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DESIGNING A CENTRALIZED DIGITAL PLATFORM TO SUPPORT TYPE 2 DIABETES: FROM IDEA TO IMPLEMENTATION

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Abstract

Objective

This early-phase digital initiative aimed to develop a resource-aggregating, centralized, user-friendly digital platform for Type 2 Diabetes Mellitus (T2DM) self-management in British Columbia, Canada. The goal was to synthesize effective strategies from the literature to create an accessible resource for both patients and healthcare providers and improve access to high-quality, publicly available T2DM education materials.

Methods

A targeted literature review across PubMed, Cochrane, IEEE Xplore, and CINAHL identified essential components for T2DM digital platforms. We thematically synthesized a list of evidence-based features and design frameworks essential for a digital platform of this type. Website development was co-led by patients and healthcare professionals through interviews (focus groups), usability testing (remote and contextual inquiry), and structured (survey) and iterative feedback to ensure relevance and real-world applicability. Nine patients contributed lived experiences, while eleven clinicians provided expert input, shaping a digital platform that is both empowering and clinically sound.

Results

The literature review identified key features included automated communication, interactive tools, goal tracking, educational resources, and professional support. User-centered design ensured accessibility and alignment with user needs. The final platform integrated over 375 evidence-based resources, interactive features, and community support. This early-phase project registered 1368 website visits, 756 unique visitors, over 4 minutes session durations (benchmark 2-3 minutes), two pages per session (benchmark 2 pages), and a 51% bounce rate (benchmark ≤60%). These results underscore the platform's role in enhancing health information access and engagement.

Conclusion

This centralized digital platform for T2DM in British Columbia demonstrates the potential of user-centered, co-designed solutions to transform chronic disease management. By integrating resources, facilitating collaboration, and providing tailored support, this initiative addresses key gaps in diabetes care and exemplifies a scalable model for digital health innovation. Ongoing efforts will monitor long-term data to inform accessibility, expand content, and ensure continuous platform improvement to better meet the needs of users and healthcare systems alike.

Keywords: digital health, diabetes self-management, user-centered design

Introduction

The global prevalence of diabetes is increasing. An estimated 537 million adults were affected by diabetes in 2021, and the prevalence is projected to increase to 643 million by 2030 [1]. Type 2 diabetes mellitus (T2DM) accounts for 90% of these cases, driven by a complex interplay of demographic, environmental, genetic, and socio-economic factors [1]. This rise in prevalence presents significant challenges for individuals and healthcare systems alike [2]. Diabetes rates in Canada are also rising, the majority being affected by T2DM [2]. In 2015, 9.3% of the population (3.4 million) had diabetes, with projections reaching 12.1% (5 million) by 2025 - a 44% increase [2]. Additionally, prediabetes affected 22.1% of adults in the same year in which Canada ranked seventh worldwide in diabetes-related healthcare spending, with costs reaching 17 billion US dollars [2].

Diabetes can lead to severe complications, including blindness, heart disease, and kidney failure, impacting quality of life and placing a substantial burden on healthcare resources [2]. Despite advancements in medications and technologies, achieving treatment goals remains a challenge, often hindered by difficulties in accessing timely and relevant information [3]. To address these challenges, innovative approaches are needed to improve access to high-quality resources, empowering patients with the knowledge and skills to effectively self-manage their condition [4]. The key is providing access (having the right information available) and ensuring regular use (actively engaging with digital tools to obtain or apply that information). Digital technologies, particularly web-based platforms that support self-management, offer a promising solution to bridge information gaps, enhance patient education, and alleviate some burden on healthcare systems [3, 4].

The current landscape of technological initiatives in diabetes management in British Columbia, Canada, reveals a critical need for a centralized digital platform. Patients and health care professionals alike face challenges navigating a fragmented information system, often struggling to find credible, easily accessible T2DM resources. This lack of a centralized hub hinders effective care, limits patient education, and ultimately impacts health outcomes. Digital interventions hold immense potential to address these challenges and empower patients in their self-management journey [3, 4]. By prioritizing key elements such as reliable information, accessibility, personalization, integrated human support, social connection, and practical solutions, a digital platform can become an invaluable tool for both patients and providers.

This paper presents a two-pronged objective. Firstly, we delve into the existing evidence base, examining published literature on digital platforms for T2DM to identify the best practices and key features that address user needs. Secondly, we outline the development of a functional digital T2DM platform tailored to the specific context and populations of British Columbia, Canada. Both objectives were equally important, as reviewing the existing evidence base provided essential insights and best practices that directly informed the tailored development of the digital T2DM platform for British Columbia, Canada, ensuring it was both evidence-based and contextually relevant.

Methods

Objective 1: Existing Evidence on T2DM Digital Platforms

To achieve the first objective of defining the ideal digital platform, a targeted literature review was conducted on February 11th and 12th, 2025. A targeted literature review is a focused approach to evidence synthesis that aims to address specific aspects of a research question rather than providing a comprehensive overview of all available literature on a topic. Targeted reviews are generally narrower in scope than systematic reviews and may use more flexible or pragmatic search and selection strategies. For this targeted review, a focused search strategy was employed, utilizing PubMed, Cochrane, IEEE Xplore, and CINAHL databases to identify relevant English articles published within the last decade. The search was guided by the PICOS framework, with keywords derived from the following criteria: Population (patients with T2DM), Intervention (digital web-based tools and/or platforms), Comparators (any), Outcomes (efficacy and key components of T2DM digital platforms), and Study design (qualitative and quantitative studies, systematic/scoping literature reviews, and guidelines). To ensure a rigorous selection process, two independent reviewers (CK, AL) assessed the literature for quality and inclusion in the review, resolving any discrepancies through discussion.

Objective 2: Development of a Digital T2DM Platform

The development of the early-phase digital platform for T2DM support followed a three-phased approach: Beta Phase, Soft Launch Phase, and Official Launch, which took place over 6 months. The Beta Phase focused on the development and review by healthcare professionals, followed by the Soft Launch Phase, which involved patient and healthcare professional partner engagement and refinement based on user feedback. The Official Launch marked the public release, and ongoing feedback collection continued to refine the platform. A needs assessment survey was conducted using a validated process to evaluate various aspects such as format, navigation, relevance, and overall value. The beta website

was modelled after three well-established T2DM websites: Diabetes Canada, Diabetes UK, and the Alberta Health Diabetes, Obesity, and Nutrition Clinical Network.

The platform was co-created with patient partners and health professionals. Feedback was gathered through structured interviews, focus groups, usability testing (including contextual inquiry), and surveys during the beta and soft launch phases from nine patients with or at risk of T2DM, eleven healthcare professionals from diverse fields, and digital marketing specialists. The iterative design process involved multiple rounds of feedback and revisions, leading to the final website release.

The development process integrated the features of a website, digital platform, and digital intervention, offering accessible information, fostering stakeholder collaboration, and providing tools to support behavior change, creating a seamless, community-driven experience for improving T2DM support.

This platform was purposefully designed as a publicly accessible resource-aggregating tool uniquely designed to improve access to high-quality, publicly available T2DM education materials across Canada. It was not designed to store, collect, or transmit personal health data, and was not integrated with electronic health records (EHRs) or clinical systems. The platform was designed to comply with the Accessible Canada Act (ACA) for digital accessibility and supports equitable access in alignment with the Canada Health Act. Formal accessibility standards, specifically the Web Content Accessibility Guidelines (WCAG) 2.1 AA, were applied to ensure the platform meets best practices for digital accessibility and usability in healthcare settings. This platform was built using Wix, a top-rated cloud-based website builder. Wix maintains user privacy in analytics by using anonymous, aggregated data; requiring a transparent privacy policy; providing user consent options for cookies; not selling personal data; and employing data protection controls.

Results

Objective 1: Existing Evidence on T2DM Digital Platforms

This targeted literature review screened 40 publications which yielded 22 articles meeting the inclusion criteria (see Figure S1 for a PRISMA flow diagram). Research was conducted in numerous countries including Canada, Spain, Sweden, the United Kingdom (UK), the United States of America (USA), Germany, Slovenia, Malaysia, and Belgium amongst others. Studies vary in their methodologies, including randomized controlled trials, quasi-experimental designs, qualitative analyses, and systematic literature reviews. Sample sizes ranged from 11 patients to 1,041 patients. A summary of key characteristics of the included publications is presented in Table S1.

Digital Platform Types

All included studies discussed the digital platforms that had been implemented to help support T2DM self-management (Table 1). The studies examined a variety of digital tools, including websites, mobile apps, web-based platforms, and multi-channel systems that integrate SMS, websites, and mobile applications. Most platforms offered a mix of educational resources, self-management tools, goal tracking, and community support. Features like personalized feedback, automated reminders, and integration with health monitoring devices were common. For instance, several studies cited below highlighted the effectiveness of automated alerts for medication and activity tracking, while others emphasized peer support forums. These digital platforms are being adopted globally and tailored to meet the needs of both patients and healthcare providers, offering support, resources, and tools to enhance self-management and disease control.

Three digital platforms were previously developed in Canada for diabetes management. Mobile Digital Access to a Web-enhanced Network (mDAWN) combines SMS and a website for resources and self-monitoring [5], while Diabetes Web-Centric Information and Support Environment (DWISE) integrates digital tools into primary care, empowering both providers and patients with personalized strategies [6]. The Diabetes Online Companion offers a comprehensive self-management website, centered on self-efficacy, with resources like information, logs, and a blog [7]. In Spain, digital interventions focus on online support and management, with platforms like Dulces Diabéticos providing support groups and educational resources [8], and the gluUCModel serving as a web application that enhances disease control for patients and providers [9]. Both Dulces Diabeticos and gluUCModel emphasize accessibility and the delivery of relevant information. Belgium's My Plan 2.0, is a self-regulation web-based intervention adapted for T2DM [10]. In the UK, HeLP-Diabetes offers an unstructured online format for self-management education [4, 11-14].

While approaches vary from structured, theory-based models to more flexible, unstructured formats, they all share the common goal of improving accessibility, engagement, and outcomes for people with T2DM.

Table 1: Comparison of digital T2DM platforms from the literature

Platform	Country	Description/Features	Intended Users	Data Use / Integration	Key Limitations
mDAWN	Canada	Mobile app, SMS, website; coaching modules	Patients	Collects health data; no EHR	No real-time interaction; limited customization
HeLP-Diabetes	UK	Modular education program; video/text content	Patients + Providers	Basic login; no EHR link	Not tailored culturally; limited

					patient control
My Diabetes My Way	Scotland	Patient portal; clinical data access and education	Patients with EHR access	Integrated with NHS records	Not available outside NHS network
Dulces Diabeticos	Spain	Spanish-language T2D blog with recipes, tips	General public	No data use	Informal content; no clinical oversight
Our platform	Canada	Web-based, resource-aggregating repository of 375+ T2D tools/resources; co-designed with patients and clinicians	General public, patients, providers	No data stored/shared; no EHR or clinical system integration	No clinical tracking; designed for public access only

EHR: electronic health records; NHS, National Health Service; SMS, short message services; T2D, type 2 diabetes; UK, United Kingdom.

Key Components

The key components of the digital health platforms for diabetes management encompass a wide array of features designed to enhance patient engagement and self-management. These include automated communication systems, such as emails and SMSs, delivering tailored reminders, warnings, and research updates, with an opt-out option [4, 7, 9, 10, 14-17]. Interactive platforms incorporating physiological sensors and social media synergies are also prominent [5, 18], fostering both autonomy and peer connection. Educational content and materials form a crucial element, with resources ranging from web-based learning modules and self-help tools to informative texts based on international consensus recommendations [4, 6, 9-11, 14-20]. Goal setting and progress tracking tools [6, 10, 11, 17, 18, 20], along with health professional support and communication channels [17, 18, 21], further empower patients in their disease management. Self-monitoring logs, blogs [7, 17], and patient-generated health data [14, 21] facilitate active participation, while personalized recommendation tools offer tailored guidance [18]. Mobile self-management support resources and medication management platforms, including automatic interaction checks and insulin dose calculators, complete the suite of key components [18, 22].

Design Principles

The design principles underpinning these interventions emphasize user-centered approaches and evidence-based content. Behaviour change techniques and theoretical models, such as the transtheoretical model stages of change, are integral to promoting sustainable lifestyle modifications [4, 7, 11, 19, 20, 23]. Participatory design, involving patients and health professionals in the development process, ensures that the

interventions meet diverse user needs [4, 19]. The design also prioritizes accessibility, catering to individuals with varying literacy and health literacy skills through multimedia content [4].

Continuity of care was supported through features like report generation and web-based appointment scheduling [18], as well as prompts to return to the web platform for updates [7]. Other key components include an interactive multi-media design, including videos, links to other resources and websites, tips, quizzes, photos depicting healthy behaviours, factsheets, local events and activities, medical news, newsletters, and self-help tools [4, 7, 14, 15, 17, 19, 20, 23]. Technical considerations to keep in mind, include security, access control, interoperability, and compatibility across devices and platforms [22, 23]. Interventions should aim for a simple, user-friendly design with intuitive navigation and concise information, ensuring ease of use and engagement [10].

Content

The content of these digital health interventions is comprehensive and multifaceted, covering a wide spectrum of diabetes-related topics. It was evidence-based and personalized, focusing on lifestyle management, medication adherence, and problem-solving, with several platforms leveraging multidisciplinary teams to develop accurate, evidence-based, and actionable resources [18, 20, 24]. Educational resources, including web-based learning modules and informative texts, were grounded in evidence-based guidelines and recommendations [4, 18, 24]. Personalized recommendation tools delivered by health professionals provide tailored advice based on individual patient data [18]. The interventions also incorporate self-assessment tests, quizzes, and knowledge evaluation tools to gauge patient understanding and progress [7, 9, 17, 18, 24]. Practical solutions and real-life answers are prioritized, addressing patients' desire for actionable guidance [7].

Dietary guidelines from reputable organizations, such as the American Diabetes Association, are integrated into the content [20], alongside pedagogical materials on nutrition education [18]. The interventions also provide links to reputable websites and resources [20], ensuring patients have access to reliable and up-to-date information. The content is often developed using models such as the Corbin and Strauss model using participatory design principles in collaborative content development [4, 11, 14].

Technical Aspects

The technical aspects of these interventions are crucial for their functionality, security, and accessibility. Web applications utilize relational databases on secure centralized servers or

cloud-based systems for data storage [6, 9]. Algorithms based on behaviour change models and case-based reasoning are employed to generate personalized recommendations and feedback [6, 9]. Interoperability with existing management software systems is a key consideration, facilitating seamless data exchange [22]. Data interfaces, such as web interfaces and mobile platforms, are designed for user-friendly data entry and visualization [9]. Security measures, including access control, data encryption, and secure messaging, are implemented to protect patient information [22, 23].

Technical support is provided to users [18], addressing any issues related to bandwidth, latency, or device compatibility [23]. The interventions are designed to be multi-platform, ensuring accessibility across various devices and operating systems [9]. Semantic web-based knowledge modelling and execution technologies are also utilized (advanced web technologies that structure, represent, and process health information in a way that enables machines to understand and reason with it) [6]. Integration with Electronic Health Records and other systems was a key technical consideration for real-time updates and seamless data flow [13, 18], while platforms like mDAWN utilized multiple mHealth technologies to create a cohesive user experience for both patients and healthcare providers [5].

User Needs

Digital diabetes interventions are increasingly recognized for their potential to support patients in managing their condition and improving health outcomes. In this literature review, the platforms prioritized a user-friendly interface for diverse user groups, including those with low digital literacy, while ensuring mobile compatibility and multilingual support to foster broad adoption, especially among global audiences [4, 10, 19, 23]. However, to be truly effective, these interventions must be designed with a deep understanding of user needs. A review of various digital diabetes interventions reveals several key themes that underscore what users seek in these platforms.

Firstly, users prioritize reliable and trustworthy information. They value platforms that are monitored by health professionals and that offer tailored advice from qualified experts [17, 18], Information from laypeople or sources lacking healthcare professional oversight is often perceived as unreliable [8, 17]. Interventions should cater to diverse literacy and health literacy levels, with content presented in accessible formats like video and text [12, 18, 23, 25]. A simple, user-friendly design with easy navigation and evidence-based concise information is crucial for widespread adoption and engagement [6, 8, 10, 11, 17-19].

Furthermore, personalization is essential for meeting individual needs. Many report that users benefit from tailored advice and culturally sensitive content [7, 11, 17, 19, 20, 23]. This includes tools to support goal setting, tracking health objectives, and overcoming barriers, features identified as important across multiple studies [6, 10, 11, 17, 18, 20].

Effective interventions also recognize the importance of integrating technology with human support [4, 5, 8, 15, 17-19, 21]. Users seek seamless communication with healthcare professionals through various channels, including chat, email, and videoconferencing [18]. However, platforms should ensure that advice from non-professionals is appropriately moderated and supervised [17, 18].

Social support remains a crucial aspect of diabetes management [4, 5, 8, 15, 17-19]. Users benefit from online communities, discussion forums, and opportunities to connect with peers; combining autonomy with social connection, allowing users to learn from and support each other while maintaining independence in their self-management journey [5, 21]. Finally, users value feedback and practical solutions. This includes practical advice for real-life challenges, self-assessment tools, and opportunities to receive personalized feedback [14, 18, 21, 24].

Efficacy

Some studies found improved clinical health outcomes [4, 5, 15-18, 20, 21, 24], psychological health outcomes [12, 15, 18, 20], and patient reported outcomes [7, 14, 15, 19, 24] when patients used digital tools and platforms. However, other studies did not find any improvement in clinical health outcomes [7, 8], psychological outcomes [4, 7], or functional health status [16] with these interventions. Further research is needed in this area.

Feasibility

Feasibility and costs were evaluated in very few studies. A systematic literature review of digital interventions for diabetes self-management found no high-quality studies which evaluated the feasibility of the interventions, using CERQual and GRADE guidelines [26]. A notable exception is the mDAWN publication which provided per-user costs [5]. Willingness to pay remained largely unexplored, suggesting the need for further investigation into the economic sustainability of these tools. Common limitations included barriers like cost, lack of internet access and digital literacy, and the requirement for primary care visits for some platforms [7, 15, 17, 18]. Ongoing updates and user feedback were essential for maintaining content relevance and user engagement [21, 23].

Evidence Summary

This literature review aimed to define the key components of digital platforms for T2DM support. A review of 22 studies from across the globe indicated that digital platforms designed for T2DM frequently included educational content, self-management functionalities, progress tracking, and opportunities for community interaction, often enhanced by tailored feedback and automated prompts. The review highlights the global

adoption of digital platforms for T2DM, emphasizing key components, design principles, user needs, content strategies, and technical aspects critical for effective implementation and improved patient outcomes. Similarities across studies included a consensus on the importance of personalization, tailored resources, user involvement and collaboration on design and content, health professional moderation, and evidence-based information to support T2DM self-management.

However, differences arose in the scope and integration of platforms, some focused on education and others on comprehensive management. Cost and sustainability models were also noted, and user involvement, where platforms with continuous user input saw greater success in maintaining engagement. Success of digital platforms was linked to usability, patient involvement, effortless integration into daily workflow, integration with health records, and expanding from the traditional measurement of success (medical test) to broader indicators like, usability, scalability, and cognitive impact [26]. Future efforts should focus on enhancing user-centered design, interoperability with healthcare systems, and affordability to maximize impact.

Objective 2: Development of a Digital T2DM Platform

The second objective of this paper was to use the information from the literature review and outline the design and development of a functional digital web-based T2DM platform designed to aggregate resources tailored to the specific context and populations of British Columbia and Canada. The results of which are discussed here.

Review Groups and Their Contributions

The web-based digital platform was co-created with patients and health professionals through a series of iterative feedback loops, ensuring that the content was not only clinically accurate but also directly relevant and useful to the end users. Nine patients with or at risk of T2DM from various ethnic backgrounds (South Asian, African, Hispanic, East Asian, Indigenous Canadian) provided feedback primarily focused on user experience from a patient perspective. Eleven clinicians from diverse fields (physician, endocrinologist, community nurse, dietician, pharmacist, health leader, nurse educator, and clinical nurse specialist) evaluated the platform's content for clinical accuracy and relevance to T2DM self-management.

More specifically, the review groups evaluated whether the website's content was accurate, evidence-based, up to date, and understandable, ensuring that linked resources met their individual needs. Using a structured online survey, they also assessed the ease of finding information and overall user experience, identified any confusing navigation, and checked that all links, forms, and interactive tools functioned properly. Additionally, they tested the website's performance across different devices and browsers and looked for opportunities

to incorporate new technologies or features, such as AI chatbots or telehealth integration, to enhance the platform.

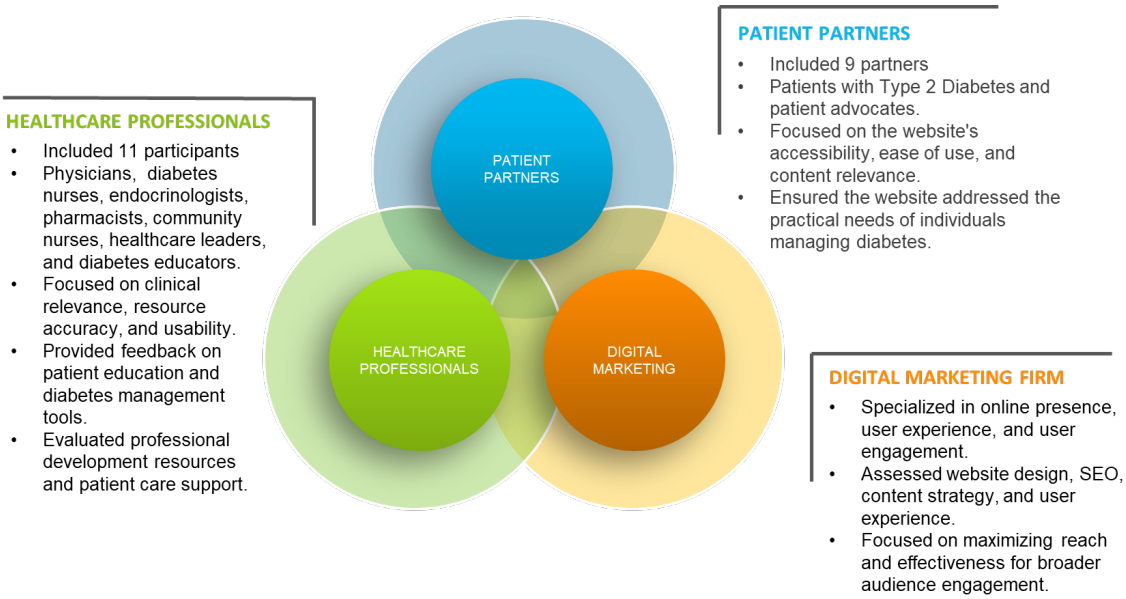
This collaborative approach involved structured interviews, focus groups, and usability testing sessions (remote and contextual inquiry) as noted in the methods, where patients with or at risk of T2DM and diverse healthcare professionals, including endocrinologists, dietitians, and nurses, provided invaluable insights. Patients shared their lived experiences, highlighting the challenges they faced in managing their condition and identifying the types of information and tools they found most beneficial and described how these changed over time. This shaped the way the platform was ultimately designed and customized with the ability to drill down into more detail based on an individual's unique needs. Health professionals contributed their clinical expertise, ensuring that the content was evidence-based and aligned with current best practices. By incorporating these diverse perspectives, the platform was designed to address the real-world needs of individuals with T2DM, fostering a sense of ownership and ensuring that the final product was both accessible and empowering.

The feedback from the patient and clinical partners was categorized into topics based on the five survey categories: content accuracy & relevance, usability & navigation, functionality & accessibility, mobile & cross-browser compatibility, new technologies & features. This was then integrated into the platform based on a user-centered design process. To resolve discrepancies between patient and provider feedback in website design, several strategies can be employed. Open communication and partnership models ensure both groups actively participate in design decisions

This was a descriptive co-development project; therefore, no formal thematic analysis or demographic data collection was conducted. Feedback from participants was reviewed iteratively by the design team and integrated based on alignment with usability, accuracy, and inclusion goals. The design intent was to create a resource accessible to all people with T2DM in Canada, regardless of age, location, or literacy level.

Additionally, digital marketing experts contributed insights on optimizing user engagement, platform design, and visibility, ensuring the interface was both user-friendly and appealing to a broad audience. Figure 1.

Fig. 1. Collaborative partners in the website development and review



Patient Engagement

Patient engagement deserves special mention, noted for its importance in the published literature and due to its role in achieving better health outcomes, increasing patient satisfaction, and achieving treatment results [27]. By empowering individuals to actively participate in their care, they become more likely to follow treatment plans and manage chronic conditions effectively, with better self-management and increased responsibility [27].

In the context of the digital platform design, a structured patient engagement process was implemented. This involved conducting four weekly one-hour sessions followed by the integration of patient feedback into the website design. Participants were invited to review the updated site during a soft launch phase which incorporated approximately 90% of their requested information and design elements. A final patient engagement session was held prior to the official launch to gather direct feedback on their experience using the website during the soft launch, allowing for further refinements.

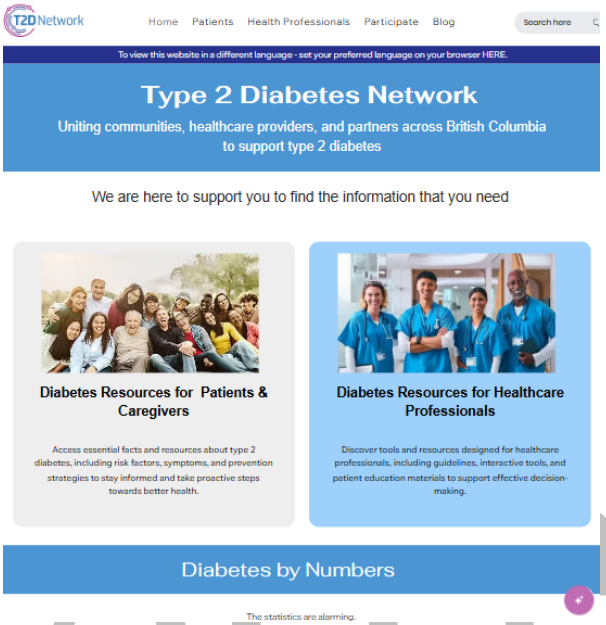
Patient partners were highly engaged by the shared purpose of contributing to a meaningful online resource, the diversity of perspectives, and the opportunity to see their feedback directly implemented. They appreciated structured meetings with advance agendas, along with the flexibility to choose session times, though the initial large group size was less ideal. Effective facilitation, including well-organized sessions, prompt communication, and direct collaboration with the website designer, contributed to a positive experience. No significant barriers to participation were reported, and participants expressed strong interest in future engagement opportunities. The rapid progress of website development and feedback incorporation was particularly motivating.

Features of the Developed Digital Platform

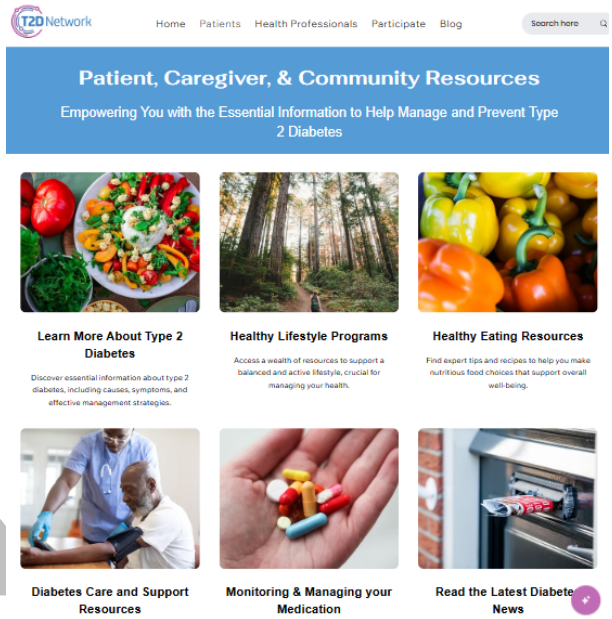
The platform was designed with integration in mind, networking the fragmented silos of credible T2DM information into one unique hub. It consolidated a growing body of over 375 unique links from 75+ evidence-based sources, providing resources related to self-management, lifestyle changes, professional development, clinical guidelines, peer support, and diabetes news, to name a few. The content was evidence-based, with structured learning modules tailored to various demographic groups at higher risk of T2DM in British Columbia, including South Asian, East Asian, and Indigenous populations. Interactive tools, such as symptom tracking, goal setting, and behaviour change support, were included, as were self-screening tools and needs assessment. The platform also included community and peer support features with an open forum to all users, lightly moderated by an expert health care provider. Other special features include a weekly update section of relevant T2DM news, professional education, and valued resources, AI chat bot feature, dedicated events page, and weekly blog feature.

Figure 2a: T2D Network home page, 2b: Patient, caregiver, & community resources landing page, 2c: Resources aggregation informed by patient partners. and 2d: Resources aggregation informed by healthcare professional partners.

2a.



2b.



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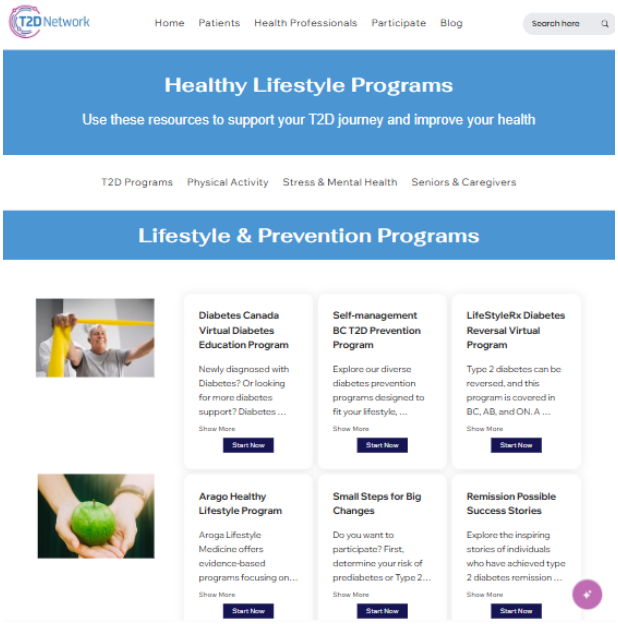
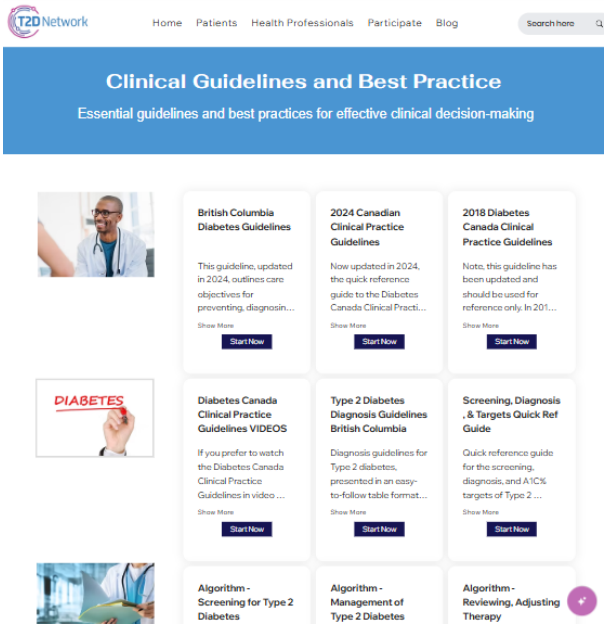


2d.



Achievements and Lessons Learned

Following the website relaunch, early analytics demonstrated a significant increase in user engagement across multiple metrics. In the first 90 days post soft launch, website visits surged to 1368, while unique visitors cumulated to 756. User interaction was healthy with over 4 minutes session durations (benchmark 2-3 minutes), 2 pages per session (benchmark 2 pages), and a 51% bounce rate (benchmark ≤60%). Visitors were more engaged and exploring content more extensively. These findings suggest that the redesigned platform successfully enhanced user experience and accessibility, fostering greater engagement with the site's resources.

Additionally in the 3 months after launch, key pages such as Patient & Family Community (202 visits), Forum (196 visits), Provider Resources (146 visits), and About Us (137 visits) also saw increased traffic. Users engaged with critical resources, with the most-clicked links including Diabetes Resources for Patients & Caregivers (38 clicks) and Diabetes Resources for Healthcare Professionals (25 clicks), both prominently featured on the homepage. Form submissions, particularly for newsletter sign-ups, saw a dramatic rise. Join the network form to receive newsletters views reached 4,463 reinforcing the growing interest in receiving diabetes-related updates and resources. Traffic sources evolved, with direct traffic accounting for the majority of visits (885) followed by organic search traffic from Google (244). Overall, these trends highlight sustained momentum following the website relaunch, with users actively exploring content, engaging with educational resources, and subscribing for updates.

The development of this platform has resulted in a scalable, accessible, and user-centered solution that meets diverse needs. Through collaboration, innovation, and continuous improvement, the initiative has successfully navigated key challenges and implemented strategic solutions to ensure long-term sustainability. A significant achievement has been the successful engagement of partners, including healthcare professionals, patients and caregivers. By establishing structured advisory panels, fostering clear communication channels, and implementing regular feedback loops, the initiative has ensured that all voices are heard. Quarterly partner, patient and health professional, reviews now maintain ongoing collaboration and alignment with partner priorities as well as content relevance.

From a technical standpoint, the integration of content from over 75 sources while maintaining a seamless user experience has been a major success. A modular design approach and prioritization of core functionalities have created a flexible and scalable system capable of adapting to future updates without compromising performance. The platform’s features have been carefully curated to balance comprehensiveness with feasibility and the thorough needs assessment allowed for prioritization based on user value, ensuring that resources were optimized effectively. Instead of developing new

content from scratch, the team focused on curating and enhancing high-quality existing resources, a strategy that has proven both cost-effective and sustainable. Additionally, consulting community experts ensured cultural relevance, making the platform more inclusive and useful. This structured approach has enhanced the reliability and longevity of the platform.

Accessibility and user engagement have also been prioritized. Usability testing with diverse groups identified potential barriers, leading to enhancements such as a link to multilingual support, culturally sensitive content, features like an AI chatbot, content search feature, events calendar, simplified navigation and menus, and diverse screen reader compatibility. These improvements have made the platform more inclusive for users with varying literacy levels, diverse cultural backgrounds, and digital competencies. Marketing and brand awareness efforts have successfully increased the platform's reach. Targeted outreach strategies, ongoing promotional campaigns, and consistent engagement across digital platforms have ensured visibility among key audiences. These efforts have been instrumental in sustaining interest and broadening the platform's impact.

The platform's early traffic analytics provide further insights into its growing success, reflecting a significant surge in traffic during soft and official launch stages. The user base has shown strong loyalty, with returning users and a clear upward trend in sessions, time on pages, and decreased bounce rate. While engagement is strong, there are plans to build more interactive features on the website to encourage visits including, user surveys and polls, personalized search features, and frequent updates on news and activities to ensure relevancy.

Challenges and Future Considerations

Despite these successes, some challenges remain. Coordinating feedback from diverse partners continues to require ongoing effort, and maintaining long-term engagement with patient partners and healthcare professionals can be challenging. Additionally, ensuring the continuous relevance of content as healthcare information evolves demands sustained monitoring and updates. To assist in the process, a standard operating procedure was developed for the quarterly review by patient and health care professionals partner groups, ensuring a structured scalable strategy moving forward.

Moving forward, efforts will focus on refining partner engagement strategies, refining quarterly reviews of the digital platform, expanding accessibility features, and strengthening content governance by creating clear content guidelines and assigning partners specific roles in reviewing and updating content. By continuing to adapt and evolve, the goal is that this digital T2DM platform will remain a dynamic and valuable resource for its users.

Discussion

This local early-phase initiative underscores the potential of digital platforms to address the growing needs of individuals with T2DM and the healthcare systems that serve them. The literature review highlighted key components and design principles crucial for successful digital health interventions in diabetes care, such as user-centered design, evidence-based content, personalization, accessibility, and integrated human support. These findings, consistent with recent research emphasizing the importance of patient-centered approaches in digital health interventions [5, 7, 9, 17, 19], informed the development of a functional digital T2DM platform tailored to British Columbia, Canada. This platform, developed through a collaborative, iterative process, empowers patients with accessible information and self-management tools while providing Healthcare professionals with a centralized resource hub for professional practice.

As mentioned previously, this site serves multiple purposes and functions as a website, digital platform, and digital intervention. By doing so, the project not only provides accessible information (like a website), but also fosters collaboration and engagement among diverse stakeholders (as a digital platform) and delivers targeted tools and resources that directly support behavior change and self-management (as a digital intervention). This integrated approach enables a seamless user experience, bridges gaps between information and action, and creates a dynamic, community-driven environment for improving T2DM support.

Early data on website activity will provide valuable insights into user engagement and platform effectiveness, allowing for ongoing optimization and refinement. This aligns with the emphasis on continuous improvement and data-driven decision-making in digital health, as highlighted in studies examining the role of user feedback and analytics in platform development [4, 8, 19].

Our early-phase T2DM digital initiative reinforces the importance of user-centered design, evidence-based content, personalization, accessibility, and integrated human support. These findings resonate with broader trends in digital health, where there is a growing emphasis on patient engagement, personalized medicine, and the integration of technology into healthcare delivery [12, 22, 28, 29]. Despite the potential of digital health interventions, gaps often exist between theoretical ideals and practical implementation. Our initiative identified challenges related to balancing desired features with real-world and technical limitations. These challenges are not unique to us and are echoed in the broader literature on digital health implementation, where issues such as partner buy-in, interoperability challenges, and resource constraints are frequently encountered [8, 13, 14, 17, 18]. To enhance feasibility and sustainability, supportive policy and funding strategies are needed. This includes investment in digital health infrastructure, incentivizing

healthcare professionals' adoption, and exploring sustainable funding models. Addressing these challenges requires a multi-faceted approach, involving collaboration between governments, healthcare organizations, technology developers, and researchers [30].

Future directions for our digital platform include scaling its reach, continuous improvement based on user feedback, enhanced interactivity, and rigorous evaluation of its long-term impact. These goals align with the broader vision for digital health, where these platforms can be used as catalysts to expand access to quality health information, improve education and awareness, streamline provider workflows, and drive decision-making for better health outcomes [31]. To enhance the website and support patient self-management, targeted improvements are planned, including refining accessibility and introducing an intuitive and personalized search feature. An ongoing quarterly review with patient and healthcare provider partners will ensure the website remains relevant, user-friendly, and responsive to evolving user needs.

Conclusion

The development of a centralized, resources-aggregating digital platform for T2DM in British Columbia, Canada as described in this paper, exemplifies a unique and comprehensive approach. Co-designed with patients and health professionals, this project represents user needs by design. By functioning simultaneously as a website, digital platform, and digital intervention, the digital resource addresses the fragmentation of diabetes information, fosters collaboration among patients and healthcare providers, and delivers targeted tools to support prevention, early intervention, and ongoing self-management. This integrated model not only provides a seamless user experience but also bridges the gap between information and actionable support, setting a new standard for digital health initiatives in chronic disease management.

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Conflict of Interest statement

The authors declare no conflict of interest.

Author contributions

C.K. conceptualized the project, developed the methodology, conducted the manuscript administration, wrote the original manuscript draft, reviewed and edited the manuscript.

A.L. conducted the literature review, contributed to methodology development, reviewed and edited the manuscript.

S.T. conceptualized the project, developed the methodology, validated the approach, reviewed and edited the manuscript.

R.M.C. conceptualized the project, reviewed and edited the manuscript.

E.S.G. conceptualized the project, reviewed and edited the manuscript.

K.C. conceptualized the project, reviewed and edited the manuscript, supervised the project.

All authors approved the final manuscript as submitted and agree to be accountable for all aspects of the work.

Figure S1: PRISMA flow diagram of the targeted literature review

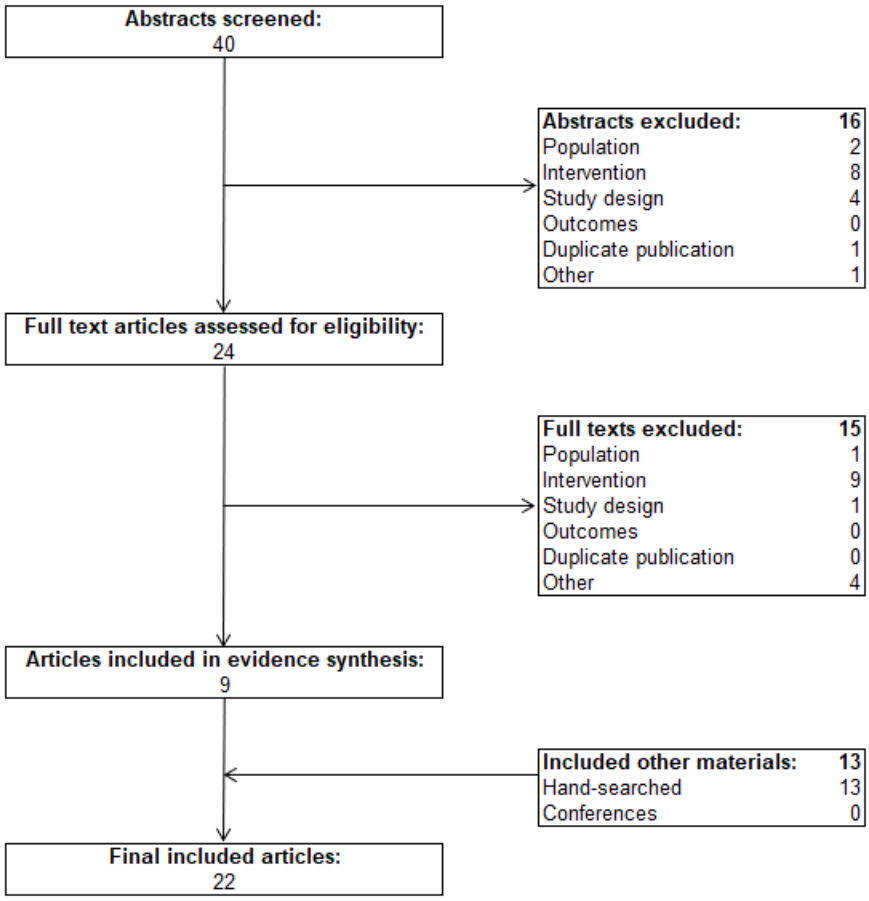

Table S1. Summary of the targeted literature review

First Author	Year	Name and Type of Digital Tool	Country	Sample	Setting	Methods	Key Findings
Abidi[6]	2018	"Diabetes Web-Centric Information and SupportEnvironment" (DWISE)"; a digital health platform	Canada	11 patients 10 primary care practitioners	Patients and primary care practitioners in Halifax	Questionnaires Case scenarios Focus group	For the patient tool, most issues were related to the tool's screen layout, design features, understandability of the content, clarity of the labels used, and navigation across the tool.
Bernhard[22]	2018	A shared patient-centered, web-based medication platform for T2DM patients using a FITT framework (Fit between Individuals, Task, and Technology)	Germany	25 patients 13 general practitioners 10 health care assistants	Regional healthcare	Focus groups	To optimize usability, there was consensus among participants to display information in a structured, chronological format, to provide information inlay language, to use visual aids and customize information content, and align the platform to users' workflow.
Dwibedi[24]	2022	Web-based platform with a responsive design to enable patients to use it via their own computer, tablet or mobile phone	Sweden	297	Registry and other means	Randomised controlled and open-label trial	The tool does not require in-person reinforcement or increased healthcare resources, and the marginal cost is fundamentally lower than pharmacological treatment and most existing lifestyle interventions.

Greenwood[21]	2017	Mobile phones, secure messaging, and web based information used in combination with other interventions such as mobile apps or messaging	Global	25 studies	Not stated	Systematic literature review	Technology-enabled diabetes self-management solutions significantly improve A1c. The most effective interventions incorporated all the components of a technology-enabled self-management feedback loop that connected people with diabetes and their health care team using 2-way communication, analysed patient-generated health data, tailored education, and individualized feedback.
Hawkes[11]	2024	Healthy Living for People with Type 2 Diabetes (HeLP-Diabetes), a digital intervention designed to provide ongoing self-management support for people with T2DM	UK	19	Participants engaged with HealthyLiving	Cross-sectional semi-structured interviews	Digital Diabetes Self-Management Education and Support programs offering emotional aspects of self-management are addressing an unmet need.
Herrero[8]	2021	“Dulces Diabéticos” website; “Diabetes Foro” online diabetes forum; and Facebook groups related to diabetes	Spain	205 T2DM patients	General public	Cross-sectional survey	Patients with T2DM who participate in online support groups show a higher correlation with having lower levels of diabetes self-care management as well as health complications related to the disease.

Hidalgo[9]	2014	glUCModel: a web-based monitoring and modeling system applied to diabetes	Spain	Not applicable	Online	Description of a web application development	glUCModel, improves the communication and interaction between patients and doctors, and eventually the quality of life of the former. glUCModel also presents three novelties in the disease management: a recommender system, an e-learning course and a module for automatic generation of glucose levels model.
Ho[5]	2015	mobile Digital Access to a Web-enhanced Network (mDAWN); website with discussion forum, sms, and 3 monitoring devices	Canada	39 patients 28 caregivers	General public	Self-reported health measures Physiological outcomes in weight, blood pressure, heart rate, and blood glucose Program cost and feasibility In-depth post-study interviews	Participants largely saw the mDAWN as providing good value for the costs involved and found the program to be empowering in gaining control over their diabetes.
Hofmann[19]	2016	The Impact of an Internet-Based Self-Management Intervention (HeLP-Diabetes), an internet-based self-management intervention	UK	19	General practices	Mixed-method cohort study	Internet-based self-management interventions may have the potential to decrease diabetes-related distress in people with type 2 diabetes. The qualitative data also suggests internet

							interventions can positively impact both psychological and behavioural outcomes of adults with type 2 diabetes.
Howland[15]	2021	Telehealth interventions for physical activity and sedentary behavior self-management in adults with T2DM	Various	17 studies	Not stated	Integrative review	Web and mobile phone-based telehealth interventions to increase physical activity, reduce sedentary behaviours, and improve glycaemic control have been supported by the literature.
Iljaz[16]	2017	eDiabetes, a web portal for patients and health-care providers with a patient-oriented interface for individualised care, and a web server for a repository and education material	Slovenia	120	General practitioner offices	Randomised controlled trial	This eDiabetes application was confirmed to be an innovative approach for better self-management of DM type 2 patients not using insulin.
Jain[17]	2020	Web-based, mobile app, DVD, virtual reality or telehealth interventions, including MyPath, the Diabetes Online Companion (Canada), HeLP-Diabetes, MyPlan 2.0, Diabetes to Go	USA, UK, Canada, Iran, Belgium	13 studies 242 participants	Not stated	Systematic literature review of qualitative and mixed-method studies	Patients generally preferred technologies that were easy to access, use, and apply and that had reliable information. Patients liked peer support, but did not like it when there was no regulation of advice on these platforms.
Karimi[20]	2024	2 digital platforms, web and messaging services (SMS text	USA, Saudi Arabia,	10 studies 947 participants	Emergency department, community,	Systematic literature review	There is some support for the efficacy of digitally delivered interventions in improving healthy

		messaging or multimedia messaging service)	Iran, Mexico		primary health care centers		eating behaviours in disadvantaged people withT2DM. Further research is needed into how disadvantaged people with T2DM may benefit more from digital approaches and to identify the specific features of effective digital interventions for supporting healthy behaviours among disadvantaged populations.
Larbi[26]	2020	The evaluations of the apps and digital diabetes self-management interventions based and questionnaires and medical tests	Various	31 studies	Not stated	Systematic literature review	The most evaluated criteria for apps and digital diabetes self-management interventions were cognitive impact, clinical impact, and usability. Feasibility and security and privacy were not evaluated by studies considered of high confidence in the evidence.
Mannoubi[18]	2024	Web portal or mobile apps, mostly coupled with blood glucose meters, weight scales, pedometers, accelerometer, smartwatch, and tensiometer	Global	42 studies	Not stated	Scoping review	Combining different digital tools that incorporate diabetes self-management and monitoring features with a health professional's advice and interaction results in more effective interventions and outcomes.
Muller[12]	2017	Healthy Living with Diabetes, a tailored web-based intervention to motivate people with T2DM to increase their physical activity	UK, Austria, Germany, Ireland, Taiwan	1,041	Primary health care, outpatient clinics, diabetes support groups	Randomised control trial	Following established practice for simple, clear design and presentation and using a person-based approach to intervention development, with in-depth iterative feedback from users, may be more important than

							interactivity and audiovisual presentations when developing accessible digital health interventions to improve health literacy outcomes.
Murray[13]	2018	Healthy Living for People with Diabetes (HeLP-Diabetes), an evidence-based theoretically informed web-based self-management programme for all stages of T2DM, developed using participatory design principles	England	WP A = 20 diabetes patients WP B = 18 HCPs WP C = 18 HCP WP D = 374 people with T2DM WP E = 205 registered users, could be patients or HCPs	Primary care	A report on five linked work packages (WPs), including development, implementation, evaluation, randomised controlled trial, etc.	The HeLP-Diabetes programme is an effective self-management support programme that is implementable in primary care.
Murray[4]	2017	Healthy Living for People with Diabetes (HeLP-Diabetes), an interactive, theoretically informed, web-based selfmanagement programme vs. a simple, text-based website	England	374	General practitioner practices	Randomised controlled trial	Access to HeLP-Diabetes improved glycaemic control over 12 months.
Poduval[14]	2020	Healthy Living for People with type 2 Diabetes (HeLP-	UK	791 Quantitative	Primary care	Mixed-methods Real-world data Interviews	The study provides evidence of the feasibility and acceptability of a Web-based structured education.

		Diabetes), a Web-based structured education program; and Healthy Living for People with type 2 Diabetes: Starting Out (HDSO)		10 patients with T2DM and 7 healthcare professional for interviews			However, uptake and completion rates were low, limiting potential population impact.
Poppe[10]	2018	My Plan 2.0, a self-regulation-based web-based eHealth intervention aimed at promoting a healthy lifestyle in the general population, but was adapted for T2DM	Belgium	21	University hospital	Interviews	Participants experienced difficulties completing the coping planning component. The simple design of the website was considered helpful, and most participants were aware of the beneficial effects of an active lifestyle.
Ramadas[23]	2015	Internet-delivered dietary intervention program (myDIDeA), a web-based dietary intervention for people with T2DM	Malaysia	59 respondents	Urban tertiary hospitals	Randomised controlled trial	*my*DIDeA is feasible. Future studies should identify the possibility of extending the use of Internet-based intervention programs to other health behaviours and issues related to self-management of chronic conditions. In addition, interactivity, peer support via social media, and other means to stimulate the interest of participants can be explored.
Yu[7]	2014	The Diabetes Online Companion, a self-contained diabetes self-management website to support	Canada	81	Family practices ad endocrinology clinics	Questionnaires Interviews Modelling	A self-management website for patients with type 2 diabetes did not improve self-efficacy. Website use

	self-management of patients with T2DM	was limited. Although its perceived reliability, availability of a blog and emailed reminders drew people to the website, participants' struggles with type 2 diabetes, competing priorities in their lives, and website accessibility were barriers to its use.

Abbreviations: App = application; DVD = digital versatile disc; HCP, healthcare professionals; SMS = short message service; T2DM = type 2 diabetes mellitus.

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