Dental Drug Information Tertiary Resources: New Initiative Project in Saudi Arabia

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ABSTRACT

Objectives: The textbook of dental drug information resources is a prime reference to dental knowledge. The dental knowledge valuation is appropriate for dental care. The contemporary topic of declaring the updated information about dental medications textbooks. **Methods:** It is a literature review of drug information resources and tertiary resources in dental practice. Searching of PubMed/Medline dated from the 1960s to 2021s. It entailed of all types of research design including market analysis, SWOT analysis, quality management of the project, and management of any risks. The selected drug information resources list was done through resources name, medications coverage, types of publications, either manual or online or mobile applications, frequency of updating, and the publisher. **Results:** The total number of nominated dental tertiary drug information was more than twenty. The tertiary resources are articulated as regular textbooks or online and mobile applications. Some resources were only about dental drug information. They were a potted or in-depth information including some of the resources about disease management with importance on the specialties. Recently, there is a collection of drug information textbooks through a website. This includes choice of selection textbook-based of updated information, method of publications online and applications and cost-related issues. **Conclusion:** Dental drug information resources textbook was vital in the dental care. The collection of textbooks with more than one method of publication online and mobile application are highly endorsed in dental practice.

Key words: Dental, Drug, Tertiary, Resources, Saudi Arabia.

INTRODUCTION

Drug information services are one of the old pharmacy services in Saudi Arabia and other countries. The services want various tools, skills, and references. The references comprised of primary or secondary, and tertiary resources. The resources employed to overcome and meet drug information services counting answering drug information inquiries. Various healthcare professionals exploited drug information services, including physicians, dentists, nurses, and pharmacists. All of them want drug information resources to answer their related inquiries based on their necessities and specialty. The dentists among healthcare providers had drug information resources to response their needs for drug-related information. Back to history investigating were drug information sources applied, the pharmacists and dentist primarily use reference books and textbooks as sources of drug information.[1,2] In the 1978s, the official reference books were the most extensively used information sources.[3] Various studies were showed to evaluate the knowledge or practice or perception of drug information resources in dental care.[2-7] Based on those studies, the dentist had not recognized knowledge or practice of drug information resources.[5,6] In contrast, the dentists had an excellent awareness of utilization and need education or training during undergraduate or postgraduate dentists.[7] However, the author was not familiar with literature or books debated and review drug information resources in dental care in Saudi Arabia or

Middle East countries and the rest of the world. As a outcome, series of literature conversed various drug information resources in dental practice including dental tertiary resources of drug information, and the website of dental drug information resources. Moreover, there are evidence-based dentistry drug information references and mobile dental applications of drug information resources. In the current evaluation, the author will analysis the tertiary references of drug information in dental care.

METHODS

It is a literature review of drug information resources for dentists or drug information references employed during the dental care. In PubMed, the search word is used as a general term, not a subject term. The search comprised all types of studies Clinical Study, Clinical Trial, Clinical Trial, Phase I, Clinical Trial, Phase II, Clinical Trial, Phase III, Clinical Trial, Phase IV, Controlled Clinical Trial, Meta-Analysis, Observational Study, Practice Guideline, Randomized Controlled Trial, Review and Systematic Review. The searching date included 1985 to May 2021. The PubMed search words including as follows:

Dental Drug Information Resources
Filters: Full text, Humans, English
(("dental health services"[MeSH Terms] OR ("dental"[All Fields] AND "health"[All Fields] AND "services"[All Fields]) OR

"dental health services"[All Fields] OR "dental"[All Fields] OR "dentally"[All Fields] OR "dentals"[All Fields]) AND "drug"[All Fields] AND ("inform"[All Fields] OR "informal"[All Fields] OR "informality"[All Fields] OR "informally"[All Fields] OR "informant"[All Fields] OR "informant s"[All Fields] OR "informants"[All Fields] OR "information"[All Fields] OR "information s"[All Fields] OR "informational"[All Fields] OR "information"[All Fields] OR "informative"[All Fields] OR "informatively"[All Fields] OR "informativeness"[All Fields] OR "informativity"[All Fields] OR "informed"[All Fields] OR "informer"[All Fields] OR "informers"[All Fields] OR "informing"[All Fields] OR "informs"[All Fields]) AND ("health resources"[MeSH Terms] OR ("health"[All Fields] AND "resources"[All Fields]) OR "health resources"[All Fields] OR "resource"[All Fields] OR "resources"[All Fields] OR "resource s"[All Fields] OR "resourced"[All Fields] OR "resourceful"[All Fields] OR "resourcefulness"[All Fields] OR "resourcing"[All Fields])) AND ((fft[Filter]) AND (humans[Filter]) AND (english[Filter]))

Dental Drug Information References Filters: Full text, Humans, English

(("dental health services"[MeSH Terms] OR ("dental"[All Fields] AND "health"[All Fields] AND "services"[All Fields]) OR "dental health services"[All Fields] OR "dental"[All Fields] OR "dentally"[All Fields] OR "dentals"[All Fields]) AND "drug"[All Fields] AND ("inform"[All Fields] OR "informal"[All Fields] OR "informality"[All Fields] OR "informally"[All Fields] OR "informant"[All Fields] OR "informant s"[All Fields] OR "informants"[All Fields] OR "information"[All Fields] OR "information s"[All Fields] OR "informational"[All Fields] OR "information"[All Fields] OR "informative"[All Fields] OR "informatively"[All Fields] OR "informativeness"[All Fields] OR "informativity"[All Fields] OR "informed"[All Fields] OR "informer"[All Fields] OR "informers"[All Fields] OR "informing"[All Fields] OR "informs"[All Fields]) AND ("refer"[All Fields] OR "referral"[All Fields] OR "referrals"[All Fields] OR "referred"[All Fields] OR "reference"[All Fields] OR "references"[All Fields] OR "referral and consultation"[MeSH Terms] OR ("referral"[All Fields] AND "consultation"[All Fields]) OR "referral and consultation"[All Fields] OR "referred"[All Fields] OR "referring"[All Fields] OR "refers"[All Fields])) AND ((fft[Filter]) AND (humans[Filter]) AND (english[Filter]))

Dentist Drug Information References Filters: Full text, Humans, English

(("dentist s"[All Fields] OR "dentists"[MeSH Terms] OR "dentists"[All Fields] OR "dentist"[All Fields]) AND "drug"[All Fields] AND ("inform"[All Fields] OR "informal"[All Fields] OR "informality"[All Fields] OR "informally"[All Fields] OR "informant"[All Fields] OR "informant s"[All Fields] OR "informants"[All Fields] OR "information"[All Fields] OR "information s"[All Fields] OR "informational"[All Fields] OR "information"[All Fields] OR "informative"[All Fields] OR "informatively"[All Fields] OR "informativeness"[All Fields] OR "informativity"[All Fields] OR "informed"[All Fields] OR "informer"[All Fields] OR "informers"[All Fields] OR "informing"[All Fields] OR "informs"[All Fields]) AND ("refer"[All Fields] OR "referral"[All Fields] OR "referrals"[All Fields] OR "referred"[All Fields] OR "reference"[All Fields] OR "references"[All Fields] OR "referral and consultation"[MeSH Terms] OR ("referral"[All Fields] AND "consultation"[All Fields]) OR "referral and consultation"[All Fields] OR "referred"[All Fields] OR "referring"[All Fields] OR "refers"[All Fields])) AND ((fft[Filter]) AND (humans[Filter]) AND (english[Filter]))

Dentist Drug Information Resources Filters: Full text, Humans, English

(("dentist s"[All Fields] OR "dentists"[MeSH Terms] OR "dentists"[All Fields] OR "dentist"[All Fields]) AND "drug"[All Fields] AND ("inform"[All Fields] OR "informal"[All Fields] OR "informality"[All Fields] OR "informally"[All Fields] OR "informant"[All Fields] OR "informant s"[All Fields] OR "informants"[All Fields] OR "information"[All Fields] OR "information s"[All Fields] OR "informational"[All Fields] OR "information"[All Fields] OR "informative"[All Fields] OR "informatively"[All Fields] OR "informativeness"[All Fields] OR "informativity"[All Fields] OR "informed"[All Fields] OR "informer"[All Fields] OR "informers"[All Fields] OR "informing"[All Fields] OR "informs"[All Fields]) AND ("health resources"[MeSH Terms] OR ("health"[All Fields] AND "resources"[All Fields]) OR "health resources"[All Fields] OR "resource"[All Fields] OR "resources"[All Fields] OR "resource s"[All Fields] OR "resourced"[All Fields] OR "resourceful"[All Fields] OR "resourcefulness"[All Fields] OR "resourcing"[All Fields])) AND ((fft[Filter]) AND (humans[Filter]) AND (english[Filter]))

Dentistry Drug Information Resources Filters: Full text, Humans, English

(("dentistry"[MeSH Terms] OR "dentistry"[All Fields] OR "dentistry s"[All Fields]) AND "drug"[All Fields] AND ("inform"[All Fields] OR "informal"[All Fields] OR "informality"[All Fields] OR "informally"[All Fields] OR "informant"[All Fields] OR "informant s"[All Fields] OR "informants"[All Fields] OR "information"[All Fields] OR "information s"[All Fields] OR "informational"[All Fields] OR "information"[All Fields] OR "informative"[All Fields] OR "informatively"[All Fields] OR "informativeness"[All Fields] OR "informativity"[All Fields] OR "informed"[All Fields] OR "informer"[All Fields] OR "informers"[All Fields] OR "informing"[All Fields] OR "informs"[All Fields]) AND ("health resources"[MeSH Terms] OR ("health"[All Fields] AND "resources"[All Fields]) OR "health resources"[All Fields] OR "resource"[All Fields] OR "resources"[All Fields] OR "resource s"[All Fields] OR "resourced"[All Fields] OR "resourceful"[All Fields] OR "resourcefulness"[All Fields] OR "resourcing"[All Fields])) AND ((fft[Filter]) AND (humans[Filter]) AND (english[Filter]))

Dentistry Drug Information References Filters: Full text, Humans, English

(("dentistry"[MeSH Terms] OR "dentistry"[All Fields] OR "dentistry s"[All Fields]) AND "drug"[All Fields] AND ("inform"[All Fields] OR "informal"[All Fields] OR "informality"[All Fields] OR "informally"[All Fields] OR "informant"[All Fields] OR "informant s"[All Fields] OR "informants"[All Fields] OR "information"[All Fields] OR "information s"[All Fields] OR "informational"[All Fields] OR "information"[All Fields] OR "informative"[All Fields] OR "informatively"[All Fields] OR "informativeness"[All Fields] OR "informativity"[All Fields] OR "informed"[All Fields] OR "informer"[All Fields] OR "informers"[All Fields] OR "informing"[All Fields] OR "informs"[All Fields]) AND ("refer"[All Fields] OR "referral"[All Fields] OR "referrals"[All Fields] OR "referred"[All Fields] OR "reference"[All Fields] OR "references"[All Fields] OR "referral and consultation"[MeSH Terms] OR ("referral"[All Fields] AND "consultation"[All Fields]) OR "referral and consultation"[All Fields] OR "referred"[All Fields] OR "referring"[All Fields] OR "refers"[All Fields])) AND ((fft[Filter]) AND (humans[Filter]) AND (english[Filter]))

As a result, very few or zero studies came up with it. Another search had been done if pharmacy textbooks of drug information and some google searching engine. The authors employed drug information resources as

a textbook or drug information and tertiary resources for dental medication inquiries. The author planned some parameters to summarize the drug information references appropriate for the dental care. Each resource summary contained of Name of Resource, Content, questions answered, type of resources, Number of medications or Journal covered, Frequently Update and the Last edition: Price, Subscription, Publisher, Manual book, Online version, Website address, Application type, Usage of dental student recommendations, and General dental practitioner usage. This also includes use of specialized or consultant dentists, dentistry specialties.

RESULTS

Assessment of Needs

The practice of dentistry today was the advances in the dental pharmacology and toxicology. It is no accident that dental school curriculum revisions include significant teaching time keen to studying drugs and their application.[8] Corresponding to the augmented acceptance of drug use in dental treatment is the need for dentists to be warned to potential problems resulting from the drug therapy. The National Center for Health Statistics specifies about 295 million visits to dentists per year in the United States, an average of 1.5 visits per person.[9]

Drug information resources deliver clinicians with safer medications and play a vigorous role in improving drug safety. The drug information resources should be well equipped with all the essential resources for providing comprehensive, recent, and up-to-date information on medication queries.[10] The need to use drug information resources have a confident impact on improving the outcomes of drug therapy. The provision of non-biased and authentic information can support in diminishing the occurrence of drug-related complications and assure drug safety during patient care.[11-13] With these people come a wide mixture of medical conditions and drug treatments, many of which will interrelate with the therapeutic dental milieu. The dentist staff should supply the needed drug-use information in these areas. One of the conventional methods of new project assessment is the SWOT analysis. It means strengths, weaknesses, opportunities, and threats of the project.[14] This project's strengths comprise initiating drug information center services or even list for most crucial dentist drug recourses, which complicated actual and appropriate activities, preventing drug-related mistakes, and preventing additional redundant. The weaknesses of this project are not aware of the service, no education or guidance in the usage of the drug information center, difficulties in supporting and funding these services. The opportunities in this project are the implementation of accreditation standards and the accessibility of dentists aware of drug information resources. The threats to this project indicate no dentist attracted in this field and the plan.

Scope of the Project

Resources of drug information can be classified as primary sources, where all other drug information is based such as journal publications on drug-related subjects, such as clinical drug trials, case reports, and pharmacological research. The most suitable evidence comes from randomized controlled trials design. Proper valuation of these trials needs considerable experience,[15-17] where the secondary sources present as a guide to or review of the primary literature includes review articles, meta-analyses, abstracts, and combinations of abstracts and full-text reprints. For an instant, the Medline, Current Contents, International Pharmaceutical Abstracts, Index Medicus, and Excerpta Medica. The last class of drug resources is the tertiary or general sources that provide documented information in a condensed format. Examples include formulary manuals, standard treatment manuals, textbooks, general reference books, drug bulletins, and drug compendia.[18] The vision of

the current project to reach the best dental drug information tertiary resources with high quality and best cost, while the mission of the dental drug information resources is to deliver best extemporaneous and references dental drug information sources by using effective methods. Gaps occur in the extent to which technology has been fully integrated into dental practices. This is partially the result of continuously emerging techniques and partially attributable to different attitudes among dentists towards innovation. Therefore, the objectives of the project are to make choose for most important dentist drug information recourses. Implementation of these findings is energetic for optimizing patient outcomes, improving clinical practice, providing cost-effective high-quality care and attractive the credibility of dentists.

Project Implementation

The cost management plan is one of the indispensable things to implement a dental drug information resources or references is the financial budget related management. The budget should reflect cost-related issues, counting education and training. Besides, the cost of equipment that is desired for the preparation and the management team meetings. The defined budget should be checked throughout the project period implementation. As a result, the project needs the management team, the experts in the dentist drug information resources: the team contains of clinical pharmacists, dentists, dentists' assistants, and nursing. The team should educate and train the dentist and dentist's assistant in drug information-related issues. The team should set up new policies and procedures connected to the drug information services, monitor the program's implementation, and evaluate the outcome with the economic impact of the new services. The dentist staff wants to attend several courses on drug information research and how to deal with it, with updated information on drug therapy for some diseases and vital pharmacology references. Besides, the education and training on drug information resources are decisive for dentist staff and healthcare providers. Another educational course for administrative officers contains the management of the team and higher administration. The project needs to highlight quality management tools called Balance Scored Card as key performance indicators of tertiary dental drug information resources with numerous elements, counting the customer, finance, internal process, education, and innovation.[19] There are risks in the current project: budget, scope, personnel, scheduled, technical, and quality risks. This project might be uncovered to personnel risk due to the shortage of expert dentists. Also, it might be exposed to budget risk. The budget of the education and training for the dental staff. This project might also be bare to technical risks such as material not being obtainable. Quality risks are met due to the untrained dentist being available.[20,21] The total number of selected dental drug information tertiary was twenty on as discovered in Tables 1-3.

DISCUSSION

The healthcare practitioner, counting dentists, denotes to a regular textbook or online or mobile applications when needed. The textbook is straightforward to search, summarized information and elementary to understand. However, the tertiary references might not often update, or there is a lag time for updating and the summary information.[22-24] The dental textbook book entailed of various types: dental medical or dental surgery and others. Here, we will emphasis on textbook importance on dental drug information resources. There are multiple types of those tertiary resources based on the specialties. The famous references have deliberated medications only. It also discussed generic and trade names, indications, precautions, contraindications, and adverse drug reactions.[22-24] The selected dental drug information resources were defined in Tables 1 to 3. However, some references had advantages over the others.

For instance, dental Lexi-drug conferred medications registered in the United States of America, and sometimes it encompassed various

Table 1: Basic information of Dental drug information resources tertiary part 1.[22,23]

	Dental Lexi-Drugs[25]	AHFS DI® Essentials[22,23]	BNF*[26-28]	PDR[29]	Martindale[28,30]	BNF* pediatric[26,28]	drug interactions facts[22,23,31]	Sanford Guide to Antimicrobial Therapy[32]	Merck manual[33,34]	Micromedex, drugdex[35]
Medication coverage	over 7500 drugs	90,000 cited references	Summaries of adults and pediatrics medication registered and marketed in the United Kingdom	more than 329 drug	over 6,400 drug and 60,000 reference	Summaries of pediatrics medication registered and marketed in the United Kingdom	It is designed to identify potential drug-drug interactions, drug-allergy interactions, and duplicate therapy interactions with severity interaction classes	Most of the common infectious diseases and drug therapy	It consisted of common ailments and drug therapy and provide medical information for healthcare professionals	It is evidence-based clinical resources to support diagnosis and treatment decision
Frequently Update:	automatic updates	monthly	every six months	annually or every six month	every three months	annually	automatic updates	Annually	monthly	every three months
Last edition:	According to the updated and last published year									
Price:	Paid	Paid	Paid	Free	Paid	paid, free only to NHS health professionals	Paid	Paid	Free	Paid
Subscription:	Individual Institution	Individual Institution	Individual Institution	Individual Institution	individual for NHS workers only	both	Individual Institution	Individual Institution	Individual Institution	Institution
Publisher:	The Wolters Kluwer	The American Society of Health-System Pharmacists	BMJ Publishing Group Ltd and Royal Pharmaceutical Society	PDR, LLC.	Pharmaceutical Press	BMJ Publishing Group Ltd and Royal Pharmaceutical Society	Wolters Kluwer	Sanford Guides	Merck & Co., Inc.	IBM Watson Health Products
Manual book:	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes
Website:	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Application:	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

*BNF or BNF pediatrics: The principal resource for new and existing drug information. It was a Consensus guideline from the National Institute for Health and Care Excellence (NICE). The Scottish Medicines Consortium (SMC) and the Scottish Intercollegiate Guidelines Network (SIGN). Systematic review databases (including the Cochrane Library), Medical and pharmaceutical journals, research papers, and reviews relating to drug therapy.

Table 2: Basic information of Dental drug information resources tertiary part 2.[22-24]

	Statref dentistry[36]	Access medicine[37]	Access Pharmacy[38]	Oral Soft Tissue Diseases (Lexicomp)[39]	pregnancy and lactation drugs[39]	Mosby's Dental Drug Reference[40]	Nursing Lexi-Drugs[39]	Pediatric and Neonatal Lexi-Drugs[39]	ADA Dental Drug Handbook: A Quick Reference[41]	Natural Products[39]	Drug Allergy and idiosyncratic Reactions[39]
The number of medications or journal covered:	It is a textbooks Collection for Dentistry and Dental Hygiene that includes more than 56+ references in over 21 dentistry sub-disciplines	More than 100 textbooks for most medicine discipline	More than 50 textbooks related to drug therapy for various diseases and drug information references	It describes the prognosis and management of patients with oral soft tissue diseases	More than 1,200 commonly prescribed drugs. More than 140 new drugs included in this edition.	More than 800 drug monographs make it easy to find information such as dosages, indications, contraindications, interactions, precautions, side effects, and severe reactions	1165 Drug Monographs Up to 75 Fields of Information per Monograph More Than 140 Pages of Special Topics and Appendix Information.	It included1177 drug with up to 46 Fields of Information per Monograph More than 150 Extemporaneous Preparation Recipes More than 120 Pages of Appendix Information	It contains the latest information from dental pharmacology's adults and pediatrics.	It includes over 415 natural products. It included Clinical Overview, Dosing, Pregnancy/ Lactation, Interactions, Adverse Reactions, and Toxicology	Its integration of scientific and clinical literature offers unique insight into allergic mechanisms, concepts, and categorizations.
Frequently Update:	automatic updates	automatic updates	automatic updates	automatic updates	automatic updates	automatic updates	automatic updates	automatic updates	automatic updates	automatic updates	automatic updates
Last edition:											
Price:	Paid	Paid	Paid	Paid	Paid	Paid	Paid	Paid	Paid	Paid	Paid
Subscription:	Institutions	Individual Institutions	Individual Institutions	Individual Institutions	Individual Institutions	Individual Institutions	Individual Institutions	Individual Institutions	Individual Institutions	Individual Institutions	Individual Institutions
Publisher:	TDS Health	McGraw-Hill	McGraw-Hill	Wolters Kluwer	Wolters Kluwer	Elsevier	Wolters Kluwer	Wolters Kluwer	Wolters Kluwer	Wolters Kluwer	Springer
Manual book:	Yes	Yes	Yes	Yes	Yes, but changed from 2014 to digital	Yes, e-book	Yes	Yes	No	No	Yes
Website:	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Application:	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 3: Practice of Dental drug information resources tertiary.[22-24]

Name of resource	Content	Drug inquiries answered	Usage of dental student	Usage of general dental practitioner	Use of specialized or consultant dentist	Reference
Dental Lexi-Drugs	information about the drugs related to the dental field	analysis of the patient's entire drug, drug interactions, precautions, drug's effects on dental procedures and bleeding, adverse reactions, contraindication, and Pediatric Considerations	Needs to be available for universities and academic institutions	Recommended	Recommended	25,31
AHFS DI® Essentials	based on the foundation of the AHFS drug information, this is focused more on the essentials and basics of drug therapy	Compatibility, drug interactions, dosage, and adverse reactions of the drugs.	recommended using in dental college and academic institutions	Recommended	Recommended	22,23
BNF	Drug management and conditions	dosage, uses, contraindications, side effects, precautions, and prices	Recommended to use in dental college and academic institutions	Recommended	Recommended	26,27
PDR	The package insert of registered medication in the USA	supply, dosage for adult, children, and geriatric with considerations, indication, administration, contraindications, adverse reactions, and drug interaction, MOA, pharmacokinetics	recommended to use in dental college, available access for dental student	Recommended	Recommended	29
Martindale	Summary of international pharmaceutical products	characteristics of drugs use and pharmacological substances, radiopharmaceuticals	Recommended to use in dental college and academic institutions	Recommended When needed	Recommended When needed	28,30
BNF pediatric	detailed prescription of the medications commonly prescribed for neonates and pediatrics in the UK	indication, dose, contraindications, precautions, interactions, adverse reactions, manufacturer	Recommended to use in dental college and academic institutions	Recommended	Recommended	28,26
Drug interactions facts	detailed interaction information about the drug-drug or drug-food interactions, by class, generic, or trade name	Potential drug-drug interaction, mechanism of drug interaction, the severity of drug interaction	Recommended to use in dental college and academic institutions	Recommended	Recommended	22,23,31
Sanford Guide to Antimicrobial Therapy	Summary of updated antimicrobial medications	Common dental infections, G- bacilli treatment options overview, duration of therapy, new drugs, highly resistant bacteria, recent desensitization procedures. Immunization and Post-exposure prophylaxis current, PK and the drug interactions, the latest pediatric dosing, obesity dosing, and renal impairment drug modification, drug-drug interactions, and surgical prevention,	Recommended to use in dental college and academic institutions	Recommended for common dental infectious diseases	Recommended common dental infectious diseases	32
Merck manual	The symptoms, diagnosis, and treatment in all aspects of medicine	different dosing for special conditions, administration, consideration, contraindication and precautions, adverse effects, drug interactions, generic and brand names, MOA, price, LA precautions, developments on the dental procedure, and bleeding	Recommended to use in dental college and academic institutions	Recommended When needed	Recommended When needed	33,34

Table 3: Cont'd.

Name of resource	Content	Drug inquiries answered	Usage of dental student	Usage of general dental practitioner	Use of specialized or consultant dentist	Reference
Micromedex, drugdex	It is evidence-based detailed drug information, including the FDA, approved prescription and non-prescription drugs along with non-U.S preparations	doses, pharmacokinetics, drugs interactions, preparations, the drug of choice and adverse effects and efficiency, and clinical trail-related medications	Recommended to use in dental college and academic institutions	Highly Recommended	Highly Recommended	35
Statref dentistry	3D anatomy product, Dental books, and free dentistry related medical dictionary	Dental diagnosis, drug therapy, and management	Recommended to use in dental college and academic institutions	Recommended	Recommended	36
Access medicine	Textbooks, Drugs resource, diagnostic terms and tests, Eng-Spn dictionary, medical guidelines, Treatment of diagnosed disease, learning tools, medical cases, and patient education Inquiries answered: FDA approved drug list, anatomy visuals, medical techniques, flashcard and quizzes, lectures	Dental drug information, application of dental therapy, dental medication patient counseling	Recommended to use in dental college and academic institutions	Recommended	Recommended	37
Access Pharmacy	Textbooks, Drugs resource, pharmacy cases, patient education, and quizzes	Dental drug information, dental drug information resources, clinical pharmacokinetics, toxicology emergency, and dental pharmacotherapy	Recommended to use in dental college and academic institutions	Recommended	Recommended	38
Oral Soft Tissue Diseases (Lexicomp)	Overview Oral Soft Tissue Diseases are visually cued. It is designed to support the diagnosis and management of oral soft tissue diseases for busy dental practitioners.	Medication for oral soft diseases and management	Recommended to use in dental college and academic institutions	Recommended	Recommended	39
pregnancy and lactation drugs	It includes commonly used medications during pregnancy and breastfeeding	Medication used during pregnancy and lactation, including safety during conditions	Recommended to use in dental college and academic institutions	Recommended	Recommended	39
Mosby's Dental Drug Reference	It provides essential drug information at a glance and makes this guide ideal for chairside use	The indications, mechanism of action, doses, and routes of administration. Besides, the side effects/ adverse reactions, contraindications, precautions, pharmacokinetics, drug interactions of concern to dentistry	Recommended to use in dental college and academic institutions	Recommended	Recommended	40
Nursing Lexi-Drugs	It had Special Alerts, Pharmacologic Category, Medication Safety Issues, Use. Besides, Unlabeled/Investigational Use, Pregnancy Risk, Factor, Lactation, Contraindications, Warnings/Precautions, Adverse Reactions, Drug Interactions :	Drug doses, administration, compatibilities, contraindication, and medication safety-related issues	Recommended to use in dental college and academic institutions	Recommended	Recommended	39

Continued....

Table 3: Cont'd.

Name of resource	Content	Drug inquiries answered	Usage of dental student	Usage of general dental practitioner	Use of specialized or consultant dentist	Reference
Pediatric and Neonatal Lexi-Drugs	It includes more than 1,100 drug monographs featuring concise information specific to neonates and children, including doses, approved indication, drug administration.	Neonates and pediatrics doses and related indications, drug administration. Medication safety for pediatrics and neonatal therapy	Recommended to use in dental college and academic institutions	Recommended	Recommended	39
ADA Dental Drug Handbook: A Quick Reference	It provides the drugs most used in the dental practice, and information about dosage, probable interactions, potential complications	Typical dental medication doses and drug interaction and related problems	Recommended to use in dental college and academic institutions	Recommended	Recommended	41
Natural Products	Lexi-Natural Products includes over 415 natural products.	Common herbal used for dental condition and diseases	Recommended to use in dental college and academic institutions	Recommended	Recommended	39
Drug Allergy and idiosyncratic Reactions	It provides the current state of knowledge of basic mechanisms of adverse drug reactions (ADRs). The main focus is on idiosyncratic drug reactions	Dental medication and related problems of adverse drug reaction	Recommended to use in dental college and academic institutions	Recommended	Recommended	39

international medications. British National Formulary (BNF) for adults or pediatric discoursed registered medications, including all description medications (in the United Kingdom prices only).[22-24] The Physicians Disk Reference (PDR) controlled the package inset of a pharmaceutical company in the USA. In comparison, the significant advantages of Martindale had all international trade names in most of the countries around the world. The IBM Micromedex Drug Reference discussed in detail medications registered in the USA and under the clinical trial. It checked a detailed summary of the clinical trial for indication, precaution, and adverse drug reaction included the case reports. It is an enormous reference of drug information. It does not seem desirable to refer to it if you which high-speed information about medications.[22-24]

Some textbook references dedicated for one disease or multiple diseases. For instance, Merck Manual discussed disease diagnosis and system, counting drug therapy for most common medical or surgical conditions. In comparison, the Sanford Guide of antimicrobial therapy conversed antibiotics, including dental infectious diseases and drug management. Some textbooks specialized in dental medications. For instance, ADA Dental Drug Handbook (more frequently used in practice),[5] the dental Lexi-comp, or Lexi-comp oral soft tissue diseases, and Mosby dental drug references. They are more attentive on dental medications and their management. Some references are helpful for dental practice and specialized one area of specialties. For example, Lexi-comp pregnancy and lactation drug, nursing Lexi-drug, pediatrics, and neonatal Lexi-drug, drug allergy, an idiosyncratic reaction.[39] They are instrumental if the dental face any problem with medications during pregnancy or lactation. Any patients had any antiquity of adverse drug reactions, or the dentists treat pediatrics and need the appropriate dosing for them. Some textbooks came as collection textbooks at one website. For instance, access medicine or started dentistry. The access medicine collected most of the standard textbooks employed in the medical or surgical field with all medical occupations. While started dentistry had a collection of dental books in medical or surgical dental practice, the medications were among them. Others specialized in pharmacy-related issues highlighting medicine used in dental practice.[38]

The textbook wants to be chosen based on various factors included the dental student or postgraduate dental practitioner needs straightforward and quick dental drug information like Dental Lexi-comp or BNF. In contrast, the specialized or consultant dentist desires high detail drug information resources like Micromedex drug references.[22-24] Another factor was a personal or institutional subscription. The collection textbook use of the library for all dental staff cheaper than individual subscriptions.

Moreover, the choice of dental textbook drug information is based on the type of dental question. If the dentists like to know pediatrics doses, they mention to pediatrics BNF. In contrast, the USA's medications' prices straight to dental Lexi-drug or AHFS drug information, or dental infectious diseases and denote to Sanford guide for drug treatment.[22,23]

CONCLUSION

Drug information textbooks or tertiary resources in dental practice show an essential role in dental knowledge and afterward improve patients' dental services. Few kinds of literature deliberated this topic when searching in PubMed and Medline resources. Selected dental drug information tertiary references can benefit undergraduate and more specialized dentists. Education and training in the current projects in the dental college can recover the utilization of the resources in dental care. Further studies of post-education and exercise are highly suggested to flow up the implementation of the project in dental care in the Kingdom of Saudi Arabia.

ABBREVIATIONS

KSA: Kingdom of Saudi Arabia; **USA:** United State of America; **SWOT:** Strengths, Weaknesses, Opportunities, and Threats; **BNF:** British National Formulary; **PDR:** Physicians Disk Reference; **AHFS DI:** American Hospital Formulary Services Drug Information; **ADA:** American Dental Association.

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REFERENCE

1. Rae CE, Rappaport HM, Mahajan P. Drug information sources used by community pharmacists in Louisiana: A preliminary study. J Pharm Technol. 1992;8(1):30-3. doi: 10.1177/875512259200800109, PMID 10122328.

2. Murray BP. Dentists' preferred sources of new drug information and their attitudes toward the use of drugs by patients. Soc Sci Med Part A Med Psychol Med. 1981;15(6):781-8. doi: 10.1016/0271-7123(81)90022-5, PMID 6976636.

3. Parker WA, Reid LW. Dentist attitudes toward drug information resources. Drug Inf J. 1978;12(2):81-4. doi: 10.1177/009286157801200201, PMID 10308115.

4. Moses G. Drug information for the dental Profession – A whole new world. J Pharm Pract Res. 2017 Jun 1;47(3):236-40. doi: 10.1002/jppr.1353.

5. Alomi YA, Alshammari AM, Aljohani HSS. Dentist's knowledge of essential drug information resources in Saudi Arabia. PTB Reports. 2021;7(1):17-22. doi: 10.5530/PTB.2021.7.4.

6. Alomi YA, Alshammari AM, Saleam Aljohani HS. Dentist's knowledge of evidence-based dentistry and digital applications resources in Saudi Arabia. PTB Reports. 2021;7(1):23-7. doi: 10.5530/PTB.2021.7.5.

7. Ahmed Alomi YA, Alshammari AM, Alshammari KS. Perception of dentists about drug information resources in Saudi Arabia. PTB Reports. 2021;7(1):35-9. doi: 10.5530/PTB.2021.7.7.

8. Koehler HM. Sources of biomedical information in the dental literature. Drug Inf J. 1975;9(1):30-1. doi: 10.1177/009286157500900105, PMID 10236954.

9. Hussar DA. Interactions involving drugs used in dental practice. J Am Dent Assoc. 1973;87(2):349-58. doi: 10.14219/jada.archive.1973.0389, PMID 4515694.

10. Palaian S, Mishra P, Shankar PR, Bista D, Purwar B. Contribution of the regional drug information center towards drug safety. JNMA J Nepal Med Assoc. 2006;45(161):216-8. PMID 17160101.

11. Vassilev ZP, Chu AF, Ruck B, Adams EH, Marcus SM. Evaluation of adverse drug reactions reported to a poison control center between 2000 and 2007. Am J Health Syst Pharm. 2009;66(5):481-7. doi: 10.2146/ajhp080267, PMID 19233996.

12. Entezari-Maleki T, Taraz M, Javadi MR, Hajimiri MH, Eslami K, Karimzadeh I, Esmaeili M, Gholami K. A two-year utilization of the pharmacist-operated drug information center in Iran. J Res Pharm Pract. 2014;3(4):117-22. doi: 10.4103/2279-042X.145368, PMID 25535619.

13. Hands D, Stephens M, Brown D. A systematic review of the clinical and economic impact of drug information services on patient outcome. Pharm World Sci. 2002;24(4):132-8. doi: 10.1023/a:1019573118419, PMID 12227245.

14. Helms MM, Nixon J. Exploring SWOT analysis – where are we now?: a review of academic research from the last decade. Journal of Strategy and Mgt. 2010;3(3):215-51. doi: 10.1108/17554251011064837.

15. Nibu P, Ramesh M, Parthasarathi G. Review of a drug information service in an Indian teaching hospital. Aust J Hosp Pharm. 2001;31(2):144-5. doi: 10.1002/jppr2001312144.

16. Cuddy PG, Elenbaas RM, Elenbaas JK. Evaluating the medical literature. Part I: Abstract, introduction, methods. Ann Emerg Med. 1983;12(9):549-55. doi: 10.1016/s0196-0644(83)80296-0, PMID 6614609.

17. Elenbaas RM, Elenbaas JK, Cuddy PG. Evaluating the medical literature. Part II: statistical analysis. Ann Emerg Med. 1983;12(10):610-20. doi: 10.1016/s0196-0644(83)80205-4, PMID 6625262.

18. Elenbaas JK, Cuddy PG, Elenbaas RM. Evaluating the medical literature, Part III: Results and discussion. Ann Emerg Med. 1983;12(11):679-86. doi: 10.1016/s0196-0644(83)80416-8, PMID 6356998.

19. Enwere EN, Keating EA, Weber RJ. Balanced scorecards as a tool for developing patient-centered pharmacy services. Hosp Pharm. 2014;49(6):579-84. doi: 10.1310/hpj4906-579, PMID 24958976.

20. Ray S. The risk management process in project management - ProjectManager.com [internet]; 2017. Project Manager [cited Mar 15 2020]. Available from: https://www.projectmanager.com/blog/risk-management-process-steps.

21. Kaplan RS, Mikes A. Managing risks: A new framework [internet]; 2012. Harvard Business Review [cited Mar 15 2020]. Available from: https://hbr.org/2012/06/managing-risks-a-new-framework.

22. Malone PM, Kier KL, Stanovich JE. Drug information: A Guide for pharmacists. 3rd ed; 2006.1-877.

23. Gabay M. The clinical practice of drug. Information. 2016.1-539.

24. Kier KL, Goldwire M. Drug information resources and literature retrieval. 2018. 619-45.

25. Lexi-DENTAL COMPLETE [Internet]. [cited 2021 Mar 15]. Available from: http://webstore.lexi.com/Lexi-DENTAL-COMPLETE

26. Books, BNF. Publications [internet] [cited Mar 15 2021]. Available from: https://www.bnf.org/products/books/.

27. Digital medicines information suite | MedicinesComplete [internet] [cited Mar 15 2021]. Available from: https://about.medicinescomplete.com/.

28. Martindale: Pharmaceutical Press. The complete drug reference online via MedicinesComplete [internet] [cited Mar 15 2021]. Available from: https://www.pharmpress.com/product/MC_MART/martindale-the-complete-drug-reference.

29. Physician's desk reference for consumers [internet] [cited Mar 15 2021]. Available from: https://www.drugs.com/pdr/.

30. Martindale: the complete drug reference | MedicinesComplete [internet] [cited Mar 15 2021]. Available from: https://about.medicinescomplete.com/publication/martindale-the-complete-drug-reference/.

31. Wolters Kluwer clinical drug information | Wolters Kluwer clinical drug information [internet] [cited Mar 15 2021]. Available from: https://store.wolterskluwercdi.com/CDI/ccrz__Products?viewState=ListView&cartID=&categoryId=a2I0L0000026xjIUAQ&isCSRFlow=true&portalUser=&store=&cclcl=en_US&categoryName=Dentists&grid=a2x0L00000324QiQAI.

32. Home, Guide S. Antimicrobial stewardship [internet] [cited Mar 15 2021]. Available from: https://www.sanfordguide.com/.

33. Merck manuals professional edition [internet] [cited Mar 15 2021]. Available from: https://www.merckmanuals.com/professional.

34. The trusted provider of medical information since 1899 [internet] [cited Mar 15 2021]. Available from: https://www.merckmanuals.com/.

35. IBM. Watson health products: please login [internet] [cited Mar 15 2021]. Available from: https://www.micromedexsolutions.com/home/dispatch/ssl/true.

36. TDS health: STAT! Ref Online.

37. AccessMedicine. Internal medicine clinical resource [internet] [cited Mar 15 2021]. Available from: https://accessmedicine.mhmedical.com/.

38. Books, AccessPharmacy. McGraw-Hill Medical [internet] [cited Jun 20 2021]. Available from: https://accesspharmacy.mhmedical.com/books.aspx?view=library&list=true.

39. Wolters Kluwer clinical drug information [internet] [cited Apr 11 2021]. Available from: https://store.wolterskluwercdi.com/CDI.

40. Jeske AH. Mosby's dental drug reference. 12th ed [internet] [cited Jun 20 2021]. Available from: https://evolve.elsevier.com/cs/product/9780323481113?role=student.

41. American Dental Association. ADA dental drug handbook: a quick reference [internet]; 2020 [cited Jun 20 2021]. Available from: https://ebooks.ada.org/new_graduates_2020/.