Doi:https://doi.org/10.3329/ewmcj.v14i1.83032

Original Article

EFFECTIVENESS OF A DIGITALLY ENABLED PATIENT SUPPORT PROGRAM THROUGH PATIENT EMPOWERMENT FOR COMPREHENSIVE DIABETES MANAGEMENT

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Article history:
Received: 14th July, 2025
Accepted: 18th August 2025

Key words:
Diabetes, Digital Health, Patient Support Program, Glycemic Control, Insulin Titration, Bangladesh

Abstract

Background: *The prevalence of diabetes in Bangladesh is rising at an alarming rate, with projections estimating an increase from 8.4 million in 2019 to 15 million by 2045. Despite medical advances, a large proportion of patients fail to achieve adequate glycemic control, due to poor adherence to lifestyle modifications and insufficient education. To address these gaps, a digitally enabled Patient Support Program (PSP) was introduced to empower patients through structured education and hybrid counseling.*

Methods: *A longitudinal observational study was conducted over one year with 50 insulin-treated diabetic patients. The PSP included six structured counseling sessions three telephonic consultations by physicians and three home visits by pharmacists focusing on lifestyle, diet, insulin titration, and self-monitoring of blood glucose (SMBG). Key metrics were assessed at baseline and at one year.*

Results: *At baseline, 23% of patients achieved fasting blood sugar (FBS) control (<8 mmol/L); this increased to 73% at one year. Weekly SMBG adherence rose from 41% to 78%. Confidence in insulin titration improved significantly, with only 11% lacking confidence post-intervention compared to 61% at baseline. Overall, 87% of participants reported high satisfaction.*

Conclusion: *The digitally enabled PSP significantly improved glycemic control, patient confidence, and adherence behaviors. This hybrid model holds promise for enhancing chronic disease management in resource-limited settings.*

EWMCJ Vol. 14, No. 1, January 2026: 17-20

Introduction

Diabetes mellitus (DM) is a global health crisis that continues to escalate, particularly in low- and middle-income countries. The International Diabetes Federation projects a staggering increase in the global diabetic population from 537 million in 2021 to 783 million by 2045.[1] Bangladesh, like many developing nations, is experiencing an epidemic of diabetes with an estimated 8.4 million cases in 2019, expected to reach 15 million by 2045.[2] This exponential increase is mainly due to urbanization, sedentary lifestyles, unhealthy dietary patterns, and limited healthcare access.[3-5] Glycemic control remains a significant challenge, as studies show that more than 80% of Bangladeshi diabetic patients

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have suboptimal control.[6] Additionally, adherence to lifestyle modifications such as physical activity and diet is low, with 87% of patients not meeting recommended exercise levels.[7] Despite advances in pharmacological treatment, these behavioral and educational gaps persist, highlighting the need for structured patient education and support. Digital health technologies are emerging as vital tools for bridging healthcare gaps, especially in countries with resource limitations. Mobile health (mHealth) platforms, teleconsultation, and digital Patient Support Programs (PSPs) have demonstrated efficacy in enhancing treatment adherence, glycemic control, and patient satisfaction.[8-10] Combining these tools with human-led counseling can provide comprehensive and personalized care to individuals managing chronic diseases like diabetes.[11] In this study, a hybrid PSP model was introduced by Digital Healthcare Solutions (Grameen Telecom Trust) in Bangladesh, combining remote and in-person counseling to empower patients through structured, protocolized education. This study evaluates the effectiveness of that PSP in improving diabetes outcomes and patient empowerment over a one-year period.

Materials and Methods

A longitudinal observational study was conducted from March 2021 to May 2022 involving 50 adult diabetic patients. Equal numbers of male and female were selected from urban areas of Dhaka, Bangladesh via telemedicine. Inclusion criteria included insulin therapy (new or ongoing) and physician referral.

Participants underwent six structured counseling sessions over six months - three via telephone and three home visits. Counseling was standardized and covered: dietary education, physical activity, self-monitoring of blood glucose (SMBG), and insulin usage. Quantitative data were collected at baseline and after one year. Primary outcomes included fasting blood sugar (FBS <8 mmol/L), weekly SMBG adherence, patient confidence in insulin titration, and self-reported satisfaction. Descriptive statistics were used for analysis.

Results

The impact of the Patient Support Program (PSP) was assessed over a one-year period across several key indicators: glycemic control, adherence to self-monitoring of blood glucose (SMBG), confidence in insulin titration, patient satisfaction, and body weight change. The findings indicate significant improvements in diabetes management outcomes. Fasting Blood Sugar (FBS) Control: The percentage of patients achieving FBS levels below 8 mmol/L increased from 23% at baseline to 73% post-intervention, as shown in Figure 1.

SMBG Adherence: Patients performing weekly self-monitoring rose from 41% initially to 78% after six months. Insulin Titration Confidence: Initially, 61% of participants lacked confidence in adjusting insulin doses; this number dropped to just 11%, implying a final confidence rate of 89%.

At the end of the program, 87% of patients expressed high satisfaction with the PSP model. Weight Change: While quantitative data was not collected, qualitative feedback indicated that patients experienced stable or mildly reduced weight following improved dietary practices and insulin adherence.

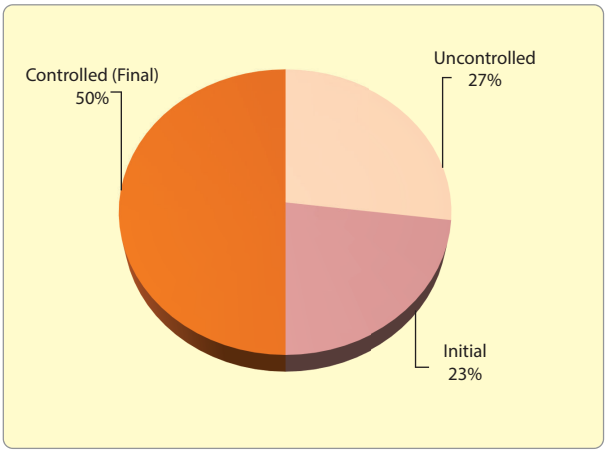

Figure 1: *Proportional improvement in FBS control post PSP.*

The overall comparison of pre- and post-interventions of all the key diabetes management indicators are shown in Figure 2.

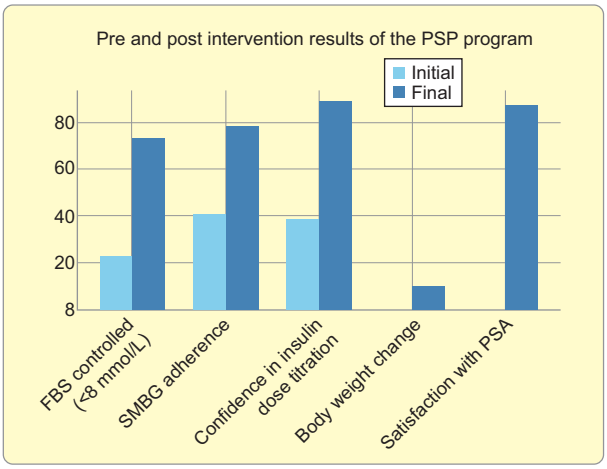

Figure 2: *Pre- and post-intervention comparison of key diabetes management indicators.*

Discussion

The outcomes of this study provide robust evidence that a hybrid Patient Support Program (PSP), combining digital telemedicine with in-person pharmacist-led counseling, is a practical and effective strategy for enhancing diabetes self-management and clinical outcomes. In Bangladesh, where the diabetic population is projected to rise from 8.4 million in 2019 to 15 million by 2045 (International Diabetes Federation, 2019), health systems face mounting pressure to manage this chronic condition efficiently. The observed improvements in fasting blood sugar (FBS) control, patient confidence in insulin titration, and weekly self-monitoring of blood glucose (SMBG) compliance validate the program's success in facilitating behavior change. More than 80% of Bangladeshi diabetics have poor glycemic control, and 87% do not adhere to physical activity guidelines,[2,4] highlighting the urgent need for patient-centric, continuous support systems. This PSP addressed these needs through structured and protocol-driven interventions, resulting in measurable improvement in clinical metrics and high patient satisfaction. Structured diabetes self-management education (DSME) is globally recognized as a cornerstone of effective diabetes care.[5] When delivered through scalable, technology-supported models, DSME becomes even more potent, especially in resource-constrained settings. The integration of mobile health (mHealth) has been shown to reduce HbA1c levels and improve treatment adherence in several international studies.[6-8] Beyond clinical metrics, digital tools promote patient empowerment and autonomy, key drivers of sustainable disease control.[8] The RENEWING HEALTH trial in Norway, for example, confirmed that digital counseling and self-management tools significantly improved quality of life and glycemic outcomes .[10] Similarly, the personalized mobile-based intervention studied by Quinn et al. demonstrated statistically significant improvement in glycemic control over conventional models.[11] Despite the study's promising results, there are certain limitations. The sample size was relatively small, and there was no randomized control group. Therefore, future research should explore the scalability and generalizability of this approach using randomized controlled trials and cost-effectiveness analyses. Nevertheless, this pilot experience underscores the transformative potential of digitally enabled PSPs within national diabetes control frameworks, especially in low- and middle-income countries like Bangladesh.

Conclusion

This study provides compelling evidence that a digitally enabled, hybrid Patient Support Program (PSP) like integrating structured telephonic consultations along with home-based pharmacist visits can substantially improve key clinical and behavioral outcomes in diabetes management. Over a one-year period, patients demonstrated marked improvements in fasting blood sugar control, confidence in insulin titration, adherence to self-monitoring of blood glucose, and overall treatment satisfaction.

In a country like Bangladesh, where healthcare resources are limited and the diabetic population is rapidly increasing, such an intervention offers a practical and scalable solution. By leveraging both digital tools and personalized human interactions, the PSP model not only enhances patient education but also fosters self-efficacy and sustained behavioral change, essential components of chronic disease management.

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Peer-Review History:

The peer review history for this paper can be accessed here: https://ewmch.com/review/