The use of social media among health professionals to facilitate chronic disease self-management with their patients: A systematic review

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Abstract

Objective: The objective of this systematic review was to summarize the evidence pertaining to the use of social media by health professionals to facilitate chronic disease self-management with their patients.

Methods: A systematic approach was used to retrieve and extract relevant data. A total of 5163 citations were identified, of which seven unique studies met criteria for inclusion; one was a randomized controlled trial, two were prospective cohort studies, and four were qualitative studies. The following social media platforms were evaluated: discussion forums (6 studies) and collaborative project (1 study).

Results: The available evidence suggests that health professionals perceived discussion forums and collaborative projects to be useful social media platforms to facilitate chronic disease self-management with patients. No relevant evidence was found regarding the use of other social media platforms. Most studies indicated positive findings regarding health professionals' intention to use discussion forums, while the one study that used a collaborative project also indicated positive findings with its perceived ease of use as health professionals felt that it was useful to facilitate chronic disease self-management with patients. Mixed findings were seen in regards to health professionals' perceived ease of use of discussion forums. The most common barrier to using social media platforms was the lack of time in health professionals' schedules.

Conclusions: Discussion forums and collaborative projects appear to be promising resources for health professionals to assist their patients in self-managing their chronic conditions; however, further research comparing various social media platforms is needed.

Keywords

Social media, chronic disease, self-management, dissemination, evidence-based practice, patient education

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Introduction

The prevalence rates of major chronic diseases among Canadian adults continue to increase, and the population over 65 years of age is growing almost four times greater than the overall population.[1] Chronic disease has also resulted in significant use of health care services as adults with multiple chronic diseases account for over two-thirds of health care spending.[2] Given that

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more Canadians are living longer with chronic diseases,[1] there is a need for health professionals to promote evidence-based self-management support to their patients.

In an effort to improve joint partnerships between health professionals and patients for the collaborative care of chronic diseases, health professionals are supplementing traditional patient education by providing technical skills and information allowing their patients to self-manage their chronic conditions.[3]

Self-management support, such as the provision of personalized feedback, creation of small action plans and goal setting, enlisting social support, and determining goal achievement,[4] allows health professionals to complement traditional patient education.[3] Self-management support may allow patients to make appropriate decisions and manage their conditions through the use of technical skills and information to identify problems.[3]

There remains a lack of clarity on how health professionals can optimally enhance self-management support[5] while addressing many challenges associated with provision including limited time and difficulties with ensuring patients are willing and able to understand instructions.[6] New methods to provide successful self-management support to patients are therefore needed to minimize resource demand and improve patient education.

Self-management support can be enhanced by online information and communication technologies (ICTs) as chronic disease patients are increasingly using them to access health information[7] and these tools appear to be a promising resource allowing new strategies for patients and health professionals to communicate with one another and to educate themselves.[8,9] Online ICTs, such as social media, have the potential to reach a broad population,[10] and allow for improved social support and knowledge acquisition.[10,11] Furthermore, online self-management interventions have been associated with improvements in health behaviors and health status among older patients with chronic diseases.[7]

Social media have been defined as "a group of online applications that allow for the creation and exchange of content generated by users" (p. 1376)[12] and have been categorized into the following groups: collaborative projects, content communities, blogs or microblogs, social networking sites, virtual gaming or social worlds,[13] and online discussion forums.[12] Collaborative projects (e.g., Wikipedia) are "websites which allow users to add, remove, and change text-based content" and "enable the joint and simultaneous creation of content by many end-users" (p. 62).[13] Content communities (e.g., YouTube) allow users to share media content such as videos, text, photographs, and presentations.[13] Blogs and microblogs (i.e.,

Twitter) are specific websites that come in different formats such as reviews of relevant information in one content area, to personal memoirs.[13] These forms of social media are typically managed by one individual[13] and are usually displayed by date-stamped entries.[14] Social networking sites (e.g., Facebook) are "applications that enable users to connect by creating personal information profiles, inviting friends and colleagues to have access to those profiles, and sending e-mails and instant messages between each other" (p. 63).[13] Virtual game worlds (e.g., Second Life) are "platforms that replicate a three dimensional environment in which users can appear in the form of personalized avatars and interact with each other as they would in real life" (p. 64), while virtual social worlds "allow inhabitants to choose their behavior more freely and essentially live a virtual life similar to their real life" (p. 64).[13] Online discussion forums, sometimes referred to as bulletin boards, allow users to have conversations using posted messages, and have been considered a form of social media as they incorporate user-generated content.[12]

Social media have demonstrated to be a potentially successful resource tool for patients to self-manage their chronic conditions as it has provided them with empowerment,[15] improved health indicators,[9] and enhanced patient knowledge and confidence.[16] Social media use among health professionals has also increasingly become popular[17,18] and has engaged learners and disseminated accurate information to enhance education.[17,19,20] Social media allows for multimedia-sharing (e.g., disease management videos, podcasts and wikis) and has also shown to facilitate public health promotion[21] and respond to public health concerns.[22]

While evidence shows that health professionals are using social media more regularly,[17,18] and with a growing need to improve self-management strategies for patients, there is a lack of clarity regarding its use for chronic disease management and the role played by health professionals.[9]

This systematic review was designed to address this knowledge gap. The objective of this systematic review was to summarize the evidence pertaining to the use of social media by health professionals to facilitate chronic disease self-management with their patients. Specifically, the aim of this systematic review was to provide new knowledge on health professionals' perceived usability and change in practice behavior when using social media to assist patients in self-managing their chronic conditions.

Methods

This systematic review was conducted using the Preferred Reporting Items for Systematic Reviews

and Meta-Analyses (PRISMA) guidelines.[23] To summarize the evidence, a systematic approach was adopted to retrieve relevant papers from the literature. Articles were selected for this review using the predefined selection criteria guided by population, intervention, comparison, outcome, and study design (PICOS) in Table 1.

Studies were excluded if they did not meet the selection criteria (Table 1). Duplicate publications, narrative reviews, case series, case reports, data presented in abstract form only, conference proceedings, study protocols, and publications not written in English were also excluded.

Search strategy

The literature search was performed by an information specialist. Published literature was identified by searching the following bibliographic databases up to April 2016: Medline, Cochrane Central Register of Controlled Trials, Embase, CINAHL, ERIC, and PsycINFO. The search was performed using terms to identify peer-reviewed research in which social media and chronic disease self-management were important features (see Supplementary Appendix 1). Gray literature (literature that is not commercially published) was conducted by searching Google and other internet search engines to identify any additional web-based publications. In addition, the searches were supplemented by hand searching the bibliographies of key papers. A date limit of 2004 onwards was placed to ensure the most relevant social media technologies were included.

Two reviewers independently screened the titles and abstracts of all citations retrieved from the literature search using Covidence (www.covidence.org), an online systematic review tool. Independent reviews of the full-text articles were then performed based on the selection criteria. Disagreements were resolved through discussion until consensus was reached. The study selection process is presented in a PRISMA flow diagram (Figure 1).

Descriptive data were extracted by one reviewer for each eligible article. The extraction was subsequently verified by a second reviewer. Data extraction forms were designed a priori to document and tabulate relevant study and patient characteristics, study findings and authors' conclusions. Data from figures were not used if they were not explicit. Studies were categorized by the type of social media intervention used as categorized by Hamm et al.[12] (Table 2).

Given the broad inclusion criteria and heterogeneity of the interventions and methodological characteristics of included studies (PICOS), a meta-analysis was deemed inappropriate, and a narrative synthesis and summary of study findings was therefore conducted. The outcomes of interest included the usability of social media platforms for chronic disease self-management and practice behavior change among health professionals (Table 1).

Quality appraisal of the selected literature

One reviewer independently assessed the quality of each study using the Scottish Intercollegiate Guidelines Network (SIGN 50) tool for cohort studies and randomized controlled trials (RCTs),[24] and the Critical Appraisal Skills Programme (CASP) tool[25] for qualitative studies, which was subsequently checked for accuracy by a second reviewer. Disagreements were resolved through consensus. Risk of bias was assessed at the study level. Summary scores were not calculated, rather the strengths and limitations of each included study were described (see Supplementary Appendix 3).

Usability

The usability outcomes were guided by the Technology Acceptance Model (TAM2)[26] which illustrates that behavior intention to use a system is determined by perceived usefulness and perceived ease of use. Perceived usefulness is defined by Venkatesh and Davis[26] as "the extent to which a person believes that

Table 1. Selection criteria for systematic review.

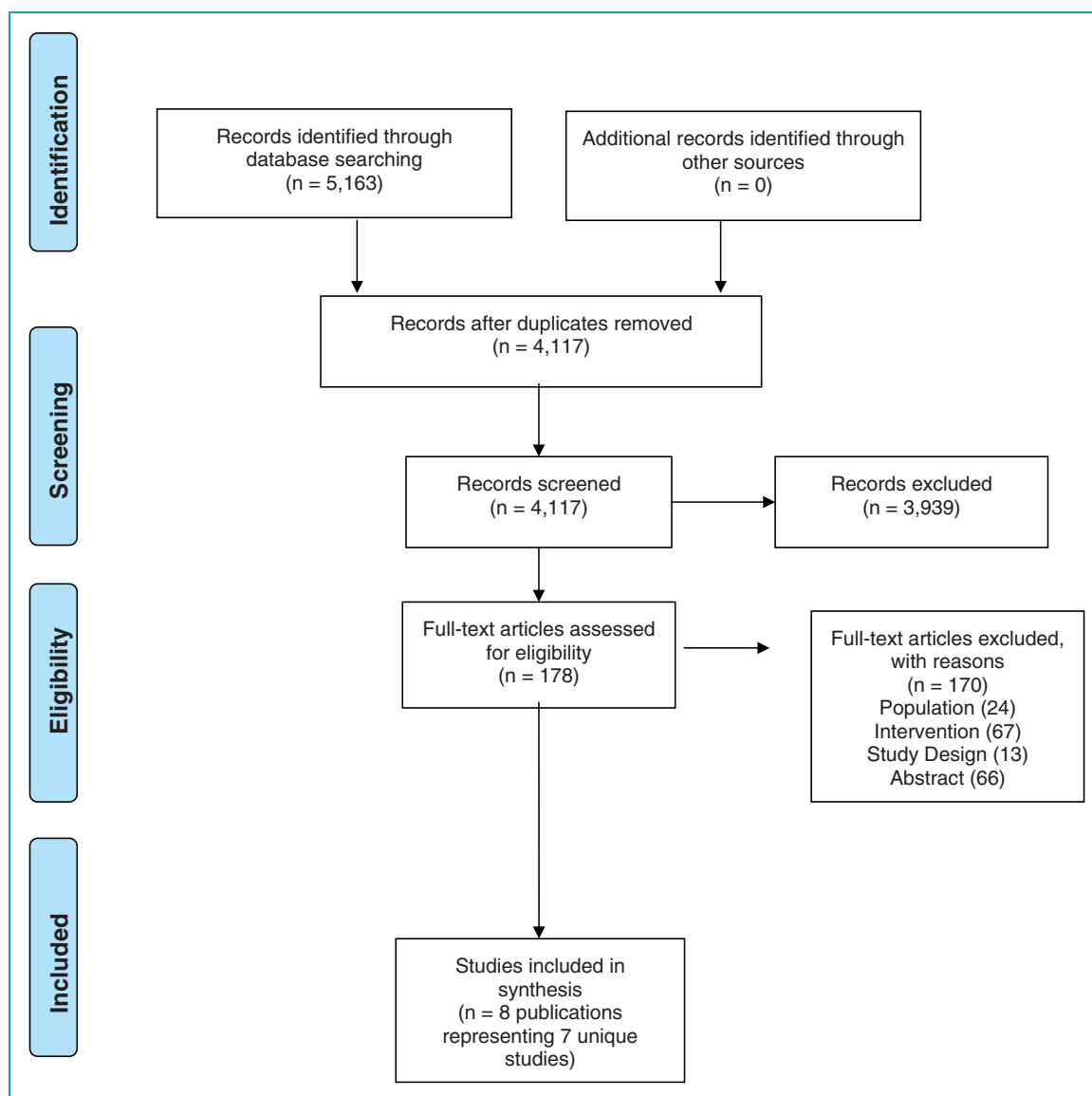|	
Population	Health professionals (e.g., physicians, nurses, dieticians)
Intervention	Chronic disease self-management programs disseminated using social media platforms (i.e., collaborative project, blog or microblog, content community, social networking site, virtual world, discussion forum)
Comparator	• Other social media platforms • Information and communication technologies (e.g., email, websites) • No comparator
Outcome	• Usability (e.g., perceived usefulness and ease of use) • Practice behavior change (e.g. barriers, knowledge, skills, social/professional role and identity, optimism, beliefs about capabilities, beliefs about consequences, intentions, memory/attention/decision, environmental context and resources, social influences, and emotion)
Study Design	Randomized controlled trials (RCTs), non-randomized comparative controlled trials (CCTs), observational studies, qualitative studies

Figure 1. PRISMA flow diagram of included studies.

using the system will enhance his/her job performance'' (p. 187), and perceived ease of use is defined as ''the extent to which a person believes that using the system will be free of effort'' (p. 187).

Practice behavior

Practice behavior change outcomes were guided by the Theoretical Domains Framework (TDF).[27] The TDF identifies numerous behavior constructs and consists of 12 domains: (a) knowledge; (b) skills; (c) social/professional role and identity; (d) beliefs about capabilities; (e) beliefs about consequences; (f) motivation and goals; (g) memory, attention and decision processes; (h) environmental context and resources; (i) social influences; (j) emotion regulation; (k) behavioral regulation;

and (l) nature of the behavior. Practice behavior outcomes were categorized by the domains listed above.

Results

Included studies

A total of 5163 citations were identified through the initial database search. After removing duplicates, 4117 publication abstracts and titles were screened. The full texts of 178 articles were assessed; of these, 170 were excluded for the following reasons: irrelevant population (24 studies), irrelevant intervention (67 studies), inappropriate study design (13 studies), and presented as abstract only (66 studies). Two publications[28,29] present on findings from one unique study.

Table 2. Characteristics of included studies.

Author (year), country	Study design	Data collection	Chronic disease	Participants (sample)	Social media intervention	Duration/follow-up
Anhøj J (2004), Denmark	Prospective cohort	Online survey, mailed survey and interviews (location not specified)	Asthma	Health care providers that according to the manufacturer's (AstraZeneca) customer database had received a user name and password for LinkMedica. Survey: $n=131$; interview: $n=5$	Discussion forum	1 month
Anttila M (2008), Finland	Qualitative	Online survey, multi-center	Chronic mental illness (psychiatric care)	Nurses working on nine acute wards in two psychiatric hospitals $n=56$	Discussion forum	1 month (duration) 1-year follow-up post intervention
Gupta S (2011) and Gupta (2012), Canada, United States, Australia	Prospective cohort	Online survey, multi-center	Asthma	Pulmonologists, primary care physicians, and certified asthma educators from academic and community clinics. Development stage: $n=16$; wiki stage: $n=35$	Collaborative project	3 weeks
Nordfeldt S (2012), Sweden	Qualitative	Online survey/essay (setting/location not specified)	Diabetes	Members of two pediatric diabetes care teams, including physicians, nurses, dieticians, and a social welfare officer $n=18$	Discussion forum	Not specified
Nordqvist C (2009), Sweden	Qualitative	Telephone interview, single-center (clinic)	Diabetes	Members of two diabetes teams, including seven physicians, eight nurse specialists in diabetes, one nurse, two dieticians, and two social welfare officers $n=20$	Discussion forum	~1 year
Oh H (2011), Republic of South Korea	Qualitative	Face-to-face or telephone interview, or email communication, single-center	Gout	An expert panel consisting of four physicians, one out-patient nurse, and 20 in-patient nurses $n=25$	Discussion forum	Not specified
Wiecha J (2015), United States		Survey, multi-center	Asthma	Primary care providers from community health centers, a medical center, and other practices $n=14$	Discussion forum	6 months

The excluded studies are listed in Supplementary Appendix 2. The PRISMA flow diagram is shown in (Figure 1).

Of the seven unique studies that were included in our systematic review, one was an RCT,[30] two were prospective cohort studies,[28,29,31] and four were qualitative studies.[9,32–34] In regards to the types of social media platforms, six studies[9,30–34] assessed discussion forums while one study assessed a collaborative project.[28,29] The included studies were conducted in Denmark,[31] Finland,[32] Canada,[28,29] United States,[28–30] Australia,[28,29] Republic of Korea,[34] and Sweden.[9,33] The following chronic conditions were assessed: asthma,[28–31] chronic mental illness,[32] diabetes,[9,33] and gout.[34] The following health professionals were represented in the included studies: nurses working in acute psychiatric wards,[32] diabetes nurses,[9,33] out-patient arthritis nurses,[34] in-patient arthritis nurses,[34] >asthma nurse,[30] pulmonologists,[28–30] primary care physicians,[9,28–31,33,34] certified asthma educators,[28,29] and dieticians.[9,33] Further details regarding the included study characteristics can be found in Table 2.

Methodological quality

The strengths and limitations of each included study are summarized in Supplementary Appendix 3. The RCT by Wiecha et al.[30] addressed an appropriate and focused question and the assignment of subjects to intervention groups was randomized. However, there was no mention on how randomization was concealed. While a RCT design was used allowing patients and health professionals to be randomized to their respective interventions, comparative analyses were not conducted among the health professional sample. A self-reported survey was used to measure health care professionals' experience with the discussion forum. The authors indicated the use of validated tools to assess patient outcomes (population and outcomes outside the scope of this review); however, the reliability and validity of the survey used among the health professional sample is uncertain. Limited information regarding the health professional sample was provided. Blinding of study subjects was not relevant given the nature of the study design. The study was also limited to a single site.

Both prospective cohort studies[28,29,31] addressed appropriate and focused questions and indicated the number of subjects who were invited to participate. Outcomes were clearly defined in both studies and blinding was not feasible given the nature of the interventions. Gupta et al.[28,29] used a validated tool (System Usability Scale) and assessed participants at multiple time points, while it was unclear whether the study by Anhøj et al.[31] used a validated measurement tool and

assessments were only conducted at one time point. While no effort was made to minimize confounding or risk of bias in Anhøj et al.,[31] focus groups and development testing was used to identify barriers and analyses were stratified by type of health professional in Gupta et al.[28,29]

There was a clear statement of the aim of the research in all four qualitative studies.[9,32–34] The qualitative methodology was appropriate in three studies[9,32,33]; however, it was unclear whether the methodology used in the study by Oh et al.[34] was appropriate as it was based on a structured interview with only one open-ended question. While Nordqvist et al.[9] clearly described their reasoning why qualitative methods were used, the other study authors opted to use surveys rather than focus groups or open-ended interviews to collect information.[32–34] Only the study by Anttila et al.[32] provided details on how participants were recruited and whether ethical issues were taken into consideration. Data analyses appeared to be rigorous in three studies,[9,32,33] but were unclear in the study by Oh et al.[34] All studies provided a clear statement of findings.

Social media interventions, measures, and results

Of the seven included studies, six used a discussion forum[9,30–34] while one used a collaborative project.[28,29] All studies assessed health professionals' perceived usefulness (TAM2), four studies assessed perceived ease of use (corresponding to similar concepts used by TAM2),[28,29,32–34] four studies assessed environmental context and resources (TDF),[9,28,29,32,33] three studies assessed intention to use (TAM2),[28,29,33,34] and one study assessed knowledge (TDF),[28,29] social influences (TDF),[28,29] beliefs about capabilities (TDF),[28,29] output quality (TAM2),[33] beliefs about consequences (TDF),[9] social/professional role (TDF)[9] and job relevance (TAM2).[9] Further details on the reported baseline characteristics of included study participants (health professionals) can be found in Supplementary Appendix 4 in the supplementary material. A summary of findings of the included studies can be found in Supplementary Appendix 5.

Discussion forum

Anttila et al.[32] assessed nurses' ($n = 56$) experiences of an online portal (Mieli.Net) developed for patients with schizophrenia spectrum psychosis. The portal is intended to support patient self-management skills in mental health services and includes processes to support knowledge, develop patient problem-solving skills, and improve self-efficacy. Specifically, the interactive internet-based portal included patient-centered,

tailored information using multimedia material (text, sound, figures, photographs), a channel for peer support for patients (i.e., discussion forum, chat room, open internet diary), and an e-support tool for counseling and support between patients and nurses. While the study was designed to compare the portal intervention with standardized patient education using leaflets, only findings from the portal intervention were presented. Surveys were distributed to the nurses following one year of using the online portal. The questionnaires also included open-ended items that allowed them to describe their experiences in their own words. Qualitative data from the surveys indicated that nurses experienced the online portal as a broad information source and a "self-help" aid for patients, and felt that it was useful for patients when their mental state was healthy (Perceived usefulness, TAM2). Additionally, they felt that the portal supported patients' self-management abilities as it enabled autonomous access to information and could be used independently, separate from education sessions (Perceived usefulness, TAM2). Nurses felt that the absence of ICT skills was an obstacle in patients' use of the portal and felt it was difficult to use themselves (Perceived ease of use, TAM2). Nurses also felt that there were inadequate resources (e.g., lack of space or quiet room with available computer and internet connection) as it took too much time away from their basic work (Environmental context and resources, TDF). Another common theme from the surveys was nurses' hesitancy to use the portal with patients because of their lack of experience with it (Intention to use, TAM2)

Anhøj et al.[31] assessed physicians' and nurses' ($n = 136$) use of the LinkMedica website, an asthma self-management tool which includes an electronic asthma diary for patients, a knowledge center which includes over 100 articles about asthma and allergies, and an unmoderated discussion forum that allows users to engage in discussion and pose questions with experts. A mailed questionnaire was sent to 131 physicians and nurses. Surveys were evaluated five to seven months following the launch of the website. Findings from the survey revealed that 73% of participants felt that there is a need for internet tools like LinkMedica in medical practice (Perceived usefulness, TAM2). Additionally, 22% did not use the tool, but wanted to try it (Intention to use, TAM2), and only 3% had looked at it, but did not find it useful (Perceived usefulness, TAM2). Based on the results of the questionnaires, different types of LinkMedica users ($n = 5$) (i.e., level of familiarity with tool and experience as a general practitioner (GP)) were selected for semi-structured interviews. Findings from the interviews concluded that the GPs were not confident "PC" users and found it difficult to instruct patients in the system

(Beliefs about capabilities, TDF). Although the GPs had a positive attitude towards the tool, they felt it was difficult to use (Perceived ease of use, TAM2). They also indicated that their use of the tool is influenced by external factors such as time and economy (Environmental context and resources, TDF).

Nordfeldt et al.[33] assessed the perceptions of physicians, nurses, dieticians, and a social welfare officer ($n = 18$) in pediatric diabetes care teams of using an open-access interactive online portal (Diabit List) tailored to young diabetes type 1 patients and their guardians or significant others. In addition to providing access to general and local diabetes-related information, the online portal also provided peer-mediated information and dialogues through open-access forums and blogs. A local news feed, including staff presentations, was integrated in the portal and was managed by a member of each clinical diabetes team. Approximately 18 months following the launch of the portal, the health professionals were each asked to write an essay on their experience using the portal, focusing on both positive and negative user experiences. Each survey was then analyzed using qualitative content analysis. Overall, the survey respondents felt that the online portal functioned well, its design was easy to understand, and felt it was a manageable tool for seeking information (Perceived usefulness, TAM2). Respondents also believed that the online portal was a source of scientifically sound information (Output quality, TAM2), and the information was easily accessible to primary care and other hospital staff (Perceived ease of use, TAM2). They also felt comfortable recommending the online portal as the source of information came from a reputable source, produced by a multi-professional community of practitioners (Intention to use, TAM2). Some respondents identified barriers and difficulties with the online portal including lack of time and computer access, and inadequate computer experience (Environmental context and resources, TDF).

Nordqvist et al.[9] also assessed the Diabit List open-access interactive online portal among physicians, nurses, dieticians, and social welfare officers ($n = 20$) from two pediatric diabetes teams. The objective of this study was to assess pediatric health professionals' attitudes towards the use of the online portal, and determine barriers and facilitators to introducing such systems into clinical practice. The assessments took place approximately over a one-year duration (between the creation of the piloted prototype in 2005 to the launch in the spring of 2006). The investigators conducted semi-structured interviews and analyzed data using qualitative (phenomenological) methods. Overall findings from the interviews suggested that health professionals were confident that in addition to

being part of the internal routine of the clinics, the online portal's use could extend beyond the clinics (Beliefs about consequence, TDF). Health professionals also felt that the portal was useful for providing families with newly updated diabetes information and provided a closer interaction between diabetes teams and families (Perceived usefulness, TAM2). Several health professionals believed that the shared information provided on the online portal, including references to verified websites and assuming it is regularly updated, would be a great tool to support their practice with patients (Job relevance, TAM2). Some of the interviewees shared their concerns regarding privacy, whether the current legislation permitted email contact with patients, and whether email communication would be safe (Social/professional role and identity, TDF). Another barrier that was noted was the lack of time and determining how to incorporate the online tool into routine practice, while other health professionals expected the online portal to save time during consultations when providing general information to patients (Environmental context and resources, TDF).

Oh et al.[34] assessed an interactive website that consisted of a discussion forum for posting patients' gout-related experiences, as well as an expert section to introduce recent gout-related scientific information among an expert panel consisting of physicians, in-patient and out-patient nurses ($n = 25$). The content of the gout-related information was based on a systematic review of the literature and the website was structured into the following sections: overview, causes, risk factors, symptoms, diagnosis, progress, treatments and complications. The website was placed on a web server and was implemented to the expert panel. One week after its implementation, face-to-face or telephone interviews or email communication were used to assess content access, satisfaction of the program contents, and ease of site navigation. When asked about the information content of the website, most experts (between 80–88%) felt that the causes, symptoms, diagnosis, treatments and prognosis of gout sections were useful to understand gout, and 84% were satisfied with the self-management techniques (Perceived usefulness, TAM2). The majority of experts indicated that the website was useful in understanding patients' gout-related experiences; however, only 44% stated that the website was of interest to them (Perceived usefulness, TAM2). Additionally, 60% of the experts suggested that further information on diet and gout progress/medications were needed (Perceived usefulness, TAM2). Findings from the evaluation on ease of site navigation and content access indicated that experts were highly satisfied (Perceived ease of use, TAM2) and all respondents indicated a willingness to use the website frequently (Intention to use, TAM2).

Wiecha et al.[30] assessed an interactive website (BostonBreathes) for patients and primary care providers (physicians and nurses) to promote asthma self-management. The website allows primary care providers to participate in a private discussion forum with patients and/or asthma nurses, while also allowing for the review of patient-level data on symptoms, medication usages, emergency room visits and patient graphical data of peak flow. Children with persistent-level asthma and their primary care providers were randomized to either usual care ($n = 21$) or monitoring and self-management using the interactive website ($n = 37$). Some of the primary care providers in the intervention arm ($n = 14$) completed a survey on their experience with the website during the six-month study period. The primary care providers used a separate interface to monitor their patients' website use and were able to communicate online via the discussion board with patients. Findings from the primary care provider survey using a Likert scale ($0 = $ strongly disagree to $10 = $ strongly agree) indicated a neutral response in that the discussion board was an effective way to communicate with patients (mean score of 5.6) and marginally agreed that the website provided useful information about their patients that they would not have had otherwise (mean score of 6.5) (Perceived usefulness, TAM2). Overall, there was agreement that the website was easy to use (mean score of 6.9) (Perceived ease of use, TAM2) and agreement that they would recommend the website for their asthmatic patients (mean score of 6.2) (Intention to use, TAM2). There was overall disagreement that the primary care providers had enough time in their schedules to use the website (mean score of 4.6) (Environmental context and resources, TDF).

Collaborative project

Gupta et al.[28,29] used a wiki-based system to develop an asthma action plan (AAP) by multiple stakeholders including pulmonologists and primary care physicians, asthma educators, and patients ($n = 51$). The intervention was described by the authors as "a system that allows multiple users to collaboratively design an AAP by inputting preferences for the content and format (visual layout and design) of the AAP plan through a Web-based wiki-inspired platform" (p. 2).[29] The AAP underwent a development phase ($n = 16$) where the investigators established the AAP content, tested the tool among stakeholders, and revised the tool based on stakeholder feedback. The tool then underwent three separate one-week "wiki" periods where the content was collaboratively compiled by stakeholders ($n = 35$). The visual design features of the AAP were then optimized, and underwent face

validity testing in three one-hour focus groups consisting of two pulmonologists, two asthma educators, two patients and two primary care physicians who were not involved in the development process. During the wiki stage, the mean System Usability Scale score (range from 0 to 100, with higher scores representing greater usability) improved to 75.9 (SD 19.6) compared to 72.2 (SD 10.2) in the development stage. Pooled results from 35 participants (including 19 patients) indicated that 80% were satisfied with the overall AAP that was created, and 77% felt that the wiki tool was an effective way to design an AAP (Perceived usefulness, TAM2). The majority (91%) of respondents indicated they would be able to use the wiki tool and AAP that was created (Perceived ease of use, TAM2). Almost half (49%) of respondents indicated if their schedules permitted, they would have used the site more often (Environmental context and resources, TDF). Most respondents (86%) indicated they would be willing to use a wiki tool to design visual media in the future (Intention to use, TAM2). Most respondents (67%) felt that the chat room feature allowed them to understand the preferences of other participants (Knowledge, TDF). The wiki tool did not appear to be impacted by social influences as only 26% of respondents indicated that there were certain participants whose opinions were more influential than others (Social/professional role and identity, TDF), and only 37% felt that they were able to make more changes and suggestions through the web-based process than they would have been able to in a face-to-face group discussion (Beliefs about capabilities, TDF). See Supplementary Appendix 5 for further details on findings from Gupta et al.[28,29]

Discussion

This review contributes to the growing literature on social media used by health professionals. To our knowledge, there has been no other synthesis of evidence pertaining to the use of social media by health professionals to facilitate chronic disease self-management with their patients. In summary, the available evidence suggests that health professionals perceived discussion forums to be a useful social media platform in the majority of included studies,[9,31–34] while the one study that used a collaborative project (wiki)[28,29] also indicated that it was useful to facilitate chronic disease self-management in patients.

Research has revealed that social media can be used among health professionals as a useful and dynamic tool to access up-to-date information, maintain professional connections,[18,35] and to share knowledge and health promotion.[18,36] Additionally, social media have shown to enable professional networking, community outreach, and building social capital.[37]

The collaborative project in Gupta et al.[28,29] had positive findings in regards to its perceived ease of use. Mixed findings were seen in regards to health professionals' perceived ease of use as three studies demonstrated positive findings,[30,33,34] while two studies noted difficulties with using the discussion forum interventions.[31,32] The interventions in Anttila et al.[32] and Anhøj et al.[31] included multiple components in addition to the discussion forums such as online patient diaries, e-support tools and chat rooms; thus it remains unseen whether the complexity of these interventions led to health professionals' perceived difficulties. Similarly, there appeared to be an observed pattern between health professionals' perceived ease of use and their intention to use the discussion forum interventions as the studies by Anttila et al.[32] and Anhøj et al.[31] also noted that most respondents were hesitant to use the tool.

Nordqvist et al.[9] demonstrated that health professionals anticipated positive outcomes (beliefs about consequences) for using discussion forums, indicating that its use could extend beyond internal use in clinics. Health professionals felt that discussion forums were a great tool to support their practice.[9]

Findings from Gupta et al.[28,29] indicate that there remains uncertainty about the benefits of using a web-based process versus face-to-face group discussion. Other research comparing social media-based outreach dissemination of clinical practice guidelines to traditional methods concluded no difference in awareness and knowledge of the guideline recommendations.[38] Conversely, in comparison to traditional face-to-face methods, online chronic disease self-management interventions have the potential to reach a broader population of chronic disease patients,[10] while online communities may allow for improved social support.[10,11]

The included studies noted several barriers to using social media to facilitate chronic disease self-management with their patients. The most common barrier identified was the lack of time in their schedules to use these tools.[9,28–30,32,33] Online ICTs, such as social media, can enhance self-management support, providing a potential demand-reducing and time-saving opportunity for health professionals.[3,7,10] For example, encouraging patients to use social media platforms to access educational material and to engage in discussion with other patients may provide health professionals with an additional option to improve self-management support, while potentially allocating less time for patient education and behavior change counseling during consultations.[39]

Previous research has shown that although perceived barriers to using social media are high, health professionals still frequently use them.[34] While the findings of this review suggest that health professionals believe

they do not have enough time to engage in social media interventions, research has shown that disseminating evidence and educational programs through social media may in fact be a time-saving and a potential demand-reducing option for patient care.[3,7,10]

Another barrier noted in the included studies was lack of space or computer access within the work place.[32,33] The need for access to internet and online technologies is necessary as clinics and hospital settings continue to evolve, and technology can enable health professional and patient shared decision making.[3]

Health professionals also noted a lack of computer skills and unfamiliarity using these types of interventions resulting in hesitancy in instructing patients to use these types of interventions.[31] The promotion of using and incorporating social media in chronic disease care requires adequate training. Research has indicated that most health professionals have basic knowledge of how to use some social media platforms such as social networking sites, yet there remains uncertainty for other types of social media use as evidence is lacking.[18]

As seen in the study by Nordqvist et al.[9], another concern that health professionals and workplaces should consider are policies on patient privacy. Concerns over confidentiality and privacy when using social media are a common concern among health professionals.[39] With the evolution of professional interactions and communications, there is a need to establish and inform health professionals about guidelines of social media use in the workplace.[18,40] Guidelines would provide direction on how to use such technologies while maintaining professionalism.[40] Some work settings and environments may have a negative perception of using social media as it may be seen as inappropriate and unprofessional because of the risk of mixing personal and professional limits and the potential for confidentiality breaches.[37] It is important to note that not all clinical settings and practices may support the use of social media in the work setting. For example, a policy statement by the American College of Physicians has recommended health professionals not to contact patients through social networking sites (i.e., Facebook) and to use high privacy settings.[41]

To our knowledge, no other systematic reviews have been conducted on health professionals' use of social media in chronic disease self-management. Hamm et al. conducted a scoping review of the literature on social media use by health care professionals and trainees.[12] Similar to the present review, the most common social media platform used in general by health professionals was discussion forums. The objectives of most social media platforms were to facilitate communication (61.5% of studies) or improve knowledge (42.7% of studies) of health professionals. The scoping review concluded that social media use among health professionals is common, particularly in education settings, and the versatility of these tools suggest that they may be appropriate for use in a wide variety of professional activities.[12] While the scoping review did not evaluate the effectiveness of the social media platforms, it was suggested that further research on their effectiveness could inform future practice. The decision to include discussion forums as an additional social media category of interest in this systematic review was decided a priori, and is in agreement with the review by Hamm et al.[12] While discussion forums do not fall within one of the social media categories identified by Kaplan and Haenlein,[13] Hamm et al.[12] indicated that discussion forums incorporate user-generated online content, and should be considered precursors to modern social media platforms.

A recent systematic review of the literature was conducted on health professionals' perceived usability and practice behavior change of ICTs for the dissemination of clinical practice guidelines.[42] The review looked at comparative evidence of various ICTs such as websites, web-based workshops, email and computer software; however, no research was found on social media use. The review concluded that health professionals' perceived usability and practice behavior change varied by type of ICT. Websites, computer software and web-based workshops all demonstrated improvements in perceived usefulness.[42] Smailhodzic et al.[15] conducted a systematic review on empirical research regarding the effects of social media use by patients for health related reasons. While the review focused on patients' rather than health professionals' use of social media, the authors concluded that social media use by patients was found to affect the health professional and patient relationship by stimulating more equal communication between them, and that social media can lead to greater confidence in their relationships with health professionals.

The selection of outcomes for this review were guided by the TDF[27] and TAM2.[26] The TDF was chosen as it integrates and clarifies several behavior change theories including learning theory, diffusion theory and social cognitive theory.[27] The TAM2, a validated and robust theoretical framework, was chosen as it was originally designed to predict the acceptance and usage of ICTs, such as social media, among various users and settings.[43] The TAM2 also considers social influence processes which have shown to explain the perceived usefulness of technologies.[44] The TDF was developed from a synthesis of psychological theories, and has shown to be useful for assessing barriers and behavior change among health professionals from various clinical disciplines and settings.[45] Together, both theoretical frameworks provided a comprehensive list of outcomes to measure health professionals' usability and practice behavior change for the use of social media to facilitate chronic disease self-management with their patients.

The strengths of this systematic review include the broad eligibility criteria that were used, allowing for numerous types of social media platforms, various health professional populations, and study designs (including qualitative) to be considered for inclusion in this systematic review. Furthermore, a systematic approach was used to select the relevant articles in the literature and to assess the methodological quality of each included study. This systematic review was conducted following the PRISMA checklist.[23]

There are several limitations of this review that should be considered. Information published in languages other than English were not included; thus, it is possible that some relevant findings may have been excluded. Given the paucity of included studies with quantitative study designs and heterogeneous populations, interventions and outcomes, meta-analyses were not feasible. Interpretation of study findings is limited by the methodological concerns noted in the Methodological quality section. Other key methodological limitations include small sample sizes ($n < 100$) in most studies, the lack of subgroup analyses to compare differences between types of health professionals (e.g., physicians versus social welfare officers), the pooling of patients with health professionals in the analyses,[28,29] and potential industry funding bias.[31] The assessment of health professionals was not always the population of interest, but rather a subgroup that was considered.[30] It remains unclear whether social media platforms are appropriate self-management resources for all chronic conditions as only a select few were assessed in this review. The terminology of outcomes in the included studies sometimes differed from the identified concepts in the TAM2 and domains of the TDF that were used to define the usability and practice behavior change outcomes, respectively. None of the included studies were designed to perform direct comparisons between different social media platforms. Overall, there was a paucity of evidence for the use of collaborative projects, and no evidence for other social media platforms met the selection criteria for this review. Lastly, it remains uncertain whether study findings are generalizable as clinical practice may vary by geographic region.

The potential implications of this review are twofold. First, this research provides a summary of the current evidence pertaining to health professionals' perception of social media use to assist patients to self-manage their chronic conditions, while identifying common barriers and knowledge gaps for future research. Knowledge gaps include the lack of evidence regarding other social media platforms not captured in this review, and the absence of studies comparing social media platforms with each other. Future research of well-conducted and properly designed studies is therefore needed. Second, the findings of this review suggest that discussion forums and collaborative projects may supplement traditional care as additional resources for sharing evidence-based self-management information and facilitating communication with patients.

Conclusion

The findings of this systematic review suggest that health professionals perceived discussion forums and collaborative projects appear to be useful social media platforms to facilitate chronic disease self-management with patients. No evidence was found regarding the use of other social media platforms. Most studies suggested positive findings regarding health professionals' intention to use discussion forums. Mixed findings were seen in regards to health professionals' perceived ease of use of discussion forums. The most common barrier to using social media platforms was the lack of time in health professionals' schedules. Other notable barriers included lack of space or computer access within the work place, and computer competency. Paucity of evidence and lack of high quality studies limited the interpretation of evidence. In summary, discussion forums and collaborative projects appear to be promising resources for health professionals to assist their patients to self-manage their chronic conditions; however, further research comparing various social media platforms is needed.

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