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The Influence of Social Media on Type 1 Diabetes Control in Iraq: A Cross-Sectional Study

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Abstract

Background: Diabetes mellitus is a metabolic disorder characterized by high blood glucose levels and inflammation, posing a significant health threat in the 21st century. Social media platforms have emerged as valuable resources for disseminating health information, enhancing management practices, and improving glycemic control, especially through prolonged patient-physician contact.

Methods: A cross-sectional study was conducted in Iraq to investigate the role of social media in achieving glycemic control among T1D patients. Participants were recruited through local health centres and social media platforms. Data were collected via structured questionnaires, including demographic information, diabetes management practices, and social media usage patterns. Glycemic control was assessed using HbA1c levels. **Results:** The mean age of the patients was 19.8 ± 9.9 years, with a slight female predominance. WhatsApp was the most commonly used social media platform (utilized by 279 patients), followed by Facebook (272 patients). Of the total cohort, 77% (286 patients) used social media in addition to private clinic visits, while 23% (85 patients) did not. A decrease in HbA1c levels was observed in 292 patients, with 250 achieving target levels. The majority of patients (226) had a physician-patient contact duration of over one year.

Conclusion: The findings of our study suggest that social media can support diabetes management as well as improve glycemic control. The accessibility of information and peer support on these platforms can enhance patient engagement and adherence to treatment protocols. Further research is recommended to explore the long-term impacts of social media use on patient adherence and diabetes outcomes.

Keywords: Diabetes, social media, (IDDM), Healthcare, HbA1c, Networking sites.

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Introduction

Diabetes mellitus (DM) is a metabolic disorder characterized by high blood glucose and inflammation. The increasing prevalence in developing regions nowadays poses a significant health threat in the 21st century. If not managed properly, serious complications like retinopathy, nephropathy, neuropathy, and cardiovascular disease can occur, potentially leading to organ damage and premature death (1).

Since the Insulin-dependent diabetes mellitus (IDDM) or type 1 DM (T1D)involves insufficient insulin production, the autoimmune nature will result in the destruction of insulin-producing pancreatic beta cells, leading to gradual or rapid loss of insulin secretion, effective management and adherence to treatment protocols are essential, involving combinations of multiple daily insulin injections (MDI), insulin pump therapy, or automated insulin delivery systems, along with continuous glucose monitoring (CGM) are utilized as is capillary blood glucose monitoring (BGM) in cases of the absence of CGM. An individualized approach is critical in managing each patient due to metabolic and genetic variation, as well as age-related differences (2-4).

Hemoglobin A1c serves as a critical marker of long-term glycemic control for diagnosis as well as prognosis, reflecting blood sugar levels over the previous two to three months. Elevated levels are independently associated with increased risks of coronary heart disease and stroke. According to the American Diabetes Association's 2020 Standards of Medical Care, less strict HbA1c goals (<8% or 64 mmol/mol) are recommended for patients with a severe history of hypoglycaemia, limited life expectancy, advanced complications, comorbidities, or difficult management. Conversely, <7% (53 mmol/mol) is suitable for many non-pregnant women (5,6).

Social media enables better patient-provider communication and encourages active participation in diabetes care, making it a valuable tool in managing blood glucose levels and other aspects of the disease. Despite privacy concerns, social media offers a promising avenue for integrating continuous support into diabetes management, especially for younger populations (7).

Advances in technology have shifted health communication to online platforms and social media, which are cost-effective and widely used for patient education. In the Middle East, high smartphone usage, particularly in Saudi Arabia, has facilitated the use of health-related social networking apps, proving effectiveness in spreading health information and reducing healthcare burdens (4). Conversely, a comparison with prior research was made to indicate that many T1DM apps focus on data management and measurement reminders, rather than promoting holistic self-management strategies. Additionally, app design should account for users' relationship to technology, whether it enhances or hinders their self-management efforts (8,9).

Social media's role in providing social support to individuals managing T1D has been increasingly acknowledged for its positive impact on both psychological well-being and physical health. Research has shown that enhanced perceptions of social support contribute to an increased sense of control over one's health, particularly during adolescence (4). Social support is categorized into informational, emotional, esteem, networking, and tangible types. Among these, informational support enhances individuals' ability to manage their condition, while emotional support fosters understanding and empathy, aiding adaptation. Peer interactions, especially in technology-mediated environments, have demonstrated numerous benefits. These include the exchange of health-related information, the development of coping mechanisms, and reduced feelings of social

isolation. Online support groups, in particular, have proven to enhance participants' perceptions of social support, self-efficacy, and quality of life. Emotional and informational support were found to be the most common forms provided in these settings, often delivered by individuals who share the same condition, which significantly aids in coping (6,10).

Social media platforms, such as Instagram, enable individuals to seek and provide emotional support, often using visual content as a mode of expression. This anonymous or semi-anonymous nature of social media promotes greater self-disclosure, which can enhance emotional support. Furthermore, interactions through platforms like Facebook allow individuals to build and communicate both personal and group identities, with actions such as "liking" content serving as non-verbal cues of social support (11).

However, social media could facilitate engagement outside the clinic setting, expressing its potential in enhancing communication with healthcare providers with smartphones as the primary access point, connecting them with peers for additional support. provide independence in managing their diabetes, also offering timely and personalized care. Adolescents also noted that social media could enable more personalized care by allowing healthcare providers to better understand their daily lives, set short-term goals, and build rapport. These preferences align with a desire for patient-centred communication, which emphasizes thorough information exchange, collaborative goal setting, and shared decision-making strategies that have been linked to better treatment adherence and a sense of empowerment in adolescents with type 1 diabetes (7,11). Additionally, it offers the ability to identify emotional disturbances and monitor drug side effects by using posts and drug reviews were also involved (7).

The study aims to highlight the potential effectiveness of social media use for contacting physicians on diabetes mellitus management, as measured by HbA1c levels, as well as achieving HbA1c targets. Furthermore, it investigates the relationship between the duration of this contact with physicians and diabetes control.

Patients and Methods

A total of 371 randomly selected patients diagnosed with Insulin-Dependent Diabetes Mellitus (IDDM) in Iraq participated in this cross-sectional study. These patients attended a private clinic between January 2020 and October 2023. The inclusion criteria for participants were a minimum of two clinic visits and being a non-pregnant diabetic woman.

Data collection involved five social media platforms that are available in Iraq. Moreover, the details of the patients' records have been collected from the health record system. The duration of social media contact was collected by patient self-report during clinic visits and categorized into three groups: less than 6 months, 6-12 months, and more than 12 months. This multi-channel approach allowed patients to receive timely guidance on insulin use, dose modification, injection techniques, dietary advice, and other diabetes management inquiries.

Each patient's HbA1c levels were tested during clinic visits using a special kit from Bio-Rad, with a target HbA1c level of ≤7.5%, in line with American Diabetes Association (ADA) guidelines. More importantly, four parameters are included in the current study.

Statistical analyses

The sample size of 371 was determined based on a power analysis to detect differences in HbA1c outcomes between patients who used social media for communication and those who did not. The chi-square test was employed to compare changes in HbA1c levels between social media users and non-users. Additionally, a Kaplan-Meier survival curve analysis was performed to assess the time required for patients to reach their HbA1c target.

Patients were categorized into two main groups: those who utilized social media platforms to contact their physicians and those who did not. These groups were further subdivided based on the duration of their social media use into three categories: less than half a year, 6-12 months, and more than 12 months. SPSS version 25.00 was employed for data analysis.

Results

The average age of the patients was 19.8 ± 9.9 years, with a marginal predominance of females (189) compared to males (182). Regarding the usage of social media applications, WhatsApp was the most frequently utilized app (279 patients), followed by Facebook (272 patients). Of the total cohort, 286 patients used social media in addition to private clinic visits, while the remaining 85 did not use social media.

Regarding changes in HbA1c levels between the first and last visits, a majority of patients showed a decrease in HbA1c levels, with 292 experiencing a reduction and 250 reaching the target HbA1c level. The terms “increase,” “no change,” and “decrease” in HbA1c levels refer to the difference in HbA1c levels between the patient’s first visit and their last recorded visit during the study period. An increase implies a rise in HbA1c levels from the baseline (first visit), no change means HbA1c levels remained consistent, and a decrease reflects a reduction in levels compared to the baseline measurement.

The most common duration of contact with the physician was more than one year, observed in 226 patients (Table 1).

Table 1: Overview of all parameters included in the study

Parameters		Count	%
Age		19.8+/-9.9 (2-61)	
Gender	Female	189	51%
	Male	182	49%
Facebook	No	99	27%
	Yes	272	73%
X	No	354	95%
	Yes	17	5%
Instagram	No	305	82%
	Yes	66	18%
Telegram	No	282	76%
	Yes	89	24%
WhatsApp	No	92	25%
	Yes	279	75%
Viber	No	225	61%
	Yes	146	39%
Social Media Use in General	No	85	23%
	Yes	286	77%
HbA1c Change	Increase	74	20%
	No change	5	1%
	Decrease	292	79%
Duration group	Less than 6 Months	88	24%
	6-12Months	57	15%
	More than 12 Months	226	61%
HbA1c Target	Not reached	121	32%
	Reached	250	68%

Association between Social Media Use and Changes in HbA1c Levels

Patients were categorised into two groups—social media users and non-users—to investigate the relationship between social media usage and alterations in HbA1c levels. Among the 286 social media users, 45 exhibited an increase in HbA1c levels, 5 showed no change, and 241 experienced a decrease in HbA1c levels. Conversely, among the 85 non-users, 29 showed an increase in HbA1c levels, 5 showed no change, and 51 experienced a decrease in HbA1c levels. This difference was statistically significant, with a Chi-square P-value of 0.0001, indicating a significant association between social media use and HbA1c level changes (Table 2).

The mean time to reach the target HbA1c level was 18.8 months for social media users and 15.08 months for non-users. After 3.83 years, 16.7% of the social media users and 12.9% of the non-users had achieved the target HbA1c level (Figure 1).

(Table 3) Table 1 displays the relationship between the duration of social media contact and the HbA1c intended status. A statistically significant association was found (P value = 0.039), particularly among those in contact with physicians through social media for more than 12 months.

Table 2: Association between social media use and HbA1c level changes.

Contact Method	HbA1C level change			
	negative	no change	positive	Total
No social media use	29	5	51	85
Social media use	45	0	241	286
Total	74	5	292	371
Chi square p value = 0.001				
Significant				

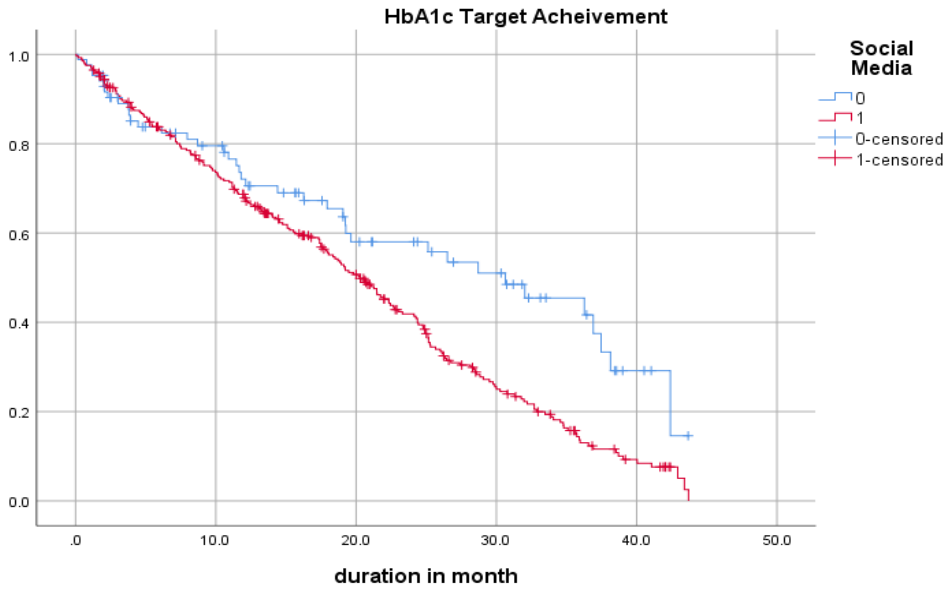

Figure 1. Showing the percentage of social media users and non-users who achieved the target HbA1c level

Figure 1 illustrates the log survival rate for the mean time needed to reach the HbA1c target, distinguishing between social media users and non-users (0: no social media use, 1: social media use).

Table 3 Association between duration of follow-up and HbA1c target

Duration group	Target HbA1c			P value *
	No	Yes	Total	
Less than 6 Months	27	61	88	0.039
6-12Months	11	46	57	
More than 12 Months	83	143	226	
Total	121	250	371	

*chi-square test

Discussion

The recent surge in social networking within healthcare has provided valuable insights into patients' emotional states and stress levels, which are crucial indicators of overall health. In particular, diabetic patients are increasingly utilizing these platforms to share emotions, experiences, and information, enhance self-care by providing education, enabling real-time communication with healthcare professionals, thereby offering mutual support and motivation (12,13).

This cross-sectional study investigated the impact of social media contact with physicians on Type 1 Diabetes Mellitus control in Iraq. The mean age of the patients was 19.8 +/- 9.9 years (range: 2 to 61 years), with women slightly outnumbering men. Patients using social media showed significant improvements in HbA1c levels and were more likely to achieve target levels compared to non-users. Furthermore, longer durations of social media contact were associated with greater improvements in glycemic control. This finding aligns with a previous study by Petroviski et al., which demonstrated positive outcomes from using social media platforms such as Facebook and Skype as communication tools in healthcare settings (14,15). However, a significant positive impact of social media on glycemic control was reported by McDarby et al. over different durations, aligning with our current study. Similarly, Lapp J. et al highlighted a positive influence on medication adherence and self-efficacy (16-18).

Another study by PHILLIS et al. on how social media campaigns raise awareness of diabetes risks in Hispanic communities supports these findings by revealing the importance of the Diabetes Prevention Program (DPP) and diabetes self-management education (DSME) in improving clinical outcomes. The Scripps Whittier Diabetes Institute in San Diego employed Facebook, a primary communication platform for U.S. Hispanics (19-21).

Aligned with these findings, a study by Alzahrani on social media usage among individuals with diabetes in Saudi Arabia, with randomly selected diabetic individuals through WhatsApp and Twitter accounts, found that most respondents were female with type 1 diabetes. Social media was used by nearly half for diabetes-related information, with WhatsApp, Twitter, and Snapchat being the most frequently used platforms. The main benefits identified were increased awareness and education about diabetes and improved communication between patients and doctors, with WhatsApp being predominantly used for diabetes-related communication (22).

Supporting our findings, a study by Malik FS et al. Focused on the role of Effective communication between healthcare providers and patients for favourable health outcomes, particularly in managing chronic conditions. Adolescents with type 1 diabetes are interested in using social media to support their diabetes management, enhance engagement with their healthcare teams, and

overcome communication barriers, such as the lack of timely access to health-related information. Given the high risk of poor health outcomes in some populations, social media could offer a novel way to improve collaboration with care teams outside of clinic settings, favouring its immediacy and accessibility over traditional communication methods like email or phone calls (23).

Amante et al. pointed out the increasing adoption of healthcare systems to electronic health technologies. patient portals have been used to enhance communication and support self-management. Yet, many patients report usability issues with these portals, including difficulties with log-in information and unfamiliar features. In contrast, adolescents in his study demonstrated a high level of comfort and familiarity with social media platforms, particularly on smartphones, which suggests that social media could be a more effective tool for communication between adolescents and their diabetes care teams, bypassing design-related barriers (24).

However, Kordonouri et al. reported that Diabetes management, particularly Type 1 diabetes (T1D), may greatly benefit from smartphone-based tools due to the complex demands of glucose monitoring, insulin dosing, carbohydrate counting, and lifestyle management. Numerous web-based platforms and smartphone apps are now available, offering a range of features for tracking patient metrics such as caloric intake, physical activity, and glucose levels, which can be used for decision-making support. Additionally, advanced technologies for managing T1D are becoming more widely integrated with smartphone apps. These apps are equipped with insulin-dosing calculators and smart meters, which further enhance treatment and monitoring by allowing for real-time tracking and data processing linked to smartphones (25).

Given that physical activity is a critical component of diabetes management, the findings support the notion that social media can encourage and promote physical activity among individuals with diabetes. Recent randomized controlled trials have shown improvements in self-reported physical activity among engaged social media users (13,16).

In respect to the significant burden that type 1 diabetes places on society, Lee et al. also highlight the urgent need for more mobile app development that allows the users to connect with social platforms, targeting young type 1 diabetes patients, particularly given their need for lifelong self-management. One notable finding was the lack of standard guidelines for app development and the inconsistent use of clinical evidence in app creation, with signifying the importance of enhancing mobile app functionality, noting that common features such as health indicators (e.g., blood glucose tracking) and self-management tools (e.g., diet and medication) were frequently included. However, communication platforms and reminders were less commonly integrated. Communication functions, such as platforms allowing interaction between users or with healthcare professionals, were suggested as crucial elements for improving app engagement and usability. Self-management features, such as tracking diet, exercise, and medication adherence, were seen as key to improving diabetes outcomes. The social support features, like peer interaction, could also increase motivation, particularly among adolescents. Apps that offer interactive, real-time communication rather than one-way input have been shown to encourage more frequent use, which is vital for long-term diabetes management. He also found that diabetes management apps were most effective in reducing HbA1C levels. However, their overall clinical impact, especially for type 1 diabetes, remains inconsistent (26).

Kebede et al. in their study also supported the role of Apps that use social networking sites by comparing App users to non-users and significantly showing higher overall self-care scores, regardless of factors like age, gender, and education (27,28).

Amante et al. directed the spotlight to a key concern in using social media for health communication as being the potential violation of patient privacy, which could have legal ramifications for healthcare providers. Many adolescents in the study echoed these concerns, preferring not to share health-related information with their broader social media networks. However, private messaging features were viewed as acceptable for communication with their care team. Future social media interventions should prioritize privacy settings and ensure a secure environment for patient-provider communication. Future mentions that healthcare professionals must address the risk of misinformation by playing a moderating role in online discussions, providing evidence-based expertise, and guiding patients toward reliable resources. This moderation could enhance social support while mitigating the spread of inaccurate information (29,30).

Aligning with these studies, Sarkar et al. examined the use of an internet-based patient portal by adults with diabetes in Northern California. It offers patients the ability to schedule appointments, view lab results, refill prescriptions, and communicate with healthcare providers. Evidence suggests that these tools can enhance healthcare quality, particularly for individuals with chronic conditions like diabetes. However, there are social disparities in DM outcomes, particularly along lines of race/ethnicity and education. which could further widen existing health disparities. The same groups are also more likely to experience the "digital divide," where access to technology is limited, exacerbating these disparities. Despite this, there is limited research on how race/ethnicity influences the use of patient portals in healthcare; this suggests that those already at risk for poor diabetes outcomes may face additional challenges as healthcare systems increasingly rely on internet-based communication (25).

Another study found that middle-aged men with diabetes who experience higher social isolation have higher blood sugar and HbA1c levels. Data from the China Health and Retirement Longitudinal Study (2011 and 2015) showed that socially isolated men who experienced limited networks and insufficient support aged 45–64 had significantly higher HbA1c levels than less isolated men and negatively affected health as well as Multivariate analysis confirmed that greater social isolation correlates with higher blood sugar levels (19-22).

Conversely, a Comparative study by Whittemore et al. found no significant differences in HbA1c values after incorporating social media as an additional tool, additionally, two publications reported no statistically significant difference in treatment adherence concerning social media, suggesting variability in outcomes depending on study design and patient population (11,12).

On the other hand, a study concluded by Williams et al. showed that despite social media interventions being popular and cost-effective tools for promoting healthy diet and exercise, they suffer from low participation and adherence rates and have a limited impact on health outcomes (15).

Comprehensive self-management education, training, and psychosocial support are crucial for optimizing clinical outcomes. A multidisciplinary approach involving collaboration among medical providers, dietitians, pharmacists, mental health professionals, and social workers is necessary for effective diabetes care, improving quality of life, and preventing further complications (14).

This comprehensive cross-sectional study establishes the importance of social media contact with physicians in improving glycemic control among patients with type 1 Diabetes Mellitus in Iraq. Highlighting the significance of integrating social media platforms into diabetes management strategies to enhance patient engagement, as well as more effective and personalized diabetes management approaches. Although the study yielded important insights, a larger sample would

have provided more robust results and allowed for more precise estimates, as it potentially impacted the statistical power and the generalizability of the findings.

Conclusion

Positive impacts on the control of type 1 diabetes mellitus have been observed through the use of social media. Additionally, greater HbA1c level improvements are associated with prolonged patient-physician contact.

Declarations

Ethical approval and consent to participate:

Ethical approval was obtained from the ethical committee of the University of Misan College of Medicine. All of the participants gave informed written consents to join the study before participation, except for participants who were minors (younger than 16 years old) or illiterates; an informed written consent to participate in the study was obtained from their parents or legal guardians. All experiments involving human tissue samples in this study were performed according to the relevant guidelines and regulations.

Transparency Statement

The authors affirm that this manuscript is an honest, accurate, and transparent account of the study being reported. No important aspects of the study have been omitted, and any discrepancies from the study as planned have been explained.

Availability of data and materials

The datasets used and/or analysed during the current study are available from the corresponding authors on reasonable request.

Competing interests

We declare that we have no financial or non-financial interests that could be perceived as a potential conflict of interest.

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Authors contribution

All authors contributed to the final version of the manuscript.

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