



Undergraduate Dental Students' Acceptance of Treatment by Dental Student Peers: A Cross-Sectional Study

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Objective: To enumerate students who accepted/would accept treatment by dental student peers (DSP), describe characteristics of DSP and explore factors associated with determining DSP treatment.

Methods: A 17-item online survey was distributed to students of all levels (383) at Taibah University Dental College and Hospital during the academic year 2019–2020. The survey comprised three sections: section one asked questions about the students' demographics and socioeconomics (family income), section two focused on the acceptance of treatment by DSP, characteristics of DSP, and section three asked about factors influencing acceptance of treatment by DSP. The collected data underwent descriptive, bivariate and logistic regression analyses.

Results: Of 383 students, 222 (58%) completed the survey; 72 (32%) were at an intern level and 150 (68%) at other levels. Those who had accepted/would accept treatment by DSP comprised 88% of respondents. Performance (85.4%) and quality of treatment (85.5%) were important characteristics of DSP. The multivariable analysis revealed that increase in score rates of confidence in DSP was significantly associated with acceptance of treatment, odds ratio (OR)=1.89, 95% CI: (1.48–2.43), $p<0.001$. Similarly, students who had a better understanding of patients' management were more likely to accept treatment by DSP (OR=2.70, 95% CI: 1.05–6.96, $p=0.039$).

Conclusion: A high percentage of students had accepted/would accept treatment by DSP. These findings also suggest that students who have confidence in DSP and those who understand patient management would accept oral health care by DSP.

Keywords: undergraduate, patients, dental, management, acceptance, peer-dentist, reciprocal

Introduction

Undergraduate dental students are exposed to didactic and clinical training. The clinical training has several distinctive features, with practice on patients being the most important. Practice on patients includes screening and check-ups, simple restorations, non-surgical extraction and root canal treatment.¹ Occasionally, treating health-care professional colleagues triggers reluctance among the care provider regarding ethical considerations and hesitation,^{2,3} as this topic is not usually covered during health-care students' training. The American Medical Association (AMA) recommends that colleagues should not hesitate to provide health care to each other, with colleagues following the same ethical commitments followed when

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treating other patients.⁴ Within dentistry, variations in service provision have been observed; these relate to a range of factors which include the dentist, the practice and the patient.⁵ However, no studies to date have explored whether undergraduate dental students have been treated/would accept being treated by their dental student peers.

In the absence of studies addressing this research, therefore, relevant literature is reported here to guide the background of the study. The dentist–patient relationship (DPR) is the core of dentistry; which is a delicate partnership where both parties have their own characteristics that may influence the service provision process.⁵ Trust and confidence are important ingredients as well. Trust, in DPR, involves obtaining and maintaining confidential patient information.^{6,7} The AMA recommends that physicians recognize that providing medical care for a fellow professional can pose special challenges for objectivity, open exchange of information, privacy and confidentiality, and informed consent.⁴ The DPR also includes dentist-related factors, such as demographic characteristics (e.g. gender), reputation, the patient relationship to the dentist, the clinical hand skills (performance) of the dentist and factors related to practice, including the location of the practice.^{5,8} DPR also involves patient-related factors such as gender. Atmeh and Hamasha reported that there was a relationship between the outcome of treatment and the dentist's gender.⁸ Patient management is also part of the outcome of treatment. Patients were reported to put weight and value on a dentist's opinion about treatment outcome.^{8,9} Relevant studies have also reported on medical students' peer interaction in terms of teaching each other or practicing on each other. Medical students' main factors in accepting teaching from peer tutors included knowledge, skills and same-sex peer tutoring.^{10,11} Peer tutors have also reported positive opinions in terms of professionally developed communication skills, presentation skills, teamwork and knowledge.¹¹ Notably, treatment by peers (i.e. student-to-student clinical practice) has been a traditional component of dental education, and forms an important transition from pre-clinical to clinical dental training. The benefits of such an approach are numerous and have been well illustrated in reports on students practicing the administration of local anesthesia on their colleagues.¹² Therefore, dental students' acceptance of treatment by dental student peers (DSP) is

substantial for mimicking future situations in DPR; enhancing patient care, creating reciprocal confidence between peers, developing professional careers, paving the way for preparing students to becoming independent dental practitioners, and consolidating their confidence in treating patients in the community.¹ This study was conducted to address this knowledge gap, with two aims, as follows: to enumerate students who accepted/would accept treatment by dental student peers (DSP), describe characteristics of DSP and explore factors associated with determining DSP treatment.

Materials and Methods

Study Design, Participants and Setting

The present analytical cross-sectional survey-based study invited the 383 dental students attending all levels at Taibah University Dental College and Hospital, Madinah, Saudi Arabia, during the academic year 2019–2020. At this college, the dental programme is seven years long. The first six years include pre-clinic, instruction and training, and the final year comprises the internship training programme.

Measurements and Data Collection

An anonymous English self-administered questionnaire was used for data collection. The survey questionnaire ([Appendix 1](#)) was developed by the investigating team, based on the research aims and the relevant literature,⁸ due to lack of other readily available questionnaires. The survey questionnaire consisted of a combination of 17 dichotomous, multiple-choice and Likert response scale questions. To check for the comprehensiveness and clarity of the questionnaire, it was piloted on 10 dental students in other dental colleges in Saudi Arabia. The questionnaire comprised three sections. Section one pertained to the participant sociodemographic, including age, gender, family income and level in dental school (intern, clinical and preclinical). Level in dental school was recategorized into “intern” and “other levels”, as there was agreement between senior students (interns) and instructors in the assessment.¹³ Section two covered questions about whether the participants had been treated by DSP; responses were dichotomous (yes/no), and those who responded “no” were asked if it would be acceptable to be treated by DSP. Both those who reported that they had been treated or that they would

accept treatment by DSP were asked about their preference regarding the dental student peer level, the peer's gender and the location (same or different college). Notably, in section two, students were asked multiple response questions (MRQs) and were instructed to check all preformatted responses that applied to them. MRQs were used in this study to capture participating students' views and attitudes. These MRQs were related to the influence of peer dental student-related characteristics on students' acceptance of treatment (e.g. clinical performance, trust, knowledge), the reasons (e.g. save time, save money) for choosing treatment performed by DSP and the type of treatment sought (screening and check-up, simple restoration). As for those who reported that they had not been treated or would not accept treatment by DSP were asked to report all the responses/reasons which applied to them (e.g. confidentiality, competitive reason, trust).

With respect to section three, factors related to students who accepted treatment by DSP were also asked about confidence. The Visual Analogue Scale (VAS) was used to rate the student level of confidence in their dental student peers to treat them. The VAS is a continuous scale comprising a horizontal line, 10 centimetres in length, with two endpoints (1 [less confidence] to 10 [more confidence]). In addition, a question on patient management¹⁴ was asked, i.e. on a 5-point Likert scale of agreeableness, students were asked the question (Question 16 in the survey Questionnaire), "Dental students who have accepted treatment from their DSP have a better understanding of the patients' management' do you with this statement? And finally, students were asked, "Do you think the performance and/or self-confidence of a peer dental student will be affected when treating his/her colleague?" and the proposed responses were "Positively", "Negatively", "No effect" and "I don't know". The latter two responses were reported by a small number of students and were recategorized as "Negatively" to ease data analysis. A briefing on the first cover page of the questionnaire about the study objectives and including the e-mail of one of the researchers and the ethical committee responsible were made available for any inquiries or complaints. The questionnaire took 5–8 minutes to complete and was sent via software applications, i.e. a WhatsApp message linked to a Google Form. To maintain

anonymity, the leader for each academic year forwarded the message to students and reminded the students after two weeks to complete the survey. The respondents were instructed to submit the web form back to the webserver. This later inserted the collected data into an Excel spreadsheet (Microsoft Excel 2010), which stored the data for retrieval and analysis.

Ethics Approval

This study was approved by Taibah University College of Dentistry Research Ethics Committee (Ref: TUCDREC/20200319/AAMahzari). The study adhered to the World Medical Association of Helsinki, i.e. participation was voluntary, confidentiality was assured, and the questionnaire was anonymous and coded. However, responding to and returning the survey questionnaire implied consent. This study adhered to the guidelines of Strengthening the Reporting of Observational Studies in Epidemiology (STROBE).¹⁵

Data Analysis

The data were imported from the Excel spreadsheet into SPSS 16 software (SPSS Inc., Armonk, NY, USA) for analysis. The sample characteristics were summarized using descriptive statistics, using Mean± standard deviation (SD) for continuous variables (e.g. age) and frequencies for categorical variables (e.g. gender). The MRQs were processed and analysed to rank the responses in the order of importance. The bivariate analysis chi-square test and independent sample *T*-test were performed to explore the factors associated with the outcome of interest (acceptance of being treated by a dental peer). This was followed by multivariable logistic regression analysis to tease out the potential significant factors associated with acceptance of treatment by DSP, after controlling for age and gender. The difference was considered significant at $p < 0.05$ for all analyses.

Results

Participants' Characteristics

The survey was returned and completed by 222 students (overall response rate=58%). Table 1 demonstrates the sociodemographic characteristics of the participating students.

Acceptance of Treatment by DSP

Of the 222 participating students, 119 (53.6%) reported having been treated or that they would accept treatment (63 [28.4%]) by DSP. Those will be discussed in the following sections dealing with acceptance of treatment by DSP. The distribution of the acceptance was comparable between male (116 [80.6%]) and female (66 [84.6%]) students ($p=0.452$). The remaining participants (40 [18.0%]) had not been treated by/would not accept treatment by DSP.

Characteristics of DSP and Type of Treatment Accepted by Students

Students who would accept treatment by DSP chose multiple characteristics of the treating DSP. A Pareto chart for the MRQs in Figure 1A shows that performance was the most important characteristic (85.4%), followed by trust (62.4%), while being first in the class was reported as the least (5.1%). Additionally, Figure 1B shows that trust in the quality of treatment (85.5%) and saving time (44.7%) were important reasons for accepting treatment from DSP.

With respect to the preference of DSP and their level, 131 (59%) preferred to be treated by DSP from the same college, and 106 (58%) reported that the peer who would provide the treatment should be senior to them or be an intern. Of the male students, 90 (79.0%) would agree to be treated by a female dental student peer, while only 32 (45.0%) female students would accept being treated by a male dental student peer; the difference was significant ($p=0.0003$).

Nearly all students (90%) reported that they would accept a range of basic treatments (Figure 2) from DSP, specifically “screening and check-ups” and “simple restoration”.

Notably, for the participating students ($n=40$ [18%]) who had never accepted or would not accept treatment by DSP, “trust” and “confidentiality reasons” (53.3% and 44.7%, respectively) were the most important reported reasons for treatment refusal, among other reasons (Figure 3).

Student-Related Factors to Accept to Be Treated by DSP

The VAS mean \pm SD of reporting confidence in accepting treatment by DSP for the whole sample was 7.27 ± 1.89 . Furthermore, 179 (90%) “Agreed” and “Strongly agreed”

that students who have been treated by DSP have a better understanding of patients’ management, and finally, 164 (74%) reported that the performance and/or self-confidence of DSP would be affected “Positively” when treating their counterpart dental students.

Bivariate Results of Factors Associated with Acceptance of Treatment by DSP

As shown in Table 2, of the sociodemographic characteristics, age and level of education were statistically significantly associated with acceptance of treatment by DSP; that is, students of older ages and those at an intern level were more likely to accept treatment by DSP (23.44 ± 1.72 years vs 22.78 ± 1.48 years; $p=0.024$; and 93.1% choosing an intern vs 76.6% other levels, $p=0.003$). Notably, students who accepted being treated by DSP scored high on the VAS for confidence, had a better understanding of patient management and finally, believed their acceptance of being treated by DSP would contribute to the self-confidence of their DSP; the findings were statistically significant at $p<0.05$.

Multivariable Results of Factors Associated with Acceptance of Treatment by DSP

The multivariable analysis (Table 3), after controlling for age and gender, revealed that increase in score rates of confidence in DSP was significantly associated with acceptance of treatment, odds ratio (OR)=1.89, 95% CI: (1.48–2.43), $p<0.001$. Similarly, students who accepted/would accept treatment by DSP were 2.70 (1.05–6.96) times more likely to “Agree” with respect

Table 1 Sample Characteristics ($n=222$)

Variables	F (%) or Mean \pm SD
Age/years	23.32 \pm 1.70
Gender	
Male	144 (64.9)
Female	78 (35.1)
Family income	
$\geq 10,000$ Saudi Riyal	165 (74.3)
$< 10,000$ Saudi Riyal	57 (25.7)
Level of education	
Intern level	72 (32.4)
Preclinical level (1st, 2nd and 3rd year)	39 (17.6)
Clinical level (4th, 5th, 6th year)	111 (50.0)

to having a better understanding of patients' management; the association was statistically significant ($p=0.039$).

Discussion

To the best of our knowledge, this was the first small-scale study investigating undergraduate dental students' acceptance of treatment by DSP. This study showed that a high percentage of undergraduate students had accepted/would accept treatment by a DSP. This aligns with the American Medical Association's recommendation that colleagues should not hesitate to provide health care to each other.⁴

Students opted to be treated by a DSP from a higher level or even at an intern level, which reflects that students were aware that seniority in dental school is associated

with enhanced skills. The internship training program is a transitional period that paves the way for a closely supervised undergraduate student to become an independent dental practitioner.¹ These findings also align with relevant studies which reported that peer-teaching is seen in a more positive light by students when the tutors are from more advanced years and are specifically selected and trained for this role.^{16,17} Our study participants also reported accepting treatment from the same sex, that one should consider the culture and the study context. In Saudi Arabia, students are separated in terms of gender.¹¹ Notably, the literature reported that same-sex peer tutoring has been associated with better outcomes¹¹ and treatment success with dentists of the same gender.^{6,8}

In the present study, the most important reported characteristics of dental student peers who would

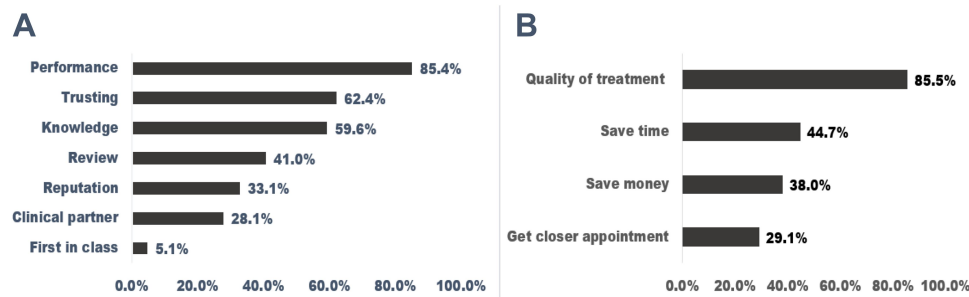


Figure 1 (A) Characteristics and (B) reasons for accepting treatment by DSP (n=182).

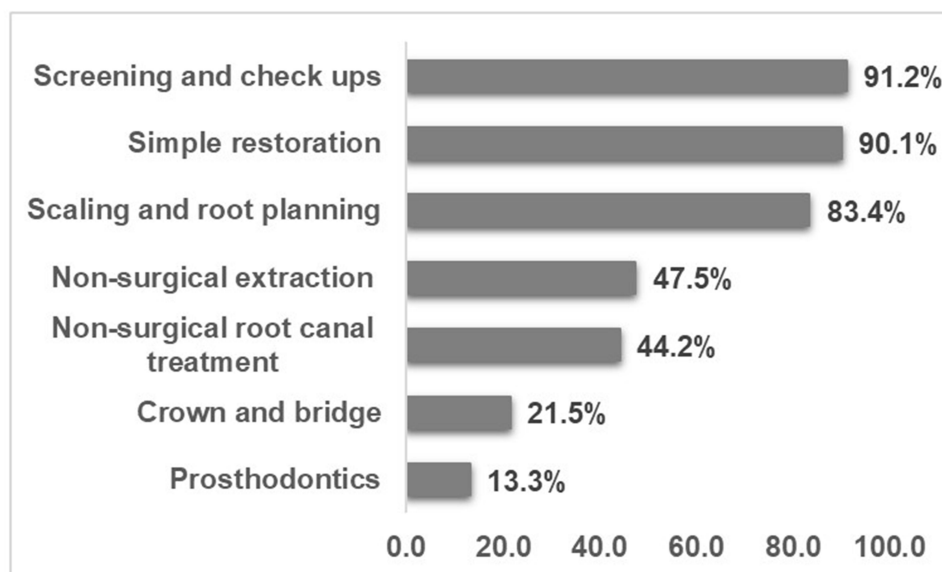


Figure 2 Accepted dental treatment by DSP (n=182).

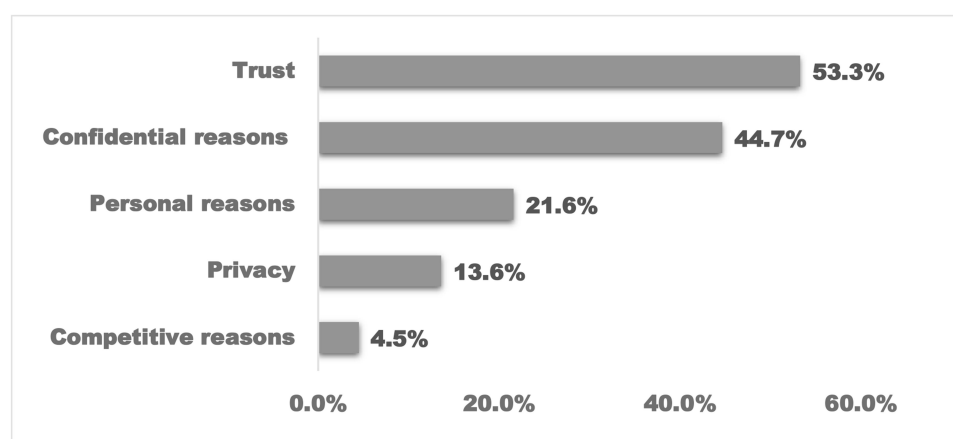


Figure 3 Reasons for refusal of dental treatment by DSP (n=40).

provide the oral health care were their performance, the provision of quality treatment and saving time. These findings align with dentist–patient relationships, specifically dentist-related characteristics which include clinical handling skills (performance), the location of the practice and time management.^{5,8} Finally, students who were confident in their DSP treatment and who had a better understanding of patient management were more likely to accept treatment by DSP, and this could reflect on dentist–patient relationships.^{5,8}

This exploratory study has limitations that should be taken into consideration when interpreting its results. A social desirability bias was possible, as this was a self-reported study; clinical validation could be used to enhance the findings of the self-reported questionnaire. The response

rate was intermediate, and the self-selection bias should be considered, i.e. students who were motivated may have participated in the study. The cross-sectional design of the study precluded causality, and the proposed characteristics of dental student peers and factors related to students who accepted treatment might not be adequate; however, what we proposed in this study was thought to be the most considered. This study also reported results from a convenience sample from one dental institute, and therefore, generalizability of the findings is not possible. As for future research, collaboration from different dental schools should be considered in implementing a qualitative study which elucidates all the relevant factors that determine acceptance of treatment, as well as the characteristics of peer dental students who provide care within different contexts.

Table 2 Frequency and Bivariate Analysis of Factors Associated with Acceptance of Treatment by DSP (n=222)

Explanatory Variables		Accepted	Not Accepted	p-value
Age		23.44±1.72	22.78±1.48	0.024
Gender	Female	66 (84.6%)	12 (15.4%)	0.452
	Male	116 (80.6%)	28 (19.4%)	
Family income	≥10,000 Saudi Riyals	45 (78.9%)	12 (21.1%)	0.489
	< 10,000 Saudi Riyals	137 (83.0%)	28 (17.0%)	
Level of education	Other levels	115 (76.6%)	35 (23.4%)	0.003
	Intern	67 (93.1%)	5 (6.9%)	
VAS rate of confidence in DSP		7.72±1.55	5.22±1.97	<0.001
Understand patient management	Disagreed	24 (57.1%)	18 (42.9%)	<0.001
	Agreed	157 (87.7%)	22 (12.3%)	
Self-confidence of DSP	Negative	39 (68.4%)	18 (31.6%)	0.002
	Positive	142 (86.6%)	22 (13.4%)	

Table 3 Regression Analysis for Factors Associated with Acceptance of Treatment by DSP (n=222)

Explanatory Variables		OR (95% CI)	p-value
Age		1.04 (0.79–1.36)	0.802
Gender	Female	1	0.813
	Male	0.89 (0.34–2.36)	
Level of education	Other levels	1	0.237
	Intern	2.26 (0.59–8.70)	
VAS rate of confidence in DSP		1.89 (1.48–2.43)	<0.001
Understand patient management	Disagreed	1	0.039
	Agreed	2.70 (1.05–6.96)	
Self-confidence of DSP	Negative	1	0.389
	Positive	1.49 (0.600–3.71)	

Conclusion

High percentages of students had accepted/would accept treatment by dental student peers. These findings also suggest that students with confidence in their dental student peers and those who understand patient management would accept oral health care by DSP. As graduated dental students are expected to treat community patients, dental schools should consider providing opportunities for every student to become peer-dentists, to enhance their preparation and clinical competency and to reflect reciprocal confidence between students as peers.

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Author Contributions

All authors contributed to the work reported in this paper. This included conception, study design, data collection, acquisition, analysis and interpreting the results. In addition, authors contributed to the literature review, drafting, revising and critically commented on the article. All authors approved the final version submitted for publication, agreed to which journal the article has been submitted to and agreed responsibility for all aspects of the work.

Disclosure

The authors declare no conflicts of interest.

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