CORPUS PUBLISHERS

Open Access Journal of Dental and Oral Surgery (OAJDOS)

Volume 3 Issue 2, 2022

Article Information

Received date : April 29, 2022

Published date: May 09, 2022

*Corresponding author

Gabriella Gatt, Deputy Dean, Head Department of Child Dental Health and Orthodontics, Faculty of Dental Surgery, University of Malta

Keywords

Dentistry; Dental Students; Peer assistance; Dental Curricula; Dental Assistance; Experiential Learning; Clinical Skills; Communication Skills

Research Article

The Outcomes of Experiential Learning in Dental Student Peer Chairside Assistance

Gabriella Gatt[1*], Emad Deen AlZoubi[2], Maria Luisa Gainza Cirauqui[3], Adrienne Busuttil[4], Arthur R G Cortes[5], David Mifsud[6], Anne Marie Agius[7] and Nikolai Attard[8]

[1]*Lecturer, Department of Child Dental Health and Orthodontics, Faculty of Dental Surgery, University of Malta*

[2]*Assistant Lecturer, Department of Child Dental Health and Orthodontics, Faculty of Dental Surgery, University of Malta*

[3]*Lecturer, Department of Dental Surgery, Faculty of Dental Surgery, University of Malta*

[4]*Visiting Lecturer, Department of Restorative Dentistry, Faculty of Dental Surgery, University of Malta*

[5]*Associate Professor, Department of Dental Surgery, Faculty of Dental Surgery, University of Malta*

[6]*Lecturer, Department of Oral Rehabilitation and Community Care, Faculty of Dental Surgery, University of Malta*

[7]*Assistant Lecturer, Department of Oral Rehabilitation and Community Care, Faculty of Dental Surgery, University of Malta*

8*Professor, Department of Oral Rehabilitation and Community Care, Faculty of Dental Surgery, University of Malta*

Abstract

Background: Although the importance of self- and peer-assessment of clinical skills by dental students have been widely researched, studies assessing student-to-student peer clinical chairside assistance are few, underscoring the need for further investigation.

Methodology: All clinical year students were asked to complete a previously validated and anonymous questionnaire at the end of the academic year. Survey responses from Google Forms were analysed with SPSS 20.0 software (IBM Company, Chicago, IL, USA). Chi-square tests explored the relation between categorical variables and gender and year of study while the scale responses were tested with the Mann-Whitney U test against gender and year of study. Students were also asked to identify what they found the MOST or LEAST beneficial with peer assistance in two open-ended questions. Statistical significance was set at $p<0.05$ for all tests.

Results: A total of 94% of the eligible clinical year dental students participated in this study. The vast majority of students (97%) found peer-assistance to be beneficial to their clinical experience, with no significant difference observed for gender and clinical year of studies (Chi^2 test, $p>0.05$). Students in their first year of clinical experiences reported statistically significant benefits in communication skills ($p=0.006$), feeling judged by their peer assistant ($p=0.02$) and that the experience allowed them to share their anxieties with their peer assistant ($p=0.038$).

Conclusions: This cross-sectional study indicated that clinical year students found the introduction of the peer assisting program to be beneficial, irrespective or year of study or gender. Peer chairside assistance gave students the opportunity to seek advice from peers, to increase their communication skills, and to reciprocate support in a clinical setting.

Introduction

The concept of dental assistance and its description as 'four-handed dentistry' has been commended and supported since the mid-19th century [1] and has been defined by the World Health Organisation (WHO) as a simplified care modality with well-defined tasks within the work team [2]. Effective dental chairside assistance also supports the principles of good ergonomic practice by reducing stress and strain on the dental team thereby increasing productivity [3]. However, few studies report on the value of inclusion of chairside assistance in dental school curricula. Despite the advantages and its use as norm in general dental practice, dental students typically work unassisted and request assistance of a qualified dental nurse only in cases of increased case complexity or challenging patient behaviour, and receive minimal training in the theory and practice of chairside assistance. This leads to qualifying dental surgeons inexperienced in effective and efficient clinical practice.

Several studies have described the benefits of faculty-organised peer mentoring [4-7] for both the senior student mentor and the mentee. These programs focus on the practice and development of soft skills including professionalism, interpersonal communication and leadership skills as listed and requested by the Profile and Competencies for the graduating European Dentist document as approved by the Association for Dental Education in Europe (ADEE) [8]. Such faculty programs usually involve mentor selection and training and regular group meetings in addition to mentor personal clinical and study duties. Performance is reported to depend on student attributes [4] and issues of trust and hierarchy may arise [5].

Self and peer assessment of clinical and interpersonal skills by dental students have been widely researched [9-11] and encouraged by the ADEE [12]. Such exercises develop reflective practice, critical thinking and enhance communication skills [13]. Such programs are generally well received by dental students [9] and are seen to enhance interaction and dialogue between peers[10] however the focus lies on observation and assessment rather than chairside assistance. Studies assessing the value of student to student peer clinical chairside assistance [14,15] and student clinic pairing [16] are few and should be further explored. Therefore, the concept of this study was to provide the opportunity for student operators to experience fourhanded assistance provided by peer students while also providing a learning opportunity for all students to witness an increased number

of clinical treatment procedures. The elements of peer mentoring and peer assessment were intentionally omitted and not communicated to the students. It is the aim of this study to evaluate the students' perceptions regarding providing and receiving chairside assistance. A secondary aim of this study is to guide curricular change leading to an enhanced learning experience and improved delivery of patient care.

Materials and Methods

A research protocol was approved by the Faculty Research Ethics Committee (FREC - 8408_15042021) to include all clinical year students of the Master in Dental Surgery Program of the Faculty of Dental Surgery, University of Malta. A clinic attendance rotation timetable was set up to provide each band of clinical year students (MDS3- first year of clinics, MDS4- intermediate year of clinics, MDS5-final year of clinics) equal opportunities at clinical practice and at chairside assistance service repeating every four weeks over an entire academic year of 28 weeks. The disciplines practised during the clinical sessions included prosthodontics, paediatric dentistry, orthodontics, periodontics, minor oral surgery, endodontics and restorative dentistry. The operator student was fully responsible for full patient care and was assessed and graded by the academic tutor present. The assisting student was to attend all assigned sessions and was requested to just provide chairside assistance. The operator and assistant students were to pair up as they preferred. The tutors on the clinic floor, present in a tutor: student ratio of 1: 5 were to be consulted as instructed at set time point intervals throughout patient treatment according to the nature of treatment being provided. The regular complement of Faculty qualified dental surgery assistants were present and were to provide additional assistance and guidance as necessary.

A literature search was carried out, and, as a previously validated questionnaire having as its domain of interest the student opinion about being assisted and providing assistance was not available, a new questionnaire was constructed. This was discussed and reviewed by three senior academics. It was decided that the dimension of being assisted was more important than that of providing assistance and the two components were given different weighting. The questionnaire was prepared having 25 close-ended questions and 3 open ended questions. The close-ended questions included 15 multiple-choice questions and 8 Likert-type scale questions. The Likert-type scale question scale anchors used had 1 denoting strongly agree to 5 denoting strongly disagree. Each item used short simple language and only assessed a single issue. Seven senior academic members of staff were tasked with evaluating the content validity of the questionnaire. Evaluators were asked to indicate in their opinion whether each item was 'essential', 'not essential', 'useful' or 'not necessary', whether they covered all areas of the construct and to assess whether the questions were clear, easy to understand and valid to the students. Evaluator responses were analysed and quantification of content validity was done using the content validity index (CVI), Kappa statistic and the content validity ratio (CVR; Lawshe test). The final version of the questionnaire was made up of one consent related question, two items collecting demographic information, a further two questions about the learning experience, four questions associated with clinical practice, five questions asking about matters related to soft skills, two questions related to the set-up of the exercise, nine of the questions also asked about being assisted and two questions about providing assistance. The final three questions were open-ended questions.

At the end of the academic year, the anonymous questionnaire was circulated once amongst all student participants over Google Forms. The students were informed that participation was voluntary, not associated with any benefits, and that they were free to withdraw at any time without any repercussions. It was stated that the purpose of the anonymised survey was for research purposes to improve faculty teaching and learning modalities. Consent was obtained by completion of the first question of the online form in which not all responses were required. Survey responses were exported to Microsoft Excel (2016) and analysed with SPSS 20.0 software (IBM Company, Chicago, IL, USA). Chi-square tests explored the relation between categorical variables and gender and year of study while the scale responses were tested with the Mann-Whitney U test against gender and year of study. Statistical significance was set at $p<0.05$ for all tests. The responses of the open-ended questions were coded into two categories of responses associated with beneficial aspects and non-beneficial aspects of providing assistance and being assisted.

Results

Evaluator responses pertaining to the questionnaire content validity were analysed using the content validity index (CVI), Kappa statistic and the content validity ratio (CVR; Lawshe test). The mean content validity index for all items (I-CVI) was 0.88 (range 0.7 – 1) and the content validity of the overall scale index (S-CVI) was 0.9. Kappa statistic for inter-rater agreement showed that there was good agreement between evaluators k = 0.67 (95% CI, 0.53 to 0.79) with percent overall agreement at 83.1%. Three items of the questionnaire were rated as not essential by more than half of the evaluators as their CVR was negative. The remaining items had a positive value for CVR (mean 0.6) indicating the more than half of the evaluators considered these items essential for the questionnaire. The composition of the final questionnaire was composed up of 23 closed ended questions (15 multiple-choice questions and 8 Likert-type scale questions) and three open ended questions. A total of 94% of the eligible clinical year dental students participated in this study with 64% being females. The latter is reflective of the overall gender distribution in the student body at the faculty (Table 1).

Table 1: Distribution of Participants according to Clinical Year of Studies

Year of Study	Frequency	Percent
MDS3	18	54.5
MDS4	9	27.3
MDS5	6	18.2
Total	33	100

Tables 2 & 3 present the students' responses; the former includes the categorical responses and Table 3 Likert scale responses. The vast majority of students (97%) found peer-assistance to be beneficial to their clinical experience, with no significant difference observed for gender and clinical year of studies (Chi2 test, $p>0.05$). The class cohort MDS4, which is the intermediate year of clinical studies responded that the experience was less of a learning experience than the other two cohorts ($p=0.015$) (Table 2 & Figure 1).

Table 2: Agreement with the following statements (categorical responses):

Item	Gender	Academic Year of Study
This academic year the Faculty organised peer assistance on the Teaching Clinic. Did you find value in this new experience?	p>0.05	p>0.05
Was the introduction of peer assisting a learning experience for you?	p>0.05	p=0.015[b]
Peer-assistance allowed for new friendships	p>0.05	p>0.05
While being assisted, I felt I was being constrained by my peer assistant	p>0.05	p>0.05
While being assisted I felt I was being judged by my peer assistant	p>0.05	P=0.02[c]
While I was assisting I sometimes felt I was treated unfairly/incorrectly by the operator student	P=0.016[a]	p>0.05
While I was assisting I sometimes felt I was considered a hindrance by the operator student	p>0.05	p>0.05
I discussed treatment plans with my peer assistant	p>0.05	p>0.05
Peer Assisting increased my communication skills	p>0.05	P=0.006[d]
Peer assisting is best done by students at: • A higher level of study • A lower level of study • Same level of study • A combination of above	p>0.05	p>0.05
The peer assistant should • Be selected by the operator student • Be timetabled by administration • Choose who to assist	p>0.05	p>0.05

Chi[2] test, Answer options (Yes /No), except for the last two questions as outlined in table.
[a]Males felt they were treated unfairly
[b]MDS4: proportion who disagreed with statement higher than the other two class cohorts
[c]Higher proportion of MDS3 &MDS4 felt judged; MDS5 felt not judged
[d]MDS3 high proportion agreement with statement

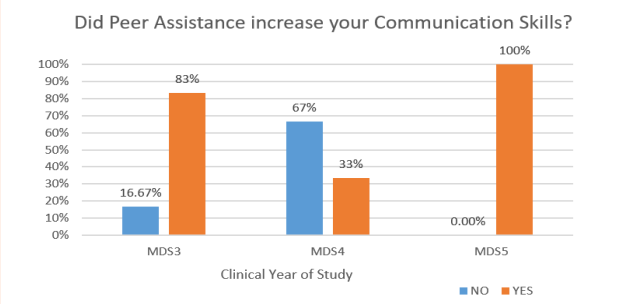

Figure 1: Distribution of Responses on Communication Skills.

Chi² test p=0.015; MDS3 & MDS5 agreement with statement.

Clinical practice

While 94% agreed that being assisted was beneficial and in 82% of cases provided them the opportunity to discuss treatment plans with their peers, only 48% agreed that it provided them with increased patient time and only 45% stated that assistance allowed them to enhance their technical skills.

Non-clinical soft skills - Professionalism and interpersonal relations

Peer chairside assistance gave students the opportunity to seek advice from peers (60%), to increase their communication skills (73%) and to develop new friendships (82%). A high proportion of MDS3 reported statistically significant benefits in their responses on communication skills (p=0.006) (Table2). An increase in self-confidence was reported in 45% of students. This finding was significantly higher in male students (p = 0.04) (Table 3).

Table 3: Agreement with the following statements (scale responses)

Identify your agreement with the following statements on Peer Assistance	Gender	Academic Year of Study
Being peer-assisted provided me with someone to ask advice from; besides the clinical tutor	p>0.05	p>0.05
Being peer-assisted provided me with someone to share my anxieties/concerns with	p>0.05	p=0.041[b]
Being peer-assisted caused me increased anxiety	p>0.05	p>0.05
Being peer-assisted allowed me to enhance my own technical skills	p>0.05	p>0.05
Peer-assistance increased my self-confidence	p=0.040[a]	p>0.05
Peer-assistance caused personality clashes	p>0.05	p>0.05
Being peer-assisted provided me with increased patient treatment time	p>0.05	p>0.05
I have enjoyed the experience of four-handed dentistry	p>0.05	p>0.05

Mann-Whitney U Test

[a]Mean Rank- Males 12.42 vs Females 19.62: Male students agreed more with the statement

[b]Bonferroni Test: MDS3-MDS5 significant difference (p=0.038) with MDS3 strongly agreeing with statement.

The Experience of being assisted

In 52% of responses, students reported feeling judged by their peer assistant, this was a finding significantly higher in the younger cohorts (p = 0.02) (Table 2), however 58% of respondents also reported that the experience allowed them to share their anxieties with their peer assistant. This was significant in the first clinical year students as compared to the more senior students (p = 0.038) (Table 3 & Figure 2).

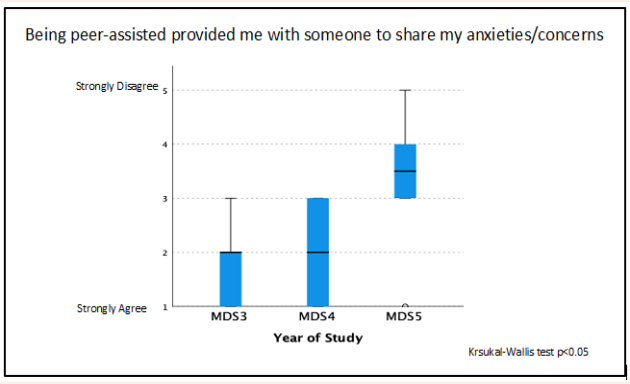

Figure 2: Responses on sharing anxieties/concerns with peers

Bonferroni test: MDS3-MDS5 p=0.038.

The experience of providing assistance

Male students reported being treated unfairly when providing assistance (p = 0.016) (Table 2) while 30% were concerned that they were considered a hindrance by the operator student.

Format of Peer Assistance

When asked whether assistance should be provided by more senior, less senior or equivalent peers, 76% reported no particular preference but rather a combination of all arrangements. The peer assistant should be allowed to choose whom to assist according to 61% of students while the remaining students equally suggested that the operator should be allowed to choose or that a schedule should be determined by faculty administration. Students were also asked to identify what they found the MOST or LEAST beneficial with peer assistance in two open-ended questions.

The beneficial themes that were acknowledged included:

a. A positive experience with having help, allowing the operator student to experience four-handed dentistry,

b. Better time management and execution of clinical procedures,

c. Having the opportunity to show other students from other years procedures that they are not as familiar with. Students also reported that having to explain to others made them study more in order to address questions.

d. Peer assistance allowed new friendships with individuals at a higher level of study and to seek advice on patient treatment plans and how to develop better technical skills and improvement of knowledge. This in turn made them more self-confident.

e. Appreciation that one's concerns are actually common with their peer students.

f. The ability to be exposed and learn from more cases that they wouldn't necessarily have had the opportunity to without peer assisting.

On the other hand, the least beneficial themes identified by students included:

a. Students from more advanced years not providing full assistance, thus increasing anxiety. It was proposed that students should assist their class- or more advanced peers.

b. Being paired with someone you are not compatible with.

c. Comments and feedback given by the demonstrators could be easily heard by the assistant, making the student operator feel uncomfortable or being judged.

d. The peer assistant hindering the student operator's performance by not collaborating properly with their technique, resulting in more time consumed/ wasted during the session.

Discussion

This cross-sectional study provided the experience of experiential learning where the faculty organised the structure and logistics of the study, and where the students were directly involved by also evaluating the outcome themselves. This study included three levels of the four levels of evaluation as described by Kirkpatrick's Hierarchy of Program Evaluation framework that is used to guide educational program changes [17]. The learners' experience of the intervention (level 1a), their change in attitudes and perceptions by providing peer mentoring (Level 2a), the acquisition of new knowledge and skills (Level 2b) and behavioural change in supporting each other academically and socially (Level 3) were educational outcomes measured by this study. The key findings of the study are that close to all (97%) clinical year students participating in this study found the introduction of the peer-assisting program to be beneficial, irrespective of year of study or gender. However, the least (MDS3) and most clinically experienced students (MDS5) were those who expressed a significantly greater value of the program as a learning experience. The MDS3 students probably appreciated the needed support due to their inexperience; the MDS5 students probably appreciated the assistance while carrying out more advanced clinical procedures. Although the implementation of student to student chair side assistance has been previously reported to increase productivity [2] and efficiency in undergraduate teaching facilities [16], this study, conversely, reports an increase in patient treatment time and enhancement of technical skills by less than half of the participating students, most of which were the least experienced first year clinical students (MDS3). The more experienced dental students (MDS4, MDS5) did not report to benefit technically as much. This could indicate that the inexperienced dental students were offering sub-optimal assistance, as indicated by a response to an open-ended question that lamented improper assisting technique. Holmes D et al. [1] report an increase in quality of care delivered by student operators and a 51% increase in student number of appointments in a fourhanded clinic, however the study involved assistance by trained chairside dental assistants. These findings indicate that the introduction of formal training in chair side assistance would benefit all clinical years better, both in terms of allowing the student to improve clinical skills and patient treatment outcomes and, in terms of providing better assistance. Significant findings were reported in the area of soft skills acquisition. Again, the less experienced MDS3 students reported an increase in communication skills at a rate significantly higher than that of the more experienced students. Assisting their more experienced peers, allowed them to witness, at greater length, ideal chairside practices as compared to witnessing tutor interactions with patients, which are more time limited in a teaching setting. Such a program provided the student the opportunity to learn about professional attitudes rather than just knowledge and skills.

Interestingly, although the concepts of peer mentoring or assessment were specifically not communicated in the set-up of the project, the students inherently engaged in these practices. The MDS3 students (89%) and the MDS5 (83%) students reported discussing treatment plans with peers. The former probably asking for advice, the latter probably engaging in spontaneous peer mentoring. The MDS3 group were also those who mostly reported finding value in engaging with peers for advice rather than with tutors. Both these cohorts represent those students experiencing the most stressful periods in their programs. The MDS3 group are dealing with the stressful transition from pre-clinical to clinical practice, while the MDS5 group are finalising their clinical cases and preparing for exit exams, two critical time points in dental studies [7] Both these cohorts also significantly reported finding the peer-assisting program of help in offering them an opportunity to share their anxieties with peers. The two junior cohorts significantly reported higher instances of feeling judged by peers. The peer assistance program appears to have served to provide an opportunity in nurturing team support and interpersonal relations. The emotional intelligence to be able to control one's emotions and those of others, provide empathy and engage in non-verbal communication are aspects of social intelligence integral to adapting to professional life. Faculty support of 'learning communities' opportunities, where students may engage in learning, mentoring and practising together may result in otherwise missed learning outcomes in the social and emotional spheres. This set-up supports the theory of the social approach to education that endorses dialogue in education as being critical for student learning [18]. Research in the field of emotional intelligence in health care professionals has increased in recent year [19] and the acquisition of such qualities are listed in the Profile and Competencies for the European Dentists [20]. Increased attention to such aspects of the dental curricula should be considered. The value of dental auxiliaries on the dental team as a means of increasing efficiency, reducing stress and providing a higher level of dental care goes undisputed. The practice of good dental assistance is well studied with the respective roles and responsibilities of each member of the team and the techniques to be followed being well defined. These are imperative for complementary interaction and proper functioning and improved patient treatment outcomes. However, attaining the required skills needs time and practice and it is to be considered that training in proper chairside assistance should be introduced as a core topic during undergraduate dental training. Within this context, further evaluation research of the program, according to the Kirkpatrick's Hierarchy of Program Evaluation framework, [17] would involve a change in faulty practice by introducing formal teaching of chairside assistance and peer mentoring support (level 4a) followed by studying the effect this will have on student learning and the improvement in delivery of care to the patients (level 4b). Comprehensive evaluation of all the project outcomes would then provide evidence-based direction for further changes in student practice and learning.

Limitations

The findings of this study may be not be generalizable but rather limited to the settings in which this study was carried out. Additionally, the questionnaire used is new and might benefit from improvement and further refining by adjusting the sequence of the questions to ensure capture of further relevant outcomes.

Conclusion

This cross-sectional study on peer clinical chairside assistance indicated that clinical year students participating in this study found the introduction of the peer assisting program to be beneficial, irrespective or year of study or gender. Peer chairside assistance gave students the opportunity to seek advice from peers, to increase their communication skills, to give and receive support and to develop new friendships. However, this study also highlights the need for the introduction of formal training in chairside assistance that would benefit all clinical years, both in terms of allowing the student to improve clinical skills and in terms of providing better assistance and ultimately better patient care.

References

1. Holmes DC, Squire LJ, Arneson SK, Doering JV (2009) Comparison of Student Productivity in Four-Handed Clinic and Regular Unassisted Clinic. J Dent Educ 73(9): 1083-1089.
2. Álvarez ZCB, Tovar NCOM, Colina TC, et al. (2021) Four-Handed Technique in Dental Education: Integrative Review. Universitas Odontologica 40.
3. Finkbeiner B (2000) Four-handed dentistry revisited. The journal of contemporary dental practice 1(4): 74-86.
4. Sheridan RA, Hammaker DJ, de Peralta TL, Fitzgerald M (2016) Dental Students' Perceived Value of Peer-Mentoring Clinical Leadership Experiences. J Dent Educ 80(3): 311-317.
5. Dudley L, Menon R, Mosleh T, Leadbeatter D (2022) Possibilities and limits of a student-led, near-peer mentoring initiative for first-year dental students. J Dent Educ 86(3): 310-318.
6. Mascarenhas F, Townsend J, Caballero P, Yu Q, Fidel Jr PL (2019) Student and faculty perspectives of a faculty-student mentoring programme in a dental school. Eur J Dent Educ 23(2): 184-189.
7. Lluch AM, Lluch C, Arregui M, Jiménez E, Giner TL (2021) Peer Mentoring as a Tool for Developing Soft Skills in Clinical Practice: A 3-Year Study. Dentistry Journal 9(5): 57.
8. Cowpe J, Plasschaert A, Harzer W, Vinkka PH, Walmsley AD (2010) Profile and competences for the graduating European dentist–update 2009. Eur J Dent Educ14(4): 193-202.
9. Quick KK (2016) The Role of Self- and Peer Assessment in Dental Students' Reflective Practice Using Standardized Patient Encounters. J Dent Educ 80(8): 924-929.
10. Tricio J, Woolford M, Escudier M (2016) Analysis of dental students' written peer feedback from a prospective peer assessment protocol. Eur J Dent Educ 20(4): 241-247.
11. Tricio JA, Woolford MJ, Escudier MP (2016) Fostering Dental Students' Academic Achievements and Reflection Skills Through Clinical Peer Assessment and Feedback. J Dent Educ 80(8): 914-923.
12. Manogue M, McLoughlin J, Christersson C, Delap E, Lindh C, et al. (2011) Curriculum structure, content, learning and assessment in European undergraduate dental education - update 2010. Eur J Dent Educ 15(3): 133-141.
13. Langan AM, Wheater CP (2003) Can students assess students effectively? Some insights into peer-assessment. Learning and Teaching in ACTION 2(1): 1-7.

14. Ahmad NA, Naimie Z, Lui JL, Mariam A, Kasim NH, et al. (2012) Clinical Pairing Revisited: A Study at the University of Malaya, Malaysia. J Dent Educ 76(10): 1377-1383.

15. Abu Kasim NH, Abu Kassim NL, Razak AAA, et al. (2014) Pairing as an instructional strategy to promote soft skills amongst clinical dental students. Eur J Dent Educ 18(1): 51-57.

16. Qualtrough A (2001) Student operator-assistant pairs: an update. Br Dent J 190(11): 614-618.

17. Ogrinc G, Armstrong GE, Dolansky MA, Singh MK, Davies L (2019) SQUIRE-EDU (Standards for Quality Improvement Reporting Excellence in Education): publication guidelines for educational improvement. Acad Med 94(10): 1461.

18. Sweet J, Wilson J, Pugsley L (2009) Educational innovations for dentistry. Br Dent J 206(1): 29-34.

19. Victoroff KZ, Boyatzis RE (2013) What is the relationship between emotional intelligence and dental student clinical performance? J Dent Educ 77(4): 416-426.

20. Cowpe J, Plasschaert A, Harzer W, Vinkka PH, Walmsley AD (2010) Profile and competences for the graduating European dentist - update 2009. Eur J Dent Educ14(4): 193-202.