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Knowledge and Use of Evidence-based Dentistry among Iranian Dentists

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المعرفة واستخدام علم طب الأسنان القائم على الأدلة من قبل أطباء الأسنان الإيرانيين

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ABSTRACT: ***Objectives:*** The objective of this study was to assess the knowledge and use of evidence-based dentistry (EBD) among Iranian dentists. ***Methods:*** A cross-sectional survey was conducted by means of a questionnaire among dentists attending the 52nd National Annual Congress of the Iranian Dental Association in Tehran in April 2012. The questions covered the participants' level of knowledge and use of EBD. ***Results:*** The mean knowledge score of the 310 respondents was 3.66 ± 1.19 out of a maximum of 5. The majority of the dentists had little (56.1%) or no (20.7%) knowledge of EBD. The main reported barrier to the use of EBD was lack of time (44.1% of respondents) with 42.8% of dentists using the Internet less than one hour per week. ***Conclusion:*** EBD was not a familiar concept to these Iranian dentists; the majority of them preferred consultation with colleagues over seeking evidence from electronic databases.

Keywords: Evidence-Based Dentistry, trends; Knowledge; Iran.

الملخص: **الهدف**: تهدف هذه الدراسة إلى تقييم مستوى المعرفة وإستخدام علم طب الأسنان القائم على الأدلة من قبل أطباء الأسنان الإيرانيين. **الطريقة**: تم إجراء استقصاء مقطعي عن طريق استبيان من قبل أطباء الأسنان الحاضرين للمؤتمر السنوي الثاني والخمسون للجمعية الإيرانية لطب الأسنان بطهران في مايو 2012. غطت الأسئلة محاور مستوى المعرفة للمشارك واستخدام علم طب الأسنان القائم على الأدلة. **النتائج**: متوسط نتائج المعرفة ل310 مستجيب كانت 3.66 ± 1.19 من أصل 5. معضم أطباء الأسنان كان لديهم قليل (56.1%) أو عدم وجود (20.7%) معرفة عن علم طب الأسنان القائم على الأدلة. أكثر العوائق المذكورة عن عدم استخدام علم طب الأسنان القائم على الأدلة هو عدم توفر الوقت (44.1% من المستجيبين) مع وجود 42.8% من الأطباء يستخدمون شبكة الانترنت بمعدل أقل من ساعة أسبوعيا. **الخلاصة**: علم طب الأسنان القائم على الأدلة ليس مفهوم معرفي لدى أطباء الأسنان الإيرانيين، مع نسبة كبيرة منهم يفضلون استشارة الزملاء أكثر من طلب الدليل عن طريق قواعد البيانات الإلكترونية.

مفتاح الكلمات: طب أسنان قائم على الأدلة؛ اتجاهات؛ المعرفة؛ إيران.

Advances in Knowledge

- *According to the literature review and to the best of our knowledge, no studies have been carried out in Iran to evaluate Iranian dental practitioners' use and knowledge of evidence-based dentistry (EBD).*
- *Based on the findings of the present study, EBD is not a familiar concept for Iranian dentists.*

Applications to Patient Care

- *Teaching EBD to dental students is the key to increasing the proportion of treatments based on dental evidence and thus enhancing their quality and patient outcomes.*

Evidence-based medicine (EBM) is an accepted activity in the medical field worldwide.[1,2] EBM entails the application of the best results of clinical research studies to improve the quality of decision-making during the treatment of patients and to pave the way to achieving the best treatment modalities.[3]

Evidence-based dentistry (EBD) has attracted the attention of researchers in tandem with EBM.[4] The American Dental Association defines EBD as "an approach to oral healthcare that requires the judicious integration of systemic assessments of clinically relevant scientific evidence, relating to the patient's oral and medical condition and history, with the dentist's clinical expertise and the patient's treatment needs and preferences".[5,6] EBD is valuable and useful in many ways. It has been demonstrated that dentists who make their decisions based on evidence, rather than personal ideas and judgments, improve their clinical skills and expertise.[1–6] Dentists can improve

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the quality and results of treatment by using EBD in accordance with clinical results; furthermore, they will be able to judge the advantages and disadvantages of potential treatment modalities after evaluating the validity of the available evidence. In addition, the awareness that treatments received are based on the best evidence available may increase patient trust in dental services. Therefore, EBD is considered a necessity in the routine treatment of patients and has gained great popularity.[2,4]

Teaching EBD to current dental students is key to increasing the proportion of treatments that are based on evidence in the future.[7–9] This type of education facilitates a dentists' understanding of basic and applied sciences and also their knowledge on how to treat difficult cases.[8] As a result, dental students will be able to update their knowledge after graduation using this method; this newly gained information will affect the clinical treatments they choose thereafter.[10,11] At present, EBD has opened new horizons in dental research. Additionally, by applying EBD, the existing gap between dental researchers and clinicians decreases.[12,13] EBD also opens up a large number of new fields for dental research, but this opportunity is in need of more extensive evaluation. It will be necessary for dental researchers to work hard in order to achieve the aims of EBD.[14,15]

Based on these points and considering that, to the best of the authors' knowledge, no previous studies have been carried out in Iran to evaluate this practice, the present study was designed to evaluate the knowledge and use of EBD among Iranian dental practitioners.

Methods

In this cross-sectional study, a self-administered questionnaire was designed, modelled after similar studies.[16–18] The researcher-designed questionnaire included three sections. The first section consisted of five statements about the process and benefits of EBD. Respondents had to judge these statements according to a 3-point Likert scale: "correct", "incorrect" or "don't know". To calculate the total knowledge score, each correct answer received a score of 1, with a score of 0 being given for wrong answers or for "don't know". The second section consisted of six terms related to EBD; respondents had to state their knowledge of these terms by selecting "know well", "little is known" or "don't know anything". Responses were calculated as percentages for each term, with a score of 0 being given for wrong answers or for "don't know". The third section consisted of six questions relating to the respondents' information sources in the case of treatment uncertainties and their use of online information sources; respondents could make multiple choices in response to these questions. The answers were recorded as percentages.

The scientific reliability of the questionnaire was confirmed by two experts in the field using Hamilton methods. These experts labelled the validity of the questionnaire as optimal and all of the items were deemed highly appropriate. In the next stage, the questionnaire was given to 20 dental practitioners to evaluate its internal consistency, which yielded a Cronbach's alpha coefficient of 0.71 for the section regarding knowledge of the EBD terms and a value of 0.63 for questions regarding the process and benefits of EBD.[10] The necessary revisions were then made. The difference in proportions formula was used and, based on the pilot study results ($\alpha = 0.05$, $P = 38\%$, $d = 70\%$), the sample size was calculated to be 300.

The questionnaires were distributed among dentists attending the 52nd National Annual Congress of the Iranian Dental Association in April 2012; they were selected by a convenience sampling procedure. The volunteers were asked to fill in the questionnaires anonymously and return them at the end of the lectures after having been given sufficient time to complete them. Each participant completed a separate questionnaire sheet which included questions about age, gender and graduation year. Questionnaires that were returned with more than 30% of the questions unanswered were excluded from the study and the non-response rate was determined. All responses were kept confidential.

Data were analysed using Pearson's chi-squared test for the comparison of frequencies and mean scores and the Statistical Package for the Social Sciences, Version 16 (IBM, Corp., Chicago, Illinois, USA). A P value of <0.05 was considered significant. This study was approved by the Ethics Committee of Kerman University of Medical Sciences (No. K.91.54).

Results

A total of 310 dental practitioners completed the questionnaire with a response rate of 100%. Of the respondents, 65.6% were male, with 80.7% being general dental practitioners. A total of 64.4% of the practitioners had graduated from one of the major dental university faculties in Iran (Tehran, Mashhad, Shiraz and Isfahan) and 6.8% had graduated from universities abroad. A total of 43.2% of the respondents worked in private offices and only 3.9% were involved in academic activities. The mean age of the respondents was 39.4 ± 9.1 years, with an age range of 23–70 years.

The mean number of years since graduation was 9.87 ± 8.3, with a range of 1–47 years. The majority of the participants had graduated between 1–5 years previously and 8.5% had graduated more than 20 years previously [Table 1].

Regarding the first part of the questionnaire, participants responded to five statements designed to test the participants' knowledge of the process and benefits of EBD [Table 2]. The highest frequency of correct answers was related to the statements that EBD is a process of making decisions based on scientifically proven evidence and that it allows dentists to improve their knowledge and clinical skills (82% for each). The most frequently incorrectly answered statement was the third one—that evidence from all published articles in scientific journals can be used in EBD (46.5%). The mean total knowledge of the respondents was 3.66 ± 1.19 out of a maximum score of 5. No significant relationship was noted between the knowledge scores and any of the demographic data ($P = 0.12$). The mean knowledge scores for general dental practitioners and specialists were 3.66 ± 0.75 and 3.7 ± 0.16, respectively, with no statistically significant differences ($P = 0.23$).

For the second section of the questionnaire regarding terms related to EBD, the majority of the respondents chose "little is known" when presented with standard EBM terms such as "clinical effectiveness", "relative risk", "systematic review", "critical appraisal" and the "Cochrane Collaboration" [Table 3].

Table 1: Demographic profiles of the participants (N = 310)

Parameter		n	%
Gender	Male	203	65.6
	Female	107	34.4
University experience	Major university	199	64.4
	Minor university	89	28.8
	Universities abroad	22	6.8
Type of activity	Clinic	69	22.4
	Dental office	151	48.8
	Dental faculty	90	28.8
Years since graduation	1–5	82	32.9
	6–10	69	27.7
	11–15	42	16.9
	16–20	36	14.5
	>20	25	8.49

In the third section, there were six questions on the participants' clinical information sources. In response to the first question: "If you have any uncertainties in any of the treatment procedures, which sources do you use to resolve the uncertainty and find a proper

Table 2: Frequency of answers to selected statements eliciting knowledge of evidence-based dentistry processes and benefits (N = 310)

Statements	Male			Female			Total			*P value
	C n (%)	IC n (%)	DK n (%)	C n (%)	IC n (%)	DK n (%)	C n (%)	IC n (%)	DK n (%)	
EBD is a process of making decisions based on scientifically proven evidence.	251 (81.1)	20 (6.7)	39 (12.2)	259 (83.7)	11 (3.5)	40 (12.8)	254 (82)	17 (5.6)	39 (12.4)	**0.001
EBD involves a series of steps from identifying the clinical question, finding the answer/evidence, assessing the validity of the evidence, to applying it if clinically suitable.	241 (78)	18 (6.1)	51 (15.9)	104 (33.7)	128 (41.3)	78 (35)	239 (77.2)	21 (6.8)	50 (16)	**0.001
Evidence from all published articles in scientific journals can be used in EBD.	115 (37.2)	138 (44.5)	57 (18.3)	97 (31.4)	159 (51.2)	54 (17.4)	109 (35.2)	118 (46.8)	83 (18)	0.06
EBD benefits patients by improving quality and effectiveness of clinical treatments.	247 (79.8)	34 (11)	29 (9.2)	235 (75.9)	35 (11.6)	40 (12.8)	243 (78.3)	35 (11.2)	32 (10.4)	**0.001
EBD allows dentists to improve their knowledge and clinical skills.	254 (81.7)	34 (11)	22 (7.3)	256 (82.6)	22 (7)	32 (10.5)	254 (82)	30 (9.6)	26 (8.4)	**0.001

C = correct; IC = incorrect; DK = don't know; EBD = evidence-based dentistry.

**Pearson's chi-squared test; **Significant.*

Table 3: Frequency of answers and percentage of participants who responded "know well", "little is known" or "don't know anything", regarding selected evidence-based dentistry terms (N = 310)

Terms	Male			Female			Total			*P value
	KW n (%)	LK n (%)	DK n (%)	KW n (%)	LK n (%)	DK n (%)	KW n (%)	LK n (%)	DK n (%)	
EBD	43 (14)	174 (59.3)	93 (26.7)	62 (20)	177 (57.2)	71 (22.8)	72 (23.2)	174 (56.1)	64 (20.7)	**0.001
Clinical effectiveness	68 (22.1)	144 (46.5)	98 (31.4)	73 (23.6)	155 (50)	82 (26.4)	76 (24.4)	161 (51.8)	73 (23.8)	**0.001
Relative risk	43 (14)	162 (52.3)	105 (33.7)	56 (18)	162 (52.4)	92 (29.6)	62 (20.1)	162 (52.4)	86 (27.4)	**0.001
Systematic review	102 (32.6)	119 (38.4)	89 (29.1)	101 (32.8)	129 (41.6)	80 (25.6)	102 (32.9)	134 (43.3)	74 (23.8)	0.07
Critical appraisal	54 (17.4)	137 (44.2)	119 (38.4)	85 (27.3)	112 (36.2)	113 (36.7)	76 (24.4)	127 (40.9)	107 (34.8)	0.08
Cochrane Collaboration	25 (8.1)	97 (31.4)	188 (60.5)	46 (14.8)	99 (32)	165 (53.2)	57 (18.3)	102 (32.9)	151 (48.8)	**0.01

KW = know well; LK = little is known; DK = don't know anything; EBD = evidence-based dentistry.
**Pearson's chi-squared test; **Significant.*

solution?" the respondents chose the following items in descending order: "refer to reference books" (71.6%), "ask colleagues" (70.7%), "refer to electronic sources and databases" (40.3%) and "continue the procedure based on personal experience and judgment" (29.4%). No statistically significant differences were noted between the mean knowledge scores of the respondents and the use of difference information sources (P = 0.08). In response to the second question: "Do you use the available research evidence in various databases to find answers to your clinical questions?", the majority of respondents chose "sometimes" (44.5%). The other responses to this question were "always" (9.0%), "mostly"(31.3%), "seldom"(14.2%) and "never"(1.0%), respectively. In response to the third question "How many hours a week do you use websites to promote your knowledge in dentistry?", most respondents (42.8%) replied that they spent less than an hour a week searching the Internet. In response to the fourth question, only 0.8% of the respondents spent more than 10 hours a week using the Internet as an information resource. No statistically significant relationships were noted between the mean knowledge scores of various groups in relation to the use of databases in order to find answers to clinical questions and their weekly use of the Internet (P = 0.11). In response to the fifth question, "What is the most important obstacle to your routine use of EBD?", the most frequent answer was "lack of time" (44.1%). In response to the sixth question "Have you ever participated in any EBD educational programs?", 81.6% of respondents answered that they had not participated in any EBD educational programmes to date.

Discussion

In order to develop appropriate treatment plans, dentists should combine the treatment needs and preferences of the patient with the best available scientific evidence as well as the dentist's own clinical expertise.[19–21] EBD champions are committed to improving the quality, effectiveness and appropriateness of dental care through the application of evidence-based principles and tools.[22–24] Additionally, EBD leads to better oral healthcare by allowing the dentist systematically to collect and analyse scientific evidence to answer a specific clinical question.[20,21,25,26] EBD requires dentists to learn new skills not traditionally taught in dental schools. A great deal of motivation is therefore required by older clinicians who are comfortable with the conventional model for clinical decision-making.[27] The importance of evidence in teaching and in the support of clinical decisions is well-established in healthcare, including dentistry.[28]

The literature contains very little information on the knowledge and use of evidence-based practice for the dental field. Three papers have investigated dental professionals, general dental practitioners and dentists in both the private and public sector.[16,18,29] Several studies had differing response rates. In a study carried out by Iqbal *et al*. the response rate was 69.6%.[16] McInerney *et al*. had a 8.8% response rate;[30] in contrast, the present study evaluated the knowledge and use of EBD by Iranian dental practitioners with a 100% response rate. The variation in these response rates could be attributed to the differences in research methodologies between these studies. In some studies, the questionnaires were sent to the dental

practitioners in traditional hard copy format—it has been suggested that responses to electronic surveys are generally lower than those of paper surveys.[16,31,32–34] However, Kaplowitz *et al*. showed that web surveys can achieve a comparable response rate to mailed hard copy surveys.[35]

Another factor that differed significantly in the present study was the number of years of experience of the study participants. Almost one-third of respondents (32.9%) had graduated 1–5 years before the study took place. However, in a study carried out by Yusof *et al*., 36.8% of the participants had at least 20 years of work experience.[17] In the study by Iqbal *et al*., 62% of the respondents had worked as dental practitioners for more than 15 years.[16] Under half (44.8%) of McInerney *et al*.'s sample were in senior positions.[30] Over half (53.3%) had worked at the university for 10 years or longer while only 33.3% had been practising for between 2–5 years.[30] It appears that the relatively limited job experience of the dental practitioners in the present study might be attributed to the large number of dental practitioners who have recently graduated in Iran.

The majority of participants in the present study were familiar with the correct definition of EBD and were also aware that EBD develops clinical knowledge and expertise (82% for each). In addition, 77.2% of participants gave correct responses to the various steps constituting EBD and 78.3% confirmed the efficacy of EBD in helping patients. However, 46.8% of participants gave the wrong answer to the statement asserting that all articles published in scientific journals are suitable to be used in EBD, which was remarkable. This finding is consistent with the results of the study carried out by Yusof *et al*.[17]

In Iqbal *et al*.'s study, most respondents felt that the use of evidence-based practice and EBD is important and they showed great interest in learning more.[16] Another study by Richards *et al*. found that more than two-thirds of respondents were aware of EBD, which is consistent with other research.[16,30,36,37] Similarly to results reported by Yusof *et al*., the current study found no significant relationship between the knowledge scores of the participants and their demographic data, including age, gender and number of years since graduation.[17]

In the present study, the majority (34–56%) of participants chose the response "little is known" for terms related to EBD. Yousof *et al*. found that the knowledge rates of dental practitioners were 80%, 71% and 61.5% for the evidence-based practice terms "EBD", "systematic review" and "critical appraisal", respectively; these were higher than the rates in the present study.[17] However, another study also reported that surveyed dentists had little understanding of the terminologies involved in EBD, with only about a third of the dentists able to choose the correct definitions for "EBD", "critical appraisal" and "systematic review".[38] The concept which was defined correctly most often was "critical appraisal" (31.6%) and "evidence-based practice" (30.7%), followed by "systematic review" (21.1%).[38] Additionally, in the current study, many more dentists were able to correctly define "critical appraisal" (54%) as opposed to "evidence-based practice" and "systematic review", which is similar to findings by other investigators.[6,17,22,39]

McColl *et al*. reported that most of their respondents had some understanding of the technical terms used in evidence-based practice and a third felt capable of explaining these terms to others.[39] These findings are confirmed by Fritsche *et al*.'s finding that "self-perception of ability in EBM correlates poorly with objective assessment of knowledge and skills".[40] In addition, Morris *et al*. found that clinicians who have not undertaken any formal education in evidence-based practice have generally been found not to have the necessary skills or knowledge to search for information.[41]

The Cochrane Collaboration is a fast-growing international organisation founded in 1992, and is an excellent source of systematic reviews in all fields of healthcare. This source is fundamental in the use of EBD, particularly as it includes the Cochrane Oral Health Review Group, which addresses the prevention, treatment and rehabilitation of oral, dental and craniofacial diseases and disorders.[18,42] In this study, the rate of unfamiliarity of dental practitioners with the Cochrane collection was 48.8%, which is similar to findings from other studies.[17,18,34,42] In a study carried out by Iqbal *et al*., more than 73% of the respondents were unfamiliar with the term.[16] Adeoye similarly found that the majority of dentists were unaware of the Cochrane Collaboration.[38]

A total of 3.2% of respondents in the current study believed that the use of electronic databases was the only reliable method to achieve certainty in difficult cases. This interesting finding was similar to the rate reported by Iqbal *et al*. (2%).[16] However, the use of electronic databases along with other sources (including consultation with colleagues) comprised 40.32% of responses by the dental practitioners as a way to solve clinical problems, which was consistent with other reports.[17,24,41,42] Adeoye found that only two participants reported using an electronic database in cases of doubt; however, this source of information is usually the most accurate and up-to-date option.[38] In the study by Richards *et al*., the three most frequent actions chosen by the respondents when

faced with clinical uncertainties were to "ask friends and colleagues", "refer the patient" and/or "consult textbooks."[36] Slawson *et al*.[43] found that more than half of the respondents asked friends or colleagues when uncertain about a treatment choice.[34] Experts and colleagues have proven to be a quick, cheap and easy-to-use source of information as well as providing dentists with guidance, support, affirmation and other psychological benefits that computerised sources cannot provide. Textbooks were also consulted by some of the respondents, which could be problematic as textbooks are often already out-of-date by the time they are published. Therefore, it appears that dental practitioners currently only accept the use of electronic databases concomitantly with other more conventional methods, including consultation with colleagues. The authors recommend using Index Medicus, PubMed, the Cochrane Collaboration, SCOPUS, OVID, Oxford University Press, ProQuest, Science Direct, Springer, the British Medical Journal, the Journal of the American Medical Association and Google Scholar as the best online resources to consult for EBD.

In response to the question "How many hours a week do you use websites to promote your knowledge in dentistry?", most respondents (42.8%) replied that they spent less than an hour a week doing so. Only 0.8% of the respondents spent more than 10 hours a week searching websites to enhance their dentistry knowledge. Hadley *et al*. reported that only 19.9% of their research population searched the medical literature more than once a week and 24.6% searched only once every 1–2 weeks; the rest searched less frequently or not at all.[28] Only 38.2% of their sample reported that they read regularly every week to keep up-to-date. In this study, 43.5% reported that they spent 1–3 hours per week reading. This finding may be lower than that of Jette *et al*. who reported that 66% of their sample read an average of two to five articles per month.[44] Davidoff *et al*. suggested that a general physician would need to read 17 articles each day to keep up with the current medical literature.[45] In response, Sackett *et al*. suggested that a journal club can be a useful forum to develop and enhance critical appraisal skills.[46]

The most important reported obstacle in the present study as regards the routine use of EBD was lack of sufficient time, which is consistent with the findings of Yusof *et al*.,[17] Coleman *et al*.[47] and Bader.[48] However, Yusof *et al*. reported that the second most important obstacle was financial problems (40%).[17] Studies in medicine and dentistry have previously shown that clinicians do not have the time or inclination to appraise the evidence gathered from research themselves.[18,32,39,42,49] In the study carried out by Yusof *et al*., 22.2% of respondents reported a lack of the necessary skills to critically evaluate scientific articles as an obstacle to turning to EBD.[17] However, only 5.3% of respondents in the present study reported it as an obstacle. It appears the respondents in the present study primarily focussed on their lack of time, which may have resulted in their overlooking other obstacles which might play a more important role. Similar results have been reported by Rabe *et al*. from Sweden who discovered that one of the most common perceived barriers towards EBD among dental professionals was lack of time.[18]

Barriers to the application of EBD have been highlighted in previous studies. Upton *et al*. found that barriers to implementing evidence-based practice were similar for allied health professions and health science services, with the lack of both time and money cited as the main obstacles to implementing evidence-based practice.[50] Rabe *et al*. found that the most commonly perceived barriers to evidence-based practice were a lack of time and the poor availability of evidence.[18] Morris *et al*. obtained a 48.6% response rate to a postal survey of students who had undertaken an evidence-based practice module and reported that the greatest barriers to accessing and reviewing information were related to issues of time and lack of availability, with 48% stating that they had insufficient time to find research reports and 29% stating that reports were not available.[41] Jette *et al*. found that more physical therapists reported having access to the Internet at home (89%) in comparison with work (65%) and that 46% rated insufficient time as the most important barrier to the use of evidence-based practice.[44]

The results of the present study and other similar studies show that EBD is not well recognised in developing countries. Akadiri *et al*. carried out a study in dental faculties in Nigeria, concluding that only six articles related to EBD had been published in Nigeria. The respondents, who were members of the academic staff of these faculties, had little information about the principles of EBD, although they were aware of its exisistence.[37] In the present study, 81.6% of respondents had not participated in any EBD educational courses to date; however, Iqbal *et al*. reported a rate of 86% for this variable.[16] In the study carried out by Yusof *et al*., 81.3% of respondents had expressed interest in taking part in such courses.[17]

Finally, the results of this study found that dentists in Iran pay little attention to EBD for many reasons. The main factors were a lack of EBD education in dental schools and the fact that the respondents were

not familiar with EBD websites. Moreover, there is a deficit of research studies and papers in the field of EBD.

Conclusion

The results of the present study show that specialists and dental practitioners in Iran are not sufficiently familiar with EBD, choosing instead to use more conventional methods to find answers to clinical questions, such as consultations with colleagues, rather than using the Internet and other electronic resources. A lack of EBD education in dental schools and the fact that the majority of respondents in this study were not familiar with EBD websites highlights the need for EBD awareness programmes targeting dental practioners.

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