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Predictors of Community Physicians' Digital Information Retrieval at Point of Care

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Abstract

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MS, Walden University, 2012

MD, American University of Beirut, 2001

Dissertation Submitted in Partial Fulfillment

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Abstract

Efficient digital information retrieval at the point of care is essential for better health care delivery. The problem is the lack of knowledge about the community physician's digital information retrieval at the point of care. The purpose of this study was to examine the characteristics of the community physicians' digital information retrieval at the point of care in eight Arab countries in the Eastern Mediterranean and whether a set of factors predicted the digital information retrieval. This study was guided by the Smith model that links professional digital practices to professional competencies, digital literacy, and technological affordances. The descriptive research question directly addressed the purpose of the study, and the correlational research question addressed the extent information and computer literacy, age, sex, practice location, evidence-based medicine (EBM) training, internet access, and the use of subscribed versus free or no electronic resources predicted the digital information retrieval of community family physicians at the point of care. The study design was cross-sectional correlational using an anonymous online survey among $N = 72$ community family physicians. The dependent variable was the physician's digital information retrieval at the point of care. The independent variables considered were information and computer literacy, age, sex, practice location, EBM training, internet access, and the use of subscribed versus free or no electronic resources. The information retrieval at the point of care was low. The multiple linear regression did not support the prediction of the digital information retrieval behavior by the set of the variables. However, the findings may contribute to positive social change by reinforcing the need for physicians' information retrieval at the point of care, which in turn may lead to better decision-making and safer patient care.

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Chapter 1: Introduction to the Study

Efficient information retrieval among practicing physicians is essential to gather evidence-based health-related information to clinical questions that frequently arise during patient–physician encounters. Electronic knowledge resources are a common practice among physicians at point of care (Aakre et al., 2018) to obtain answers to clinical questions and improve patient outcomes (Maggio et al., 2019). But major barriers to pursuing an unanswered question include time, lack of skills, and efficiency of information retrieval (Aakre et al., 2019; Barzkar et al., 2018; Brassil et al., 2017), and cost and accessibility of the knowledge resources (Aakre et al., 2019) could be key barriers in developing countries.

Though recent systematic literature reviews addressed the information-retrieval behavior of physicians (Daei et al., 2020), the online health information needs of family physicians (van der Keylen et al., 2020), and the barriers to clinical information retrieval (Aakre et al., 2019), most research was published before 2017, and mostly among academic or hospital settings. Further, there was little research conducted in the Eastern Mediterranean area compared to research conducted in North America, Europe, and Australia. With the expansion in medical information, increasing digitalization, and availability of digital resources at the point of care, the purpose of this study was to examine the characteristics of the community physicians' digital information retrieval at the point of care in eight Arab countries in the Eastern Mediterranean and whether a set of factors predicted the digital information retrieval. The results of this study may have an impact at the academic and industry levels. At the academic level, it may guide the

redesign of (EBM) curricula to include topics related to relevant skills for digital information retrieval for physicians at the point of care. At the industry level, the findings may highlight changes needed to better design the point-of-care digital resources, especially among community physicians in developing countries.

The sections of this chapter include background information, problem statement, the purpose of the study, research question, theoretical framework, the nature of the study, operational definitions, assumptions, and limitations. The chapter concludes with the significance and social change impact of the study findings.

Background

Physicians frequently ask clinical questions at the point of care during the physician–patient encounter (Brassil et al., 2017). Physicians also answer clinical questions by searching through electronic knowledge resources for relevant evidence-based health-related information (Aakre et al., 2018). Nevertheless, there are major barriers to information retrieval by physicians, which include time, the efficiency of information retrieval, lack of information searching skills, cost, and accessibility of the knowledge resources (Aakre et al., 2019; Barzkar et al., 2018; Brassil et al., 2017; Daei et al., 2020). In addition to information literacy and EBM skills, physicians report a lack of digital or internet skills as barriers to online health information retrieval (van der Keylen et al., 2020).

Though the types of resources and search strategies used by physicians as well as the factors affecting resource selection and search strategies are well studied (Daei et al., 2020), few studies have been conducted in Arab countries compared to North America,

Europe, and Canada (Aakre et al., 2018). Furthermore, researchers have not explored how to address community physicians' digital information retrieval behavior in contrast to academic attending physicians at the point of care in developing countries where resources and access to information may be limited. Current digital resources that provide point-of-care information summaries are of moderate quality, require a subscription, and serve higher-income countries (Andrews et al., 2017; Kwag et al., 2016). Along the same vein, physicians' affiliation with an institution is associated with better reliable resources (Aspinall et al., 2020). Consequently, community physicians may rely on free resources that may not be equally effective or efficient (de Fernelmont et al., 2018; Morshed & Hayden, 2020). Additionally, physicians in developing countries may not have computers in their clinics, and the use of digital devices during the clinical encounter may not be accepted by a good portion of patients (Shaarani et al., 2019). The purpose of this study was to examine the characteristics of the community physicians' digital information retrieval at the point of care in eight Arab countries in the Eastern Mediterranean and whether a set of factors predicted the digital information retrieval, which may provide better insight that guides continued education of professionals in evidence-based practice.

Problem Statement

The research problem is the limited knowledge about the community physician's digital information retrieval at the point of care in Arab countries and its predictors. Most of the literature is focused on the information needs and resources, and little is known about the process of physician information retrieval behavior at the point of care (Daei et al., 2020). Moreover, although it is well known that physicians use electronic knowledge

resources on their mobile devices at the point of care, there is a lack of in-depth understanding of the phenomena in terms of how, when, and why they use the resources (Patocka et al., 2018). Fewer studies have been conducted in the Eastern Mediterranean region, and those that exist have been mainly from Saudi Arabia. This study fills knowledge about the community physician in Arab countries where cost and accessibility of the knowledge resources are key barriers towards information retrieval behavior. The study may guide future curricula redesign to incorporate digital and information literacy skills needed for physicians to answer clinical questions at the point of care. It can guide curricula designs both at the training levels and the continued education of practicing physicians.

Purpose of the Study

The purpose of this study was to examine the characteristics of the community physicians' digital information retrieval at the point of care in eight Arab countries in the Eastern Mediterranean and whether a set of factors predicted the digital information retrieval. The dependent variable was the physician's digital information retrieval practice at the point of care. The independent variables comprised information literacy, computer literacy, age, sex, location of practice, EBM training, access to the internet at point of care, and the use of subscribed versus free or no electronic resources.

Research Question and Hypotheses

This study had two questions: a descriptive and correlational research question. The descriptive research question was "What were the characteristics of the digital information retrieval practice at the point of care among community family physicians in

eight Arab countries in the Eastern Mediterranean region?" The characteristics included frequency of digital information retrieval, types of information, the use of mobile devices and mobile applications, types of digital resources, and the effectiveness and efficiency of information retrieval.

The correlational research question was "What extent do information literacy, computer literacy, age, sex, location of practice, EBM training, access to the internet at point of care, and the use of subscribed versus free or no electronic resources predict the digital information retrieval of community family physicians at the point of care in eight Arab countries in the Eastern Mediterranean region?"

Null Hypothesis: There is no significant prediction of digital information retrieval practice among community family physicians at the point of care by information literacy, computer literacy, sex, age, location of practice, EBM training, access to the internet at the point of care, and the use of subscribed versus free or no electronic resources.

Alternative Hypothesis: There is a significant prediction of digital information retrieval practice among community family physicians at the point of care by information literacy, computer literacy, sex, age, location of practice, EBM training, access to the internet at the point of care, and the use of subscribed versus free or no ed electronic resources.

The dependent variable was the digital information retrieval practice at the point of care (measured at the interval level). The independent variables were information and computer literacy (scales), age (interval), location of practice, sex, EBM training, access to the internet at the point of care, and the use of subscribed versus free or no electronic

resources (nominal). As the dependent variable was measured at the interval level, a multiple linear regression analysis was performed.

Theoretical Framework of the Study

This research examined the characteristics of information retrieval and whether a set of factors predicted the community physician's digital information retrieval at the point of care in eight Arab countries in the Eastern Mediterranean region. The research was informed by Smith et al.'s (2020) model for digital professional practice and Jansen and Rieh's (2010) constructs. There were two constructs relevant to this research aim: digital practice and information retrieval behavior. The model proposed by Smith et al. addresses essential elements for digital practices in professional education contexts: professional education, technology affordances, and digital literacy. In my study, the professional digital practice was digital information retrieval. On the other hand, the theoretical constructs put forward by Jansen and Rieh extensively reviewed the literature relevant to information search and retrieval behaviors. They set 16 theoretical constructs within different categories that highlight the relationship between people, information, and technology and provided the framework for the construct of information retrieval behavior. The theoretical frameworks guided the selection of the predictors for digital information behavior at the point of care.

Nature of the Study

This study was quantitative with a correlational, cross-sectional design. The design was explanatory correlational because it focused on questions of why (Babbie, 2015). This study was cross-sectional because it involved observations of a sample at one

time (Babbie, 2015). Furthermore, quantitative survey research uses measurable variables to measure a linear relationship between a set of independent explanatory variables and the major outcome-the dependent variable (Mertler, 2018). An online Lime survey was used to collect data from a convenience sample of community family physicians who practiced in the East Mediterranean region. Inferential statistics were used, and multiple linear regression was performed as the dependent variable (digital information retrieval at point of care) was measured at the interval level. The independent variables included information and computer literacy (measured by scales), age (interval), location of practice, sex, EBM training, access to the internet at point of care, digital resources, and the use of subscribed versus free or no electronic resources (nominal).

Definitions

Community family physician: Defined as a family physician who is not affiliated with an academic institution (Masters, 2001).

Developing country: Defined by the UN classification and based on the World Economic Situation and Prospects (WESP) statistical annex. WESP classification includes developed economies, economies in transitions, and developing economies (United Nations, 2020).

Digital information retrieval: Defined as "finding material of an unstructured nature that satisfies an information need from within large collections stored on computers" (Jansen & Rieh, 2010, p. 1517).

Digital literacy: Defined as "the ability to use information and communication technologies to find, evaluate, create and communicate information, requiring both

cognitive and technical skills" by the American Library Association (Smith et al., 2020, p. 4).

Evidence-based medicine (EBM): Defined as "the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients" (Sackett, 1997, p. 3).

Evidence-based practice: Defined as the "integration of best research evidence with clinical expertise and patient values" (Sackett, 1997, p.3).

Point-of-care resources: Defined as electronic information tools that provide medical information for use by the health care professionals in the clinical setting during or immediately following a clinical encounter (Aakre et al., 2018).

Technological affordance: Defined as "the way a technology or software can be used and what it allows the user to do or not to do" (Willcockson & Phelps, 2010, p. 3).

Assumptions

Every research design has its own ontological, epistemological, and methodological assumptions. I had three assumptions for my research. First, I assumed that members of the eight different developing countries' scientific societies of the WONCA-EMR would represent the population of physicians in the developing countries. Another assumption of survey-based methods is that the participants answered the questions honestly. Finally, the literature was lacking the effect size of the various predictors on information retrieval; therefore, I assumed that there would be a moderate effect size of 0.35.

Scope and Delimitations

Guided by the gap in the literature, this study focused on a specific group of physicians in a specific context to address the question related to digital information retrieval at the point of care and its predictors. The focus was on community family physicians in developing countries. Despite selecting community family physicians from a wide variety of WONCA EMR developing countries, it was still a convenience sample that may limit the generalizability to the concerned population (Warner, 2013). Furthermore, it had the limitation of generalizability to other developing countries in other regions especially that some countries have high and upper middle-income which are not typical of developing countries.

For the study to be feasible and manageable, I tested a limited number of predictors or independent variables in the relationship between the main outcome—the digital practice of information retrieval at the point of care—and the various independent factors. Despite the large number of physicians found in the sample, the response rate was a critical limiting factor reducing the final sample size. Physicians usually have a lower response rate than public surveys (Brtnikova et al., 2018).

Limitations

Common threats to the internal validity of research studies should be identified and mitigated if possible (Burkholder et al., 2016). Instrumentation bias could have affected the internal validity of this study regarding the construct validity of the used tools. Although I used validated tools to measure the variables, they may not be valid or reliable in my sample. Hence, further statistical analysis was performed to measure the

reliability within the sample. Another limitation was statistical regression toward the means; therefore, the proper sample size was calculated to avoid a small sample size.

Significance

Clinical questions frequently arise from physicians during their encounters with patients (Brassil et al., 2017). Retrieving an evidence-based answer during encounters of clinical care is crucial and needed for better health care delivery. Most researchers have focused on understanding this phenomenon from the perspective of medical students, residents, and attending physicians at academic institutions (Aakre et al., 2018; Daei et al., 2020). However, scarce data address the scope of the information retrieval at point of care among community family physicians, especially in developing countries. This study revealed community physicians' digital practice in information retrieval at the point of care in developing countries and its predictors regarding information and computer literacy, EBM training and access to the internet, and use of subscribed versus free or no electronic resources. These independent variables were all adjustable, and the results of this study can direct opportunities to improve the variables. The study results were essential to shed light on the practice of this large proportion of family physicians who practice in the community after they graduate.

On an academic level, the results of this study about the relationship between digital information retrieval practice and EBM training may guide curricula changes that prepare the graduating family physician to practice EBM in the community. Results of this study may show medical residency programs the importance of information and

computer literacy skills and embed them in the curricula. Based on the results, I hope to change the curricula and redesign the EBM course at my institution.

On a patient or community level, the study results highlighted the current situation of digital information retrieval by community family physicians and predictors that may lead to better digital practice. In turn, the improved digital practice has a tremendous effect on patient care and medical errors and consequently the well-being of the community at large.

On an industry level, the study results about the use of and access to electronic resources by the community physicians in developing countries may guide the industry on better design of point-of-care resources. It can further initiate a dialogue on making these resources affordable within the limitations of internet access and economic challenges in developing countries.

Summary

With the ever-expanding online medical information and the increase in digital resources, two recent systematic reviews published in the field of information retrieval behavior among physicians reported a lack of data that addresses the topic in the context of community physicians in developing countries (Aakre et al., 2018; Daei et al., 2020). The premise of this quantitative research study was that cost and access to electronic resources and the internet are barriers to information health behavior in developing countries. Moreover, guided by Smith et al.'s (2020) model, it was assumed that the digital practice of information retrieval at the point of care depends on the digital literacy of physicians and EBM training; the last two may be different in developing countries.

This quantitative, correlational, cross-sectional study aimed to examine the characteristics of the community physicians' digital information retrieval at the point of care in eight Arab countries in the Eastern Mediterranean and whether a set of factors predicted the digital information retrieval. Data were collected using an online survey among community family physicians who practiced in eight Arab countries in the Eastern Mediterranean Region.

Chapter 2 describes the literature strategy, elaborates on the theoretical framework utilized in this study, and provides a comprehensive literature review. Both the literature strategy and theoretical framework lead to a thorough review of the literature related to evidence-based practice, information retrieval among health care professionals, the use of mobile technologies, and point-of-care resources. Based on Smith et al.'s (2020) model, the literature review is extended to include digital literacy and its relationship to information retrieval. Chapter 2 concludes with an exploration of the current assessment tools that measure the study variables and constructs.

Chapter 2: Literature Review

The purpose of this quantitative study was to examine the characteristics of the community physicians' digital information retrieval at the point of care in eight Arab countries in the Eastern Mediterranean and whether a set of factors predicted the digital information retrieval. Though the literature is rich in understanding the information needs, the use of electronic digital resources, and search strategies of physicians, it lacks a comprehensive evaluation of effective digital information retrieval at the point of care. Moreover, few researchers have conducted studies in developing countries (Aakre et al., 2018), where community physicians, compared to faculty and student in academic institutions, may have different barriers, needs, and resources (Andrews et al., 2017; Aspinall et al., 2020; de Fernelmont et al., 2018; Morshed & Hayden, 2020). Therefore, the specific research problem addressed was the unknown predictors of community physician's digital information retrieval at the point of care in a developing country.

Chapter 2 includes a description of the literature search strategy, the theoretical foundation, and the literature review. The review of the literature is organized into seven sections. The first section puts the research question within the broader scope of evidence-based practice as information retrieval is one step in the 5-step process of EBM. The second section explores the literature regarding EBM as a core professional competency for physicians. The following three sections describe the current literature around the information retrieval behavior of physicians. It starts with the broad scope of practice of information retrieval behaviors irrespective of the use of technology. The following section focuses on digital information retrieval behavior and the use of

electronic resources. The following section reviews the literature related to the point of

care and introduces the use of mobile technologies. Guided by the literature review and

Smith et al.'s (2020) model, the following section highlights the link between digital

literacy and digital information retrieval behavior among healthcare professionals. The

last section discusses the current validated tools and instruments in the literature about

physicians' information-seeking behavior, evidence-based practice, and digital literacy.

Literature Search Strategy

The following databases were accessed: PubMed, Science Direct, Embase, and

SAGE Premiere. The keywords used to search for articles were *information retrieval,*

information-seeking behavior, information needs, information searching, evidence-based

medicine, evidence-based practice, healthcare professionals, search strategies,

information search, smartphones, mobile technologies, digital literacy, information

literacy, and *point of care*. Boolean operators were used between specific keywords. One

example of such combinations: ("information retrieval" OR "information seeking") AND

(physician OR doctor OR clinician OR "healthcare professional"). The process was an

iterative one where I expanded the list of keywords based on my readings and terms used

in published articles. I used synonyms, for example, "healthcare professional,"

"physician," "doctor," and "clinician." The search was aimed at publications from 2017

to 2021, and there was no limitation on the type of studies, whether it was original or

review articles.

Theoretical Framework

In a systematic review aiming to understand the physicians' information retrieval behavior, including articles up to 2017, most studies did not use a conceptual model but rather a researcher-made questionnaire (Daei et al., 2020). Two articles used the Wilson model, one article used Choo's model, and another was based on the Bates berry-picking model. Two articles suggested a conceptual model about barriers or decision-making at the point of care learning. Further, various information behavior models had a similar approach to information seeking as a process with multiple phases related to completing a task based on an information need (Kundu, 2017). But with the use of technology to retrieve information, other concepts should be considered within the context of information behavior models such as digital or information literacy. For example, Ibenne et al. (2017) built on previous models, especially the Wilson model, and argued that identifying a need for information and interaction with information sources are attributes of information literacy. Ibenne et al.'s causative and outcome factors of information behavior model starts with the user's information need based on real-world problems. Information literacy is both an enabler of better understanding of the needs and facilitator of successful information behavior. The outcome of the model is the creation of knowledge that may help solve a real-life problem. However, introducing information literacy into the information behavior model is not enough to incorporate technology in information retrieval.

Smith et al. (2020) proposed a new model for integrating technology in a professional educational context that highlights digital literacy and technological

affordances. For better technology adoption in professional digital practices, three essential elements should be aligned and integrated: professional competencies, the three domains of digital literacy (technical, cognitive, and sociocultural), and technological affordances. For better use of information technologies, specific skills and competencies should be learned within curricula to build and develop digital literacy within its three domains. The procedural or technical domain focuses on the effective use of technology such as computer skills, internet navigation, and search management. The cognitive domain reflects the effective use of the information. Sociocultural involves the social and emotional side of dealing with the digital sources and the contextual setting and data privacy. Affordance is the way the technology can be used and what it allows the user to do. Smith et al.'s model was used for the correlational research question regarding the factors associated with the digital practice of information retrieval among community physicians. Consequently, it allowed for a better understanding of the current challenges and opportunities for future knowledge and skills building.

Though Smith et al.'s (2020) model provides a link between pedagogy, technology, and practice, Jansen and Rieh (2010) identified theoretical constructs for information searching and information retrieval, which I also considered in my study. They adopted an intellectual perspective that delineated the information searching and retrieval process in addition to a theoretical orientation underlining the triad of information, people, and technology. A total of 17 constructs were identified that could be fundamental elements for a deeper understanding of the field of information behavior. Some of the constructs are relevant for a better description of the behavior of digital

information retrieval of physicians, such as the perceived benefit of information,

relevance, uncertainty principle, the principle of least effort, the principle of interaction,

searching as an iterative process, preference of channel, information obtainability, and

neutrality of technology. Some of these constructs complement the triad set by Smith's

model. For example, the concepts of technology neutrality, information obtainability, and

channel preference are highly related to technological affordances. Figure 1 is adapted

from Smith et al. and Jansen and Rieh to reflect how the two models interact to explain

the physicians' digital information retrieval at the point of care. Smith et al.'s model was

recently published in 2020 and has not been applied in other contexts or research studies.

Figure 1

Theoretical Framework Adapted from Smith et al. (2020) and Jansen and Rieh (2010)
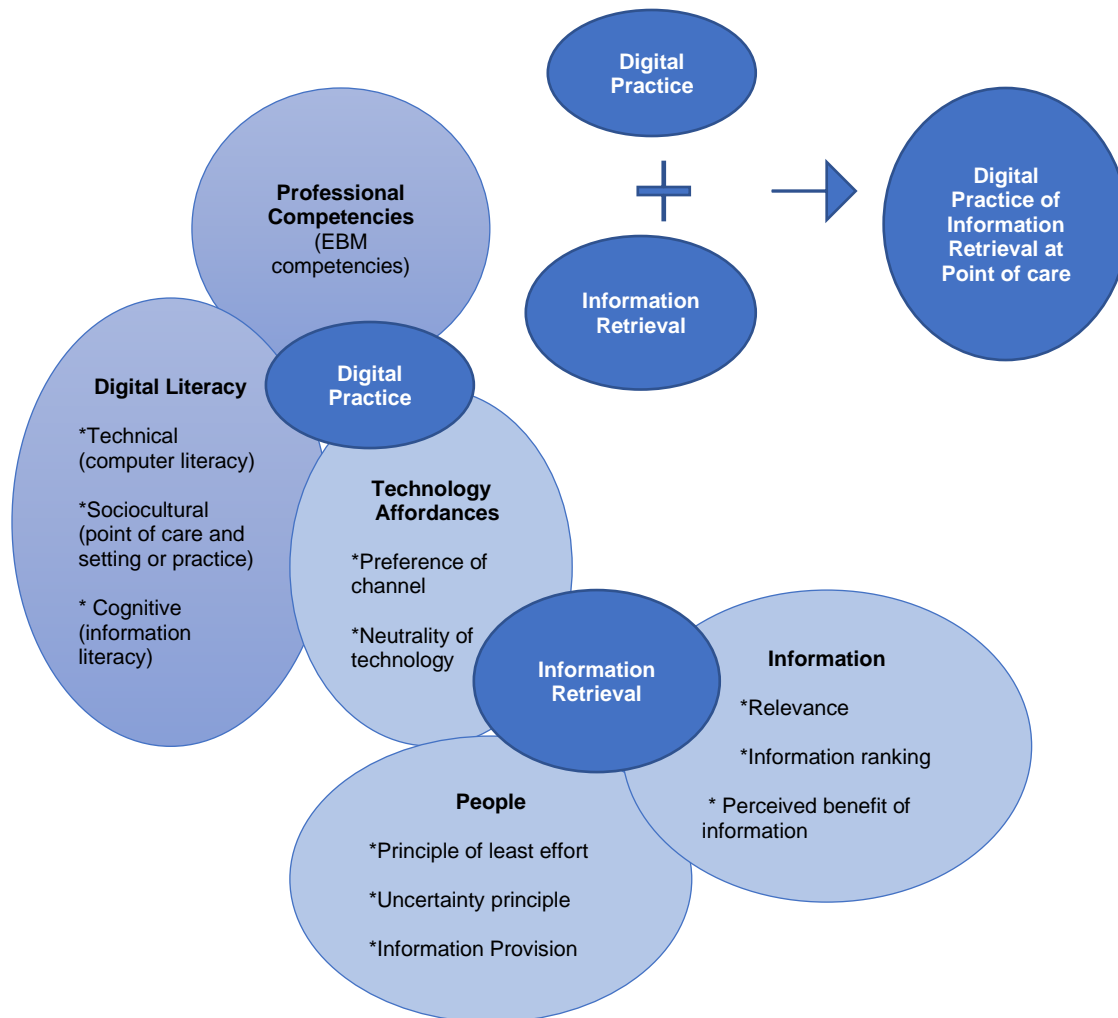
Literature Review Related to Key Variables and Concepts

The literature review covers the following major topics as guided by the research questions and the theoretical framework of Smith et al.'s (2020) model: information retrieval among health care professionals and what the technology brings to the practice (technological affordances), digital literacy, and professional training. Although my research focused on information retrieval, there was a need to expand the literature to include evidence-based practice as information retrieval is one step in the 5-step process of EBM. Finally, the literature review covers the various assessment tools to measure this research's various constructs, such as evidence-based practice, information retrieval, and digital literacy.

Evidence-Based Practice

In the 1970s and 1980s, Sackett proposed EBM to oppose the empirical practice of medicine and the use of intuition and clinical experience (Djulbegovic & Guyatt, 2017). Sackett's seminal definition of EBM was "the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients" (Sackett, 1997, p. 3). EBM is the integration of best evidence with clinical expertise and patients' values. It involves a 5-step process: questioning, searching, appraising, applying, and evaluating the best evidence for a better decision-making process for patient care.

Physicians and nurses accept EBM in both hospital and community-based settings in low and middle-income countries (Alshehri et al., 2018; Altemani & Altemani, 2018; Hong & Chen, 2019; Worku et al., 2019). They consider evidence-based practice as

important for decision making (Hong & Chen, 2019) and improved patient care (Alshehri et al., 2018). Nevertheless, the implementation of evidence-based practice into clinical practice is suboptimal. A systematic review of barriers to evidence-based practice among nurses in low- and middle-income countries reported scant resources, limited access to information, and time constraints, among other barriers (Pereira et al., 2018). Similarly, common barriers among physicians include time, internet access, and access to non-free databases (Altemani & Altemani, 2018; Hisham, Liew, et al., 2018; Worku et al., 2019). These challenges are more pronounced in rural settings where there are more patient load and consequent lack of time (Hisham, Liew, et al., 2018; Worku et al., 2019); most physicians relied on a specialist to answer their questions (Hisham, Liew, et al., 2018). Moreover, hospital pharmacists in Kuwait have shown readiness to practice EBM if they have access to computers and internet connections (Buabbas et al., 2018).

Professional Education

Being recognized as a necessary core competency by the National Academy of Medicine and various accreditation councils, Albarqouni, Hoffmann, Straus et al. (2018) developed a consensus set of core competencies for evidence-based practice for health professionals based on a systematic review and Delphi survey. The proposed set included competencies relevant to asking clinical questions, outlining the different sources of information, and conducting an appropriate search strategy (Albarqouni, Hoffmann, Straus et al., 2018). Knowledge and competency in information retrieval skills were associated with better implementation of evidence-based practice (Altemani & Altemani, 2018; Pereira et al., 2018; Worku et al., 2019). Galbraith et al. (2017) further developed a

competency framework to approach EBM in general practice from a real-world approach. The authors have emphasized pragmatism as a realistic "just in time" approach to seeking evidence given the general practice constraints (Galbraith et al., 2017). Indeed, family physicians expressed their need for practicing EBM with real-time bedside searches when asked pre a one-day EBM workshop (Allen et al., 2017).

EBM has been incorporated into the medical curricula of undergraduate medical students, postgraduate, and practicing physicians. However, critical appraisal (Step 3 in the evidence-based practice) was the most frequently taught skill and there was less focus on teaching search strategies and information retrieval skills (Albarqouni, Hoffmann, & Glasziou, 2018) . The same theme was found among a thematic systematic review of evidence-based practice nursing education where the focus on critical thinking and analysis was emphasized (Horntvedt et al., 2018). Furthermore, nursing students have reported difficulties in information literacy skills and finding research and felt they need to depend on the librarian (Horntvedt et al., 2018).

However, a systematic review assessing the training of physicians and surgeons has shown only short-term improvement in knowledge with a lack of evidence on long-term knowledge or objective clinical practice (Simons et al., 2019). One possible reason for this lack of long-term effect on practice and behavior of physicians is that most of the studies included in the systematic review were conducted before a new surge of summary databases and point of care decision tools. Another reason could be a gap between what we teach and what physicians need to practice EBM in real life.

Information Retrieval among Health Care Professionals

Information retrieval behavior is "the purposive seeking for information as a consequence of a need to satisfy some goal" (Wilson, 2000, p. 49). Identifying the information need and utilizing the appropriate information resources are key first steps for effective information retrieval. Healthcare professionals need to remain updated for better patient care delivery with the vast increase and changing scientific content. On average, physicians pose 0.4 to 0.8 questions per patient (Daei et al., 2020). Yet, information retrieval was considered difficult and challenging among health care professionals (Hong & Chen, 2019), and most were not aware of evidence-based resources (Alshehri et al., 2018; Barzkar et al., 2018). Reported barriers to information retrieval included lack of time, lack of information retrieval skills, and unawareness of accessible resources (Ahmad et al., 2018; Barzkar et al., 2018; Daei et al., 2020). Most of the research was USA-based and lacked the perspective of developing countries (Daei et al., 2020).

To fulfill their information needs, physicians rely on communication with colleagues, free internet search, online databases, guidelines, and pharmaceutical representatives (Brassil et al., 2017; Daei et al., 2020). Physicians in developing countries may rely more on printed textbooks than electronic databases (Reeda & Al-Musawi, 2019) or develop their own informal mobile health solutions due to a lack of resources (Watkins et al., 2018). Nurses rely primarily on Google and peers for information retrieval for evidence-based nursing practice (Alving et al., 2018).

Digital Information Retrieval among Health Care Professionals

Physicians used diverse electronic resources for information retrieval, such as UpToDate, Epocrates, Micromedex, PubMed, and Cochrane (Brassil et al., 2017; Daei et al., 2020). Nevertheless, physicians tend to use the most familiar resources (Daei et al., 2020) and non-authoritative online information resources (Mikalef et al., 2017). Other factors may influence the selection of a particular information resource, such as credibility, relevance, unlimited access, and ease of use (Daei et al., 2020).

The utilization of electronic or online resources among healthcare professionals for information retrieval is heterogeneous. Among a group of Italian neurologists, online resources were more utilized and considered quick and accessible than offline resources that allowed for more in-depth learning (Demergazzi et al., 2020). Similarly, most hospital-based healthcare professionals in Ghana reported a preference for electronic overprint information resources (Abukari & Menka, 2020). On the other hand, only one-third of physicians in a rural hospital in Ethiopia were aware of and used electronic databases (Worku et al., 2019). Primary care physicians in Baghdad preferred printed textbooks followed by the use of electronic resources (Reeda & Al-Musawi, 2019). Nurses in a large hospital in Denmark used Google and Uptodate on a local intranet for information retrieval (Lee et al., 2019). Point-of-care tools followed by PubMed were the most frequently used resources by medical students to answer a clinical question (Nicholson et al., 2020). This heterogeneity may be explained by the fact that the use of electronic or digital information is a multifaceted, dynamic process that requires

computer literacy, searching skills, access to digital databases, and is shaped by database interface characteristics.

Digital Information Retrieval at Point of Care

Most physicians prefer to answer their questions right away (Brassil et al., 2017). Information retrieval at the point of care is determined by the resource's accessibility, the clinical environment, and familiarity with specific knowledge resources (Aakre et al., 2018). A systematic review found only 16 articles that study information retrieval at the point of care, with most of the studies in the U.S. and Europe and very few from developing countries (Daei et al., 2020). Another systematic review about the use of electronic knowledge resources at the point of care has shown an increase in the number of publications in recent years, with two-thirds of the studies in the U.S. or Canada (Aakre et al., 2018).

Facilitators of information retrieval behavior at the point of care included personal, technical, and organizational factors (Daei et al., 2021). Personal factors included time, learned skills, and personal interest. Technical factors included ease of searching and finding the information, relevance and reliability of the information, access to electronic resources, and a simple interface. Organizational factors included access to the internet during the consultation, the financial cost of access to data, and practice in an academic setting.

Mobile technologies allow physicians, nurses, and pharmacists to search and locate information at the point of care (Curran et al., 2019). Adoption of the smartphone for accessing information was determined by perceived usefulness, personal experience,

and job-related characteristics (Tahamtan et al., 2017). Nevertheless, the use of mobile

technologies across the literature is diverse. In a U.S. academic center, many physicians

used mobile devices to access clinical information and had clinical apps installed on their

devices (Brassil et al., 2017; Watkins et al., 2018). Half of the healthcare professionals in

Australia used medical apps and perceived their benefits regarding the higher quality of

health care and location-independent access to health services (Haluza & Hofer, 2020). In

an acute care setting, most nurses used their smartphones to find information on

medications, procedures, and diseases (Flynn et al., 2018). In other contexts, such as a

pediatric emergency room, physicians used desktop computers first then smartphones to

access workplace information (Scott et al., 2018). In a hospital setting in Greece,

physicians were less enthusiastic about using their smartphones to seek the literature via

the internet for different reasons, including no access to the internet, lack of knowledge of

medical sites and apps, and lack of trust in the information obtained (Stergiannis et al.,

2017). Furthermore, the most powerful driver for point-of-care resource selection was the

habit of use among emergency medicine providers (Patocka et al., 2018).

Despite the benefits of using mobile phones at the point of care, there has been a

concern among physicians about being unprofessional (Curran et al., 2019). Although

only 10% of adult and pediatric physicians reported having a negative comment from a

patient (Nerminathan et al., 2017), 40% of patients reported that they would be bothered

by a physician who uses digital devices to retrieve information at the point of care

(Shaarani et al., 2019). Other physicians were concerned about being distracted using

mobile phones in the clinical setting (Flynn et al., 2018; Nerminathan et al., 2017).

Digital Literacy of Health Care Professionals

Information and digital literacy are necessary for information retrieval satisfaction among healthcare professionals (Kostagiolas et al., 2018). However, the perspective of digital literacy is still underused in published healthcare studies. A scoping review about digital health competencies for primary health care professionals yielded only 28 articles, with the majority published before 2011 and conducted in developed countries in the U.S., U.K., Australia, Canada, and Europe, with one article from Malawi (Jimenez et al., 2020). Moreover, only 20% of the articles focused on basic computer and information literacy skills, and the majority focused on the use of electronic medical records.

The perception of healthcare professionals about their digital literacy skills differs across different users and contexts. In the context of the confidence in the use of electronic medical records and internet digital skills, healthcare professionals and medical students reported high levels of digital literacy (Kuek & Hakkennes, 2020; O'Doherty et al., 2019). However, in the context of health information retrieval, family physicians reported a lack of digital and computer skills among major barriers to online health information retrieval (van der Keylen et al., 2020). European medical students considered their eHealth skills poor and emphasized that more digital health education should be implemented in the curriculum that tailors to future job requirements (Machleid et al., 2020). Similarly, nursing students reported that their current digital literacy skills regarding internet searching, and basic computer skills should be improved for better competence in the workplace (Binsfeld, 2019; Brown, Morgan et al., 2020). Pharmacists identified their digital literacy as reasonably basic, focusing on the usability and lack of

awareness of the processes related to the technology used (MacLure & Stewart, 2018).

Age appeared to be a predictor of both digital literacy levels and practice. Older, more

experienced nurses seemed less digitally capable than their younger counterparts (Brown,

Pope, et al., 2020). Younger healthcare staff had higher use of information systems (Kuek

& Hakkennes, 2020).

Assessment Scales

Daei et al. (2020) conducted a systematic review to understand physician

information retrieval behavior and found that the most used tools were researcher-made

questionnaires. The scoping review conducted by Aakre et al. (2018) found that over half

of the studies (a total of 64) measured the use of knowledge resources by physicians at

the point of care through retrospective surveys; others used real-time record-keeping or

direct observation with actual patients or in test settings. Therefore, it is essential to

review the current tools and instruments that can be used to measure information

retrieval, evidence-based practice, and digital literacy. Digital information retrieval is a

complex behavior; thus, no direct scale or instrument measures digital information

retrieval practice.

Furthermore, there is no unique definition of digital literacy adopted in published

studies (Adeoye & Adeoye, 2017; Kuek & Hakkennes, 2020; Miranda et al., 2018; Noh,

2017), and most researchers use self-reported surveys that ask participants to evaluate

how well they performed on a list of skills. There is no clear distinction between

information literacy, computer literacy, and digital literacy. The construct of digital

information literacy goes beyond the definition of the information need, retrieval, and

evaluation of the information. It expands to managing information, integrating the information from different resources, and creating information through digital technology (Sparks et al., 2016). Therefore, many scales include items related to information search and appraisal, communication and the use of email and the internet, and technological aspects of computer use such as the use of printers or navigation using the computer. There is no specific scale for digital information literacy, but one must adapt digital literacy assessment to reflect the complexity of the context in real-world scenarios (Sparks et al., 2016).

Assessment Tools for Information Retrieval Behavior

There exist several scales that measure information retrieval behavior in different settings and contexts. A scale was developed to measure the information retrieval behavior of undergraduate students during their study assignments (Timmers & Glas, 2010). It is a 46-item survey with four scales: applying search strategies (Cronbach's α = 0.68), evaluating information (α = 0.74), referring to information (α = 0.81), and regulation activities when seeking information (α = 0.75). The items related to the first two scales could be relevant to physician information retrieval behavior with some minor modification of the words. The Evidence-Based Medicine Questionnaire (EBMQ) is an 80-item scale with a Cronbach alpha of 0.909 (Hisham, Ng et al., 2018). It was developed and validated among primary care practitioners in Malaysia. Many parts and subscales can be used to measure information retrieval practices and resources of information. Finally, experts drafted a 33-item scale to measure evidence searching capacity among

physicians using a modified Delphi technique (Tsai et al., 2019). However, the scope was specific to the skills needed to use the Cochrane database.

Other methods have been used in the literature to assess information retrieval. Borlund (2016) reviewed the literature about using simulated work task situations for information retrieval assessment. They defined a simulated work task situation as a "short textual description that presents a realistic information requiring situation that motivates the test participants to search the information retrieval system" (page 2).

Assessment Tools for Evidence-Based Practice

As information retrieval is one step in evidence-based practice, it was worth exploring assessment tools that measure evidence-based practice. The Evidence-based Practice Questionnaire (EBPQ) has been widely used to assess the knowledge, skills, and attitude towards evidence-based practice. It is considered to have high validity and is practical to implement (Leung et al., 2014). It has been translated and validated in different languages and populations. Albarqouni, Hoffmann and Glasziou (2018) reviewed the literature on assessing evidence-based practice from the perspective of learning outcomes of educational interventions. Only six high-quality instruments were found and measured at least three steps of 5 steps of EBM. However, they were more tailored to the knowledge of EBM competencies and relevant to students and residents rather than the practice of EBM in the context of health care professionals in the community. Leung et al. (2018) developed a tool to assess evidence-based practice in nursing. The items were open-ended questions and used a scenario to ask about the five steps of EBM; however, the questions were generic and very general.

Assessment Tools for Digital Literacy

There is no unique concept, definition, or framework for digital literacy. The skills needed differ among different disciplines such as education, library information studies, information, communication technology studies, or media studies, resulting in challenges in the operationalization of digital literacy (Boechler et al., 2014). Digital literacy has been used as an umbrella for different types of literacies: computer literacy, information literacy, network literacy, communication literacy, visual literacy, and technology literacy (Covello & Lei, 2010). Digital information literacy has proven to be a complex multidimensional construct that extends beyond defining information needs and access to information to include understanding, evaluation, and using the information in a digital context (Sparks et al., 2016). Thus, it is common to measure complex measures with multiple scales that target the different sub-constructs (Boechler et al., 2014).

I used the definition of digital literacy as "the ability to use information and communication technologies to find, evaluate, create and communicate information, requiring both cognitive and technical skills" by the American Library Association (Smith et al., 2020, p.4). Therefore, the focus of this study was on two domains of digital literacy: information literacy and computer literacy.

In a research report reviewing the various definitions and assessments of digital literacy, Sparks et al. (2016) identified many assessment tools. However, they targeted higher education students. Others have developed an instrument to assess the various 21st-century skills, including information management (van Laar et al., 2020). The items

included questions relevant to formulating a problem statement, search terms, and searching for different websites.

Within the health digital literacy domain, van der Vaart and Drossaert (2017) developed a survey that includes both self-report and performance-based questions that assess digital health literacy from patients' perspectives using the internet and web 2.0. They assessed operational and navigation skills, information reaching, evaluating reliability and relevance, adding content, and protecting privacy. Some of the questions related to searching for information can be adapted to health care professionals.

The Information Literacy Self-Efficacy-M scale (De Meulemeester et al., 2018) was adapted from the Information Literacy Self-Efficacy-Scale developed by Kurbanoglu et al. (2006) to include items relevant to the specific context of medical curricula. The total scale consisted of 5 subscales: evaluating and processing information (11 items), searching and finding information (10 items), medical information literacy (10 items), using the physical library (4 items), and bibliography (4 items). Another study used the scale to measure predictors of information literacy among medical students (Soroya et al., 2020). Two relevant subscales were used for this research study: searching and finding information and medical information literacy. Furthermore, three questions in the subscales were removed as they are not relevant to the research correlational question: finding citing authors, reference the sources I use in a reference style used in medicine and use different kinds of print sources (such as books, periodicals, encyclopedias). The instrument was validated among a sample of medical students. The internal consistency of the subscales was high, with Cronbach's alpha in the range of 0.858 to 0.930. The

exploratory factor analysis of the five factors and 35 items accounted for 58.34% of the total variance. The total scale score was the sum of the various item responses, with higher scores indicating higher information literacy.

The General Confidence With Computer Use Scale was first developed and validated within the context of learning mathematics among university students (Fogarty et al., 2001). The scale was later validated among a sample of pharmacists in Lebanon (Hallit et al., 2020). It comprised 12 items answered using a 5-point Likert scale from 1 (strongly disagree) to 5 (strongly agree). The total score was the summation of the answers to all the questions. Higher scores indicated higher computer literacy. The internal consistency was good with a Cronbach's alpha of 0.716. Using exploratory factor analysis, the 12 items explained a total of 57.1% of the total variance.

Summary and Conclusions

In this literature review, I explored the three concepts associated with the Smith et al.'s (2020) model that integrates competence, digital literacy, and technological affordances for effective professional digital practice. EBM is a core competency among health care professionals (Albarqouni, Hoffmann, Straus et al., 2018). Information retrieval is the first step in EBM (Albarqouni, Hoffmann & Glasziou, 2018). Affordance is what technology brings to practice. Information needs, digital information retrieval behavior, and the use of electronic resources are well studied in the literature. Yet, there is still a gap in information retrieval at the point of care, especially among community physicians in developing countries. Moreover, the perspective of digital literacy and the relationship with digital information retrieval are still underused in healthcare. Digital

literacy is not a well-defined construct, and, in this study, it was divided into information and computer literacy. Validated instruments for information and computer literacy were discussed. This study used the Smith et al.'s model to examine the characteristics of information retrieval among community family physicians at the point of care in eight Arab countries in the Eastern Mediterranean region and whether a set of factors predicted digital information retrieval. Thus, a correlational, cross-sectional design was used.

Chapter 3: Research Method

This cross-sectional, quantitative study was conducted to examine the characteristics of the community physicians' digital information retrieval at the point of care in eight Arab countries in the Eastern Mediterranean and whether a set of factors predicted the digital information retrieval. This chapter includes a description of the research design and setting, recruitment, participants, and data collection methodology. The rationale for the various sections of the survey is detailed, followed by a description of data analysis. Finally, threats to validity and reliability and ethical concerns are discussed.

Research Design and Rationale

I used a quantitative, correlational research design to address the purpose of the study—examining community physicians' digital information retrieval at the point of care in a developing country to help predict their information retrieval. The dependent variable was the digital information retrieval practice at the point of care. The following independent variables were explored: information and computer literacy, age, sex, location of practice, EBM training, access to the internet at point of care, and the use of subscribed versus free or no electronic resources. A better understanding of the digital information practice and its predictors, especially in developing countries, provide helpful information for EBM curricula changes. Curricular modifications may enhance the ability of the graduating physicians to retrieve information at the point of care, leading to better care.

Methodology

Population

The target population was family physicians who were members of the

professional scientific societies of family medicine in the developing countries that

belong to WONCA EMR. The estimated size of the population was 19,600 doctors

(https://www.globalfamilydoctor.com/AboutWonca/Regions/EastMediterranean2.aspx).

Sampling and Sampling Procedures

Convenience samples are convenient and easy to handle (Burkholder et al., 2016),

which I chose because it was challenging to target every family physician in a developing

country. As a former president of the Lebanese Society of Family Medicine, I had

connections with the cabinet of WONCA EMR, making it easy to approach the

participants through an email that was forwarded by each professional society.

Depending on the response rate, convenience samples are prone to selection bias and

have limitations on external validity and representation of the intended population

(Burkholder et al., 2016). Nevertheless, a convenience sample did not affect the

correlational design as I tested the relationship between variables irrespective of the

external validity.

The presidents of the professional organizations or societies were asked to

forward the invitation to all physicians that were members or included in the email list of

the professional organization or society. The online survey (Appendix) started with a

question asking about the inclusion criteria for sampling, which was community family

physicians who did not have an affiliation with an academic institution. The survey was

administered in English and Arabic to ensure that all physicians could participate without any language barrier. The native language of the researcher and most of the included countries was Arabic. Using G*Power 3.1.9.7 software, a sample size of 52 was needed for multiple linear regression with eight predictors and an effect size measured by Cohen's f^2 of 0.35 with an alpha level of 0.05 and power of 80%.

Procedures for Recruitment, Participation, and Data Collection

The participants were recruited through their professional family medicine society in each country. I sent an email to each president of the professional society indicating the purpose of the study and asking them to forward the email to their members. The email included a link to the Lime survey and the inclusion criteria. The landing page of the Lime survey included informed consent. After reading the informed consent, physicians were asked a question whether they were affiliated to an academic organization. Those meeting the inclusion criteria and willing to participate continued to fill the survey. The anonymous online survey (Appendix) included sections on demographics (sex, age, years of practice, scope of practice, country of practice, and the number of patients seen weekly), point-of-care information behavior, digital information resources, information and computer literacy, and information retrieval efficiency.

A pilot study conducted among family medicine residents and attendings at my family medicine department at the American University of Beirut provided the foundation for my research. I recruited participants through an email sent to all residents and attendings by the department administrator, asking them if they would like to participate in a pilot study. The participants provided feedback on the legibility and

readability of the questions and whether they felt important questions were missing. The

data collected from the pilot study were not included in the final study analysis.

Instrumentation and Operationalization of Constructs

The study survey (Appendix) included five sections guided by the theoretical

framework by Smith et al. (2020) that explores the essential elements needed for digital

practices in professional education contexts: professional education, technology

affordances, and digital literacy. The five sections are as follows: (a) general

demographics questions, (b) professional evidence-based competencies, (c) digital

information practice, (d) digital and computer literacy, and (e) technology affordance. For

digital information practice and technology affordances, I developed the questions guided

by the findings of a systematic review of on reviewed information retrieval behaviors of

physicians (Daei et al., 2020) and the theoretical constructs by Jansen and Rieh (2010)

describing information search and retrieval behaviors. Two scales were used: the

Information Literacy Self-Efficacy-M-scale (De Meulemeester et al., 2018) and the

General Confidence With Computer Use Scale (Fogarty et al., 2001) for measurement of

information literacy and computer literacy, respectively. The total score of each scale is

the sum of the various item responses, with higher scores indicating higher information or

computer literacy.

Operationalization

The purpose of this cross-sectional, quantitative study was to examine the

characteristics of the community physicians' digital information retrieval at the point of

care in eight Arab countries in the Eastern Mediterranean and whether a set of factors

predicted the digital information retrieval. For the correlational research question, the

dependent variable was the physician's digital information retrieval practice at the point

of care. It was operationalized by the answer to the question: "On average, how many

times per week do you look for digital information at the point of care?" The independent

variables included information literacy, computer literacy, age, sex, location of practice,

EBM training, access to the internet at point of care, and the use of subscribed versus free

or no electronic resources. The survey included specific questions that targeted the rest of

the independent variables (see Table 1).

Table 1

Operationalization of the Independent Variables in the Multiple Linear Regression

Variable	Level of Measurement	Survey Question
Age	Interval	Age: _____ years
Sex	Nominal	Sex: 1) Female 2) Male
Location of Practice	Nominal	Location of Practice: 1) City 2) Suburban 3) Rural
EBM training	Nominal	Have you received any formal training in evidence-based medicine during your residency? 1) yes 2) No
Access to the internet at point of care	Nominal	Do you have access to the internet at the point of care? 1) Yes 2) No
Use of subscribed versus free or no electronic resources	Nominal	Do you own medical databases/apps that require a subscription? 1) yes 2) No
Information literacy	Scale	I feel confident and competent to (7 Likert scales) - Initiate search strategies by using keywords and Boolean logic - Use PICO - Search for EBM information - Use a factual database - Use mesh - Use PubMed - Retrieve an article of an institutional repository - Evaluate bias - Define the information I need - Decide where and how to find the information I need - Identify a variety of potential sources of information - Use electronic information sources - Use internet search tools (search engines, directories)
Computer Literacy	Scale	The following statements refer to your confidence when using the computer (5 Likert scales) - I have less trouble learning how to use a computer than I do learning other things. - When I have difficulties using a computer I know I can handle them. - I am not what I would call a computer person. - It takes me much longer to understand how to use computers than the average person. - I have never felt myself able to learn how to use computers. - I enjoy trying new things on a computer. - I find having to use computers frightening. - I find many aspects of using computers interesting and challenging. - I don't understand how some people can seem to enjoy spending so much time using computers. - I have never been very excited about using computers. - I find using computers confusing.

Data Analysis Plan

The descriptive research question was "What were characteristics of the community physicians' digital information retrieval at the point of care in eight Arab countries in the Eastern Mediterranean?" I used descriptive summary statistics to report the characteristics of the digital information practice. Mean and standard deviations were

used for interval and scale variables. Frequencies and percentages were used for categorical nominal variables.

The correlational research question examined to what extent information a set of variables predicted the digital information retrieval of community family physicians at the point of care in eight Arab countries in the Eastern Mediterranean region. I used inferential statistics and multiple linear regression for the correlational research question because the dependent variable was a continuous interval variable. The dependent variable was the physician's digital information retrieval practice at the point of care. The independent variables included information literacy, computer literacy, age, sex, location of practice, EBM training, access to the internet at point of care, and the use of subscribed versus free or no electronic resources.

I analyzed data with IBM SPSS Statistics (Version 27), and the significance level, α, was set at 0.05. I then performed a descriptive analysis of all the variables. If participants skipped a question, questionnaires with missing data for the predictor variables were removed from the regression analysis, except for missing data in the information literacy scale, where data imputation was performed. As the two scales used for information and computer literacy were not validated in a similar population of family physicians, the internal consistency of the scales in my sample was studied using Cronbach's α. Categorical variables were transformed into numeric dummy variables. The multiple linear regression analysis assumptions were examined, including the linear relationships between the dependent and independent variables, multivariate normality, non-multicollinearity, and homoscedasticity. I tested linear relationships with scatter

plots. Collinearity was tested using correlation matric and variance inflation factor. I

tested homoscedasticity using the plot of standardized residuals versus predicted values.

The results of the multiple linear regression included the level of the prediction as

depicted by the adjusted R^2 and F statistics to indicate the statistical significance of the

prediction. R^2 was interpreted as the amount of variance in the dependent variable

explained by the predictors. For the various predictors, the standardized β coefficient and

its corresponding p-value were reported. The β coefficient provided a measure of the

correlation of the independent variable on the dependent variable.

Threats to Validity

As a correlational research design, the primary threat to internal validity was the

presence of another variable that could be correlated with the dependent and independent

variable and is responsible for the apparent relationship (Warner, 2012). Another threat to

internal validity included the reliability of the instrument and measures. Although the

instruments used to measure digital information literacy were validated in other contexts,

verifying its reliability in my sample was still necessary. As a convenience sample, there

was the possibility of selection bias especially with the low response rate, which might

have threatened the study's external validity.

Ethical Procedures

The study was conducted after the institutional review board (IRB) approval from

Walden University (06-10-21-0280857) and the American University of Beirut (SB-

2021-0209). The four core ethical principles were respected throughout the

implementation of the study. The autonomy of the participants was ensured by providing

informed consent before participating in the study. The informed consent clearly stated

the purpose and methodology of the study and that their participation was voluntary, and

they had the right to withdraw their participation at any point in time. There was no

undue influence as the president of the professional society sent the email to all members,

and I was not aware of those who agreed to participate. The informed consent indicated

that their refusal to participate would not affect their relationship with their professional

society.

I approached all the physicians to ensure justice, and the survey was administered

in English and Arabic. There were no direct benefits for the physicians, but it was

beneficial to the knowledge about the topic in general. Similarly, there was no harm or

more than minimal risk if they participated in the study. The survey was short and did not

take more than 5 minutes to complete.

The confidentiality of the participants was protected by anonymity. The Lime

survey was hosted at my institution and was approved by the IRB to be safe. Access to

the data was restricted to me, and all data files were password protected. All data will be

deleted within 5 years.

Summary

This cross-sectional, correlational study among family physicians in the Eastern

Mediterranean region addressed their characteristics related to digital information

retrieval at the point of care. Physicians who were members of the professional societies

of family medicine in the WONCA-EMR countries were approached through email. Data

collection included an online anonymous Lime survey. The major threats to the design

were the reliability of instruments and convenience sampling. The four core ethical

principles were respected throughout the implementation of the study. I secured ethical

approval from the IRB office at Walden University and the American University of

Beirut. Chapter 4 presents the results of the study.

Chapter 4: Results

The purpose of this cross-sectional study was to examine the characteristics of the community physicians' digital information retrieval at the point of care in eight Arab countries in the Eastern Mediterranean and whether a set of factors predicted the digital information retrieval. The study was guided by Smith et al.'s (2020) model for the integration of technology in professional digital practices. The model highlights three essential elements: professional competencies, digital literacy, and technological affordances. The study addressed the following characteristics of physicians' frequency of digital information retrieval, types of information, the use of mobile devices and mobile applications, types of digital resources, and the effectiveness and efficiency of information retrieval. I also examined to what extent information and computer literacy, age and sex of physician, location of practice, EBM training, the access to the internet at point of care, and the use of subscribed versus free or no electronic knowledge resources predicted the digital information retrieval of community family physicians at the point of care in eight Arab countries. Chapter 4 presents an overview of the pilot study, data collection, and the results.

Pilot Study

The pilot study was conducted among attending and resident family physicians at the department of family medicine at the American University of Beirut. I selected this population because of convenience as I belong to the same department, and there was a similarity to the target study population. I invited participants through an email sent by the department administrator. A total of 13 participants responded with eight complete

responses. At the beginning of the survey, the participants were informed that they would give their feedback and note any problematic questions as they filled the survey. All the eight participants found the questions in general and the concept of "point of care" in specific clear, as well as they did not find any questions challenging or difficult to answer. The pilot study results are not included in the results because they fit the exclusion criteria of affiliation with an academic institution. The pilot study results did not lead to any modifications of the main study methodology or survey items.

Data Collection

After receiving Walden and American University of Beirut IRB approval in July 2021, I sent emails to the presidents of the professional societies of family medicine in WONCA EMR countries: Saudi Arabia, United Arab Emirates, Jordan, Kuwait, Oman, Algeria, Qatar, Lebanon, Iraq, Bahrain, and Morocco. Over 4 weeks, I sent three email reminders without any reply from Qatar, Morocco, and Oman. The presidents were asked to forward the email to the society members. The email included an invitation letter for the research study with links to the online Lime survey in English and Arabic versions.

A total of 203 responded, and 178 answered that they were not affiliated with an academic institution, fitting the inclusion criteria of a community family physician. After removing incomplete responses, a total of 72 participants were included in the analysis, which was greater than the minimum sample size of 52 participants resulting from the power analysis mentioned. The study was conducted based on the plan provided to the IRB, and there were no deviations or modifications.

Demographics

   Table 2 shows the demographics of the participants. The mean age of the

participants was 39.6 (*SD* = 9.5), with most being female physicians (41/67, 61.2%).

There were heterogeneous representations from all the countries, where most respondents

practiced in Iraq (31.8%), Lebanon (25.8%), and Saudi Arabia (12.5%). The physicians

had an average of 9.8 (*SD* = 9.7) years of practice taking care of an average of 79.0 (*SD* =

82.5) patients per week. The sample demographics may not be generalizable to the

general population of family physicians as most of the sample practiced in a city, and not

all the countries were represented.

Table 2

Demographics of the Surveyed Family Physicians

Demographic	*M*	*SD*
Age	39.6	9.5
Years of practice	9.8	9.7
Number of patients seen weekly at the clinic	79.0	82.5
	n	Percentage
Sex		
Females	41	61.2
Males	26	38.8
Country of practice		
Bahrain	3	4.5
Egypt	3	4.5
Iraq	21	31.8
Jordan	4	6.1
Kuwait	4	6.1
Lebanon	17	25.8
Saudi Arabia	9	12.5
United Arab Emirates	5	6.9
Location of Practice		
City	65	95.5
Suburban	2	2.9
Rural	1	1.5

Note. $N = 72$. Missing values exist.

Results

Descriptive Statistics

The first section describes the characteristics of digital information retrieval at the point of care. The second section provides descriptive statistics regarding the triad set by Smith et al.'s (2020) model that impacts the professional digital practice: professional EBM competencies, technological affordances, digital information practice, and digital literacy.

Digital Information Retrieval at Point of Care

The participants looked for digital clinical information at the point of care on average 14.0 times ($SD = 34.4$) times per week with a median of 5.0 [min = 0, max = 270]. Table 3 describes the digital information practice of the survey family physicians. Only 18.6% of the participants rated their ability to find the information required to answer the clinical questions as average. The majority (80.3%) searched for digital clinical information at the point of care using a mobile phone, owned one or more mobile apps for information retrieval (80.0%), and always/often had access to the internet (78.9%). On average, they owned a 3.2 mobile application ($SD = 3.0$) irrespective of whether it was subscribed or free with a median of 2 [min = 1, max = 20].

Table 3

Digital Information Practice at Point of Care of Survey Family Physicians

	n	Percentage
Ability to find the information required to answer clinical questions		
Very good	30	42.9
Good	27	*38.6*
Average	13	*18.6*
The device of information retrieval [a]		
Computer	28	39.4
Mobile phone	57	80.3
Tablet	9	12.7
Access to the internet at point of care		
Always	45	59.2
Often	14	19.7
Sometimes	10	14.1
Rarely	3	4.2
Never	2	2.8
Ownership of one or more mobile apps		
Yes	56	80.0
No	14	20.0
Ownership of medical databases/apps that require a subscription		
Yes	32	61.5
No	20	38.5

Note. N = 72. Missing values exist.

[a] More than one answer was allowed.

Table 4 continues to answer the descriptive question regarding the characteristics

of information retrieval at point of care regarding the types of information they looked for

and the information resources they used. Clinical information about medication dosage

and side effects was the most sought clinical question, and patient education was the

least. The participants used various online information resources, with textbooks, peers,

and medical pharmaceuticals being the least used. Participants were asked to list the top

three digital information resources they consult most often at the point of care. The

following were most reported: Medscape ($n = 41$), Uptodate ($n = 30$), Google/Google

Scholar ($n = 21$), American Academy of Family Physicians (AAFP) ($n = 21$), and

Pubmed ($n = 11$).

Table 4

Types and Sources of Digital Information at Point of Care of Survey Family Physicians

	Always/Often		Sometimes		Rarely/Never	
	n	Percentage	*n*	Percentage	*n*	Percentage
Type of clinical question						
Making diagnosis/workup plan	28	39.4	34	47.9	9	12.7
Making a clinical decision about treatment	29	40.8	35	49.3	7	9.9
Medication dosage/side effect	46	64.8	19	26.8	6	8.5
Patient education	20	28.2	34	47.9	17	23.9
Type of information resource						
Textbooks	18	25.4	13	18.3	40	56.3
Clinical practice guidelines	49	79.0	16	22.9	5	7.1
Online databases like Medline or Pubmed	42	59.2	18	25.4	11	15.5
Subscribed online databases like Uptodate, Dynamed, Clinical Key	43	60.6	15	12.1	13	18.3
Medical websites (ex. Medscape)	56	78.9	8	11.3	7	9.9
General databases (ex. Google)	32	45.1	23	32.4	16	22.5
Medical apps like Epocrates, Medical calculator	19	26.8	22	31.0	30	42.3
Peers/colleagues	8	11.4	40	57.1	22	31.4
Pharmaceutical representatives	3	4.2	10	14.1	58	81.7

Note. $N = 72$. Missing values exist.

Professional EBM Competencies, Digital Literacy, and Technological Affordances

Almost three-quarters of the participants (53/72, 73.6%) received formal training in EBM during their residency training. Almost two-thirds (44/72, 61.1%) attended a course or workshop on EBM. In general, almost half of the participants considered that they often found relevant (40/67, 55.6%), useful (541/72, 6.9%), and unbiased (42/72, 58.3%) information (see Table 5). A small portion (12/72, 16.7%) were rarely able to find the information in less than 2 minutes as compared to none were rarely able to find the information in less than 5 minutes. Almost two-thirds (42/72, 59.7%) were often confident about the information found.

Table 5

Effectiveness and Efficiency of Information Retrieval at Point of Care of Survey Family Physicians

	Always		*Often*		*Sometimes*		*Rarely*	
	n	*%*	*n*	*%*	*n*	*%*	*n*	*%*
I find relevant information	27	37.5	40	55.6	5	6.9		
I find useful information	28	38.9	41	56.9	3	4.2		
I find reliable, unbiased information	14	19.4	42	58.3	16	22.2		
It is easy to find the information	15	20.8	40	55.6	17	23.6		
I find the information in less than 5 minutes	19	26.4	31	43.1	20	27.8	2	2.8
I find the information in less than 2 minutes	5	6..9	24	33.3	31	43.1	12	16.7
I am confident about the information that I find	18	25.0	43	59.7	10	13.9	1	1.4

Note. N = 72.

Digital literacy was operationalized with two scales that measure information and computer literacy. As the two scales used for information and computer literacy were not

validated in a similar population of family physicians, the internal consistency of the

scales in the sample was studied using Cronbach's alpha. The total scale score is the sum

of the various item responses, with higher scores indicating higher information or

computer literacy for both scales. The mean total score for the information literacy scale

was 59.8 ($SD = 11.4$), with a Cronbach alpha of 0.862. A maximum score was 91. The

mean total score was 29.3 ($SD = 5.6$) for the computer literacy scale, with a Cronbach

alpha of 0.710. A maximum score was 55.

Multiple Linear Regression

Because most of the participants practiced in a city, I dropped the type of practice

from the predictors. Some participants did not answer all questions leading to missing

responses in less than 10% of the sample. As information literacy is a construct variable

that included a set of items or questions, I used each participant's mean across available

items on information literacy construct to represent the missing items for the information

literacy variable (Newman, 2014). The total number available for the regression analysis

was 58, more than the requisite sample size needed of 52. Dummy coding was used for

the following variables sex (male was the reference), internet access (rarely was the

reference), EMB training (no EMB training was the reference) and subscribed app (no or

free app was the reference). The reference level was coded as zero in all the new

dichotomous variables.

Statistical Assumptions

The multiple linear regression analysis assumptions were examined, including the

linear relationships between the dependent and independent variables, multivariate

normality, non-multicollinearity, and homoscedasticity. The data did not fit the

assumption of multicollinearity. Tests to see if the data met the assumption of collinearity

indicated that multicollinearity is a concern as tolerance values were more than 0.1

(Allison, 1998), although the variance inflation factor values were below 10. The

assumption of homoscedasticity was met using the plot of standardized residual versus

predicted values (see Figure 2), scatterplot (see Figure 3), and Durbin-Watson value. The

data met the assumption of independent error (Durbin-Watson value = 1.985), which

should be between 0 and 4.

Figure 2

Normal p-p Plot of Regression Standardized Residual

Normal P-P Plot of Regression Standardized Residual
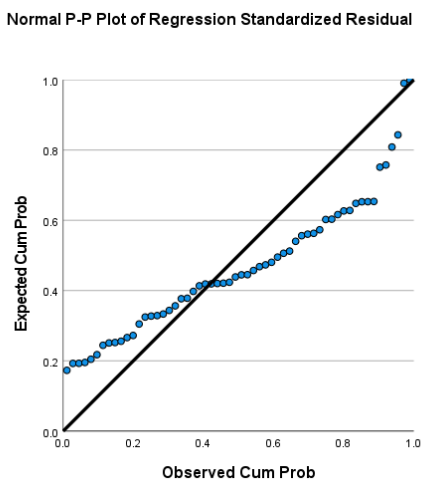
Figure 3

Scatterplot

Scatterplot
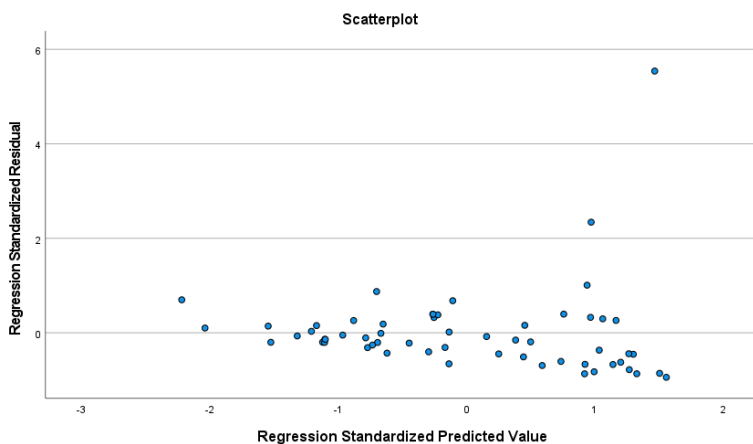
The Regression Analysis

A multiple linear regression was conducted to examine to what extent does age, sex, internet access, access to mobile apps with subscriptions, information, and computer literacy predicted digital practice of information retrieval at point of care in eight Arab countries in the Eastern Mediterranean region. A non-significant regression equation was found (F (8, 49) = 0.767, p = 0.633, R^2 = .111). None of the seven variables were significant predictors of digital information retrieval at point of care; p was > .05 for the respective coefficients of the predictors (see Table 6).

Table 6

Regression coefficients of the set of factors on information retrieval at point of care

Variable	B	ß	SE	p
Constant	20.123		27.649	0.260
Age (years)	-0.255	-0.169	0.227	0.266
Female	0.115	-0.050	0.390	0.979
EMB Training	7.444	0.214	4.997	0.143
Always/Often Access to Internet	1.347	0.036	8.287	0.872
Sometimes Access to internet	-0.4525	-0.102	9.626	0.640
Computer Literacy	-0.131	-0.050	0.390	0.739
Information Literacy	-0.063	-0.051	0.176	0.722
Subscribed App	3.363	0.116	4.139	0.420

Note. $N = 58$. $R^2 = 0.111$. The dependent variable is information retrieval at point of care.

Summary

This study aimed to determine the characteristics and predictors of digital information retrieval practice among physicians at the point of care guided by the Smith et al.'s (2020) model that integrates practice, competency, digital literacy, and technology affordances. Descriptive statistics showed that physicians might not frequently look for information at the point of care ($M = 14.0$, $SD = 34.4$ times per week or 0.1 question per patient). Most physicians rated their ability to find the information as good or very good and were often confident that they found the required information. The multiple linear regression results supported the null hypothesis that there would be no significant prediction of digital information retrieval practice among community family physicians at the point of care by sex, age, internet access, subscribed apps, EMB training, information, and computer literacy.

Chapter 5: Discussion, Conclusions, and Recommendations

The purpose of this cross-sectional, correlational study was to examine the characteristics of the community physicians' digital information retrieval at the point of care in eight Arab countries in the Eastern Mediterranean and whether a set of factors predicted the digital information retrieval. It is essential to understand the characteristics and predictors of community physicians in developing countries due to unique barriers such as internet access and the cost of resources. Most of the predictors are modifiable and may guide continued educational activities to facilitate the information retrieval at the point of care by community physicians. The results showed that community physicians in Arab countries do not frequently look for digital information at the point of care. Nevertheless, physicians were satisfied with finding the information and were often confident that they would find the required information. The physicians' computer and information literacy were average. The regression model results failed to show that the set of variables predicted the digital information retrieval.

Interpretation of the Findings

In this section, I provide an interpretation of the findings and comparison to previous studies, state what this study has added to the literature, and explain the results in the context of the theoretical framework. Physicians pursue to answer clinical questions that arise at the point of care by searching through electronic knowledge resources (Aakre et al., 2018). The efficiency of information retrieval, lack of information retrieval abilities, cost, and accessibility to electronic knowledge resources have been reported by physicians as barriers to information retrieval (Aakre et al., 2019; Barzkar et

al., 2018; Brassil et al., 2017; Daei et al., 2020). Although some of the Arab countries are

high income countries, they are classified as a developing country based on their

economies by the United Nation (2020). Barriers of cost and accessibility may be more

pervasive among community family physicians in developing countries. Moreover, the

literature focused on the information needs and sources, and little is known about the

process of physician information-seeking behavior at the point of care.

Interpretation of the Digital Information Practice

In this study, community physicians in eight Arab countries did not look for

digital information at point care very often. They looked for information 14 times per

week while they saw 79.0 patients per week, which is 0.1 questions per patient. This is

below what is reported in the literature, where physicians may pose 0.4 to 0.8 questions

per patient (Daei et al., 2020). I expected that the information retrieval among community

physicians in developing countries would be lower than that of developed countries due

to cost and accessibility. However, in my sample, the majority of the physicians used a

mobile phone to access the information, owned a mobile app, and always/often had

access to the internet. Similarly, in the literature, many physicians used mobile devices to

access clinical information and installed clinical apps on their devices (Brassil et al.,

2017; Haluza & Hofer, 2020; Watkins et al., 2018). The resources used were similar to

those reported in the literature (Brassil et al., 2017), such as online databases (Medscape,

UptoDate, and PubMed), internet search, and guidelines. One explanation for this

adequate access to the internet and digital information resources is that 65 participants

(95.5%) were in a city. Reported barriers of cost and accessibility were more pronounced

in rural settings where physicians had higher patient load and less time (Hisham, Liew et al., 2018; Worku et al., 2019), leading to most physicians relying on a specialist to answer their questions (Hisham, Liew, et al., 2018).

As there is limited knowledge about the practice of community physicians in Arab countries, the low implementation of information retrieval at point of care contributes to the literature. It is also worth exploring the reasons in future research. Other factors could have contributed to the low information retrieval practices. The use of digital devices during the clinical encounter may not be accepted by a good portion of patients (Shaarani et al., 2019). Moreover, physicians may be concerned about being distracted using the mobile phone in the clinical setting or being unprofessional (Curran et al., 2019; Flynn et al., 2018; Nerminathan et al., 2017). Nevertheless, further research is needed to explore the low use of information retrieval at the point of care among community physicians in a developing country.

Interpretation of the Predictors of Digital Information Practice

My findings did not support the alternative hypothesis that there was a significant prediction of digital information retrieval practice among community family physicians at the point of care by information literacy, computer literacy, sex, age, location of practice, EBM training, access to the internet at the point of care, and the use of subscribed versus free or no electronic resources. The predictors were based on Smith et al.'s (2020) model that linked professional digital practices to digital competence, digital literacy, and technological affordances. The model highlights the triad of pedagogy, technology, and practice. However, the Smith et al.'s model constructs are complex, and it is possible that

my instruments or survey questions did not reflect the construct properly. No unique definition of digital literacy is adopted in published studies (Adeoye & Adeoye, 2017; Kuek & Hakkennes, 2020; Miranda et al., 2018; Noh, 2017). There was no clear distinction between information literacy, computer literacy, and digital literacy (Sparks et al., 2016). The Smith et al.'s model was recently introduced and was not applied in any research context. Although Smith et al. illustrated the model in social media technologies use in health professional education settings, further research is needed to apply the model to other disciplinary and educational settings.

Limitations of the Study

There are three limitations to my study. The first limitation is the small sample size. A larger sample size may have detected a significant weaker effect. Physicians may have suffered from burnout at the current COVID pandemic and thus were not enthusiastic about participating thus lowering the number of respondents. Another explanation to the low response rate could be their lack of interest in the topic especially that the findings of my study showed low use of information retrieval at point of care. Future research may implement different recruitment approaches such as incentives, approaching family physicians attending conferences, or telephone calls.

The second limitation is the complexity of the constructs and the lack of universal instrumentations. Although I used validated tools to measure the variables, they may still not represent the Smith et al. (2020) triad. The computer literacy scale was a validated tool that was used with pharmacists but not with physicians. However, I performed reliability measures, and the tool was reliable with good Cronbach's alpha.

The third limitation is the convenience sample that threatens external validity and limits the generalizability of the results to other physicians and other developing countries especially that many countries belong to high or upper middle-income countries. There may be differences between higher and lower income countries that were unexamined. Although the recruitment targeted a large population, my sample was mainly in cities and was not homogenous among the countries.

Recommendations

The study results add to knowledge about digital information retrieval practices among community family physicians in developing countries. One of the strengths of this study is targeting community family physicians in eight Arab countries. This study has shown that the digital information retrieval practices are low despite good EBM training, access to mobile technologies, mobile apps, and the internet. This suggests an area for future research to explore the reasons behind the low implementation of digital information retrieval at point of care among community family physicians in developing countries. Contrary to what is known in the literature (Daei et al., 2020), the low use of information retrieval at point of care justifies that more research should focus on community physicians who are understudied in the literature. Further qualitative studies could explore the community physicians' experiences with information retrieval behaviors and provide a better understanding of the barriers.

As mentioned in the limitations section, the low response rate and small sample size led to a sample of physicians that practiced in the city. Further research targeting community physicians practicing in rural areas could help understand the information

retrieval needs and predictors. Another recommendation is to attempt to replicate the study with different recruitment methods and the use of incentives, leading to a high response rate and sample size before we can refute the alternative hypothesis of this study.

<div align="center">

Implications

</div>

Positive Social Change

The information retrieval of community family physicians in Arab countries was low compared to the literature and developed countries (Daei et al., 2020). I plan to change the curricula at my institution to include more dedicated content on information retrieval using non-subscription databases such as Google Scholar and Pubmed and the presence of free medical apps that could help in their information needs at the point of care.

On an academic level, the results of this study regarding the importance of information literacy and the presence of average computer literacy among community family physicians should highlight the importance to stress on digital literacy in the medical school curricula and continued educational activities for practicing physicians. I plan to develop a free online course that could improve physicians' information and computer literacy and offer it to the population of the study.

On an industry level, the study results have shown that community physicians use mobile applications and online databases for information retrieval at the point of care. However, they were not able to find the information efficiently within 2 minutes. The industry should work on better design and efficiency of point-of-care resources.

Implications for Method

This study used a correlational, explanatory design to understand the predictors of digital information retrieval among community physicians in Arab countries. The design was appropriate for the research questions. However, the results of this study showed that community physicians may be unique and have a different approach to information retrieval at the point of care. Therefore, I recommend further studies to understand the phenomenon better using qualitative studies or clinical vignettes. Clinical vignettes are suitable for studies where real-world situations are difficult to observe (Benedetti et al., 2018), and experimental vignette methodologies are ideal for analyzing medical decisions and assessing dependent variables that include behaviors (Walker et al., 2019).

Conclusion

Community physicians in Arab countries have low adoption of information retrieval at point of care despite their access to digital resources and the internet. Moreover, community family physicians reported average information and computer literacy. It is imperative for the scientific body to focus on community physicians' needs and explore their information retrieval behaviors and for the academic body to focus more on information and literacy skills in the curricula. By supporting and understanding the information retrieval of community physicians in developing countries, we are aiming for better decision making at the point of care, leading to a better and safer healthcare for patients.

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Appendix: Online Survey

Are you a family physician who practices in the community without any academic affiliation? Yes No

If no, the survey will end and the participant will be thanked
If yes, the survey will continue

Kindly note, throughout the questionnaire, **Point of care** is defined as the time during or directly after the clinical encounter with the patient in the clinic

General Questions

1. Age _____ years
2. Sex   1) Female   2) Male

3. Country: _____
4. Year of practice since graduation as family medicine: ___ years

5. Location of practice   1) City   2) Suburban   3) Rural

6. Type of practice   1) Solo   2) Group   3) Employe
                                        practice   practice   d
                                                                     physician

7. What is the number of patients seen on weekly basis at the clinic? _____

8. Country of Practice   _____

Professional EBM Competencies

9. Have you received any formal training in evidence-   1) Yes   2) No
   based medicine during your residency?
10. Have you ever attended a course or workshop on   1) Yes   2) No
    Evidence-Based Medicine?

Digital Information Practice

11. On average, how many times per week do you look for digital clinical information at the point of care? _____ week
    (This can be from search engines or online databases or mobile applications)

12. How would you rate your ability to find the information you require to answer clinical questions for patient care at the point of care?
    1) Very good   2) Good   3) Average   4) Poor   5) Very poor

13. How often do you need information **at the point of care** for the following reasons?

	Always	Often	Sometimes	Rarely	Never
Making diagnosis/workup plan					
Making a clinical decision concerning treatment options					
Medications (side effects, dosages, interaction)					
Providing information to patients					

14. How often did you look for medical information from the following sources **at the point of care**?

	Always	Often	Sometimes	Rarely	Never
Textbooks					
Clinical practice guidelines					
Online databases like Medline or Pubmed					
Subscribed online databases like UpToDate, Dynamed, Clinical Key					
Medical websites like Medscape or e-medicine					
General databases like Google or Google Scholar					
Medical apps like Epocrates, Medical calculator					
Peers/colleagues					
Pharmaceutical representatives					

15. List the top 3 digital information resources that you consult most often when your require information at point of care?

_____

_____

_____

16. What is your first resource of information in general at point of care?

_____

_____

17. At the point of care, I search for digital medical information using:
   1) Computer   2) Mobile   3) Tablet
                       phone

18. Do you have access to the internet at the point of care?
   1) Always   2) Often   3) Sometimes   4) Rarely   5) Never

19. I own one or more mobile apps for information retrieval at the point of care.
   1) Yes   2) No

20. If yes, how many apps: _____
    Please specify the top 3 frequent apps:

_____

_____

21. Do you own medical databases/apps that require a subscription?
   1) Yes   2) No

Information literacy

22. I feel confident and competent to:

	1 Almost never true	2 Usually not true	3 Sometimes but infrequently true	4 Occasionally true	5 Often true	6 Usually true	7 Always true
Medical information literacy skills							
Initiate search strategies by using keywords and Boolean logic							
Use PICO							
Search for EBM information							
Use a factual database							
Use mesh							
Use PubMed							
Retrieve an article of an institutional repository							
Evaluate bias							
Searching and finding information							
Define the information I need							
Decide where and how to find the information I need							
Identify a variety of potential sources of information							
Use electronic information sources							
Use internet search tools (search engines, directories)							

Computer literacy

21. The following statements refer to your confidence when using computers

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
I have less trouble learning how to use a computer than I do learning other things.					
When I have difficulties using a computer I know I can handle them.					
I am not what I would call a computer person.					
It takes me much longer to understand how to use computers than the average person.					
I have never felt myself able to learn how to use computers.					
I enjoy trying new things on a computer.					
I find having to use computers frightening.					
I find many aspects of using computers interesting and challenging.					
I don't understand how some people can seem to enjoy spending so much time using computers.					
I have never been very excited about using computers.					
I find using computers confusing.					

Technology Affordances

22. Please select the best answer concerning finding the clinical information that you need to answer clinical questions at the point of care

	Always	Often	Sometimes	Rarely	Never
I find relevant information					
I find useful information					
I find reliable unbiased information					
It is easy to find the information					
I find the information in less than 5 minutes					
I find the information in less than 2 minutes					
I am confident about the information that I find					