

Research Paper: Knowledge of dental clinicians in Rasht city about dental bonding agents



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ABSTRACT

Introduction: The demand of patients for tooth-colored restorations is increasing, and the need for proper dental bonding agents is undeniable. The purpose of this study was to evaluate the knowledge of general dentists practicing in Rasht city about dental bonding agents in 2020.

Materials and Methods: In this descriptive cross-sectional study, 161 dentists working in Rasht city were selected by simple random sampling. A researcher-designed questionnaire was used for data collection. The Chi-square test was applied for statistical analysis.

Results: Of 161 dentists participating in the study, 79 were males and 82 were females. The mean knowledge score was 10.34 ± 1.21 out of 15. The majority of dentists ($n=73$) had been graduated from Guilan University of Medical Sciences. The mean age of dentists was 38.35 ± 8.36 years. The knowledge score was higher in the age groups under 30 and between 30 to 40 years. Also, the knowledge score of new graduates and dentists with less than 10 years of experience was higher than others. Moreover, 100 general dentists practicing in Rasht city had participated in continuing education courses regarding dental bonding agents after 2016, and this group had a higher knowledge score than dentists who had participated in continuing education courses on dental bonding agents before 2016.

Conclusion: The knowledge of general dentists practicing in Rasht city in 2020 regarding different types of dental bonding agents was good.

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Introduction

Educational systems play an important role in thriving of a society. The educational systems have the important task of training specialized human resources. Therefore, it is necessary to use the most efficient methods for designing, implementation, and evaluation of the activities of educational systems.(1)

Continuing education is an essential activity for the healthcare workers to update their professional skills. Even if university education is sufficient, it cannot guarantee sufficient skills throughout a physician's professional life.(2) Need assessment is a necessity, because it motivates the clinicians to participate in continuing education courses, and results in improvement of the quality of programs. Considering the fact that continuing education in Iran does not have a long history, accurate evaluation of these programs is imperative.(3) In Iran, the healthcare workers are required to attend continuing education courses. Dao et al, in 2005, and Smith et al, in 2006 emphasized on the importance of proper education and training of clinicians, and its impact on their future professional attitude and behavior in treating patients.(4,5) Also, many dental clinicians may not acquire the necessary professional skills as they should during their education, and it is necessary for them to learn such skills and update their information after graduation through continuing education courses.(6)

Evidence shows that dental educational programs for dental graduates will be effective and useful when they are designed based on their actual needs. Education must keep pace with the rapid advances in technology and knowledge. Chan et al, (2006) in their study showed that the priority of dentists for continuing education courses was implantology (71.7%), cosmetic dentistry (60.1%) and endodontic treatment (52.4%).(7) At present, considering the wide variety of different products from different manufacturers, it is necessary for dental clinicians to have adequate knowledge about the composition of these products, their proper use, advantages and disadvantages, and indications

and contraindications.(8)

Many problems and failures of composite restorations are due to insufficient knowledge of dentists about the principles of adhesive bonding. The role of bonding agents is to chemically and micromechanically bind to both the underlying tooth structure and the restorative material, enabling their optimal adhesion.(9) Availability of different generations of bonding agents (generations 1 to 7) has caused some confusions among dentists with regard to choosing the most appropriate resin cement for each case, and different applications of each material. Currently, universal adhesive systems are widely utilized due to their simplified application procedure, lower technical sensitivity, and more user-friendly nature. Accordingly, dental clinicians can use them in either self-etch, etch-and-rinse, or selective enamel-etch modes.(10) Rapid growth of science and knowledge generation in the field of dental bonding agents have compromised the current knowledge of dentists in this field. In fact, one of the most important reasons for treatment failures is lack of sufficient knowledge about bonding agents and their applications.

Implementing the correct bonding strategy is critical for predictability of indirect restorations. However, it is confusing for most dental clinicians to choose the right bonding agent for each case considering the wide range of adhesives available in the market.(11) At present, the first step to improve public oral health is to update the knowledge and attitude of general dentists. Despite the importance of this topic, limited studies have evaluated the level of knowledge of general dentists about dental bonding agents. Thus, the aim of this study was to assess the knowledge level of dentists in Rasht city about dental bonding agents in 2020.

Materials and Methods

In this descriptive cross-sectional study, a researcher-designed questionnaire was used to collect information about demographic information of participants such as age, sex, attend-

ing university, graduation year, and work experience. It also included 15 questions to assess the knowledge level of dentists about dental bonding agents. Each correct answer of dentists was given a score of 1 and a score of zero was allocated to wrong answers or no responses.

First, the content validity ratio (CVR) and content validity index (CVI) of the questionnaire were evaluated. For this purpose, the questionnaire was face- and content-validated by seven experts.

To assess the reliability of the questionnaire by test-retest method, the questionnaire was distributed among 17 general dentists in two periods of 10 days, and after receiving the answers, the Cronbach alpha coefficient was calculated separately for each question, which were all 8.9. Since the obtained values were higher than 7, the reliability of the relevant questions was confirmed.

The study population was selected based on the following criteria:

- Having a degree in general dentistry
- Employment
- Consenting to participate in the study

Out of 379 dentists working in Rasht including 164 females and 215 males, 170 general dentists, including 74 females and 96 males who met the eligibility criteria were randomly selected based on their Medical Council identification number. The questionnaire was distributed among them in 2 periods of 10 days each. The questionnaire was filled out by dentists. Then, the completed questionnaires were collected to evaluate the results. The number of dentists who returned the questionnaires was 161; according to the acceptability of 10% no response, the statistical population was approved.

Statistical analysis was performed using descriptive and inferential statistics. The results were evaluated by SPSS. The Chi-square test was used to compare the knowledge level.

Ethical considerations

The study was approved by the ethics committee of Guilan University of Medical Sciences (IR.GUMS.REC.1398.171).

Results

The mean age and knowledge level of general dentists in Rasht are reported in Table 1.

Table 1: Mean age and knowledge level of general dentists in Rasht

	Maximum	Minimum	Total number	Mean±SD
Age	57	25	161	38.35±8.36
Knowledge level	13	8	161	10.34±1.21

The mean age of dentists participating in the present study was 38.35±8.36 years. The mean knowledge score of general dentists was 10.34 with a standard deviation of 1.21 out of 15.

The majority of participants were in the age range of 30 to 40 years (n=60). In terms of gender, the number of female dentists participating in the study was higher than male dentists (82 out of 161 participants). The number of participants graduated after 2011 was higher than the number of those graduated between 2001-2011 and before 2001 (84 out of 161 participants).

The number of dentists with 1 to 10 years of work experience was higher than those with a work experience between 10 to 20 years and over 20 years (89 out of 161 participants). Out of 161 participants, 100 had participated in continuing education courses after 2011, which shows their desire to update their information about bonding agents.

The level of knowledge of the study population was examined based on their age, gender, graduation year, work experience, and participation in continuing education courses. Regardless of the variables, 92 participants had a knowledge score between 5-10, and 69 scored above 10.

According to the results obtained in Table 2, there was a significant difference among the studied age groups in terms of knowledge score (P<0.05). There was no significant correlation between gender and knowledge level (P>0.05). In terms of the correlation of graduation year and knowledge level, there was a significant correlation between graduation year and knowledge level of dentists (P<0.05).

Table 2: Frequency of knowledge score and comparison of groups according to the studied variables in general dentists in Rasht

	Knowledge score 5-10	Knowledge score 10-15	Total	Chisquare P-value
Age under 30 years	11	26	37	0.001
Age between 30-40 years	35	25	60	
Age between 40-50 years	31	17	48	
Age over 50 years	1	15	16	
Males	39	40	79	0.57
Females	45	37	82	
Graduation year earlier than 2001	36	9	45	0.001
Graduation year between 2001-2011	14	18	32	
Graduation year after 2011	42	42	84	
Work experience under 10 years	45	44	89	0.017
Work experience between 10-20 years	25	20	45	
Work experience over 20 years	2	22	27	
Participating in continuing education courses before 2011	11	9	20	0.001
Participating in continuing education courses between 2011-2016	34	7	41	
Participating in continuing education courses after 2016	47	53	100	
Studied at the University of Tehran	27	18	45	0.41
Studied at the University of Guilan	43	30	73	
Studied at the University of Mashhad	9	10	19	
Studied at the University of Ghazvin	7	7	14	
Studied at the University of Semnan	1	2	3	

	Knowledge score 5-10	Knowledge score 10-15	Total	Chisquare P-value
Studied at the University of Zahedan	1	0	1	
Studied at the University of Mazandaran	3	2	5	
Studied at the University of Zanjan	1	0	1	

The results showed that new graduates had higher level of knowledge than older graduates. Regarding the correlation of admitted university and knowledge level of dentists about bonding agents, the results showed no significant relationship ($P>0.05$). There was a significant relationship between work experience of dentists (under 10 years, 10 to 20 years, and over 20 years) and their knowledge score, such that those with less than 10 years of experience had higher knowledge score regarding dental bonding agents ($P<0.05$).

Also, there was a significant difference in knowledge score among those participating in continuing education courses related to dental bonding agents before 2011, between 2011 to 2016, and after 2016, and the knowledge score was higher in those participating in continuing education courses related to bonding agents between 2016 and 2020 ($P<0.05$).

Discussion

New knowledge, concepts, and techniques are constantly presented to improve the quality of dental services. Thus, continuous education courses are essential to enhance the knowledge and practical skills of dentists.(12)

Adhesive dentistry is a rapidly evolving discipline. It is important to understand and critically analyze the attitudes and practices of dental practitioners who deal with dental materials and techniques in order to make the appropriate amendments and alterations needed.(13)

In the present study, the knowledge of Rasht general dentists about the application of bonding agents was assessed based on age, gender,

graduation year, admitted university, work experience, and history of participation in training courses. The mean knowledge score was 10.34 ± 1.21 out of 15, which was acceptable. Ashraf et al. found that most dental practitioners possessed evidence-based knowledge regarding adhesive protocols for composite restorations. However, the clinical practice of occasional use of rubber dam and use of simplified adhesives was not in accordance with the established evidence-based practice. Regular attendance of dental clinicians in continuing education programs can help reduce the disparity between knowledge and clinical practice.(14)

The level of knowledge of dentists in relation to age showed that the knowledge score acquired by the age group under 30 years and between 30 to 40 years was higher than other age groups ($P=0.001$). It appears that as the time passes since graduation, the knowledge level of dental clinicians decreases, which is expected .(15) On the other hand, the inverse correlation between age and knowledge level confirms that the dentists' knowledge about bonding agents has not been updated, emphasizing the need for continuing education courses in this respect.

According to the results of the present study, no significant relationship was observed between the dentists' knowledge score and their gender; 54.8% of female dentists and 49.3% of male dentists had a knowledge score of 5-10, and 45.2% of female dentists and 50.7% of male dentists had a knowledge score of 10-15. The difference between males and females was not statistically significant in this regard. Lack of a significant relationship between gender and knowledge score indicates that male and female dentists had almost the same level of knowledge about bonding agents, which is probably due to the fact that they had the same quality of education.(8)

Assessment of the relationship of knowledge level of dentists and their graduation year showed a significant correlation ($P=0.001$). The results showed that new graduates had higher level of knowledge than older graduates. It seems that as time passes since graduation,

knowledge retention decreases.(16) Arandi et al. found a significant correlation between the time passed since graduation and the choice of adhesive agent for all restorative procedures .(13)

In the present study, no significant correlation existed between the admitted university and knowledge level of dentists about the bonding agents ($P=0.41$). It means that dentists had relatively similar knowledge level irrespective of their admitted university.

With respect to work experience, there was a significant difference between the knowledge level of dentists with under 10 years of experience, between 10 to 20 years of experience, and over 20 years of experience, such that the knowledge score was higher for dentists with under 10 years of experience ($P=0.017$). This may be due to the fact that dentists with higher experience have not updated their knowledge and have not participated in continuing education courses to learn about the recent advances in adhesive dentistry.

Assessment of the knowledge level of dentists based on the time of attendance in continuing education courses showed that there was a significant difference in knowledge score between those participating in such courses before 2011, between 2011 and 2016, and after 2016, and the knowledge score of those participating in continuing education courses about bonding agents between 2016 and 2020 was higher ($P=0.001$). The quality of instruction in continuing education courses was recently improved such that dentists participating in recent courses acquire more knowledge; this finding explains higher knowledge level of dentists who participated in continuing education courses after 2011, compared with others.

According to the obtained results, it can be concluded that the knowledge of dentists is inversely correlated with their age and graduation year. Distancing from the educational environment can be responsible for this finding. Therefore, implementation of continuing education courses is imperative.

Precise comparison of the present results

with those of similar previous studies is not possible due to differences in questions and answer choices.(13,14) In the present study, most of the wrong answers of dentists were related to self-etch bonding agents (one-stage and two-stage) as well as multi-purpose bonding agents. A study carried out in Australia showed that 85% of dentists used total-etch adhesives.(17) Since self-etch adhesives are new, they might be less frequently used by dentists. Due to this reason, there should be some training courses about these topics. Borouzinia et al. found that 79% of dentists used etch and rinse adhesive systems (5th generation) for dental restorations; the three-step total-etch adhesives were least commonly used.(18)

Due to the optimal level of knowledge and attitude of general dentists in Rasht city about bonding agents, it may be concluded that participating in continuing education courses by dentists practicing in Rasht is responsible for their updated knowledge about dental bonding agents. Thus, in order to update the knowledge of dentists and to keep up with the current science, it is necessary to hold continuing education courses, and participation of dentists in such courses should be encouraged.

Conclusion

Based on the results of this study and according to the obtained mean knowledge scores, it is concluded that the knowledge of general dentists in Rasht in 2020 about the types of bonding agents is good, especially dentists who had graduated in the past 5 years.

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None

Authors' contributions

Yasaman Sadeghi Dehbaneh: Conceptualization, Methodology, Writing - Review & Editing
Mahan Dadpoor: Writing - Original Draft, Data Curation, Supervision

Conflict of Interests

The authors declare no conflict of interest.

Ethical declarations

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Availability of data and material

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request

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