The Saudi Experience of Health-Related Social Media Use: A Scoping Review

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Abstract

Objectives: Social media (SM) are evolving and dynamic applications which can be used in health-care settings to enhance professional networking and education; patient communication, care, and education; public health programs; organizational promotion; and research. This review aims to analyze, summarize, and describe the current Saudi experience of SM use for health. *Methods:* A MEDLINE/PubMed electronic database search was performed in July 2020 utilizing the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) recommendations. The initial search has yielded a total of 263 articles, of which 25 met our inclusion criteria. *Results:* In Saudi Arabia, the literature reports a high interest in using SM for health-related purposes among the public, with a prevalence of >51%. The Saudi population has been found to highly favor the use of WhatsApp and Twitter for gaining and exchanging knowledge. Multiple facilitators and barriers have been identified and further categorized based on the users' population, such as general public, health-care practitioners, and patients with specific conditions. Overall, the common facilitator and barrier between all users' population categories were found to be younger age and lack of time, respectively. *Conclusion:* SM use for health-care activities is increasing in Saudi Arabia. Thus, it is important for SM-based health education programs to target specific population and patients' demographics with programs tailored to their particular interests and needs. This is particularly evident in the current achievements and future plans of the Saudi Ministry of Health.

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Published by S. Karger AG, Basel

Introduction

Social media (SM) are evolving and dynamic applications with hundreds of platforms and millions of users. They have been defined as "a group of Internet-based applications that build on Web 2.0 technology and allow users to create and exchange their contents" [1]. Web 2.0 technology is based on enabling individuals to actively discuss, modify, and distribute the published information, in comparison with Web 1.0 technology, where individuals passively obtain information from the Internet [2, 3]. The term "Internet-based SM applications" refer to a multi-suite set of Web technologies such as blogs, discussion communities, social networks, collaborative

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projects, virtual game worlds, and virtual social worlds. People access these SM platforms for health-related purposes in addition to other subjects [4]. Moreover, SM can be utilized to improve health-care professional networking, education, patient communication, patient care, public health program awareness, organizational promotion, and research.

Worldwide, the use of SM continues to progress tremendously, with the number of active users reaching up to 4.1 billion [5]. In 2020, Facebook had 2.6 billion users and was ranked as the most popular SM platform [6]. Interestingly, the use of SM for health-related purposes is increasingly expanding, with almost 80% of Internet users utilizing it to look for online health information. Among the Saudi population, in particular, an estimated 18.3 million people were SM users in 2020 [7]. According to a recent Saudi study, approximately two-thirds of the population relied on official government SM accounts to acquire knowledge regarding the pandemic of coronavirus disease 2019 (COVID-19) [8].

With regard to addressing key health behaviors, such as physical inactivity, smoking, obesity, poor diets, and alcohol misuse, online social networks appear to be a cost-effective tool for public health campaigns. It reaches a wider audience by allowing them to participate through sharing their knowledge and experiences [9]. An example of SM use in health promotion is the following experience of the Centers for Disease Control and Prevention (CDC). In 2009, the CDC used Twitter to raise the awareness about the pandemic of H1N1, which reached more than 1.2 million followers [10, 11]. This incident showed the strength of SM as a health promotion tool [12].

Nevertheless, despite the fact that SM use has enormous benefits, its implementation within the health-care society could be a challenge. As the public can participate in creating content in SM, it might pose a risk of spreading incorrect health-related information. Thus, it is essential to have reliable communication channels, where information disseminated is continuously monitored and verified [4]. This issue could be aggravated by some patient attitudes such as described by Sadah et al. [13] who mentioned that about 40% of Americans consider information on SM to be more reliable than a health-care professional's advice when conflict is present.

In Saudi Arabia, the use of SM networks in health care is developing and increasing rapidly. In this scoping review, we analyze, summarize, and describe the current literature exploring the Saudi experience with the aim to answer the question of how the Saudi population is using SM for health-related purposes. We examined health-related SM use in terms of Saudi population interest in using SM for health-related purposes, users' characteristics, types of SM platforms used, and facilitators and barriers to use SM in health-care purposes. Such information is necessary to advance the successful future adoption and optimal utilization of various SM networks and technology in the health-care service provision in Saudi Arabia.

Materials and Methods

Search Strategy

We followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) recommendations when performing this scoping review. A PubMed electronic database search was performed between 1 and 31 July 2020. To avoid bias, the research question was formulated in advance, based primarily on clinical relevance, before exploring the available evidence. SM and Saudi were the principal search terms used in combination with one of the following: chronic diseases, health, and health education. The published studies' references were also searched manually for relevant studies.

Study Selection

Three of us (D.B., F.B., and J.M.) were responsible for data collection individually, with any disagreement resolved through discussion between all reviewers, including D.A. and L.B. The initial search yielded a total of 263 articles, of which 116 studies were found potentially relevant from their titles and had their abstracts reviewed. Twenty-nine articles met all following criteria [1]: studies conducted in Saudi Arabia [2], articles discussing SM use in health care [3], and articles discussing at least one of the following: the rate of interest of health-related SM use, commonly used platforms and the type of use for each platform, characteristics of users, and facilitators and barriers to SM use in health-care-related purposes. After reviewing the full text of these 29 articles, 4 articles were excluded using our exclusion criteria [1]: review articles that did not include Saudi studies [2] and articles discussing SM use that is unrelated to health care. Thus, a total of 25 articles were available for our final data extraction and analyses. The selection process of the studies is presented in a PRISMA flow diagram (Fig. 1).

Data Extraction

Data extraction was performed via a data extraction tool developed, a priori, from previously published extraction tools used by national and international studies evaluating SM use in health care. The extraction tool was used to extract information from the eligible studies, 25 articles in total. The following information is included in the extraction table: the authors, year of publication, study design, sample size, characteristics of the population, aim of the study, and study results, including health-related interest of use, types of health-related SM use, most common platforms used, and perceived facilitators and barriers of SM use in health care.
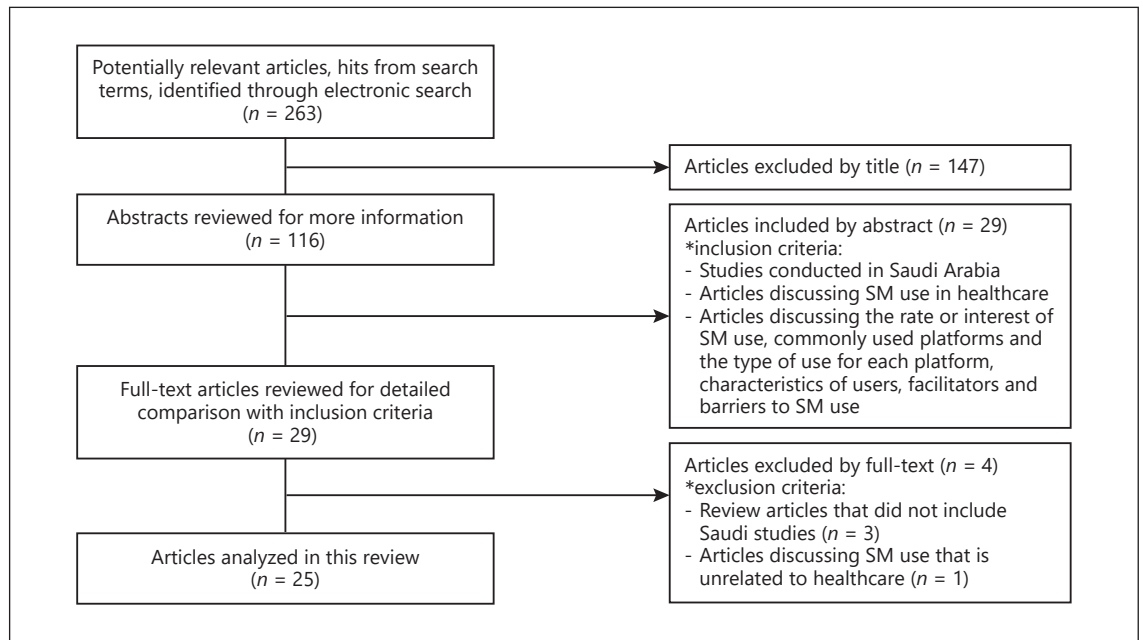
Fig. 1. PRISMA flow diagram for the Saudi studies. PRISMA, Preferred Reporting Items for Systematic Reviews and Meta-Analyses.

Results

The population studied in the 25 articles reviewed included the general public (10 articles), patients with specific disease conditions (5 articles), and health-care practitioners (10 articles). The summary of the 25 analyzed articles is shown in Table 1.

Interest in Using SM for Health-Care Purposes

In Saudi Arabia, on average, articles reported a high interest of the public to use SM for health-care-related purposes, with a minimum reported rate of interest of 51% [14]. When examining the frequency of SM use, the general public tend to spend >3 hours daily [12]. However, this rate decreases to once per week when it comes to searching health-related information on SM [15] or other Internet search engines [16].

Similarly, patients with specific disease conditions showed a high interest in using SM to learn about their disease and its management. Diabetic patients were reported to use SM for a minimum of 1 hour per day [17]. Celiac patients reported a similar pattern of daily usage [18]. Nonetheless, in a similar pattern to the general public, the majority of diabetic patients are using SM every few months to search for health-related information on Internet search engines [19]. Likewise, the majority of

health-care practitioners were using SM on a daily basis with a minimum of 1 hour per day [20–24]. While most of them have used SM for professional purposes [25, 26], none of the articles discussed how much of their time was devoted to using SM specifically for this purpose.

Types of Health-Related SM Use

There are different types of SM use for health-related activities reported in the Saudi literature. The most common was gaining and exchanging knowledge, either related to health in general [15] or to a specific health condition's diagnosis [1, 3, 19, 27], management [12, 18, 28], and prevention [14, 17].

In most of the articles, participants showed a high interest in using SM to communicate and follow SM accounts of their physicians [12, 16], most prominently in studies discussing patients with specific disease conditions [17, 18]. Communicating with other patients of similar conditions [17], sharing personal experiences [12, 16, 17, 29], and providing or seeking support through online communities and resources [29] have been also reported in the Saudi literature.

Although health-care practitioners use SM mainly for personal purposes, a majority show a high interest in using it for professional purposes [21, 22, 30]. Health-care practitioners reported improving their professional

Table 1. Characteristics and results of included Saudi articles

Author (year)/ study design	Characteristics of the study participants				HC-related use	Most common platforms used	Perceived facilitators/ barriers of SM use
	majority sex	age	education	occupation/income			
General public							
Alrukban [12]/ Cross-sectional	Females	Most ≤34	Most have more than a high school degree	N/A	100% use SM, >60% of users follow health-related accounts	N/A	Facilitators: (1) female gender, (2) higher education Barriers: lack of trustworthiness
Bahkali et al. [27]/ Cross-sectional	Females	Average = 33.9± 10.8 Most 25–34	Most have bachelor's degree or above	N/A	60% of users were active followers	NA (Twitter only studied)	Facilitators: (1) younger age, (2) higher education, (3) female gender, 4) communication and educational skills
Bahkali et al. [41]/ Cross-sectional	Female	Most 25–34	Most have bachelor's degree or above	Most are housewives, from very low family income <7,000	N/A	N/A (research focused only on Twitter)	N/A
Bahkali et al. [33]/ Cross-sectional	Females	Most <40	Most have bachelor's degree or above	Most have a middle to high income level	68.3% had online health-related information-seeking behavior	Google, followed by Twitter and Snapchat	Facilitators: (1) younger age, (2) female gender
Almoziny [3]/ Cross-sectional	Females	Most 29–39	Most have a bachelor's degree	Most were employed, followed by unemployed and students. Most had income <2,000 SAR	98% used SM, >60% use SM to gain dental information	Snapchat, followed by Instagram and Twitter	Facilitators: younger age
Iftikhar and Abaalkhail [32]/ Cross-sectional	Females	Most ≤29	Most have bachelor's degree or above	Most are housewives, with income of 2,000–5,000 SR	90% use SM, >75% received health-related information on WhatsApp	WhatsApp, followed by Facebook and Twitter	N/A
Al-Thunayan et al. [1]/ Cross-sectional	Females	Range 15–50 mean = 28.7±10.3	N/A	N/A	64% were using SM for oral health-related reasons	Twitter, followed by Instagram and YouTube	Facilitators: (1) accessibility and easiness of use, (2) female gender Barriers: (1) communication difficulty, (2) lack of trustworthiness, (3) lack of time and skills, (4) lack of interest
Alhaddad [15]/ Cross-sectional	Male	The mean age of respondents was 29±12.2 years	Majority have a university degree	N/A	More than 70% use SM, and 70% have searched for medical information on SM	WhatsApp, followed by Snapchat and YouTube	Facilitators: (1) female gender, (2) higher education Barriers: lack of trustworthiness
Alassiri and Alowfi [14]/ Cross-sectional	Male	Majority between 18 and 45 years	Majority have a university degree	Majority are students, in the medical or educational field, majority had an income of 12,000 SAR or more	More than 51% use Twitter for health information	N/A (Twitter only studied)	Facilitators: accessibility and easiness of use Barriers: lack of trustworthiness
Sumayyia et al. [16]/ Cross-sectional	Females	Majority between 18 and 44 years	Majority have a university degree	Majority have an income of 10,000 SAR or lower	More than 90% use SM	WhatsApp, followed by Snapchat and YouTube	Barriers: lack of trustworthiness
Patients with specific conditions							
Jamal et al. [19]/ Cross-sectional	Males	Mean = 53.5	Most have a low educational level	Most are retired or unemployed, with an income of 5,000–10,000 SAR	Only 39% were Internet users, and more than 70% used the Internet to search for health-related information	Google, followed by Twitter	Facilitators: (1) younger age, (2) female gender, (3) being single, (4) higher education, (5) higher income, (6) longer duration of Internet usage Barriers: (1) long history of DM, (2) familial history of the DM, (3) unemployment, (4) not seeking DM education, (5) language barriers, (6) lack of searching skills

El Kheir/Boumarah/Bukhamseen/
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Table 1 (continued)

Author (year)/ study design	Purpose of study (sample size)	Characteristics of the study participants				HC-related use	Most common platforms used	Perceived facilitators/ barriers of SM use
		majority sex	age	education	occupation/income			
Alanzi [29]/ Systematic review	Evaluate the impact of social networking interventions on diabetic patients in the Middle East (5 studies)	N/A	Range: 10–68	N/A	N/A	SANAD was easily adopted and received high ratings	N/A (research focused only on SANAD)	Barriers: (1) poor terminology, system information, and learning factors, (2) lack of trustworthiness
Alalawi et al. [54]/ Cross-sectional	Investigate the effectiveness of a SM presence for a dental practice to engage with and obtain new patients (401 patients)	Male	Majority between 18 and 25	N/A	N/A	More than 95% have an SM account	Snapchat, followed by Instagram	Facilitators: female gender
Alzahrani and Alanzi [17]/ Cross-sectional	Analyze the use of SM by people with diabetes in SA and to know the purposes, benefits, and risks of its use (158 diabetic patients)	Females	Majority between 18 and 44	Majority have a university degree	Students, employees, retirees, and unemployed	81% use SM	WhatsApp, followed by Snapchat and Instagram	Barriers: (1) privacy issues (2) lack of trustworthiness
Al Sarkhy [18]/ Cross-sectional	Investigate SM usage patterns among celiac patients and explore the potential factors that may influence the frequency of its usage (221 celiac patients or their parents)	Female	The median age was 36	Majority have a university degree	N/A	More than 95% use SM for disease management	WhatsApp, followed by Instagram and Twitter	Barriers: (1) lack of trustworthiness, (2) privacy issues, (3) lack of time
HC practitioners								
AlMaiman et al. [28]/ Cross-sectional (pilot study)	Estimate the proportion of physicians accessing online HC information in SA (253 physicians)	Females	Average = 32.8 Most <35	Majority have a university degree	Physicians	79% of physicians were seeking online health information	Twitter	Facilitators: (1) younger age, (2) income, (3) education (not specified) Barriers: (1) lack of time and skills, (2) lack of trustworthiness, (3) concerns regarding accountability
Alsobayel [30]/ Cross-sectional	Explore the use of SM networks among HC professionals in SA for professional development (231 HC professionals)	Females	Most 20–40	Most have bachelor's degree or above	Clinicians and academics	100% used SM, 70% use SM for professional development	Twitter, followed by YouTube and Instagram	Facilitators: younger age
Alshakhs and Alanzi [20]/ Cross-sectional	Evaluate the perception of HC professionals in SA toward the usages of SM in HC delivery (120 HC professionals)	Females	Majority between 20 and 40	Ranging from diploma to doctorate	HC professionals (majority are physicians, nurses, and allied health personnel)	100% use SM, 94.2% have been using for >3 years	WhatsApp, followed by YouTube	Barriers: (1) ethical and legal issues (2) lack of trustworthiness
Irfan et al. [22]/ Cross-sectional	Evaluate the utility of SM among family medicine residents and consultants (132 residents and consultants)	Male	The mean age of the participants was 34.63 +9.50 years	MBBS and postgrad qualification	Residents and physicians	More than 95% use SM, 26% use it for professional reasons	YouTube, followed by Facebook	Facilitators: younger age Barriers: lack of time and skills
Alanzi et al. [21]/ Cross-sectional	Evaluate the use of SM in the Radiology Department at Johns Hopkins Aramco HC in SA (57 radiology department staff)	Male	Majority between 20 and 50	Majority have a university degree	Radiology department personnel (technologists, receptionists, radiologists, and technicians)	95% use SM, 35% use it for professional purposes	WhatsApp, followed by Facebook and Google+	Barriers: (1) lack of time and interest (2) lack of information and experience (3) uncertainty about SM usefulness (4) privacy issues (5) negative replies
Albarrak et al. [25]/ Cross-sectional	Assess the knowledge and perception of telemedicine and its applications among physicians and evaluate their willingness toward adopting telemedicine in clinical practice (391 physicians)	Male	Majority between 20 and 40	MBBS and postgrad qualification	Consultants, residents, specialists, and interns	More than 70% use SM or email to communicate with patients	N/A	Barriers: (1) ethical and legal issues (2) cost (3) lack of skills
Justinia et al. [26]/ Mixed methods (cross-sectional and interviews)	Assess the perceptions and usage of SM by orthopedic surgeons in Jeddah, SA, and its impact on their profession, and to evaluate their level of awareness of the potential risks on their practice (qualitative: 8 orthopedic surgeons; quantitative: 165 orthopedic surgeons)	Male	Majority <40	Majority are residents	Physicians (consultants, residents, and specialists)	More than 95% use SM, >50% use it for professional purposes	Twitter, followed by Facebook and Instagram	Facilitators: younger age Barriers: (1) lack of Saudi guidelines (2) ethical and legal issues (3) lack of trustworthiness (4) lack of time

Table 1 (continued)

Author (year)/ study design	Purpose of study (sample size)	Characteristics of the study participants				HC-related use	Most common platforms used	Perceived facilitators/ barriers of SM use
		majority sex	age	education	occupation/income			
Alanzi and Al-Yami [23]/ Cross-sectional	Investigate the physicians' attitudes toward the use of SM for professional purposes in SA (235 physicians)	Females	Majority between 25 and 45	Majority have a university degree	Consultants, residents, specialists, and interns	More than 98% use SM	Facebook, followed by YouTube and Twitter	Facilitators: younger age Barriers: (1) ethical issues (2) lack of trustworthiness
Alanzi et al. [24]/ Cross-sectional	Investigate the use of SM for educational purposes by HC quality personnel in SA (78 HC quality employees)	Equal males and females	Majority <40	Majority have a university degree	Quality HC field	More than 80% use SM to improve knowledge about HC quality	YouTube, followed by Twitter	N/A
Alanzi et al [31]/ Cross-sectional	Investigate if HC providers in SA used SM to share the safety incidents that occurred in hospitals (151 HC professionals)	Females	Majority <40	Majority have a university degree	HC providers (doctors and nurses)	More than 80% use SM for knowledge of quality patient care	WhatsApp, followed by Twitter	Barriers: ethical and legal issues

SM, social media; HC, healthcare; SA, Saudi Arabia; NA, not available; SANAD, Saudi Arabia Networking for Aiding Diabetes.

knowledge and skills [23, 24, 31] by sharing the literature [29], work experiences, and medical knowledge [20, 22, 25, 26]. In addition, many articles reported health-care practitioners participating in health promotion [12, 24, 29, 31] by raising awareness and disseminating general advice through SM platforms [26]. In regard to health-care delivery by online consultations [14, 23, 25, 26], health-care practitioners showed a lower tendency of using SM for this purpose in most articles. Other reported types of use by health-care practitioners include networking, self-promotion, employment and research opportunities, and sharing incidents that affect patient safety [24, 30, 31].

Common SM Platforms

It has been found that different populations favor different SM platforms for both general use and health-related activities, and that people may use 2–4 different SM platforms. WhatsApp was reported as the most popular platform among the Saudi population, with a usage rate of 89.8%, followed by Twitter [15, 20, 21, 32]. Details regarding the most commonly used SM platforms reported in each article can be reviewed in Table 1.

Characteristics of SM Users

We reviewed the SM users' characteristics in the Saudi articles we analyzed. We observed that based on studies that examined it, most of the participants were married [19, 22, 26, 32, 33]. In addition, since all the studies included in this section took place in Saudi Arabia, almost all participants were Saudi residents and, for the majority, the country of origin was Saudi Arabia [3, 30, 32, 33]. Details of other participants' characteristics (age, education, occupation, and income) are presented in Table 1.

Facilitators of SM Use in Health Care

Many Saudi articles have discussed different participants' characteristics and SM platforms' features that increased SM use for health-care-related activities. Younger age and female gender were reported as the main users' characteristics facilitating the use of SM for health-related purposes [12, 19, 28, 30]. Specific SM platforms' features such as easy accessibility and cost-effectiveness were also associated with higher rates of use [1, 27]. Other facilitators are presented in Table 1 and further categorized in Table 2.

Barriers against SM Use in Health Care

Barriers to using SM to seek health-related information were discussed by several Saudi articles. Lack of

El Kheir/Boumarah/Bukhamseen/ Masoudi/Boubshait

trustworthiness and disease-specific information was identified as important barriers to the use of SM for health care among the general population [1, 18]. Additionally, health-care practitioners reported the risk of breaching patients' privacy as one of the factors preventing the adoption of SM in health care [21]. Different barriers reported by the general public and health-care practitioners are presented in Table 1 and further categorized in Table 2.

Discussion

To our knowledge, this is the first scoping review article analyzing and quantifying the information available on the use of SM for health-care-related activities in Saudi Arabia. In this review, we describe SM users' characteristics, their reasons and types of use, in addition to SM utilization opportunities, and utilization facilitators and barriers in Saudi Arabia.

Interest in Using SM for Health-Care Purposes

In Saudi Arabia, the literature reports a high interest in using SM for health-related purposes among the public, with a minimum reported rate of interest of 51% [1, 12, 14]. In general, the daily usage of SM was relatively high when compared to the time spent on using SM for health-related activities [17, 19]. Similarly, a cross-sectional study among Vietnamese youths reported that 73% of participants are interested in health-related information shared on SM [34]. Another study conducted by Ghweeba et al. [35] showed that individuals spend >30% of their time on SM engaging and reading health-related information. Regarding health-care practitioners, most residents, junior, and senior physicians were reported to be using SM daily, spending 3–6 hours on SM per week [36], and only a minority reported no use at all [37].

Types of Health-Related SM Use

The most common reason, as mentioned by several Saudi articles, for using health-related SM was for gaining and exchanging knowledge [3, 19, 27, 30]. In addition, general pubic showed high interest in using SM for communicating with their physicians and other patients with similar conditions [12, 16, 17]. Other types of use include providing support to patients, raising awareness, promoting health, and sharing the latest news on health care [12, 19, 27, 29, 30]. Saudi health-care professionals utilized SM for self-promotion and to explore employment or research opportunities [30]. The international audi-

Table 2. Summary of perceived facilitators and barriers of SM use

Facilitators of SM use			Barriers of SM use		
general public	patients with specific conditions	HC practitioners	general public	patients with specific conditions	HC practitioners
(1) Younger age (2) Higher education (3) Female gender (4) Communication and educational skills (5) Accessibility and easiness of use	(1) Younger age (2) Female gender (3) Being single (4) Higher education (5) Higher income (6) Longer duration of internet usage	(1) Younger age (2) Income (not specified) (3) Education (not specified)	(1) Communication difficulty (2) Lack of trustworthiness (3) Lack of time and skills (4) Lack of interest	(1) Lack of trustworthiness (2) Privacy issues (3) Lack of time (4) Unemployment (5) Language barriers (6) Lack of searching skills (7) Poor terminology, system information, and learning factors Specific to diabetics (1) Long history of DM (2) Familial history of the DM (3) Not seeking DM education	(1) Lack of time (2) Cost (3) Lack of skills (4) Lack of Saudi guidelines (5) Ethical and legal issues (6) Lack of trustworthiness (7) Lack of information and experience (8) Uncertainty about SM usefulness (9) Negative replies

SM, social media; DM, diabetes mellitus; HC, health care.

ence used SM for similar reasons, as reported by multiple articles, with goals such as connecting with other patients and finding social support described as two of the most common drivers of health-related SM use internationally [4, 38].

Common SM Platforms

It has been found that different populations favor different SM platforms for both general use and health-related activities, and that people may use 2–4 different SM platforms [38]. The Saudi population has been found to highly favor the use of WhatsApp as a SM platform, with usage rate as high as 89.8%, going up to 96.7% among health-care practitioners [15, 20, 21, 32], while some of international studies have reported different SM platforms used for health-related activities, namely, social network sites, followed by discussion forums and blogs [39]. Facebook was rated as the highest used SM platform internationally, with adoption rates of hospitals as high as 99.4%, followed by Twitter [34, 38, 40].

Characteristics of SM Users

General Saudi public users of SM for health-care activities are predominantly married [19, 32, 33], female participants [3, 12, 19, 30, 32], below the age of 40 years [3, 12, 32, 33, 41], bachelor degree holders [3, 30, 32, 33], with the majority having middle to high income, monthly salary ranging from over 2,000 to 10,000 SAR [3, 19, 32, 33], with a combination of employed and unemployed SM users [3, 19, 30, 32]. The Saudi literature investigated mainly Saudi residents with the country of origin being also Saudi Arabia [3, 30, 32, 33]. Similar to findings in the Saudi public SM users, several international studies reported that the majority of SM users for health-care activities are also predominantly females [13, 34–39, 42] and young adults (between 18 and 35 years of age) [13, 34, 35, 38, 42], highly educated (possessing or obtaining a college degree) [34, 35, 38, 39, 42], but with varying marital status [34, 35, 39].

Facilitators of SM Use in Health Care

Many Saudi articles have discussed different participants' characteristics that increased SM use such as being young, female, and having a higher level of education and income [12, 19, 27, 28, 30, 32]. The same findings were also described by a number of international studies: being young, female, and having a higher income and higher education were associated with higher use of SM for health-related activities [2, 13, 35, 37–39, 43]. One international study also examined the elderly use of SM for health-related activities, where both the breadth and depth of their daily technology use, together with their attitude and feelings toward technology, had a positive association with higher SM use [2]. Furthermore, individuals with chronic health conditions and those who perceived the usefulness of the information on SM had an increased involvement in sharing and seeking health-related information via SM [35, 44].

Features of SM platforms that increased population use of SM for health-related activities were also reported in the Saudi literature. These features included facilitating the interaction between the general public and health-care professionals, being easily accessible and cost-effective, available for all age-groups, and allowing easy extraction of health-related information [1, 27]. In addition, the professional communication and educational skills of the health practitioners providing information on SM platforms, and their adherence to evidence-based information were also found to contribute to increased use of SM by the public for sharing health-related information. SM platform features facilitating the use among the international public were also described in a couple of articles, such as being easily accessible, and cost-effective, user-friendly, in addition to their portability, speed, simplicity, and ability to update and preserve the anonymity of the user [35, 45, 46].

Barriers against SM Use in Health Care

Barriers to using SM to seek health-related information were discussed in several Saudi articles. SM platform features that lead to lower interest in using SM for health-related purposes among the general public include lack of trustworthiness [18], lack of disease-specific information, and the difficulty in communicating with health-care experts [1, 28]. Health-care practitioners have reported in multiple articles that lack of time [21, 22, 26] and lack of skills [14, 28] were the main reasons behind not using SM more frequently for professional purposes. These barriers were similarly reported by the general public [1, 18, 28].

Other barriers that might avert health-care practitioners from using SM in health care are the risk of sharing patients' private information, thus breaching the patients' privacy [21]. In addition, health-care practitioners may avoid sharing health advice on SM due to confidentiality, liability, reputation, and misinformation issues [20, 26, 31].

Our scoping review findings are corroborated by a recent Saudi study reporting on the major barriers against implementing SM in health-care management, as identified by leading health-care professionals and decision-

makers in Saudi Arabia [29]. Identified barriers included shortage in mHealth expertise and human resources, need for targeted funding and infrastructure investments, and standardization of legal, privacy, and regulatory directives, in addition to general health-care organizational and bureaucratic impediments. The study also suggested several solutions for these barriers that revolved around the need to establish appropriate leadership and clinical environment to foster SM adoption in the current Saudi health-care system [29].

Internationally, some of the commonly identified barriers to SM use were lack of time, lack of computer or Internet access, lack of skills and experience using the computer, and the possibility of acquiring misleading information via SM [10, 13, 36, 39, 47]. In addition, males, elderly, those with poor education, non-English speakers, and those from a black ethnicity were associated with less SM-related health-seeking behavior [10, 34, 36, 46]. Furthermore, privacy and confidentiality issues were also reported as important barriers to SM use in health-related communication [38, 45, 47]. Moreover, physicians reported that their work requirements, their fear of saying the wrong thing online, and the lack of guidelines and institutional support were all factors that deterred them from using SM for health-related communication [36].

Saudi Arabia Ministry of Health e-Health Project: Current Achievements and Future Plans

The Ministry of Health (MOH) has recognized the trend of increased SM use in Saudi Arabia and has embraced the change by creating MOH accounts on various SM platforms to engage with the Saudi public. The MOH was keen to join those SM networks known to be popular among Saudi citizens. The MOH's first accounts on SM were on Twitter and YouTube, both of which were found by several Saudi articles to be popular SM platforms among Saudis. In 2019, the MOH Twitter account, established in April 2011, had 2.04 million followers and 52.7 thousand tweets. The MOH Facebook page, created in April 2011, had almost 600 thousand follows and likes, and the page was rated 4.0 out of 5. During the COVID-19 pandemic, Twitter and Facebook accounts gained a huge amount of attention with a dramatic increase in the number of followers as updates regarding new cases are posted on them daily. Currently, August 2020, the Twitter account has 4.2 million followers and 55.7 thousand tweets and the Facebook page, which is now rated 4.8 out of 5, has 2.3 million followers. The YouTube account was also created in April 2011, and they currently, August 2020, have 534 videos with an overall view count of 48.9 mil-

lion. The first Instagram post was uploaded in June 2017, and the MOH team has since then uploaded 946 posts with a total of 576 thousand followers.

In 2016, in its annual report, the MOH reported that by creating several infographics and videos covering important health-related topics, as well as MOH project achievements, it was able to increase awareness of the followers (individuals and communities) about these health-related issues by delivering reliable, timely, and easily digestible information. With those findings in mind, the MOH was able to raise awareness of the COVID-19 pandemic through similar means of videos and infographics shared on their SM platforms.

It is worthy of mentioning that the MOH has launched several e-services through their portal and different apps that would benefit the citizens. One of the apps is "Seha" that provides medical consultations from accredited doctors allowing patients to connect with the doctors by chat, voice, or video calls. They are also able to evaluate their experience after the consultation through the app [48]. The other app is "Mawid" that allows the patients to book, cancel, or reschedule appointments at primary health-care centers, in addition to managing their referral appointments [49]. Another service offered through this app is the e-prescription service where the patient can obtain a prescribed medication from any pharmacy by a consultation through the app without the need to see a doctor [50]. In addition, the MOH has a call center (937) that provides a wide range of services such as medical consultations, appointment reservations at PHCs, and technical support for the MOH apps through telephone calls, SM, or email. The use of such services has become vital during the COVID-19 pandemic. In the month of July 2020 alone, the call center received over 2.9 million calls [51]. In the wake of the pandemic, the MOH services expanded to include interactive services through a designated WhatsApp number, as well as a new app "Tetamman" [52]. The app "Tetamman" is aimed to provide care and protection for those isolated or quarantined due to COVID-19 by including educational information, health status follow-ups, a countdown indicator for isolation, and other services that will ensure their safety and full recovery [53].

The strength of our study lies in our comprehensive and systematic approach to analyze and quantify the amount of information available on the use of SM for health-care-related activities in Saudi Arabia. Nevertheless, our study has some limitations mainly that we have reviewed studies published in the English language only, and we have adopted the original researchers'

interpretation(s), as published in the individually reviewed articles. Due to the limited number of Saudi studies, an effort was made to comprehensively retrieve all published articles fulfilling the inclusion criteria, regardless of their methodological quality. Future reviews addressing the use of SM in Saudi Arabia should focus on assessing methodological quality to enhance the reliability of reported data.

Conclusion

In conclusion, SM use for health-care activities is increasing in Saudi Arabia [1], mostly among female individuals and younger adults [3, 12, 19, 30, 32, 33, 41]. Studies revealed variability in the topics searched among different population demographics [29, 43]. Thus, it is important for SM-based health education programs to target specific population and patients' demographics with programs tailored to their particular interests and needs.

Recommendations

There are only a limited number of published Saudi studies, to date, investigating the use of SM for health-care-related activities by the Saudi population and health-care practitioners. Majority of the available Saudi literature focused on describing the characteristics of SM users in health care and their preferred SM networks. However, little information is available concerning the impact of SM on health behaviors and status of the users. In addition, little is known about the implementation of SM in health care, especially with regard to communicating with patients and overall management and follow-up of patients' health conditions. Thus, further research is recommended in these areas to assess the current and future utilization and impact of SM platforms on health care in Saudi Arabia.

Statement of Ethics

Our current submission is a scoping review of publicly available published literature. As such, it did not require a formal Ethical Approval, as per the requirements of the Institutional Review Board of Imam Abdulrahman Bin Faisal University.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

Funding Sources

The authors did not receive any funding.

Author Contributions

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