Dentist's Knowledge of Evidence-based Dentistry and Digital Applications Resources in Saudi Arabia

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ABSTRACT

Objectives: Drug information resources provide clinicians with safer use of medications and play a vital role in improving drug safety. Evidence-based medicine (EBM) has become essential to medical practice; however, EBM is still an emerging dentistry concept. Therefore, in this study, we aimed to explore dentists' knowledge about evidence-based dentistry resources in Saudi Arabia. **Methods:** This is a 4-month cross-sectional study conducted to analyze dentists' knowledge about evidence-based dentistry resources in Saudi Arabia. We included dentists from interns to consultants and those across all dentistry specialties and located in Saudi Arabia. The survey collected demographic information and knowledge of resources on dental drugs. The knowledge of evidence-based dental care and knowledge of dental drug information applications. The survey was validated through the revision of expert reviewers and pilot testing. Moreover, various reliability tests had been done with the study. The data were collected through the Survey Monkey system and analyzed using Statistical Package of Social Sciences (SPSS) and Jeffery's Amazing Statistics Program (JASP). **Results:** A total of 260 dentists responded to the survey. Of them, 51% were interns, 85% as dental staff with three years or less experience by 88.46%. The results showed that most responders (56.76%) did not know that the Evidence-Based Dentistry (EBD) database is a part of the drug information resource. Their institution does not establish it. Almost half of the responders (48.23%) were not familiar with the digital application of dental drug information resources. The average knowledge of dentists regarding EBD drug information resources was 48%. Furthermore, the majority of the resources that the dentists frequently accessed were MEDLINE/PubMed (77.69%), American College of Physicians (www.acponline.org/ clinical information/ guidelines/) (73 (28.08%), and Guideline.gov (www.guideline.gov) (71 (27.31%). **Conclusion:** There was inadequate knowledge of evidence-based dentistry of drug information resources in Saudi Arabia. Implementation of these findings is vital for optimizing patient outcomes, improving clinical practice, and patient care.

Key words: Dentist, Knowledge, Evidence-based Dentistry, Digital Application, Resources, Saudi Arabia.

INTRODUCTION

Drug information is needed to assist various clinical decisions and utilize well-supported evidence for better patient care and clinical outcomes. Medical information encompasses information focused on healthcare professionals, patients, and consumers with the primary goal of educating and ensuring the quality, safety, effectiveness, and appropriate utilization of medicines.[1] With the high growth in electronic drug information resources, information via online sources has dramatically increased. Several studies have shown that physicians rely upon varied information sources in acquiring knowledge about drugs.[2] Haug's meta-analysis indicated that physicians most frequently found medical information in desk references (journals and books) and through consultations with colleagues.[3,4]

Evidence-based medicine (EBM) recognizes that the practitioner has to use both individual clinical experiences and the preferable available evidence and that neither alone is enough.[5] Consideration of the patient's needs and preferences is also an integral part of the clinical application.[6] As in medicine, dentistry has adopted the concept of evidence-based practice. In evidence-based dentistry (EBD), patients present with situations that may be addressed with various treatment plans, which may differ among practitioners. The dental team also includes technicians who may have a significant influence on treatment decisions.[7]

For the past 30 years, healthcare providers have used the concept of EBM. This term is used by medical professionals, whereas other healthcare professionals use the same idea but with a different name; for instance, pharmacists use the evidence-based pharmacy, and dentists use EBD. The majority of them use the same tools, concepts, and resources with a slight difference in problems or some references. In 1990, the American Dental Association (ADA) indentured EBD as follows:

"...evidence-based dentistry is an approach to oral health care that requires the judicious integration of systematic 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.[6] One of the significant EBD elements is searching for EBD resources, including journals, textbooks, or databases. Several studies have discussed the concept of EBD, different methodologies, tools, and

resources in dental practice. However, the assessment of the knowledge of dentists about resources on EBD has not been conducted yet. Moreover, most healthcare providers, including dentists, use online resources and faraway from drug information services that have included applications used through windows OS or Androids OS with small friendly devices such as mobile. Sometimes used those devices for searching EBD resources, or they had special applications for dental drug information resources. The assessment of dental knowledge of applications of drug information resources was very rare. The authors were not aware of any investigation about the dentist's knowledge of EBD or application drug information resources in Saudi Arabia, Gulf, and Arabian countries. This study aims to explore dentist knowledge of EBD or application drug information resources in Saudi Arabia.

METHODS

This is a 4-month cross-sectional study conducted to evaluate dentists' knowledge about various resources on EBM drugs in Saudi Arabia. It is a self-reported electronic survey of dentists. The responders included dentists who were interns to consultants and those across all dentistry specialties and located in Saudi Arabia. Responses received from non-dentists or students, and incomplete surveys were excluded from this study. The survey consisted of two parts. The first part collected demographic information of the responders. The second part was contained questions about the responders' knowledge of evidence-based dental care and expertise in dental drug information digital applications. We collected the responses on a 5-point Likert response scale system. According to the previous studies, the sample was calculated as a cross-sectional study with unlimited population size, a population percentage of 50%, a confidence level of 95% with a z score of 1.96 and margin of error of 5–6.5%, and drop-out rate of 10%. Based on these criteria, the sample size was calculated as 251 to 432 with a power of study of 80%.[8-10] The response rate required to achieve the calculated sample size was at least 60–70% and above.[10,11]

The survey was distributed to dentists via social media such as WhatsApp and Telegram. A reminder message was sent every two weeks. Expert reviewers validated the survey after pilot testing. Moreover, we obtained the test of the reliability of data by calculating Cronbach's alpha. The data were collected through the Survey Monkey system and analyzed using the SPSS, Jeffery's Amazing Statistics Program (JASP), and Microsoft excel sheet version 16. Descriptive and frequency analysis was performed. The goodness of fit analysis, correlation analysis, and inferential analysis of factors that affect physician's knowledge of adverse drug reaction and reporting system were analyzed. The STROBE (Strengthening the reporting of observational studies in epidemiology statement: guidelines for reporting observational studies) guided the reporting of the results of this study.[12,13]

RESULTS

A total of 260 dentists responded to the survey, with most of them coming from the northern (75 (28.85%)) and central regions (64 (24.62%)), with a statistically significant difference between all areas (p<0.001). Of them, 153 (59.30%) responders were male, and 105 (40.7%) were female, with a statistically significant difference between them (p<0.003). The majority of the dentists (257 (98.85%)) were in the age group of 24–35 years, with a statistically significant difference among all the age groups (p<0.001). Almost half of the dentists were interns (135 (51.92%)) followed by residents (63 (24.23%)) and General Practitioner 62 (23.85%), with statistically significant differences among them (p<0.001). Most of the responders were dental staff (222 (85.38%)), with a statistically significant difference between the type of positions (p<0.001). Most of the dentists had three years of work experience (230 (88.46%)), with more than half of them being non-specialized dentists (217 (84.44%)), with a statistically significant difference between the number of years of experience (p<0.001) (Tables 1 and 2). The average knowledge of EBD drug information resources was 48%. Furthermore, according to our results, the most frequently used resources by dentists were MEDLINE/PubMed (202 (77.69%)), American College of Physicians (www.acponline.org/ clinical information/ guidelines/) (73 (28.08%)), and Guideline.gov (www.guideline.gov) (71 (27.31%)) (Table 3). Almost half of the dentists (48.23%) were not familiar with Apps regarding dental drug information. The most frequently used resources were MedCalc Pro (30 (11.72%)) (Table 4). The reliability test of McDonald's ω (0.665), Cronbach's α (0.777), Gultman 2 (0.794), and Gultman 6 (0.823) in regular biostatistics, whereas in Bayesian Biostatistics, the reliability tests were McDonald's ω (0.671), Cronbach's α (0.775), Gultman 2 (0.794), and Gultman 6 (0.825).

DISCUSSION

Drug information resources provide clinicians with information on the safe use of medications and play a vital role in improving drug safety. These resources should be well-equipped with all the necessary resources for providing detailed and updated information on medication inquiries.[14] Therefore, the need to use drug information resources shows a positive impact on improving drug therapy outcomes. The provision of unbiased and authentic information can help in diminishing the occurrence of drug-related complications and assure drug safety to an extent.[15-17] Evidence-based practice is an approach with findings that uses the best

Table 1: Demographic, social information.

Nationality	Response Count	Response Percent	*p*-value
Central area	64	24.62%	< 0.001
North area	75	28.85%	
South area	31	11.92%	
East area	36	13.85%	
West area	54	20.77%	
Answered question	260		
Skipped question	0		
Gender	**Response Count**	**Response Percent**	
Male	153	59.30%	< 0.003
Female	105	40.70%	
Answered question	258		
Skipped question	2		
Age	**Response Count**	**Response Percent**	
24–35	257	98.85%	< 0.001
36–45	3	1.15%	
46–55	0	0.00%	
> 55	0	0.00%	
Answered question	260		
Skipped question	0		

Table 2: Demographic, social information.

Dentist Qualifications	Response Count	Response Percent	*p*-value (chi X2)
Intern	135	51.92%	< 0.001
Resident	63	24.23%	
General Practitioner	62	23.85%	
Specialist	0	0.00%	
Consultant	0	0.00%	
Answered question	260		
Skipped question	0		
Position Held	**Response Count**	**Response Percent**	
Director of dental unit	5	1.92%	< 0.001
Assistant director of dental unit	2	0.77%	
Dental Director	31	11.92%	
Dental staff	222	85.38%	
Answered question	260		
Skipped question	0		
Years of experiences at Dentists career	**Response Count**	**Response Percent**	
< 1	149	57.31%	< 0.001
1 – 3	81	31.15%	
4 – 6	28	10.77%	
7 - 9	2	0.77%	
> 9	0	0.00%	
Answered question	260		
Skipped question	0		
Dentist Specialties	**Response Count**	**Response Percent**	
Dental Public Health	6	2.33%	< 0.001
Endodontics	8	3.11%	
Oral and Maxillofacial Surgery	1	0.39%	
Oral Medicine and Pathology	0	0.00%	
Oral and Maxillofacial Radiology	0	0.00%	
Orthodontics and Dentofacial Orthopedics	1	0.39%	
Pediatric Dentistry	1	0.39%	
Periodontics	0	0.00%	
Prosthodontics	5	1.95%	
Restorative dentistry	18	7.00%	
Special needs dentistry	0	0.00%	
Non-applicable	93	36.19%	
General practitioner	124	48.25%	
Answered question	257		
Skipped question	3		

current research evidence to help make healthcare decisions. Evidence-based practice's primary goal is to give patients the most recently available treatment that is safe, effective, and efficient and continuously improve patient care based on new research developments.[5,18]

In dentistry, evidence-based practice is less developed but is quickly gaining momentum. The American Dental Association has made a concerted effort to incorporate evidence-based practice into the United States' dental field; its website has an entire section devoted to EBD.[19]

In this study, we investigated the knowledge of dentists about various drug information resources. With abundant resources available on drug information, quality is crucial to utilize the evidence in the clinical setting with paramount confidence.[20] In the previous twenty years, the meaning of EBM has become the standard of medical care, defined as "the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients".[5] In dentistry, however, evidence-based practice is still an emerging concept. An increasing number of published articles; which are intended to help clinicians work through the confusion associated. Also, recognizing and understanding crucial clinical research and providing the individual clinician a means to achieve increased confidence in the clinical decision-making process.[21]

In this study, we investigated an appropriate representative sample of dentists using a cross-sectional design. Our results showed that the average knowledge of all EBD resources was less than 50%, which was reflected in the insufficient understanding of EBD drug information resources. Our results showed that the majority of the dentists knew about PubMed. This result was expected because they had been accessing PubMed during their undergraduate course and well-known old resources. The other two most accessed resources were the American College of Physicians (www.acponline.org/clinical information/guidelines/) and Guideline.gov (www.guideline.gov) websites; that's might be because either some dentists had undertaken courses on EBD or they might have been taught during their period. Our results on dentists' knowledge about EBD drug information resources were good enough because most of the resources were not available at their working sites. The students continuously demand education and training on EBD drug information.

Our survey results revealed that most dentists did not know about the EBM Database as a drug information resource, and their institution does not establish it. It is necessary to develop and enhance dental curricula as our sample consisted of only interns. According to a previous study, the curriculum should incorporate learning objectives to clarify the importance of clinical decision-making based on the best available evidence.[22] This training should include incorporating specific learning objectives related to the principles of EBD through the curriculum.

Publishing a research paper is an essential requirement during the final year of graduation in dentistry. Our results show that 71.88% of the responders used Google Scholar to access information during their graduation. The majority of the responders used MEDLINE/PubMed for more practical training on information seeking and reviewing and interpreting scientific articles' results, which is a positive finding. Lack of resources was another significant barrier. Gaps exist in the extent to which technology has been fully integrated into dental practices. These findings are partially the result of continuously emerging techniques and partially attributable to dentists' attitudes toward innovation. Further development of EBD is needed before it becomes a productive and widely used part of practice.[23]

Regarding dentists' knowledge about drug information applications, our results showed poor knowledge with less than 10% of the study sample; they used selected drug information applications while almost half of the responders do not know those applications. That might be related to the responders not using the dental apps and devices for drug

Table 3: The frequent type of dental evidence-based for drug information resources used by the dentist.

	Yes		No		I do not know the references		Available at your institution		Total
MEDLINE/Pubmed	77.69%	202	8.08%	21	13.46%	35	5.38%	14	260
EMBASE	9.38%	24	37.11%	95	53.52%	137	0.00%	0	256
National Institute of Health and Clinical excellence	7.81%	20	32.81%	84	58.98%	151	0.39%	1	256
National Comprehensive Cancer Network	8.17%	21	35.02%	90	56.81%	146	0.00%	0	257
Clinical Trail.gov	14.29%	37	37.45%	97	48.26%	125	0.00%	0	259
JAMA-evidence	10.00%	26	33.85%	88	56.15%	146	0.00%	0	260
Dynamid	19.53%	50	37.11%	95	43.36%	111	0.39%	1	256
Evidence Based Medicine Database	11.58%	30	31.66%	82	56.76%	147	0.00%	0	259
Up-to-date	3.47%	9	43.63%	113	52.90%	137	0.00%	0	259
Natural Medicine Comprehensive Database	10.89%	28	36.19%	93	52.92%	136	0.00%	0	257
The Cochrane Database of Systematic Reviews	6.23%	16	41.63%	107	52.14%	134	0.39%	1	257
TRIP (Turning Research Into Practice) Database	4.62%	12	37.69%	98	57.69%	150	0.00%	0	260
The Database of Abstracts of Reviews of Effectiveness (DARE)	3.86%	10	40.54%	105	55.60%	144	0.00%	0	259
Guideline.gov (www.guideline.gov)	27.31%	71	31.15%	81	41.54%	108	0.00%	0	260
American College of Physicians (www.acponline.org/ clinical information/ guidelines/)	28.08%	73	53.08%	138	18.46%	48	0.77%	2	260
Open Clinical (www.openclinical.org/ guidelines.html)	4.63%	12	39.77%	103	55.60%	144	0.00%	0	259
CINAHIL	8.91%	23	49.22%	127	41.86%	108	0.00%	0	258
Other (please specify)									0
Answered									260
Skipped									0

Table 4: The frequent type of Applications for dental drug information resources used by dentists.

	Yes		No		I do not know this reference		Total
Skyscape library	7.31%	19	38.08%	99	54.62%	142	260
Read by QxMD	8.88%	23	37.07%	96	54.05%	140	259
PEPID	6.54%	17	38.08%	99	55.38%	144	260
Omnio	7.42%	19	40.63%	104	51.95%	133	256
MedCalc Pro	11.72%	30	42.97%	110	45.31%	116	256
Medhand library	7.72%	20	46.72%	121	45.56%	118	259
Dental clinical mastery	5.77%	15	53.46%	139	40.77%	106	260
Clinical advisor	6.56%	17	55.21%	143	38.22%	99	259
Other (please specify)							3
Answered							260
Skipped							0

information resources. The survey questions were not straightforward and might miss understanding of reading the questions. For instance, some references were written by all library or company publishers. Further study is required to register detailed applications in assessing a dentist's assessment knowledge of using drug information applications. Moreover, our sample represents last year's students with frequently used a MedCalc Pro as a mobile application, which provided quick references for drug information about dosing calculations. That s agrees with the results of a previous study,[24] which demonstrated the medical students embrace and use electronic medical information resources, which could explain the current growth in digital application networks.

Therefore, implementing these findings is vital for optimizing patient outcomes, improving clinical practice, providing cost-effective, high-quality care, and enhancing dentists' credibility. Evaluating the literature and incorporating the results into clinical practice is an essential aspect of dental education. That's maybe one of the most critical skills to pass to the next generation of general dentist practitioners.

LIMITATIONS

It was challenging to find an updated literature or research data about dentist's drug recourses. The sample size of responders did reach the optimal number. The reliability test score came to a desirable level because most of the data was nominal data; those considered the main limitations of our study.

CONCLUSION

EBD is a new archetype and is not well-known to every dentist; creating awareness regarding EBD is imperative to be highlighted. That can create a unique opportunity for dental staff to strive for excellence of scientific knowledge through evidence finding processes that have a potential role in improving patient healthcare services.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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Consent for Publications

Informed consent was obtained from all the participants

Ethical Approval

This research is exempted from research and ethical committee or an institutional review board (IRB) approval.
https://www.hhs.gov/ohrp/regulations-and-policy/decision-charts-2018/index.html

ABBREVIATIONS

MOH: Ministry of Health; **KSA:** Kingdom of Saudi Arabia; **ADA:** American Dental Association; **OS:** Operating System; **EBD:** Evidence-based dentistry; **SPSS:** Statistical package of social sciences; **JASP:** Jeffery's Amazing Statistics Program; **STROBE:** Strengthening the reporting of observational studies in epidemiology; **GDPS:** General dentist practitioners.

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