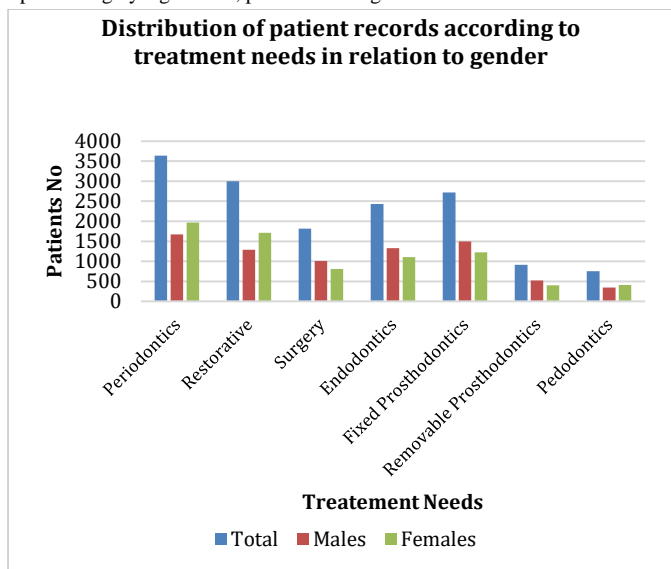
Graph 2: Distribution of patient records according to age category and gender.

Patients’ records were categorized based on their gender and treatment needs into 7 groups. It was observed that treatment needs in males were significantly higher than females in surgery, endodontics, fixed and removable prosthodontics while the other treatment needs were more significantly recorded among females than in males. The commonest treatment need verified in records was periodontics (73.3%) while the least treatment need was pedodontics (15.2%) with non-significant difference between males and females as evident in table 3 and graph 3.

Table 3: Number, percentage and T-test of patient records according to treatment needs in relation to gender.

Treatment needs	Total		Males		Females		P value
	no.	%	no.	%	no.	(%)	
Periodontics	3639	73.3%	1673	46%	1966	54 %	<0.01 ^b
Restorative	2999	60.4%	1288	42.9%	1711	57.1%	<0.01 ^b
Surgery	1817	36.6%	1011	55.6%	806	44.4%	<0.01 ^b
Endodontics	2431	48.9%	1328	54.6%	1103	45.4%	<0.01 ^b
Fixed Prosthodontics	2722	54.8%	1495	54.9%	1227	45.1%	<0.01 ^b
Removable Prosthodontics	916	18.4%	517	56.4%	399	43.6%	<0.01 ^b
Pedodontics	755	15.2%	345	45.7%	410	54.3%	>0.05 ^b

^b p<0.01 highly significant, p>0.05 non- significant.



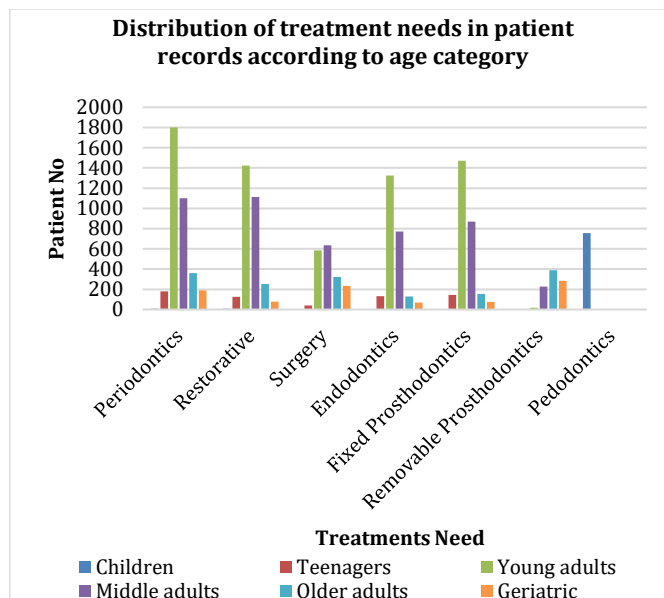
Graph 3: Distribution of patient records according to treatment needs in relation to gender.

According to age category, periodontics, restorative, endodontics and fixed prosthodontics were highly significantly common (49.5%, 47.5%, 54.5%, 54% respectively) among young adults. While removable prosthodontics was more common in older adults (42.4%) as illustrated in table 4 and graph 4.

Table 4: Number, percentage and T-test of treatment needs in patient records according to age category.

Treatment needs	Age category						P value
	Children	Teenagers	Young adults	Middle adults	Older adults	Geriatric	
	no (%)	no (%)	no (%)	no (%)	no (%)	no (%)	
Periodontics	8 (0.2%)	179 (4.9%)	1802 (49.5%)	1101 (30.3%)	360 (9.9%)	189 (5.2%)	<0.01 ^c
Restorative	8 (0.3%)	125 (4.2%)	1424 (47.5%)	1112 (37.1%)	253 (8.3%)	77 (2.6%)	<0.01 ^c
Surgery	3 (0.2%)	39 (2.1%)	585 (32.2%)	635 (34.9%)	322 (17.7%)	233 (12.9%)	<0.01 ^c
Endodontics	5 (0.2%)	132 (5.4%)	1325 (54.5%)	772 (31.8%)	129 (5.3%)	68 (2.8%)	<0.01 ^c
Fixed Prosthodontics	6 (0.2%)	144 (5.3%)	1472 (54%)	869 (31.9%)	155 (5.8%)	76 (2.8%)	<0.01 ^c
Removable Prosthodontics	0	0	18 (1.9%)	226 (24.7%)	388 (42.4%)	284 (31%)	<0.01 ^c
Pedodontics	755 (100%)	0	0	0	0	0	<0.01 ^c

^c p<0.01 highly significant, p>0.05 non-significant

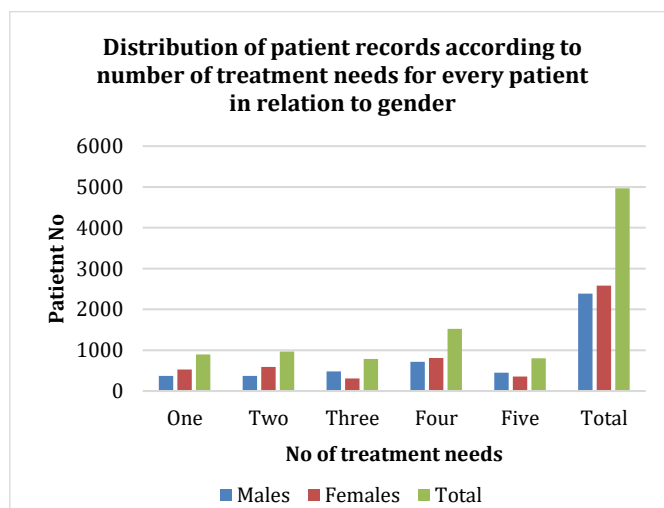


Graph 4: Distribution of treatment needs in patient records according to age category.

The numbers of treatment needs in each patient record was calculated. The highest percentage of total patients (30.7%), males (29.9%) and females (31.4%) had four treatment needs. On the other hand, the lowest percentage of male patients (15.5%) had one treatment need while among total and female patients, the lowest percentages of patients (15.8%, 11.7% respectively) had three treatment needs as shown in table 5 and graph 5.

Table 5: Number and percentage of patient records according to number of treatments needs for every patient in relation to gender.

Gender	Number of treatment needs										Total
	One		Two		Three		Four		Five		
	No.	%	No.	%	No.	%	No.	%	No.	%	
Males	369	15.5%	373	15.6%	480	20.1%	713	29.9%	450	18.9%	2385
Females	525	20.3%	590	22.9%	304	11.7%	810	31.4%	353	13.7%	2582
Total	894	18%	963	19.3%	784	15.8%	1523	30.7%	803	16.2%	4967



Graph 5: Distribution of patient records according to number of treatment needs for every patient in relation to gender.

4. Discussion

Postgraduate dental education for different sub-specialties has a crucial role in the proper training of dental practitioners, to meet specific treatment needs of society. However, specialization in the Saudi dentistry field is undergoing a decline in the number of graduates locally. Failure to establish postgraduate education programs might result in a shortage of skills and expertise in the dental field. Consequently, it is becoming important to guide the final year

students in choosing their future specialties, while considering the needs and requirements of the community.[17]

According to regulations of Ministry of Higher Education, Saudi Arabia, short term courses, diplomas and fellowship programs are not currently provided by Universities. So, the present study was conducted at the Faculty of Dentistry, Umm Al-Qura University, that is already hosting the Saudi Board for Endodontics and Periodontics, to aid in planning to establish postgraduate programs. This dental health needs analysis was undertaken to evaluate the treatment needs of the patients during one academic year, to ensure that the needs of the community are addressed in the future.

As a teaching hospital focusing on undergraduate studies, the hospital accepts mainly patients indicated for students' clinical training. Since complicated cases, that need advanced management and therapy, such as suspicious lesions like /tumors/cysts/oral cancer that may need a biopsy or cases requiring implants, and orthodontic treatment, these are dealt with in specialty clinics in a multidisciplinary approach, hence, they were excluded from the study.

In the present study, the total number of new patient files registered from September 2017 to May 2018 was 4,967 which was higher than those registered from January 2014 to August 2014 (3,566), as reported in a previous study [18] at Faculty of Dentistry, Umm Al-Qura University. This reflects the increasing number of patients seeking treatment and the high level of patient trust in the services provided at the Dental Hospital.

The percentage of female's records in the current study was higher than that of males, while the mean age of males was significantly higher (table 1). These findings are similar to those of a previous study at Istanbul, Turkey¹⁹. The difference in treatment needs by gender was previously explained by the existence of a difference in health perceptions and symptom reporting between genders and the higher probability of use for health care by females [20].

The results of this study showed that the young adult age category constituted the greatest number of total male and female patients. This could be attributed to the improvement of dental health knowledge and accordingly the interest in better oral health present among the recent generations. This explanation is also confirmed by the higher demands for periodontics, restorative, endodontics and fixed prosthodontics among young adult age category than others versus lower surgical demands. Similarly, previous studies reported that adolescents and younger adults were the age groups who most utilized dental services. This finding has been interpreted that individuals in those age groups are more aware of their appearance and may also have more incidence of dental caries than other age groups [21-23]. However, the least number of patients' files in the present study were in the teenager age category although this may be explained by the narrow age range (14-19 years) used compared to other age categories.

Among geriatric patients, the commonest treatment needs were removable prosthodontics and surgery then periodontics (Table 3). On a regular basis, at Umm-Al-Qura dental clinics, cases indicated for periodontal therapy are referred to periodontics clinic or comprehensive care clinic as first line of treatment plan. Cases that have teeth with grade III mobility and that are diagnosed as non-restorable; based on clinical judgement by the students' supervising consultants, are referred to oral surgery clinic for extraction. The high risk of tooth loss in that age group could explain the high rate of removable prosthodontics and surgery (teeth extraction) in the current study. This finding could be attributed to the fact that in this age group there is the detrimental effect of dental plaque accumulation being responsible for advanced periodontal disease with resultant tooth loss. In accordance with these results, earlier studies concluded that the majority of patients had missing teeth and gum problems and suggested that elderly people always have risk factors for periodontal diseases [24,25].

In the present study, the commonest treatment need recorded in patients' files were periodontics followed by restorative then fixed prosthodontics and nearly half of the records were in need of endodontic treatment (Table 3). Surgery was needed in about third of them, while 18.4% required removable prosthodontics and only 15.2% need pedodontics treatment. In comparison to another study at Istanbul, Turkey, authors reported nearly similar order of treatment needs but with different percentages and without pedodontics patients, as the study participants were more than 16 years [19]. On the other hand, a previous study at Baghdad, Iraq of 470 patients reported a

different order and percentages for treatment needs, where more than half of patients needed conservative treatment, 14.89% extraction, 5.79% prosthodontic treatment, 8.64% periodontal treatment, 2.34% fixation of bridge, 0.2% surgical operation[26]. Different order and percentages of treatment needs in both studies may be explained by small sample sizes, inclusion of the endodontic treatment need among the restorative need and different study population with different oral habits and lifestyle.

High levels of treatment needs of periodontics, restorative, fixed prosthodontics followed by endodontics were recorded in the present study. Higher percentage of treatment needs for fixed prostheses than endodontics is justifiable and could be explained by the fact that fixed prosthodontics is usually applied after endodontic treatment as well as in cases of missing teeth. Treatment needs identified in the current study provide evidence for the high priority need for postgraduate degrees at Faculty of Dentistry, Umm-Al Qura University for periodontics and restorative dental care. Moreover, high restorative and endodontic needs indicate the presence of a high percentage of caries that have led to restorations and endodontic treatment need. These findings confirm the conclusion of an earlier study in Saudi Arabia [27] that showed that various age groups have high prevalence and greater severity of caries and highlights that the Makkah community need for increased provision of the postgraduate restorative specialty. According to the recommendation of a previous study [28], the college should revise its undergraduate curriculum and program to suit a more career and clinical practice-guided training for the graduate students.

Correlating the gender to treatment needs in the present study showed that the commonly significantly higher needs in females were in the areas of restorative and periodontics, while among males, significantly higher treatment needs for surgery, endodontics and prosthodontics were recorded. These findings show that male patients only visit the dentist when suffering from a major problem in contrast to females who are keen to visit the dentist earlier as soon as they have a complaint. Similarly, a previous study in India [21] reported that more females required treatment for decayed tooth than males as well as in another study at King Saud University Riyadh, Saudi Arabia including 264 female patients where 76% of patients needed restorative treatment and 74.5% needed periodontal treatment[10]. These higher periodontal and restorative treatment needs among females were previously explained by the suggestion that female patients were more concerned with their appearance and placed high importance on a beautiful smile with nice teeth that was achieved by good oral hygiene habits [29].

About third of the patients in the present study were in need of treatment by four specialties representing comprehensive care clinics which is lower than the percentage reported in the earlier study at College of Dentistry, King Saud University where 45.78% of patients required comprehensive restorative treatment[30]. The difference in percentage could be explained by different sample sizes as well as the recent increased awareness about oral care.

5. Conclusion

Treatment needs at faculty of dentistry, Umm Al-Qura University reflect high priority of proposing postgraduate degrees in periodontics and restorative dentistry.

6. Recommendations

It is recommended to encourage undergraduates for periodontics and restorative specialties by holding seminars in dental practice together with devoting considerable time and effort in counseling and providing them with information that guide in making career decisions to match the treatment needs in Saudi Arabia. Graduates affair unit should update the information of the graduates about the community needs, the received postgraduate qualifications and sharing their experiences with the newly graduated students.

The major strength of the present study is that it is the first published research in Saudi Arabia to document treatment needs as a potential driver for planning of dental postgraduate educational programs. However, a limitation in the present study, although convenient sampling was taken, generalization of results is limited and doesn't reflect the entire Makkah population as it was done on only patients of one academic year.

Clinical Significance: Establishment of dental postgraduate degrees that meet treatment need of the community will lead to more

professional diagnosis and management of patients by qualified specialists.

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