



Exploration of Social Media Use in Diabetes Prevention and Intervention Strategies

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Abstract

Background: Technology has expanded the use of the internet and social media applications to include intervention and prevention strategies. Users are already drawn to these forums and using them for information-seeking. Some research has begun to use this interest to form meaningful interventions that can improve patient outcomes.

Methods: Four electronic databases were searched to find original studies that either sought to gauge social media use and its applications or that used social media in an intervention. References of relevant articles were also used to find additional sources. After applying inclusion and exclusion criteria, 19 studies were included.

Results: HbA1c improved in all the intervention studies that measured it, though only four of the five had significant findings. Most intervention studies used social media to supplement other content, such as researcher-controlled Web sites that served as educate, network, or collect data. The widespread impact of social media as a means for patients and families was also highlighted.

Discussion: Social media is a cost-effective and potentially successful way to supplement patient education, awareness, and metabolic control. Most research has focused on type 1 diabetes, and the need to extend the reach to preventable type 2 diabetes and even prediabetes is evident.

Keywords: Diabetes, management, social media, Facebook, Twitter

Exploration of social media use in diabetes prevention and intervention strategies

A continued increase in the prevalence of diabetes and related issues like obesity accentuates the need to find useful, low-cost approaches to improve health behaviors and well-being, especially for at-risk populations.

Advances in technology and growing use of social media have provided a way for people to access health information, allowed more patient engagement in health decision making, and given a means for wide-based reach through Internet-based platforms (Tan & Goonawardene, 2017). In 2016, there were roughly 3.4 million internet users with a 46.1% penetration in the world population while the most recent numbers show an increase to 4.1 million and counting (Internet Live Stats, 2018). In America, 69% of the public uses some type of social media (Pew Research Center, 2018). Social media encompasses a range of platforms including blogging sites, web sites, social engagement sites like Twitter and Facebook, YouTube, and more (Kaplan & Haenlein, 2010).

This rapid increase in technology use and social media have led to a connection to health. Health and social networks

are increasingly connected as the latter is a capable medium for emotional, instrumental, informational, and appraisal support that can improve coping during stressful times and improve health outcomes (Zhang, He, & Sang, 2013). This is especially important as managing diabetes requires individuals to have extensive self-care management and sufficient understanding of the disease (Hanberger, 2013). Thus, this means diabetic patients need to have the required skill set for long-term control, which shifts the responsibility from the health care providers to the patients (Gomez-Zuniga et al., 2015). The caveat for this is that patients must have access to the knowledge and skills needed to manage care effectively. Social media has provided a means for health information seeking and for providing social and emotional support with peer-to-peer interactions (Zhao, 2017).

This review sought to summarize evidence relating to social media use and diabetes. Specifically, it tried to answer these two questions: 1) What types of interventions are being used with social media and diabetes, and are they effective? 2) How is social media being used in relationship to diabetes?

Methods

Search strategy

PubMed, CINAHL, EBSCOhost, and One search (a database that allows multisite searching from one location) was used to identify articles and citations from January 1, 2008, to

December 31, 2018. The search strategy included combinations of keywords "diabetes," "diabetes management," "social media," "social networking," "intervention," "prevention," "Facebook," "Twitter," and "Youtube." References were also checked to find potential articles to include. Figure 1 shows a summary of the search process.

Table 1: Social media impact on diabetes by year and theme

<i>Intervention-based studies by year</i>					
Author, year, country	To Goal	DM Type	Participants	Social Media type, measures, and findings	DM outcome
Nicolas (2012) Canada	To see if an 8-week online education and support website intervention	T1DM	31 participants with (intervention) and matched to comparison group n=16 (approximate age and condition) All had condition for 1 year. Mean age = 14.5 years	<ul style="list-style-type: none"> • Average internet access of one two hours daily with activities like web surfing, social networking, and information seeking. • Participation improved social support and having a relationship with others outside of family ($p = 0.052$). • Most participants used website to read and post messages in discussion forum (no numbers reported). <p>Felt having moderator being actively presented helped assure safety, give suggestions, and helped stimulate discussion.</p>	Not measured
Hanberger (2013) Sweden	To determine if a Web 2.0 portal would be used, complement everyday life and help in times of instable metabolic control, and be perceived as helpful in self-treatment, and help improve metabolic control.	T1DM	0-18-year olds registered in Swedish pediatric diabetes quality registry. Intervention group n= 244 vs control n = 230	<ul style="list-style-type: none"> • Web portal created with social networking functions like storyboard, blog, and discussion board (peer communication). • No directions given for use. • Portal usage in first year: 159 users had 695 portal visits (adolescents 163, fathers 169, and mothers 363) with 6,421-page hits (adolescents 1,611, fathers 1,326, and mothers 3,484). • Portal usage in second year: 207 users had 980 portal visits (adolescents 210, fathers 197, and 	<ul style="list-style-type: none"> • Baseline HbA1c: 6.8% control and 6.8% intervention <p>1 year follow up on HbA1c: 6.7% control and 6.7% intervention</p>

				<p>mothers 573) with 5,940-page hits (adolescents 1,954 , fathers 622, and mothers 3,364).</p> <p>In the first study year, 51% (n =119) at least one person in family visited portal once. In the second year, the percent was 35 (n=169).</p>	
Rogers (2014) United States	Develop and describe early implementation of The Bigger Picture, which is a youth-targeted prevention campaign for T2DM.	T2DM		<ul style="list-style-type: none"> • PSAs produced for web site. Online platform with dedicated website. 	<ul style="list-style-type: none"> • Academic and community partnership to create youth poetry and messages about social media. Engaged stake holders via multiple mediums.
Gomez-Zuniga (2015) Spain	To determine if changes blood sugar levels are related to participant self-efficacy and social support and to see if after participating in the BBT, people had explicit intentions to do physical activity. Lastly, they wanted to see if self-efficacy, social support, and intention to exercise was different with insulin-dependent and non-insulin dependent diabetics.	T1DM T2DM	3,916 people with 78.8% being insulin users.	<ul style="list-style-type: none"> • Social networking site called the Big Blue Test experience. No specific data reported relating to social media. 	<ul style="list-style-type: none"> • Participants who reduced their blood glucose levels the least after exercise had a lower perception of self-efficacy to manage diabetes and develop healthy habits. • Blood glucose was 158.4 mg/dl before exercise and 123.26 mg/dl after exercise in insulin users. • Blood glucose was 139.01 mg/dl before exercise and 116 mg/dl after exercise in non-insulin users. Cohen's d showed $d = 0.33$, meaning that insulin-dependent participants had a glucose

					level reduction that was 0.33 standard deviations higher than non-insulin dependent participants.
Petrovski (2015) Greece	Evaluate social media results from Skype and Facebook as well as CareLink software tools to improve diabetes control in patients with T1DM who are on insulin pumps with sensors.	T1DM	56 participants ages 14-23 randomized to either regular group ($n = 29$) who were treated with standard medical protocol with regular clinic visits or internet group ($n = 27$) treated with CareLink software with patient uploading data. Facebook intervention same for both groups.	<ul style="list-style-type: none"> • Social media allowed patients to increase diabetes knowledge, gain information, and interact regarding daily insulin adjustments. 	<ul style="list-style-type: none"> • HbA1c improved in both groups with baseline of $7.7 \pm 1.6\%$ in regular group and $7.8 \pm 1.9\%$. At 12 months, HbA1c was $6.6 \pm 1.5\%$ regular group and $6.4 \pm 1.6\%$ ($p < 0.05$).
Ng (2015) England	Develop 3 digital technology strategies including Facebook social media communication, Twinkle.net for integrated pediatric diabetes electronic management, and optimize therapy in outpatient clinics with blood glucose and pump downloading system.	T1DM	Not described	<ul style="list-style-type: none"> • Interactive communications channel with frequent education updates. Twinkle.net enabled monthly audits to identify patients with poor metabolic control and those who were recurrent non-attenders at clinic. This allowed more intensive contact with diabetes team at home. 	<ul style="list-style-type: none"> • HbA1c reduced from 65 mmol/mol ($p < 0.05$) to less than 7.5% in 2013 versus 23.7% in 2011. Admission rates fallen to 19% in 2013.
Weymann (2015) Germany	Test effectiveness of a Web-based IHCA for patients with type 2 diabetes or chronic low back pain in a blinded randomized trial with parallel design.	T2DM	179 of 561 had T2DM.	<ul style="list-style-type: none"> • Web-delivered intervention with dialogue-based information system related to either T2DM or chronic low back pain. • No significant intervention effect found. In the intervention group, participants had more knowledge after the first visit ($p = 0.02$) and more emotional well-being at the second visit ($p = 0.009$). 	Not measured.

Yi-Frazier, (2015) United States	To see if Photovoice research method can be applied to adolescents using social media like Instagram.	T1DM	14-18 year olds with diagnosis of T1DM for six months or longer. N = 20	<ul style="list-style-type: none"> • Of the 20 participants, 81%, using Instagram for 1 year prior, 64% used at least weekly, and 50% checked it daily. • Only 12 participants were actively engaged. Focus groups revealed positive response of enjoying peer interaction with those who have diabetes. 	Not measured.
Rogers (2017) United States	Increase public health literacy with campaign <i>The Bigger Picture</i> . This uses social marketing to impact low-income, minority populations.	T2DM	Age range: high school Mean age: 15.7 (CI 15.6, 15.8)	<ul style="list-style-type: none"> • Web site developed in English and Spanish • Twitter, Facebook page, and toolkits/workshop books for educators made available • PSA views: 1,049,187 times • Facebook page: 1,388 likes • Twitter: 874 followers • Toolkit download: 890 times • Workshop book download: 1,812 times 	Student knowledge and attitudes improved. Ability to recognize environmental cause increased from 34% to 83% (OR 13.1, $p < 0.0001$), agreed that Type II DM preventable changed from 70% to 92% (OR 5.3, $p < 0.001$), and cared a lot about preventing Type II diabetes went from 29% to 59% (OR=9.1, $p < 0.001$)
Vorderstrasse (2017) Not described	Use a virtual environment (LIVE) community of a gaming platform for adults with diabetes that helps share information, allow social networking, and encourage individual learning and behavior modification strategies.	T2DM	Pilot with 208 participants with a mean age of 59 and diabetes duration of 10.9 years.	<ul style="list-style-type: none"> • Participants in top quartile for site use had a significant decrease in fat intake over six months versus control (est. -0.65, $p = 0.025$). • Those with highest engagement of live compared to control group had significant decrease in sedentary activity ($p = 0.048$). • Control involved traditional website for education and support versus the virtual environment (intervention). 	<ul style="list-style-type: none"> • HgA1c did not decrease significantly overall. • HgA1c levels $\geq 10\%$ at baseline and significantly decreased ($M = 11.42$ to 8.77, $p = 0.018$).
Petrovski (2018)	Evaluate effect of Facebook and	T1DM	67 participants 14-23 with 34 in control	<ul style="list-style-type: none"> • CareLink personal account prepared for 	<ul style="list-style-type: none"> • HgA1c improved in

Macedonia	Carelink software to improve diabetes control in T1DM using a sensor augmented pump; three year data.		group with standard medical treatment and clinic visits and 33 in control group with Facebook and CareLink software.	<p>intervention group, and they had access to software.</p> <ul style="list-style-type: none"> • Both groups part of Facebook group and had chance to share experience. • Facebook visit was used to deliver the same information that control group received at clinic visits. 	both groups with control decreasing from 7.9% ± 1.4% to 6.9% ± 1.2% and intervention going from 7.8% ± 1.8% to 6.7% ± 1.8%. Significant improvement noted in internet group over control ($p < 0.05$).
<i>Social media use and its effects on diabetes by year</i>					
Greene (2010) Any Country	To qualitatively evaluate communication content in Facebook groups dedicated to diabetes.	Any	15 largest Facebook groups focused on diabetes management.	<ul style="list-style-type: none"> • Average of 9,289 participants (range 1,107 to 61,957). • 690 individual posts included in analysis on wall pages and discussions boards with 490 unique users. • 75% ($n = 362$) posted once, 9% ($n = 44$) posted three or more times, and one user posted 14 times in study period. • 66% ($n = 29$) of those posting three or more times were personally engaged users, 30% ($n = 13$) promoting products, 5% ($n = 2$) conducting online surveys. <p>Frequency of posts by coding: advertisements 26.7%, providing information 65.7%, 13.3% requesting information, 28.8% support, and 3% irrelevant.</p>	Not measured
Zhang (2013) Not limited to one country	Understand how users of the Facebook group, Diabetes, engage, characteristics of group, and what activities they perform.	Any	Not described except as diabetes patients and caregivers	<ul style="list-style-type: none"> • 1,352 messages on group wall (154 posts and 1,198 responses/comments); 497 done by unique participants ($M=2.82$) • 31,860 members worldwide 	Not measured.

				<ul style="list-style-type: none"> • Eliciting and providing information were major themes of use. • In eliciting information: • 57.9% ($n = 164$) asked for medical information, symptoms, complications, diagnoses, tests, treatments, and medications. • 20.1% ($n =$) wanted information on lifestyles, specifically diet and workout. • In providing information: there were 847 messages. • 59.3% ($n = 502$) voluntarily reported information. 41.9% ($n = 355$) responded to peers. 	
Gabarron (2015) Norway	Understand the information is on Twitter regarding T1DM.	T1DM	Not described.	<ul style="list-style-type: none"> • 300 random tweets found. • These tweets potentially read by 549,676 readers. • The tweets by non-government agencies, media, and T1DM patients had most potential for readers: 210,086, 122,232, and 90,084. <p>Personal experiences encompassed the content of T1DM posts.</p>	Not measured.
Gabarron (2016) Norway	Describe nature of information being shared on Norwegian diabetes social media groups and user reactions to posts.	Any	Not described.	<ul style="list-style-type: none"> • 400 posts from four social media platforms: Norwegian diabetes patient association Facebook group (open), Twitter, Instagram, and a closed Facebook group for diabetes. • Self-management most common topic posted in Facebook patient group (64%) and the most commented on. The open Facebook group, Twitter and Instagram posts related to diabetic awareness most comment posts (65%, 45%, 88%; $p < 0.001$). 	Not measured.

AlQarni (2016) Arabic-speaking countries	Understand type of information sharing and its potential health consequences in Arabic speaking world.	Any	Not described	<ul style="list-style-type: none"> • 6,107 posts in Arabic related to DM on Facebook. Focus of posts was sharing experiences ($n = 423$; 27%), increasing awareness ($n = 210$, 3.5%), giving spiritual support ($n = 162$, 10.4%), sharing newest research ($n = 147$, 9.5%), and giving education ($n = 110$, 7.1%) on diabetes. 	
Abedin (2017) Any	Determine the general characteristics and usefulness of information on diabetic footcare-related Facebook groups.	Any	N/A	<ul style="list-style-type: none"> • 103 eligible posts from 16 Facebook groups. • 45.6% of 103 posts useful. Group size ranged from 2 to 1,724. The mean was 266.75. 	Checking feet daily was most common content in posts ($n = 23$, 22.33%).
George (2016) United States	Use 6-week social marketing campaign to raise awareness of obesity and increase involvement in DM prevention, nutrition, and fitness programs available.	T2DM	Black and/or Hispanic men and women aged 18 to 64 171 follow up surveys	<ul style="list-style-type: none"> • Organization website, hotline, email account, Facebook, Twitter, e-blasts, and traditional media (radio, tv, and newspapers) • 11,000 visits to FB • 65 Twitter messages reaching almost 550 people 37 unique inquires via email 	Not measured
Oser (2018) Not specified	Determine what effects social media, including blogs used in self-management have on HgAc1.	T1DM	282 participants with 214 blog readers and 68 non-blog readers	Examining the impact of T1DM blogs to glycemic control.	<ul style="list-style-type: none"> • HbA1c was lower in blog readers than non-blog readers (7% vs 7.48, $p = 0.006$). Remained significant after adjusting for significant covariates ($p = 0.039$).

Inclusion and exclusion criteria

Articles had to be written in English and published in peer-reviewed journals to be eligible for review. The most important inclusion criteria were that articles focused on diabetes and utilized social media either as part of an intervention or analyzed how it related to diabetes. They also had to involve original research. Studies were excluded if: 1) they were published in another language 2) they involved cell phone usage and not social media 3) they were

not individual, original research (i.e., no systematic reviews).

Results

The review found eleven studies that focused on using social media in an intervention for people with diabetes while another eight sought to describe the use of social media. Table 1 details the included studies.

Intervention-based studies

Five studies designed a specific web portal or web site that required a username and password to access the provided interventional content (Nicholas et al., 2012; Hanberger, 2013; Gomez-Zuniga et al., 2015; Weymann, 2015; Vorderstrasse et al., 2017). Three studies incorporated a unique site as well as additional social media, such as Skype and Facebook (Petrovski, Zivkovic, & Stratrova, 2015) or just Facebook (Ng, 2015; Petrovski & Zivkovic, 2018). Instagram was used alone in one study (Yi-Frazier et al., 2015). There was only one study that implemented multiple types of social media, including a public Website with PSAs and downloadable tool kit, Twitter, and Facebook (Rogers et al., 2017).

Most of the interventions were explicitly aimed at type 1 diabetes mellitus (T1DM) T1DM (Nicholas, 2012; Hanberger, 2013; Petrovski, 2015; Ng, 2015; Yi-Frazier, 2015), one study looked at insulin and non-insulin dependent diabetics (Gomez-Zuniga, 2015), and three focused on type 2 diabetes mellitus (T2DM) (Weymann, 2015; Rogers et al., Vorderstrasse, 2017). Meanwhile, Rogers et al. (2014) described the approach to develop a youth-created, "spoken word" campaign that focused on specific environmental and social components that affect T2DM in minority populations. Gomez-Zuniga (2015) described an innovative approach to partnering with a diabetes foundation and administering their intervention via that site. The 3,916 participants took their blood sugar, did 14 minutes of activity, retested their blood sugar, and shared their experience. The blood glucose of insulin users was 158.4 mg/dl before and 123.6 mg/dl after exercise while non-insulin users were 139.01 mg/dl and 116 mg/dl respectively. Results showed that people who reduced their blood glucose levels the least after exercise also had lower self-efficacy relating to diabetes management and healthy habit development.

Gomez-Zuniga (2015) was one of the five that developed unique sites for diabetes intervention and the only one to involve physical activity as an intervention measure. While that study focused on blood glucose as an outcome, three others looked at T1DM and thus HbA1c changes specifically. The approaches to intervention and the findings related to HbA1c were variable. Hanberger (2013) had a web portal with access to social media functions like a storyboard, blog, and a discussion board. They provided no instructions for the use of the site. Results showed at least one family member visited the web portal in the first study year in 51% (n = 119) of the sample, and 35% (n = 169) in the second year. The second year the control group gained access to the portal. Metabolic control improved only slightly from 6.8% in both control and intervention groups to 6.7% (no significance). Vorderstrasse (2017) added the inclusion of behavior modification to this portal approach. This research used a virtual environment called LIVE that served as a gaming platform that allowed participants to share information, engage in social networking, and encourage individual learning and behavior modification strategies. While no significant decrease in HgA1c was found overall, those who had

baseline levels of greater than 10% did have a significant decrease (M = 11.42 baseline and M = 8.77 after, p = 0.018). Their approach also showed that those in the top quartile of engagement had a significant decrease in fat intake over six months compared to the control group (p = 0.025) and had a significant decrease in sedentary activity (p = 0.048). Unlike the other web-based intervention, the last only focused on T2DM. While no significant intervention effect was found, Weymann (2015) did find that the participants in the intervention group had more knowledge after the first visit (p = 0.02) and reported higher emotional well-being at the second visit (p = 0.009).

HgbA1c was also used as a measure in two of the mixed method approaches that employed a portal/web-based training and a social media medium. Ng (2015) found a significant drop in the measure mmol/mol at 65 (p = 0.05), which translates from 23.7% HgbA1c in 2011 to 7.5% in 2013. This study focused on improving T1DM management of adolescents who use insulin pumps. The use of *twinkle.net* allowed electronic management with blood glucose and insulin pump downloading system plus allowed identification of patients with poor metabolic control or those who were irregular in visits to help focus home visits. Facebook was added as a social media communication as well.

Meanwhile, Petrovski (2015) found that integrating Skype and Facebook with specific software improved T1DM management in patients using insulin pumps with sensors. Social media was used to give a resource for knowledge improvement, information, and interaction with others, specifically regarding daily insulin changes. The HbA1c in the intervention group dropped from 7.8% at baseline to 6.4 at 12 months (p < 0.05).

The last mixed method approach did not track diabetes-specific parameters as its goal was to increase awareness of T2DM. They did find significant changes in the metabolic parameters followed. Their use of a web site, multiple social media outlets, and an in-person assembly at local high schools helped improve recognition of T2DM being preventable (70% vs. 92%, p < 0.001) and improved concern for preventing T2DM (29% vs. 59%, p < 0.001). They also tracked engagement in the social media with PSA views at 1,049,187 times, 1,388 Facebook likes, and 874 Twitter followers. Similar to this social media tracking, Yi-Frazier et al. (2015) tracked involvement on Instagram to measure response to a social media-oriented awareness project. The focus groups reported positive responses and enjoyment of peer interaction. Of the sample of 20, only 12 participants were actively engaged. No specific numbers were discussed.

Defining social media and its use or effects on diabetes

Eight studies sought to understand better how social media has been used in relation to diabetes. Four of these specifically examined Facebook use (Green, 2010; Zhang, 2013; AlQarni, 2016; Abedin, 2016). Twitter was also examined (Gabarron, 2016). Two studies examined a combination of sites, such as Twitter, Instagram, and both a closed and open Facebook group (Gabarron, 2016) or

website, hotline, email account, Facebook, Twitter, e-blasts, and traditional media (George, 2016). The last included study was unique in its examination of how blog use can affect glycemic control (Oser, 2018).

Individuals sharing personal experiences encompassed the most substantial amount of content across the studies, despite the medium used (Greene, 2010; Zhang, 2013; Gabarron, 2015; AlQarni, 2016). For example, AlQarni (2016) found that 27% of the posts (n = 423) involved sharing information while Zhang (2013) found 58% involved personal experience. Zhang (2013) broke down information sharing further. The study determined that 57.9% (n = 164) participants were using social media to elicit information, such as describing symptoms or complications and asking what they meant as well as asking about other's HgA1c levels and how frequently they were checked and what they meant. A second theme of providing information was also identified and encompassed 847 messages. In 59.3% (n = 502), participants voluntarily gave information ranging from glucose readings to diet and exercise while 41.9% (n = 355) involved responding to peer requests.

Social media has been used to elicit engagement in diabetes care. George (2016) had a unique approach to use multiple aspects, including a web site, Twitter, and Facebook, in English and Spanish to encourage healthier eating and encouraging advocacy. This involved 65 Twitter messages that reached 550 people. After the 18-month follow-up, the Facebook page had more than 11,000 visits. Gabarron (2016) also found the open Facebook group, Twitter, and Instagram involved posts related to improving diabetes awareness (65%, 45%, 88%, p < 0.001). Who is sending tweets was also deemed important. Gabarron (2015) showed that 300 random tweets potentially could reach 549,676 readers. Non-government agencies, media, and T1DM patients had the most potential to reach people: 210,086, 122,232, and 90,084.

Related to engagement is the idea of self-care that was examined in multiple studies. Oser (2018) examined blogs for self-care management to see how they impacted glucose. This was the only study that includes a diabetes-specific measure as an outcome. Results showed that HgA1c was lower in blog readers than in non-blog readers, (7% vs. 7.48%, p = 0.039). Others like Abedin (2017) examined an important diabetic topic of foot care and examined the information available on this in Facebook groups ranging in size from 2 to 1,724 (M = 266.75). Of the 103 eligible posts, 45.6% (n = 103) included useful information with the need to check feet daily being the most common (n = 23, 22.33%).

Discussion

The internet and specifically social media have emerged as a primary source of health information, especially with chronic illnesses such as diabetes. This idea has been supported by multiple researchers in this review with those like Greene (2010) reporting an average of 9,289 participants in 15 of the largest diabetes management Facebook groups, Zhang who examined a group with

31,860 worldwide members on a diabetes Facebook group, and most recently by George (2016) who had 11,000 Facebook visits during their awareness campaign. The use of social media via self-management blog readers versus non-blog readers was even tied to improvement in HbA1c at a significant threshold. However, researchers like Abedin (2017) have found that information posted in these mediums may not be useful. They found that of 103 eligible reviewed posts related to diabetic foot care specifically in Facebook groups, less than half were useful.

Given the importance of appropriate counseling and education of patients with diabetes and their families that are stressed by organizations like the World Health Organization (2016), it is imperative that patients have access to quality information and that they can develop proper skills. With decreasing practitioner time and infrequent and brief consultations, this can be difficult to achieve (Gabarron, 2018). The interventions in this review supported that use of social media and managed sites can improve patient outcomes, such as HgA1c in T1DM (Hanberger, 2013; Petrovski, 2015; Ng, 2015; Vorderstrasse, 2017; Petrovski, 2018). Likewise, awareness of T2DM, its prevention, and desire to do so was highlighted by Rogers et al. This supports the idea of other research that shows that going online to engage with health information is described as an essential part of fact-finding, being informed, and understanding insights from other people's experiences (Fergie, 2015).

This review also highlighted that social media users are drawn to content that allows them to share experiences and learn from others who have the disease (Greene, 2010; Zhang, 2013; Gabarron, 2015; AlQarni, 2016). This need to connect has been shown with other research, too. Involvement in Facebook and Twitter groups dedicated to diabetes is high with 527 groups and 564,023 members in 2012 (De-la-Torre-Diez, 2012). Support for patients and families ranked the highest goal for the groups 25.09% while awareness was at 6.27%.

Conclusion

Research supports that social media can be effectively used to help manage diabetes. Coupling controlled social media messages on Facebook and Twitter with specifically designed web sites were shown to have the most significant improvements on diabetic parameters like HgA1c. Future research should continue to explore how to successfully use social media to complement the care of diabetic patients. There also needs to be a greater understanding of which social media mediums is best to use in combination with other interventions.

Further, as most research has focused on T1DM, it is essential to understand what implications social media can have with improving awareness and educating patients who have prediabetes or even T2DM. The few studies identified did show a promising, though a limited glimpse of the potential impact social media can have on these conditions and on motivation to do something. It is crucial these future studies use measurable parameters, such as the HgA1c or blood glucose levels, and to investigate

changes in knowledge, motivation, and confidence in managing diabetes as self-care is crucial for this population.

Social media is being used to communicate about diabetes, even if health professionals are not involved. Providing research-based content, advice, and strategies to improve the management of this chronic condition could be incorporated into participatory strategies that help patients access quality information.

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