ORIGINAL ARTICLE

Assessment of Dental Service Provided by Undergraduate Dental Students in Faculty of Dentistry, University of Malaya

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ABSTRACT

Patient satisfaction can be used as one of the indicator for measuring quality of dental care provided. The objective of this study was to assess patient experiences with dental service provided by undergraduate dental students in Faculty of Dentistry, University of Malaya. A cross sectional study was done by distributing a self-answered questionnaire to patients treated by undergraduate dental students. Patient level of satisfaction was assessed by using five point Likert-like scale (strongly disagree, disagree, neutral, agree and strongly agree), with a list of items divided into three domains, consist of interpersonal skills, dental treatment and services. The response rate was 71.3%. The mean satisfaction scores were 83.09%, 78.62 and 74.16 for interpersonal skills, dental treatment and services domains respectively and the overall mean satisfaction score was highly satisfactory (78.62%). The percentage of satisfied patients was 82.4%, 66.2% and 55.4% for interpersonal skills, dental treatment and services domains respectively. There was significant association between satisfaction score with age (*p*-value=<0.001), treatment received by examination and diagnosis (*p*-value=0.027), denture treatment (*p*-value=0.032), others treatment (*p*-value=0.043) and 'year of study' of the students (*p*-value=0.001). Patients were satisfied with their overall experiences while receiving dental care provided by undergraduate dental students. They were highly satisfied with the students' interpersonal skills, dental treatment received and services provided at the undergraduate dental clinics.

Keywords: patient experience; patient satisfaction; dental care; dental students; dental treatment; dental services.

INTRODUCTION

Patient experience has been recognized as one of the component in measuring service quality in health care and sometimes reported as level of satisfaction. Assessment of patient experience cover topics such as access and waiting times, provision of information, communications with health or social care professionals, quality of the physical environment, involvement in decisions, support for self-care, coordination of care, health status, and quality of life (1, 2). The National Institute for Health and Care Excellence (NICE) United Kingdom (UK) has provided a guideline on components of a good patient experience (2). One of the quality statement listed in the guideline is 'experience of good interaction with the staff and competency of the communication skills'. A Good Dentist-staff relationship can avoid any interpersonal conflict in the clinic (2). Working as a team in achieving the same goals can increase productivity and provide ultimate success. Another important part of quality standard from NICE is "giving enough information to the patient regarding

the treatment and gives them the options to choose" (2). Dentist need to use a simple language to describe and recommend the treatment options so that the patient can understand the pros and cons of each choice (5). Giving adequate information for informed consent can help in avoiding any problems or issues with the patients in the future.

In this study, patients experience will be assessed based on three domains. The first domain is on interpersonal skill. Interpersonal skill is an important aspect to assess the student communicating skill with the patient. Most of the items in the questionnaire are regarding the ability of the student's to communicate with the patients. This section will allow an opportunity for patients to assess the student's communications skills. Some studies (6, 7) reported that the level of satisfaction between the students and patients can be different in assessing communications skill and patients usually believed that the students actually have a good communicating skill. These studies showed that the student think that they have a poor communication skills while the patient actually think in contrast.

The second domain assess patient experienced with the dental treatment given by undergraduate students. The items in this section cover whether the students gave enough and adequate explanation and information before starting the treatment, provide a safe treatment area and have a competent clinical skills (8). There are not many studies have been conducted regarding this issue, However, there are studies that cover similar items as our research which is about patients satisfaction in treatment given by dental student.(8,9)

The third domain is referring to patient experienced with services provided at the polyclinics used by undergraduate students while providing care for patients. Under this domain, patient will be asked regarding their experience outside the clinic for example the cleanliness of washroom, waiting area and treatment cost. Studies by N. Nagappan et al (9) shown that majority of the patient were satisfied with dental service given except for facilities such as parking and water supply.

As a teaching facility, it is important for University of Malaya Dental Center to maintain its quality in teaching and dental care provided. Patients are very important input in the teaching process. Therefore, it is very important for the faculty to ensure an adequate number of patients visit the dental center. Satisfied patients will come back for further treatment and they can give informal promotion through words of mouth. Therefore, it is very important for the faculty to assess levels of satisfaction among patients receiving treatment from undergraduate dental students.

Therefore, the aim of this study is to assess patients experience with dental care provided by undergraduate dental students in Faculty of Dentistry, University of Malaya. The specific objectives are as follows; to assess patient experience with interpersonal skills, dental treatment and services that they received from undergraduate dental students in University Malaya and to assess the association between the patients demographic background with their satisfaction score. Hopefully, the findings of this study can identify areas that can be improved either through teaching or upgrading the existing facilities.

MATERIALS AND METHODS

Study design that had been used in this research was a cross-sectional study. The study was done in Faculty of Dentistry, University of Malaya. The patients that were chosen aged 18 years and above and they had been treated by under-graduate dental students (year three, four and five) in the faculty. They had received different type of dental treatment such as restorative, prosthetic, endodontic and also periodontal treatment.

This study received ethic approval from the Medical Ethic Committee, Faculty of Dentistry, University of Malaya (reference no. DF CO1605/0046(U)). The questionnaire was developed with the aim to assess patients experience through their satisfaction with dental care provided by undergraduate dental students. The statement used in this questionnaire was based on content of satisfaction items that have been used in many studies (8, 10, 11, 12, 13). The finalized questionnaire had been chosen based on NHS guidance (2) and its suitability with the patient, student and the environment of the Dental Faculty, University of Malaya. The questionnaire was design in English with Malay translation for the better understanding of the multiracial patient. It was validated by a Dental Public Health specialist and head of dental surgery assistants for content and pretested on 12 dental patients to check for language, task difficulty, patient interest and attention. Based on the feedback, amendments were made to the questionnaire. Cronbach's α was calculated using the data from pretest to measure the internal consistency of the items in each domain and as a whole in the questionnaire. If the Cronbach's α value is more than 0.7, the items were considered acceptable (14). The Cronbach's α values for all items either per domain or as overall patient experience measures were above 0.8. Therefore no items were removed. The final outcome was a structured questionnaire consists of four domains. The first domains asked for demographic information including age, gender,

treatment received and the clinical year of the student that treated them. The second domains rate the student interpersonal skill based on the patient experience. The third domain was designed to assess the treatments that were given and the final domain asked about the services that were provided in the faculty. Domains 2, 3 and 4 were answered via Likert-like scale (15) range from 0 (strongly disagree), 1 (disagree), 2 (neutral), 3 (agree) and 4 (strongly agree). All the question were worded in a positive manner and the patient were asked to rate the score where the higher the score means that they highly agree with the item and thus showing that they were satisfied with the interpersonal skill, treatment and service received in the faculty.

Sample size estimation was done using Epi info application provided by Centers for Disease Control and Prevention (CDC) based on level of satisfaction at 70% (8), population size of 2500 and confidence level of 95%. The minimum sample size was estimated as 286. Four hundred (400) questionnaires were distributed to all dental students in their clinical years to be given to their patients at the end of clinical sessions. To increase number of responses, the researchers also distributed the questionnaires directly to patients that sat in the waiting area in front of the polyclinics. All completed questionnaires were collected at the end of the clinical sessions.

The information collected was recorded and data cleaning was done manually and by running frequency and other descriptive statistic. Similar to Balkaran et al (10), imputation of missing data was done by replacing it with the mean value of that particular question and if the missing value was more than 20%, it will be excluded. SPSS software version 12 was used for the statistical analysis. The age of the patient was grouped into 3 categories, 18-39 year-old, 40-64 year-old and 65 years old and above.

Mean and standard deviation of each items was calculated as the agreement score for each items in the domain. For each patient, the total satisfaction score was calculated using the following formula:

K= number of item (for domain= K_d and overall = K_o)

A = total agreement score (for domain= A_d, and overall = A_o)

S= satisfaction score (for domain=S_d and overall = S_o)

Total satisfaction score for domain B $(S_B) = \dfrac{A_B}{K_B} \times 25$

Overall satisfaction score $(S_o) = \dfrac{A_o}{K_o} \times 25$

The resulting satisfaction score ranges from 0 to 100. The lowest satisfaction score showed the patient having the least satisfied experience. As the satisfaction score increases, it indicates better satisfaction level with the experience. The satisfaction score was then divided into two groups, 'Unsatisfied/ Neutral' with score from 0 to 74.9%, and 'Satisfied' score from 80% to 100%. The association between the age, gender, ethnicity, year of the student and type of treatment received with overall satisfaction were tested using independence Chi square test. The *p*-value of <0.05 was considered statistically significant.

RESULTS

The response rate was 51% ([204/400] x 100). Table 1 display the demographic characteristics of the patients. There were slightly more female patients (59.3%) than male patients. Age of patients' ranges from 19 to 81 year old with highest percentage was from age group 18-39 year-old. Most of the patients were Malay (49%) followed by Chinese (44.6%), Indian (4.4%) and others (2%). The common treatment received by patients was examination and diagnosis (79.4%). Only 15.7% patients received other types of treatment which consist of orthodontics, periodontal, endodontics and fixed prosthodontics. The largest group of the patients were treated by year 3 undergraduate's student (44.1%). An analysis of patient's demographic characteristic is presented in Table 1.

Table 1. Demographic characteristic of the patients

Demographic variable n=204	n	%
Gender		
Male	83	40.7
Female	121	59.3
Age groups		
18-39	149	73.0
40-64	40	19.6
65 and above	15	7.4
Ethnicity		
Malay	100	49
Chinese	91	44.6
Indian	9	4.4
Others	4	2
Treatment received*		
Examination and diagnosis	162	79.4
Tooth filling	79	38.7
Denture	27	13.2
Others	32	15.7
Treated by student from:		
Year 3	90	44.1
Year 4	72	35.3
Year 5	42	19.1

*can answer more than one

Table 2, 3 and 4 indicate the agreement score of patient's experiences regarding interpersonal skills, dental treatment and services provided at Faculty of dentistry, University Malaya. In table 2, the total mean score was 3.32±0.59. Questions of 'Students communicate politely and nicely' received the highest mean score (3.55±0.61).The lowest mean score was 'The students talk only if necessary' (3.13±0.97).

In table 3, the total of mean score was 3.14±0.60. The highest mean score was 'satisfaction of the treatment', 3.25±0.70. In contrast, 'The treatment options and ability to choose' had the lowest mean score of 3.01±0.83, followed by 'treatment completed in time' with only 3.04±0.82.

In table 4, the total mean score of the domain services provided was 2.93±0.54. The lowest mean scores were reported on 'washroom's cleanliness' (2.83±0.96) and 'comfortable sitting at the waiting area' (2.83±0.89). However, 'cleanliness of treatment areas' had the highest mean score (3.52±0.65).

Table 2-Mean score for 'Interpersonal skills' by items and domain

No.	Items	Mean	SD
1.	Ability to contact the students.	3.31	0.83
2.	Students communicate politely and nicely.	3.55	0.61
3.	Ability to ask questions.	3.33	0.70
4.	The students talk only if necessary.	3.13	0.97
5.	The students show professionalism.	3.32	0.68
6.	The students explain before start the treatment.	3.25	0.74
	Total Mean Score	3.32	0.59

Table 3-Mean score for 'dental treatment' by items and domains

No.	Items	Mean	SD
1.	The treatment options and ability to choose.	3.01	0.83
2.	Comfortable sitting on the dental chair.	3.21	0.75
3.	Safety from infection or disease.	3.16	0.74
4.	Treatment received when needed.	3.17	0.74
5.	Satisfaction of the treatment.	3.25	0.70
6.	Recommendation of the treatment.	3.24	0.78
7.	Treatment completed in time.	3.04	0.82
8.	The student's skill and competency.	3.07	0.70
	Total Mean Score	3.14	0.60

Table 4-Mean score for 'services' by items and domains

No.	Items	Mean	SD
1.	Service at reception by staff.	2.88	0.81
2.	Reasonable cost.	3.09	0.82
3.	Washroom's cleanliness.	2.83	0.96
4.	Comfortable sitting at the waiting area.	2.83	0.89
5.	Treatment area's cleanliness.	3.52	0.65
6.	Ability to find rooms or clinic.	2.92	0.93
	Total Mean Score	2.93	0.54

Suggestion for domain services	There is significant number of patients suggest that access to the clinic are difficult because when they are bringing their own transport there is insufficient parking available, expensive and far from the clinic.

Table 5 shows total percentage of satisfied and unsatisfied patients and the mean satisfaction score regarding their dental experiences. For all three domains, the mean satisfactions score were classified as unsatisfied or neutral and satisfied. The number of satisfied patients for domains interpersonal skills (82.4%), dental treatment (66.2%) and services (55.4%) were higher than unsatisfied or neutral's patients. Among the three domains, the interpersonal skills domain has the highest percent of satisfied patients. And the services domain recorded the lowest percent of satisfied patients. Overall, total number of satisfied patients was 120 (58.8%). The mean satisfaction score domains for interpersonal skills was the highest (83.09±14.35), followed with dental treatment (78.62±14.78) and services (74.16±15.78). Overall, total percentage of mean satisfaction score was 78.62±13.39.

Table 5. Percentage of satisfied and unsatisfied/neutral patients and the mean satisfaction scores by domains

Domains n=204	Patients n (%)		Mean Satisfaction score ± SD (%)
	Unsatisfied/ Neutral	Satisfied	
Interpersonal skill	36 (17.6)	168 (82.4)	83.09±14.35
Dental treatment	69 (33.8)	135 (66.2)	78.62±14.78
Services	91 (44.6)	113 (55.4)	74.16±15.78
Overall satisfaction	84 (41.2)	120 (58.8)	78.62±13.39

Table 6 shows association between groups of patients with satisfactory experience and neutral or unsatisfied experience with demographic background, type of treatment and year of study of the students providing treatment. Percentage of patients satisfied with their experiences was significantly associated with their age groups, types of treatment received and 'year of study' of the students. There was significantly higher percentage of patients aged 40 year-old and above who are satisfied as compared to the younger groups. Association of the satisfied groups with 'year of study' of the students treating was also found to be significant. Post hoc test showed significant differences for all three pairs namely between 'year 3' and 'year 4' (*p*-value < 0.001), 'year 3' and 'year 5' (*p*-value = 0.001) and 'year 4' and 'year 5' (*p*-value = 0.017).

Table 6- Percentage of satisfaction by the demographic background, type of treatment and students' year of study.

Demographic Background(n) n=204	Patients by satisfaction group n (%)		*p*-value χ2 test
	Unsatisfied/ neutral	satisfied	
Gender			
Male(83)	32(38.6)	51(61.4)	0.529
Female(121)	52(43.0)	69(57.0)	
Age			
18-39(149)	73(40.9)	76(51.1)	<0.001
40-64(40)	10(25.0)	30(75.0)	
65 and above(15)	1(6.7)	14(93.3)	
Age**			
18-39(149)	73(40.9)	76(51.1)	**<0.001**
40 and above (55)	11(20.0)	44(80.0)	
Ethnicity			
Malay(100)	42(42.0)	58(58.0)	
Chinese(91)	40(44.0)	51(56.0)	0.250
Indian(9)	1(11.1)	8(88.9	
Others(4)	1(25.0)	3(75.0)	
Ethnicity**			
Malay(100)	42(42.0)	58(58.0)	
Other ethnicity (104)	42(40.4)	62(59.6)	
Treatment received*			
Examination and diagnosis			
No (42)	11(26.2)	31(73.8)	**0.027**
Yes(162)	73(45.1)	89(54.1)	
Filling			
No (125)	52(41.6)	73(58.4)	0.877
Yes (79)	32(40.5)	47(59.5)	
Denture			
No (177)	78(44.1)	99(55.9)	**0.032**
Yes (27)	6(22.2)	21(77.8)	
Others			
No (172)	76(44.2)	96(55.8)	**0.043**
Yes (32)	8(25.0)	24(75.0)	

Demographic Background(n) n=204	Patients by satisfaction group n (%)		*p*-value χ2 test
	Unsatisfied/ neutral	satisfied	
Treated by student from***:	48(53.3)	42(46.7)	0.001
Year 3 (90)	17(23.6)	55(76.4)	
Year 4 (72)	19(45.2)	23(54.8)	
Year 5 (42)			

*can answer more than one
** the groups were collapsed into two to have an adequate numbers in each cells for valid statistical test
*** post hoc were done for each pair using Kruskal-wallis test

DISCUSSION

The assessment of dental service provided by dental undergraduate students can be made through assessing the patients' satisfaction towards the service. There are many studies reported on patient's satisfaction with dental care. A dental patient satisfaction survey done by Ministry of Health (MOH) of Malaysia showed a very high mean satisfaction score (94.6%) (16).

As a comparison, our study showed a lower mean satisfaction score (78.2%) similar to a study done at Kermanshah Dental Faculty, Iran (17) with mean satisfaction score of 69.8%. On the other hand, a higher result of 91.6% was reported by Habib et al (8). The result of the MOH study was higher because the patients were treated by a dentist, and as expected patients would be more satisfied with treatment done by the dentist compare to dental students.

Patients were very satisfied with students' interpersonal skill and treatment received. Communication with the patient was the most satisfactory attribute followed by 'asking question' and professionalism. Good communication and patient management skill are as important as clinical skills. This dentist-patient relationship is always significant in relation to patients' satisfaction (18). High satisfaction was also recorded under the 'ability to contact the student'. All the appointment for the patient will be managed by the students themselves. It showed that there was no difficulty for the patient to contact the student and get a clear information or explanation whether through phone call, texting or instant messenger.

Under the treatment received, high mean score for item 'recommendation of the treatment' indicated that they were satisfied with the treatment received and would probably recommend it to others to do treatment with the undergraduate students. However, patients were only fairly satisfied with the item 'treatment completed in time'. Patients were well aware that their appointment for treatment was

based on the student's schedule. The treatment will be delayed if the treatment sessions are very few in the week. Besides, as undergraduate students who are under training, all the procedures done in the clinic need to be supervised by the lecturer, thus it will take longer to complete the treatment compared to the treatment done by the registered dentist. Lower satisfaction score was also recorded under the 'the treatment options and ability to choose'. It is recommended that students should explain more about the proposed treatment and other treatment options as well as discussing with the patient the potential benefits and risks of the treatment. All decisions should be made together with the patient based on the explanation given by the student. It was assumed that this treatment option might be limited due to the scope of the dental undergraduate study that does not involve complicated treatment such as implant and fixed orthodontic appliance. However, as an alternative, the student may consider referring the patient to postgraduate students or dental specialists to do the treatment.

The patients were least satisfied with items under domain services. The result for 'washroom's cleanliness' showed a low satisfaction score similar to finding from other study (9). However, higher result was achieved by the study done in Saudi Arabia (19). The cleanliness can be improve so that patients will be more comfortable while they are in the faculty getting treatment. The result also showed that patients were having problem with the service provided by the receptionist staff. Thus, training may be given to the staff so that their skill can be improved. Low satisfaction was also recorded under the item 'Ability to find rooms or clinic'. This problem may cause the patient especially the first timer to come late for their appointment. It may be due to the lack of signage to show the direction around the faculty. The signage should be clear enough for them to understand and follow it. An additional information obtained from this study which most of the patients stated that they were having problem with the transportation as it was hard to find the parking and the fare was high. Dissatisfaction with transportation had also been reported in studies done by Awliya (20) and Nagappan et al (9). The closest public parking area available is in University Malaya Medical Center, located next to the faculty and it is usually crowded and full during the peak hours. Although services such as transportation and cleanliness were not considered to be as important as other factors, these factors had been shown to be one of the important contributing factors in determining patient satisfaction (19).

The association of patient satisfaction score with social demographic background was statistically significant except for gender, ethnicity and type of treatment received (restoration). However, findings from previous study showed that female patients were more satisfied with dental treatment compared to male (21). No significant association between satisfaction level with ethnicity had also be reported by the previous local study (22). Patients' age in this research had been grouped into young adulthood (18-39 years old), middle adulthood (40-64 years old) and old age (≥65 years old) based on different in their cognitive and psycho-social development. The result show that number of patient age 65 and above was too low (<5). Hence, they were re-grouped to ensure adequate numbers in each category for valid statistical test (<40 and ≥40 years old).

Young adulthood's group showed the highest percentage of unsatisfied/neutral and satisfied as compared to other age group. It may be due to their high concern and knowledge on dental treatment as stated by Vujicic et al (23) that this age group tends to search for more dental information. The current advance technology makes it easier for a person to obtain most of the information regarding dental treatment through the internet. It was also reported that high number of young adulthood seek for dental insurance due to the financial position. Similarly, these may be implied for patients in this study as the highest number of patients were between aged 18 to 39 years. In addition, the price of dental treatment in the dental center was much lower compare to the private clinics.

The result also showed significant number of patient received examination and diagnosis compared to other treatments. This can be due to the format of the question that allowed the patients to choose more than one answers. The patients were probably confused and choose only the treatment they currently received by the students and not reporting other treatments that they had received prior to the session. Logically, there shouldn't be any patient who did not received examination and diagnosis as it is actually a compulsory procedure that need to be done before the students started the treatment. Most of the patient were the patient of year 3 and 4 student. Lack of patient from year 5 patient was due to the more complicated treatment that the year 5 students did and the treatment were usually would be time consuming. Hence, it was difficult for them to give the questionnaire during the limited time of clinical session.

A few limitation of this research may cause the differences in the results of this study compare to other satisfaction studies. The response rate was very low (51%) compare to the others (20, 9). However, if compared to the estimated sample size required, it was not very far off (204). This was due

to the timing and short duration of data collection period. Data collection was done at the end of the semester and continued early in the new semester that gives the total duration of 3 months compare to the population size estimation of 2500 that referred to the total number of patient for a year. In addition, data collection was done with the help of other dental students in the faculty which obviously had other more important things in their mind resulting in questionnaires not given to patients. Thus this study cannot represent all the patient treated in the faculty and can only represent the patients who answered the questionnaires only. This can be improved in future research by distributing the questionnaires more effectively. As for this research, it can only be distributed within a limited time which was early in the clinical session. Proportionate sampling method was not done causing it to be less well distributed according to the demographic factors.

CONCLUSION
Within the limitation of current study, it can be concluded that patients in this study were highly satisfied with the interpersonal skills, dental treatment and services provided by undergraduate students. Percentage of patients' satisfied with their experiences was significantly associated with their age groups, types of treatment received and 'year of study' of the students. There are rooms for improvement through teaching or upgrading the existing facilities.

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