Original Article

Assessing the Utility of Oral and Maxillofacial Surgery Posters as Educational Aids in Dental Education for Undergraduate Students: Is it Useless or Helpful?

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ABSTRACT

Background: Educational posters play a crucial role in education, information dissemination, and awareness. Their visual appeal efficiently communicates condensed yet vital information on significant topics, making them valuable for teaching sequential concepts. We aimed to assess the effectiveness of educational posters in the oral and maxillofacial surgery department for student education.

Methods: The study was carried out during the fall semester of 2022 at Mashhad Dental School, Mashhad, Iran utilizing a questionnaire-based approach. The questionnaire gathered demographic information and assessed students' perspectives on educational posters. Statistical analysis was performed using SPSS version 23 with a significance level set at 0.05.

Results: This study was conducted on 70 students (35 females and 35 males). Gender-based analysis demonstrated significant differences in beauty, adaptability, and learning, with male students scoring lower than females (*P* values = 0.036 and 0.031, respectively). Further analysis by academic year unveiled higher beauty and adaptability scores among third-year students compared to second-year students, showing statistical significance (*P* value = 0.035). A two-by-two comparison highlighted that the average beauty score of third and fifth-year students surpassed that of second-year students (*P* values = 0.041 and 0.038, respectively). In summary, higher academic years correlated with superior performance, emphasizing the potential impact of educational posters on academic outcomes.

Conclusion: Posters in the oral and maxillofacial surgery department received commendable ratings in various areas, positively impacting the teaching and learning process.

KEYWORDS
Educational posters; Dental Education; Surgery; Iran

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INTRODUCTION

Insufficient mastery of clinical topics in oral and maxillofacial surgery among students can give rise to issues within the department, notably affecting their ability to manage critical conditions like syncope or asthma attacks. Furthermore, a lack of awareness regarding optimal

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dental procedure execution can contribute to an elevated incidence of occupational ailments such as musculoskeletal disorders (MSD). A systematic review's findings reveal that the prevalence of MSD among dental professionals falls within the range of 64% to 93% [1]. Consequently, there is a growing imperative to incorporate ergonomics principles into dental school curricula [2, 3]. Visual and hands-on training methodologies prove markedly more effective than traditional lecture-based instruction when teaching ergonomics [4].

Numerous topics are encompassed within the training curriculum of the oral and maxillofacial surgery department. These include principles of sterilization, history-taking and documentation, techniques for anesthetic administration, managing medical emergencies in dentistry, tooth extraction procedures and tools, ergonomics, and the fundamentals of suturing. A study conducted at the Faculty of Dentistry, Qazvin University of Medical Sciences, yielded insights from students who reported that the skill of suturing proficiently and effectively was the least acquired competence within the oral and maxillofacial surgery department [5].

Educational posters serve as a valuable medium for imparting education, disseminating information, and raising awareness [6]. These posters possess the ability to captivate the viewer's attention with their visual appeal, while succinctly conveying vital subject matter. They prove especially advantageous in elucidating concepts that involve stages or necessitate visual aids for effective instruction. Several studies have scrutinized the efficacy and attention-grabbing potential of dental educational posters, whether used in isolation or in conjunction with other educational methodologies aimed at promoting health in waiting rooms, educating primary school teachers on managing children's dental traumas, instructing dental students in biosafety principles, enlightening patients on the prevention of malignant diseases within the head and neck region, and elucidating diagnostic and treatment modalities for dentists [7-9]. These investigations have consistently underscored the utility of educational posters as a significant factor in heightening awareness. However, it is noteworthy that there exists a scarcity of research concerning educational posters in the context of dentistry. Therefore, an in-depth exploration of the effectiveness of educational posters holds promise in guiding decisions regarding their proliferation across diverse subject matter, their integration with other educational multimedia, and the evaluation of students' educational requirements. To the best of the researchers' knowledge, no prior studies have appraised the impact of educational posters within the oral and maxillofacial surgery department as an adjunct to the educational process for students.

Consequently, we aimed to bridge this knowledge gap and contribute to advancements in this realm. The primary objective of this study is to explore students' perspectives on the posters within the Department of Oral and Maxillofacial Surgery. Additionally, it seeks to assess the extent to which students engage with and pay attention to these departmental posters. Furthermore, we aimed to examine whether there exists any correlation between students' gender, academic year, and their level of attention to the department's posters, along with their awareness of the concepts presented therein.

MATERIALS AND METHODS

This descriptive-analytical study was carried out during the fall semester (October to February) of 2022 at the Faculty of Dentistry, Mashhad University of Medical Sciences, Mashhad, Iran employing a questionnaire-based methodology.

Ethical approval for the study was granted by the Ethics Committee of Mashhad University of Medical Sciences, indicated by code IR.MUMS.DENTISTRY.REC.1401.092.

The questionnaire employed was developed by the researchers. To ensure qualitative validity, ten oral and maxillofacial surgery specialists and one medical education specialist were consulted to provide feedback on grammar, phrasing, and the arrangement of statements within the questionnaire. For quantitative content validity assessment, two metrics, namely Content Validity Ratio (CVR) and Content Validity Index (CVI), were utilized. External reliability was determined by administering the questionnaire to 20 students and employing the test-retest method, calculating the correlation coefficient over a 10-day interval, which yielded a correlation coefficient exceeding 0.7. Furthermore, the internal reliability of the questionnaire was assessed through Cronbach's alpha coefficient, which also surpassed the 0.7 threshold. The questionnaire for the study is depicted in Figure 1.

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*	Presentation	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	The poster used simple and fluent language					
2	The text of the poster is in harmony with the image and shapes					
3	The design of the poster is obvious and illustrative					
4	Various audio and visual media have been used in poster design					
-	**Attraction**					
5	The poster has an attractive content					
6	The designed environment of the poster is simple and user-friendly					
7	The use of posters in education increases the attractiveness and satisfaction of students					
-	**Coherency**					
8	The content of the educational posters is well-organized					
9	The media used in the poster matches the content					
10	The hierarchical structure of the content has integrity					
11	The language and content of the poster are consistent with each other					
-	**Esthetic and Consistency**					
12	The poster can be read without tiring the eyes					
13	Color balance is used in poster design					
-	**Visual aspects and Text and content images**					
14	In the design of the poster, the balance and density of the shape, images, and text have been observed					
15	The font color is appropriate					
16	The font size is appropriate					
17	The background color is appropriate					
18	The spacing of the letters and the style of the fonts are appropriate and visible					
19	Poster images and titles are clear and of good quality					
-	**Multimedia support and Technology**					
20	It has a proper usage guide					
21	In addition to the original texts, appropriate images, videos, and educational videos have been used					
-	**Content educational aspects**					
22	The topics presented in the poster are aligned with the curriculum topics					
23	The information in the educational posters is academically accurate					
24	Using the poster improves my scientific knowledge					
25	Educational posters provide clear information about the theoretical content of the subject					
26	Educational posters provide clear information about the practical content of the subject					
27	After seeing the poster, I got to know a lot about the tools and techniques of surgery and tooth extraction					
28	Using the poster helps me a lot in choosing the type of forceps and dental material					
-	**Learning**					
29	Educational posters are useful for learning about specific topics					
30	I am happy with educational posters as a learning tool for specific subjects					
31	Educational posters motivate me to learn about different subjects					
32	The presented poster covered my educational needs					
33	Educational posters make learning about subjects easier					
34	The presented poster has improved my learning					
35	The use of posters has a great impact on learning the details and exact method of tooth extraction and surgery					

Fig. 1: The questionnaire for the study

Seventy questionnaires were distributed among students enrolled in the oral and maxillofacial surgery practical courses who willingly participated in the study. The questionnaire consisted of two parts: the first part gathered demographic information from the students, including their gender and academic year. Subsequently, students responded to survey questions covering various aspects such as presentation, attraction, coherency, esthetic and consistency, visual aspects, text and content images, content educational aspects, learning, multimedia support, and technology.

Following the collection of questionnaires, data analysis was conducted using SPSS version 23 (IBM Corp., Armonk, NY, USA) software. Descriptive statistics, including appropriate charts and tables, were employed to elucidate statistical indicators and present the frequency distribution of the data. The normality of the data was assessed using the Shapiro-Wilk test. To analyze and ascertain data correlations, t-tests and Pearson's correlation coefficient were applied. The threshold for statistical significance in all tests was set at less than 0.05.

RESULTS

The perspectives of 70 dental students from Mashhad who had enrolled in practical courses within the oral and maxillofacial surgery department were examined, with a specific focus on their evaluation of the educational posters displayed within the department. These students comprised 35 (50%) females and 35 (50%) males. Among them, 12 individuals (17.1 percent) were in their second year, 15 (21.4 percent) in the third year, 27 (38.6 percent) in the fourth year, and 16 (22.9 percent) in the fifth year of their studies.

The data underwent an initial analysis based on gender, wherein the normality of the distribution of quantitative variables was assessed using the Shapiro-Wilk test. With the exception of presentation among males (P value = 0.096), attraction among males (P

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value = 0.075), and learning among females (*P* value = 0.073), other variables did not exhibit a normal distribution.

In Table 1, number, average, standard deviation, median, interquartile range, minimum and maximum value of variables by gender and the results of statistical tests are given. As can be seen, the mean scores of presentation variables, coherency, visual aspects, text and content images, and content educational aspects were lower in male students than female students, but the difference was not significant (*P* value>0.05 for each). The mean scores of esthetic and consistency and learning in male students were significantly lower than female students (*P* value=0.036 and *P* value=0.031, respectively). This can be attributed to the greater

Table 1: Comparison of each field between female and male students

Variable	Group	Number	Standard deviation ± Average	Interquartile range	Range (minimum and maximum)	Yeoman-Whitney test result
Presentation	Female	35	15.46±2.74	15.00(5.00)	12-20	Z=0.17
	Male	35	15.43±3.01	15.00(4.00)	9-20	*P*=0.868
Attraction	Female	35	11.74±2.17	12.00(3.00)	8-15	Z =0.12
	Male	35	11.86±1.97	12.00(3.00)	8-15	*P*=0.900
Coherency	Female	35	8.71±1.05	8.00(2.00)	7-10	Z=0.24
	Male	35	8.57±1.22	9.00(2.00)	6-10	*P*=0.809
Esthetic and Consistency	Female	35	8.26±1.62	8.00(2.00)	4-10	Z=2.10
	Male	35	7.20±2.11	7.00(3.00)	4-10	*P*=0.036
Visual aspects and Text and content images	Female	35	25.06±3.89	24.00(6.00)	17-30	Z =1.15 *P*=0.249
	Male	35	23.40±5.16	24.00(8.00)	10-30	
Multimedia support and Technology	Female	35	7.63±2.09	8.00(4.00)	2-10	Z=1.55 *P*=0.122
	Male	35	8.29±1.64	8.00(2.00)	3-10	
Content educational aspects	Female	35	28.31±3.96	28.00(6.00)	22-35	Z =0.26 *P*=0.795
	Male	35	27.54±5.10	28.00(8.00)	15-35	
Learning	Female	35	28.66±4.21	29.00(7.00)	21-35	Z =2.16
	Male	35	25.60±5.85	27.00(9.00)	8-34	*P*=0.031

Table 2: The result of the Shapiro-Wilk test for the normality of the data distribution of quantitative variables according to the student's educational year

Variable	Second year		Third year		Fourth year		Fifth year	
	P value	Distribution	*P* value	Distribution	*P* value	Distribution	*P* value	Distribution
Presentation	0.318	Normal	0.166	Normal	0.212	Normal	0.130	Normal
Attraction	0.552	Normal	0.473	Normal	0.042	Unnormal	0.037	Unnormal
Coherency	0.012	Unnormal	0.014	Unnormal	0.001	Unnormal	<0.001	Unnormal
Esthetic and Consistency	0.333	Normal	0.017	Unnormal	0.001	Unnormal	0.273	Normal
Visual aspects, Text and content images	0.073	Normal	0.579	Normal	0.009	Unnormal	0.051	Normal
Multimedia support, and Technology	0.024	Unnormal	0.056	Normal	0.007	Unnormal	0.005	Unnormal
Content educational aspects	0.085	Normal	0.079	Normal	0.267	Normal	0.062	Normal
Learning	0.025	Unnormal	0.033	Unnormal	0.026	Unnormal	0.425	Normal

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Table 3: Comparison of each field between different students' educational years

Variable	Student's educational year	Number	Standard deviation ± Average	Interquartile range	Range (minimum and maximum)	Kruskal-Wallis test result
Presentation	2	12	15.08±2.31	14.50(2.00)	12-20	
	3	15	16.20±2.27	16.00(4.00)	13-20	F=0.50
	4	27	15.15±2.97	15.00(5.00)	9-20	*P*=0.683
	5	16	15.50±3.56	15.50(6.75)	10-20	
Attraction	2	12	11.50±2.32	11.50(3.00)	8-15	
	3	15	11.33±2.16	11.00(3.00)	8-15	χ^2=3.96
	4	27	11.67±2.20	11.00(4.00)	8-15	*P*=0.266
	5	16	12.69±1.30	13.00(1.75)	11-15	
Coherency	2	12	9.00±0.85	9.00(2.00)	8-10	
	3	15	8.80±1.01	9.00(2.00)	7-10	χ^2=2.06
	4	27	8.44±1.42	8.00(3.00)	6-10	*P*=0.561
	5	16	8.56±0.81	8.00(1.00)	8-10	
Esthetic and Consistency	2	12	6.92±1.38	7.00(2.00)	5-9	
	3	15	8.80±1.15	9.00(2.00)	6-10	χ^2=8.62
	4	27	7.78±2.24	8.00(4.00)	4-10	*P*=0.035
	5	16	7.25±2.02	7.00(3.00)	4-10	
Visual aspects and Text and content images	2	12	24.42±4.80	24.00(8.00)	17-30	
	3	15	25.07±2.81	24.00(4.00)	20-30	χ^2=1.35
	4	27	23.37±5.71	23.00(9.00)	10-30	*P*=0.717
	5	16	24.75±3.82	25.00(3.50)	17-30	
Multimedia support and Technology	2	12	7.17±2.69	8.00(2.75)	2-10	
	3	15	8.00±1.81	8.00(3.00)	4-10	χ^2=1.38
	4	27	8.04±1.68	8.00(3.00)	3-10	*P*=0.710
	5	16	8.38±1.59	9.00(3.50)	6-10	
Content educational aspects	2	12	27.67±4.19	28.00(8.00)	22-33	
	3	15	29.27±3.58	28.00(8.00)	24-34	F=1.17
	4	27	26.81±5.32	28.00(7.00)	15-35	*P*=0.329
	5	16	28.75±4.07	30.00(7.75)	23-35	
Learning	2	12	25.42±3.94	24.50(3.00)	21-33	
	3	15	27.80±5.87	31.00(11.00)	17-34	χ^2=8.79
	4	27	25.89±6.14	27.00(7.00)	8-35	*P*=0.032
	5	16	29.88±2.47	30.00(4.00)	26-34	

F: The result of one-factor analysis of variance

significance of poster aesthetics among female students. They exhibit a heightened inclination to scrutinize posters with greater care and invest more time in studying them. As a result, female students tend to recognize and appreciate the valuable insights imparted within the posters, especially in the context of mastering surgical principles. The mean scores of attraction, multimedia support, and technology were higher in male students than female students, but the difference was not significant (*P* value>0.05 for each).

For the analysis based on student year, as well as gender, we assessed the normality of the distribution of quantitative variables using the Shapiro-Wilk test. This analysis revealed that more than half of the variables exhibited a normal distribution. Further details regarding these results can be found in Table 2. In Table 3, comprehensive data, including the number, average, standard deviation, median, interquartile range, minimum, and maximum values of variables, along with the results of statistical tests, are provided, categorized by student's educational year. Notably, the lowest and highest average scores were observed among second-year and third-year students, respectively; however, no significant difference was identified between students of different years in this regard (*P* value = 0.683). Similarly, for attraction scores, the lowest and the highest averages were associated with third-year and fifth-year students, respectively, with

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no significant inter-year variation (*P* value = 0.266). Mean coherency scores exhibited the lowest and the highest values for fourth-year and second-year students, respectively, yet no statistically significant differences were observed between students from different years (*P* value = 0.561). In contrast, mean scores for esthetic and consistency were significantly different between second-year and third-year students, with the lowest average scores being attributed to second-year students and the highest to third-year students (*P* value = 0.035).

Furthermore, in a pairwise comparison of students at different stages of their academic journey, it was noted that the average aesthetics score of third-year students was significantly exceeded by that of second-year students (*P* value = 0.041), although no significant differences were observed among students at other stages of study. The mean scores for visual aspects and text and content images were at their lowest for fourth-year students and highest for third-year students. Nevertheless, there was no significant difference between students of different years in this regard (*P* value = 0.717). Similarly, the average scores for multimedia support and technology were lowest among second-year students and highest among fifth-year students, but the difference between students of different years was not statistically significant (*P* value = 0.710). The lowest and highest average scores for content educational aspects were associated with fourth and third-year students, respectively, with no significant difference between students of varying years (*P*-value = 0.329). The lowest and highest average learning scores were observed in second-year and fifth-year students, respectively, and the difference between students of different years was significant in this regard (*P*-value = 0.032).

In a two-by-two comparison of students from different years of study, the average aesthetics score of fifth-year students was significantly higher than that of second-year students (*P*-value = 0.038). However, students from various years of study did not exhibit any significant differences in this aspect.

DISCUSSION

As a form of written-visual media, the poster serves as a vehicle for communication between the designer and their audience or audiences, conveying message content through diverse visual elements. The designer's approach to poster creation should be grounded in psychological theories within the realm of education and learning. This approach aims to stimulate learner motivation, enhance cognitive processes, and ultimately facilitate improved learning outcomes. Such an approach enables the adaptation of education to cater to diverse learner styles. Educational posters find common application in environments like classrooms, libraries, and other educational settings. Nevertheless, the efficacy of educational posters remains a subject of debate among scholars and researchers. While some proponents contend that posters effectively enhance learning, others argue that alternative teaching methodologies may yield superior results [10].

Several studies have explored the effectiveness of educational posters in improving learning outcomes. Among the suggested methods for learning are lectures, catalogs, and posters. Traditional face-to-face lectures, widely employed across universities for education, serve as the cornerstone of information dissemination to students but come with higher costs and demand additional time for information review and presentation. This is particularly relevant in practical courses, where diverting attention from hands-on training can potentially hinder clinical instruction. On the other hand, the catalog method, while relatively cost-effective, carries the risk of individuals forgetting or misplacing the catalogs, rendering them inaccessible when needed. In contrast, the poster method proves to be a cost-efficient alternative, readily available in designated locations (as demonstrated in this study within the oral and maxillofacial surgery department). This method offers timely and location-specific access to the necessary information [11].

Young et al. observed that the utilization of educational posters can effectively influence the attitudes and awareness of high school students regarding dental trauma management. The knowledge scores of students in the educational intervention group notably surpassed those in the control group. Nevertheless, the researchers identified an issue with the educational posters, noting that a significant portion of participants, both in the intervention and control groups, failed to address several specific questions, indicating a lack of attention to certain aspects of the posters [12].

Awad and colleagues conducted an investigation into the impact of utilizing educational posters on

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the awareness of dental trauma among secondary school teachers. The employment of educational posters resulted in a notable enhancement of teachers' knowledge and awareness. Interestingly, the teachers who already possessed some relative knowledge regarding dental trauma management reported a more pronounced effect of the educational posters compared to those teachers with limited prior knowledge on the subject. Furthermore, the researchers highlighted the significance of identifying and emphasizing pivotal content within the poster, underscoring the importance of precise poster design [13]. In the present study, akin to this research, higher-year students exhibited superior evaluations of the poster across various domains in comparison to their lower-year counterparts. Generally, the repetition and thorough review of educational materials, coupled with hands-on practical training, can facilitate enhanced learning outcomes and, in turn, indirectly impact a student's comprehension and engagement with educational posters [14].

In a similar study, Ghadimi and colleagues delved into the effectiveness of employing educational posters to enhance the awareness levels of health teachers in schools across Tehran. Prior to the implementation of the educational intervention, the teachers exhibited a limited understanding of how to manage dental trauma incidents. However, following the introduction of educational posters, their knowledge witnessed a substantial and statistically significant increase in comparison to the control group [11].

Hasanica et al. conducted a study to examine the impact of utilizing printed texts and posters on elevating students' awareness of health-related behaviors, encompassing aspects like healthy eating, exercise, and healthy habits. The poster group demonstrated the most significant effects, primarily attributed to the visual appeal, visibility, and prolonged exposure they offered [15].

Based on varying student perspectives, it appears that the incorporation of educational posters as a supplementary tool alongside other educational methods can prove beneficial. To further enhance the efficacy of posters, complementing them with practical activities and hands-on workshops has been suggested, a notion supported by previous research findings [16]. Furthermore, it is worth noting that, despite its efficacy in supplementary education, poster usage may not significantly impact attitude change. This limitation arises from the inherent constraints of poster presentations, where direct interaction between the instructor and the learner is not possible, resulting in an indirect transmission of information that may not deeply influence students' attitudes. Consequently, relying solely on this method is unlikely to yield substantial results [11]. Thus, in light of the reviewed studies in this field, which compare various educational methods, the integration of diverse instructional approaches is deemed essential.

Selecting suitable educational interventions to enhance learning outcomes on a broad scale represents one of the most efficient and cost-effective measures for educating learners. Consequently, the quest for an effective, economical, user-friendly, and comprehensive educational solution holds paramount importance in the field of education. In light of the considerable costs and time involved in designing, reproducing, and disseminating educational posters, it is prudent to explore ways to maximize their impact on learners. To achieve this, it is advisable to assess the effectiveness of posters under various conditions and in strategically chosen locations, thus optimizing their placement for greater efficiency. Additionally, augmenting poster campaigns with complementary educational strategies can further enhance their overall effectiveness and influence on learners.

CONCLUSION

The posters designed in the Oral and Maxillofacial Surgery Department received commendable ratings in various areas, including presentation, coherency, esthetic and consistency, visual aspects, text and content images, content educational aspects, learning, attraction, multimedia support, and technology. These posters had a positive impact on the teaching and learning process.

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CONFLICTS OF INTEREST

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REFERENCES

1. Hayes MJ, Cockrell D, Smith DR. A systematic review of musculoskeletal disorders among dental professionals. *Int J Dent Hyg* 2009;**7**(3):159-65.
2. Corrocher P, Presoto C, Campos JADB, Garcia PPNS. The association between restorative pre-clinical activities and musculoskeletal disorders. *Eur J Dent Educ* 2014;**18**(3):142-6.
3. El-Sallamy RM, Atlam SA, Kabbash I, El-fatah SA, El-Flaky A. Knowledge, attitude, and practice towards ergonomics among undergraduates of Faculty of Dentistry, Tanta University, Egypt. *Environ Sci Pollut Res Int* 2018;**25**:30793-801.
4. Faust AM, Ahmed SN, Johnston LB, Harmon JB. Teaching methodologies for improving dental students' implementation of ergonomic operator and patient positioning. *J Dent Educ* 2021;**85**(3):370-8.
5. Hamadzade H, Sarchami R, Nazeri S. Evaluation of Viewpoints of final-year Students of Qazvin Dental School on Clinical Skills Based on Educational Program in 2015. *JSSU* 2021;**29**(6):3822-9.
6. Shah SF, Bener A, Al-Kaabi S, Al Khal AL, Samson S. The epidemiology of needle stick injuries among health care workers in a newly developed country. *Saf Sci* 2006;**44**(5):387-94.
7. Lopes AL, Rodrigues LG, Zina LG, Clemente A. Biosafety in Dentistry: conduct of students before and after an educational intervention. *Rev ABENO* 2019;**19**(2):43-53.
8. Ward K, Hawthorne K. Do patients read health promotion posters in the waiting room? A study in one general practice. *Br J Gen Pract* 1994;**44**(389):583-5.
9. Young C, Wong KY, Cheung LK. Effectiveness of educational poster on knowledge of emergency Management of Dental Trauma–Part 1. Cluster randomised controlled trial for primary and secondary school teachers. *PLoS One* 2013;**8**(9):e74833.
10. Macdonald G. A new evidence framework for health promotion practice. *Health Educ J* 2000;**59**(1):3-11.
11. Ghadimi S, Seraj B, Keshavarz H, Shamshiri AR, Abiri R. The effect of using an educational poster on elementary school health teachers' knowledge of emergency management of traumatic dental injuries. *J Dent (Tehran)* 2014;**11**(6):620.
12. Young C, Wong KY, Cheung LK. Effectiveness of educational poster on knowledge of emergency management of dental trauma-part 2: cluster randomised controlled trial for secondary school students. *PLoS One* 2014;**9**(8):e101972.
13. Awad MA, AlHammadi E, Malalla M, et al. Assessment of elementary school teachers' level of knowledge and attitude regarding traumatic dental injuries in the United Arab Emirates. *Int J Dent* 2017;**2017**.
14. Change ACo, Education IiD, Haden NK, et al. The dental education environment. *J Dent Educ* 2006;**70**(12):1265-70.
15. Hasanica N, Ramic-Catak A, Mujezinovic A, Begagic S, Galijasevic K, Oruc M. The effectiveness of leaflets and posters as a health education method. *Mater Sociomed* 2020;**32**(2):135.
16. Brandl K, Rabadia SV, Chang A, Mandel J. Benefits of focus group discussions beyond online surveys in course evaluations by medical students in the United States: a qualitative study. *J Educ Eval Health Prof* 2018;**15**.

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