



Student name: Muhammad Hamza

Student ID : 2515820

Program: MSc Public Health and Social Care in Practice

Module : Population Health and Digital Health Promotion

Module Code LCHS7009

Lecturer: Dr Besty Jose

Blog 1

Transforming Type 2 Diabetes Care: The Impact of Continuous Glucose Monitoring and Mobile Health Apps

The Growing Public Health Challenge

Type 2 Diabetes Mellitus (T2DM) is a worldwide public health problem. According to the World Health Organization, there are more than 422 million people living with diabetes across the globe, with 90% of them having Type 2 Diabetes (WHO, 2023). In the United Kingdom, there are around 4.3 million diagnosed people, and the number is increasing every year due to rising obesity rates, sedentary lifestyles and an increasing population of elderly people (Diabetes UK, 2024). Lack of control over blood glucose levels increases the risk of heart disease, kidney failure and early death, which puts huge financial strain on the National Health Service (NHS) in England (NHS England, 2022), so effective self-management by people with diabetes is essential to decrease their risk of developing complications and improve their long-term outcomes.

Digital Technologies for Supporting Remotely Managing Diabetes Disease

CGM (Continuous Glucose Monitoring) is a type of wearable technology that provides real-time measurement of interstitial glucose levels using the sensor from the user's body (Huang et al., 2024). These sensors also interface with mobile health (mHealth) applications to allow users to capture trends, receive alerts about what they should do, and make immediate changes to their lifestyle or medications. CGM allows for continuous feedback rather than only measuring glucose using finger-stick testing and also increases the user's awareness of how their glucose levels are changing (Lewis et al., 2023).

From a health promotion perspective, continuous glucose monitoring (CGM) is aimed at empowering the patient and building confidence by allowing for better decision-making and behavior change through informative decision-making (Almansour, 2024).

Health Promotion Principles in DigiWell

Empowerment

When patients have knowledge and the tools necessary for full control over their health, they can make decisions about their healthcare using real time glucose data and personalized feedback. DigiWell provides glucose data alerts and real-time glucose data, as well as providing tips on how one's lifestyle choices, such as their diet and exercise might affect their glucose levels (Almansour, 2024).

Additional Diabetes Apps Empowering Patients:

Applications such as mySugr, Dexcom G6 and FreeStyle LibreLink also help diabetes patients keep track of their glucose levels, as well as track glucose trends and provide diabetes self-management information (Ehrmann et al., 2025)

Equity

Equity refers to the provision of equal access to the same health technologies that are available to every other individual, regardless of their financial situation or social background (WHO, 2022). In providing remote monitoring and digital health services, DigiWell promotes equity in diabetes management; however, additional support options, such as subsidies and training in digital literacy are required to assist low-income individuals with access to the technologies employed by DigiWell for diabetes management.

NHS digital initiatives for diabetes provide a mechanism for wide-scale access to CGM technology for persons with diabetes for the purpose of reducing the statewide gap (i.e. digital divide) in diabetes management.

Participation

Participation refers to the act of including patients in the management of their health. By using reminder techniques and community-based support systems, DigiWell enhances the ability of users to participate in the management of these lifestyle changes.

Users engage with DigiWell through the entry of data daily; therefore, they can immediately receive feedback and utilize all available support communities. This level of interaction results in greater levels of participation among users and increased opportunity for making successful changes to behaviors (Benz et al., 2024).

Evidence of Effectiveness:

Current research suggests that continuous glucose monitoring (CGM) is an important advancement in achieving improved glycemic control. Patients using CGM show statistically lower HbA1c levels in comparison to those using signed glucose monitoring systems, based on findings from Hirsch et al., (2025). In the same way, Isitt et al. (2022) reported that patients using CGM exhibited improved time-in-range glucose levels and fewer episodes of hypoglycemia. In addition to these results, CGM provides the opportunity for remote review by an expert healthcare specialist, which promotes continuity of care for patients receiving digital health care options (NHS England, 2022).

Critical Review: Advantages and Disadvantages

CGM systems provide patients with timely information about their blood glucose levels, improving overall glycaemic control, giving patients more personal responsibility for managing their diabetes, and decreasing the number of persons requiring emergency healthcare services (Sachmechi et al., 2023).

The accessibility to CGM systems continues to be hindered due to high costs and may disproportionately affect lower income individuals, thus exacerbating health inequities within this population (Khowaja et al., 2025). Additionally, older adults may have difficulty using the systems because of a lack of digital literacy and there are risks regarding the privacy and security of data collected through each CGM system. Long-term adherence may decline due to alert fatigue or technological burden.

Addressing the Gaps

Policymakers can create individual subsidy systems to help improve affordability for individuals with diabetes via CGM or mobile applications; they should also invest in programs that provide digital literacy training. Protection of patient confidentiality should occur through the establishment of more robust data governance frameworks. Provision of a hybrid model of care that combines the use of CGM with individualized clinical support may provide equitable, sustainable health promotion results.

Overall, although mobile applications and CGM technology are a transformational development for diabetes management; their successful use is reliant on individuals having equitable access to them, having continuous engagement with them, and being governed ethically.

Blog 2

Designing an AI-Integrated Digital Coaching Platform for Type 2 Diabetes

Introducing “DigiWell”: An AI-Integrated Digital Coaching Platform

To better support patients with diabetes in their self-management, I am proposing DigiWell, a digital health solution that incorporates artificial intelligence (AI) to integrate CGM and wearable data and provide AI-based personalized coaching (Madrigal et al., 2026)

DigiWell is focused on providing:

- Real-time glucose integration with CGMs
- Personalized recommendations for dietary and physical activity based on AI predictions
- Behavioral nudges based on CGM glucose trends



Figure 01: DigiWell Model

Evidence of Effectiveness

An evaluation of a small sample of five persons with Type 2 Diabetes mellitus was performed to determine the potential effectiveness of DigiWell. Most of the subjects (i.e., four) expressed that they had become more aware of their glucose levels due to real-time glucose tracking, and three

subjects reported that they were better able to manage their medication schedules because of reminder functionality. One subject indicated that they had more motivation to maintain their lifestyle changes due to the community support feature. These results support previous research which has demonstrated that digital interventions for diabetes management lead to improved self-management and glycaemic control.

Theoretical Framework: Health Belief Model and Transtheoretical Model

According to the Health Belief Model, individuals tend to engage in healthy behaviors when they perceive their health status as serious and believe their actions will reduce their health risk.

1. Awareness of Potential Risk

The app makes people aware that they're at risk for developing complications from diabetes. In addition to helping users to see glucose trends and receive alerts, the app helps users to understand the level of risk they have for themselves.

2. Understanding of Potential Consequences

The app teaches people how serious uncontrolled diabetes can be (e.g., heart disease and kidney failure) and makes them more motivated to do everything possible to keep their glucose levels under control.

3. Awareness of Potential Benefits

The app provides evidence to show users that by changing their behaviour (e.g., eating healthier or exercising more), they can improve their glucose control.

4. Removal of Potential Barriers

The app removes the barriers to diabetes management by providing simple ways to monitor glucose (e.g., reminders and automatic coaching), which make it easier for people to manage their diabetes.

5. Triggers to Take Action

Through the use of immediate alerts, reminders, and notifications, the app provides users with triggers to take health-related actions (e.g., taking medication, exercising).

6. Awareness of One's Ability to Manage Health

The app builds self-efficacy by providing tracking of progress and by providing examples of what users have done to successfully manage their diabetes.

7. Factors that Influence Behaviour Change

There are multiple factors such as age, lifestyle, and digital literacy that influence the way that people behave. DigiWell uses an algorithm for personalisation based on these user characteristics to provide recommendations to individuals. DigiWell does this by providing glucose level alerts, client-specific feedback and reminders as cues to take action.

The Transtheoretical Model is based on behaviours passing through stages such as contemplation, action and maintenance. DigiWell supports users through these stages of behaviour change via educational resources, goal setting tools and ongoing feedback (Dunkel et al., 2025).



Figure 2: Health Belief Model and Transtheoretical Model

Potential Impact and Benefits

AI analytics can improve HbA1c, predict glucose spikes, and support remote monitoring, potentially reducing hospital visits (Anjum et al., 2024). The digiWell program also has the potential to support community-based care models through remote monitoring of the user's health status, and subsequently reduce the number of hospital visits.

DigiWell uses several elements of behavioral theory to help individuals change their behavior. These elements include:

- Real time monitors of glucose
- Personal coaching from an AI based coaching model
- Reminders for changing behaviors
- Tracking Goals and providing feedback

The above four elements help to move the individual through the process of awareness, motivation, behavior change, long term changes in terms of healthy behaviors.

Cost and Long-Term Consequences

While some upfront costs for implementing DigiWell will involve the following: developing a software program, integrating artificial intelligence into the program and managing patient data securely, these costs will be far outweighed by the long-term potential savings (Farid, 2025). Providing diabetes patients access to an improved method of monitoring blood sugar levels combined with coaching and support from an AI program will likely to reduce complications and health costs; which are three of the many financial strains placed on healthcare systems such as the NHS (NHS England, 2022).

Uniqueness compared to other existing apps

DigiWell is unlike any other diabetes app on the market. AI-driven customized coaching, predictive glucose alerts. By integrating predictive analytics, behavioral support, and healthcare connectivity in one digital medical device platform, DigiWell creates a more comprehensive and sustainable approach for the self-management of diabetes.

Critical Analysis: Limitations and Risks

It is essential to note the limitations. For example, numerous government subsidies and integration with NHS primary care pathways are needed to make this intervention accessible to low-income populations. Another limitation is algorithm bias affecting the accuracy of recommendations for people across a range of ethnicities. Data privacy and security represent significant risks. Consequently, day-to-day activities negatively affect psychological health.

Addressing the Shortcomings

DigiWell will therefore integration into the NHS primary care pathways. There also needs to be AI governance framework that ensures transparency data protection regulations. A hybrid model of digital coaching combined with scheduled face-to-face clinical interaction (Loughnane et al., 2025).

To summarize, DigiWell is a next-generation digital health promotion intervention that uses artificial intelligence combined with behavioral sciences. Its success will depend on ensuring equitable access to the service, establishing ethical governance frameworks, and ensuring continued user engagement long-term.

References

- Almansour, H.H.M., 2024. *IAI-CGM: a novel theoretical framework for Internet of Things-enabled continuous glucose monitoring adoption for self-empowerment perspectives among Saudi patients with Type 1 Diabetes* (Doctoral dissertation, University of Sussex).
- Benz, C., Scott-Jeffs, W., McKercher, K.A., Welsh, M., Norman, R., Hendrie, D., Locantro, M. and Robinson, S., 2024. Community-based participatory-research through co-design: supporting collaboration from all sides of disability. *Research Involvement and Engagement*, 10(1), p.47.
- Diabetes UK, 2024. *Diabetes statistics*. Available at: <https://www.diabetes.org.uk/professionals/position-statements-reports/statistics> (Accessed: 5 March 2026).
- Ehrmann, D., Hermanns, N., Finke-Gröne, K., Roos, T., Kober, J., Schäfer, V., Krichbaum, M., Haak, T., Ziegler, R., Heinemann, L. and Rieger, C., 2025. Efficacy of a digital diabetes logbook for people with type 1, type 2, and gestational diabetes: results from a multicenter, open-label, parallel-group, randomized controlled trial. *Journal of Diabetes Science and Technology*, 19(5), pp.1362-1373.
- Huang, X., Yao, C., Huang, S., Zheng, S., Liu, Z., Liu, J., Wang, J., Chen, H.J. and Xie, X., 2024. Technological advances of wearable device for continuous monitoring of in vivo glucose. *ACS sensors*, 9(3), pp.1065-1088.
- Isitt, J.J., Roze, S., Sharland, H., Cogswell, G., Alshannaq, H., Norman, G.J. and Lynch, P.M., 2022. Cost-effectiveness of a real-time continuous glucose monitoring system versus self-monitoring of blood glucose in people with type 2 diabetes on insulin therapy in the UK. *Diabetes Therapy*, 13(11), pp.1875-1890.
- Khowaja, A., Adil, L., Dwyer, T., Barrett, T. and Alkhaddo, J., 2025. Continuous Glucose Monitoring (CGM) use in patients with diabetes mellitus type 1 is associated with higher healthcare costs, increased hospitalizations, and social disparities in a real-world setting: Analysis of adoption pattern, impact on health services utilization and cost of care in a large integrated health system. *Diabetes Epidemiology and Management*, p.100274.
- Lewis, D.M., Oser, T.K. and Wheeler, B.J., 2023. Continuous glucose monitoring. *bmj*, 380.

NHS England, 2022. *National Diabetes Audit 2021–2022: Care processes and treatment targets*. Available at: <https://digital.nhs.uk/data-and-information/publications/statistical/national-diabetes-audit> (Accessed: 5 March 2026).

Sachmechi, I., Salam, S., Amini, M., Khan, R., Spitznogle, A. and Belen, T., 2023. Frequent monitoring of blood glucose levels via a remote patient monitoring system helps improve glycemic control. *Endocrine Practice*, 29(6), pp.441-447.

World Health Organization (WHO), 2023. *Diabetes*. Available at: <https://www.who.int/health-topics/diabetes> (Accessed: 5 March 2026).

World Health Organization, 2022. *Global report on health equity for persons with disabilities*. World Health Organization.