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Enhancing Elderly DiaβCare: Pharmacist-Initiated Counselling and SMS Reminders Impact on Medication Adherence and Clinical Outcomes

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Abstract

Medication non-adherence is a significant challenge in chronic diseases such as type 2 diabetes mellitus (T2DM), particularly among elderly patients, leading to increased healthcare costs and adverse outcomes. This study aimed to assess the impact of pharmacist-led counselling and short message service (SMS) reminders on medication adherence and clinical outcomes in elderly patients with T2DM. A 12-month prospective, open-label, randomized controlled study was conducted at an outpatient diabetic clinic, with 340 participants randomly assigned to either the Diaβcare or usual care groups. The Diaβcare group received pharmacist counselling sessions and SMS reminders, while the usual care group received standard care. Medication adherence and clinical outcomes, including HbA1C, random blood sugar (RBS), fasting blood sugar (FBS), blood pressure (BP), low-density lipoprotein (LDL), high-density lipoprotein (HDL), triglycerides (TG), and body mass index (BMI), were assessed. The Diaβcare group demonstrated significantly improved medication adherence (12.2±7.1%) compared to the control group (0.75±10.2%) ($P<0.001$). Furthermore, significant reductions in HbA1C, systolic blood pressure (SBP), and LDL cholesterol levels were observed in the Diaβcare group compared to the usual care group ($P<0.01$). Pharmacist-led Diaβcare effectively enhanced medication adherence and improved clinical outcomes in elderly patients with T2DM. Collaborative efforts among healthcare providers, policymakers, and technologists are essential for scaling up such interventions to enhance global health outcomes.

Keywords: Clinical Outcomes; Diabetes Care Service; Medication Adherence; Message Reminder Services; Pharmacist Counseling; T2DM.

Introduction

Amidst the complex landscape of managing chronic diseases in the elderly, the integration of pharmacist-led interventions stands out as a beacon of hope, offering tangible solutions to the pressing challenges of medication adherence and clinical outcomes [(1)]. Diabetes mellitus (DM) is considered as global health concern because of its upsurge in prevalence, burden of co-morbidities and the mortality rate [(2)]. Type II DM occurs when an unhealthy lifestyle co-exists with a susceptible genotype [(3)]. Individual with high blood glucose level is at higher risk of developing micro & macro vascular complications, which resulting in increased mortality, worse quality of life (QoL), and higher health care expenses [(4)]. Between 2000 and 2019, the age-standardized death rate from diabetes raised by 3%. The death rate from diabetes increased by 13% in countries with lower middle incomes [(5)]. In terms of the worldwide diabetes epidemic, India is in second place next to China [(6)]. According to the International Diabetes Federation (IDF), in 2021,

India had an estimated 74.2 million people living with diabetes, with a prevalence rate of 9.6%. Alarmingly, over 39 million cases remained undiagnosed, representing 53.1% of the diabetic population. By 2045, the diabetic population in India is projected to soar to approximately 124.9 million, with a prevalence rate of 10.8% [(7)]. Medication non-adherence is a persistent issue in healthcare, particularly among elderly individuals with chronic diseases such as type 2 diabetes mellitus (T2DM) [(8)]. Failure to adhere to prescribed medication regimens can result in suboptimal health outcomes, increased risk of complications, and higher healthcare costs [(9)]. In the context of type 2 diabetes mellitus (T2DM), adherence to medication regimens is crucial for achieving optimal glycemic control and reducing the risk of complications [(10)].

Various factors contribute to medication non-adherence among elderly individuals with T2DM, impairments, socioeconomic barriers, and lack of social support [11]. As the elderly population continues to grow, there is a pressing need for innovative interventions to enhance medication adherence and improve clinical outcomes in this group .According to research, many patients with type II diabetes face barriers to self-care, including economic, educational, social, psychological, and physical barriers [12]. Since it may be difficult for some people with diabetes and elderly patients to visit medical centers, distance education and follow-up by emerging educational methods based on mobile technology and SMS service could effectively enhance adherence. These methods can eliminate time and place limitations in establishing a caring relationship and have a lower cost. A systematic review of sixteen studies showed that SMS intervention significantly impacted the glycemic level or health behavior of diabetic patients. Finally, the authors concluded that more studies are needed to determine the frequency, time interval, and duration of intervention to be more effective [13]. On the other hand, the evidence about the superiority or inferiority of this new method over traditional group-based education is not conclusive, especially in middle- and low-income countries [14]. Text-based interventions play a vital role in the healthcare sector by disseminating information and promoting self-management. They serve as valuable tools for improving treatment adherence and reminding patients to follow their healthcare regimens. In the realm of diabetes management, numerous studies have demonstrated the efficacy of mobile phone text messaging. However, there is limited research focusing on the impact of SMS on health beliefs, diabetes care profiles, and HbA1c levels. An example of such an intervention is the Diabetes Self-Management Support and Education Through Text-Messaging system. This cost-effective platform utilizes text messaging to deliver self-help and educational messages. The present research study outlines the findings of a 12-month prospective, open-labeled, randomized controlled trial conducted at an outpatient diabetic clinic. Throughout the study, medication adherence and clinical outcomes, including HbA1C levels, blood pressure, and lipid profiles, were assessed at baseline and follow-up visits. This study aims to evaluate the impact of a pharmacist-initiated Diaβcare, which combines structured counseling sessions with SMS reminders, on medication adherence & clinical outcomes in elderly patients with T2DM.

Materials and Methods

Study design

A 12-month prospective, open-labeled, randomized controlled trial was conducted at a including complex treatment regimens, combined with age - related factors such as cognitive hospital outpatient diabetic clinic located in Ooty (15.02.2023 to 15.02.2024). The study aimed to evaluate the efficacy of Diaβcare, a structured counseling intervention coupled with SMS reminders, compared to usual care in managing diabetes. Figure. 1 depicts the participants approached in a flow chart.

Patient Enrollment and Randomization

A total of 340 eligible patients were randomly assigned to either the Diaβcare group (n=170) or the usual care group (n=170). Sample size for the present study was calculated with the help of Cochran's formula, n=Z2 pq/d2, where n is the sample size, Z is 1.96, p is the estimated average patient adherence to diabetic drug at 49%, q is 1-p, and there is a 5% margin of error. Therefore, the estimated sample size for the study is approximately 340. The randomization process was conducted within the outpatient diabetic clinic at the hospital. Patients were provided with detailed information about the study, and informed consent was obtained. Write the materials and methods used in this manuscript using the same format of the text.

Inclusion criteria: Patients aged between 55 to 90years old on diabetic medication and able to open & read text messages in English/Tamil.

Exclusion criteria: Patients who don't own a mobile phone and who are unwilling to engage in the study.

Diaβcare and Control

Patients in the Diaβcare group received structured counseling sessions conducted by pharmacists and received SMS reminders for medication intake. Conversely, patients in the control group received standard clinical outcome evaluation without additional interventions.

Assessing Health Progress - Clinical Outcome Evaluation:

Clinical outcomes, including HbA1C levels, random blood sugar (RBS), fasting blood sugar (FBS), systolic blood pressure (SBP), triglyceride (TG) levels, low-density lipoprotein (LDL) levels, high-density lipoprotein (HDL) and body mass index (BMI), were collected from participants at baseline, first follow-up, and second follow-up visits for both Diaβcare and control groups.

Study Visits

Visit 1 (Screening): Patients underwent screening one week prior to baseline, where informed consent and baseline data collection was initiated.

Data Collection: A pre-validated data collection form was utilized to gather baseline sociodemographic information, including age, gender, marital status, educational status, occupation, BMI, comorbidities, and duration of diabetes, from all enrolled participants. This form was administered in both Tamil and English languages to accommodate participant preferences.

Visit 2 (Baseline): Eligible participants were randomly assigned to either the Diaβcare or usual care group. Diaβcare group participants were educated on their medication and its management. Minimum self-monitoring blood glucose (SMBG) requirements were recommended based on individual therapy regimens. Venous blood samples were drawn to establish baseline HbA1C levels.

Visit 3 (12 Weeks): Venous blood samples were drawn for HbA1C measurement, & other clinical outcomes. Participants' progress was discussed, and SMBG data from the first 12 weeks were collected. Adverse events were monitored.

Visit 4 (24 Weeks): Venous blood samples were drawn for HbA1C measurement, & other clinical outcomes progress was assessed, and adverse events were documented.

Empowering Diabetes Management Comprehensive Pharmacist-Led Patient Counseling

In the Diaβcare intervention group, participants benefited from personalized face-to-face counseling sessions led by a pharmacist. These sessions delved into multifaceted aspects of diabetes management, encompassing comprehensive education on the condition, self-monitoring techniques for blood glucose levels, routine blood pressure assessments, weight monitoring strategies, and the significance of cholesterol level monitoring. Non-pharmacological approaches to management, such as tailored dietary guidance, structured exercise regimens, and proficient recognition and handling of symptoms, were meticulously addressed. Moreover, participants received detailed insights into their antidiabetic medications, including thorough discussions on indications, potential adverse effects, contraindications, precautions, relevant drug interactions, and optimal storage practices. The pharmacist also adeptly customized medication administration schedules and dosages according to each patient's unique requirements, aiming to enhance treatment adherence. Notably, participants engaged in a series of three counseling sessions, conducted at baseline, first follow-up (after 3 months), and second follow-up (after 6 months).

Furthermore, individuals in the Diaβcare group received daily text messages, tailored to their language preference in either Tamil or English. These messages served as vital reminders for medication adherence and additionally encouraged consistent participation in aerobic exercise routines. Timed approximately 30 minutes before scheduled medication dosages, the messages thoughtfully included prompts for upcoming exercise sessions. This invaluable service extended over a duration of 6 months, with all associated costs thoughtfully covered by the dedicated study team.

Tracking Treatment Compliance - Assessing Medication Adherence

Pill count and Visual Analog Scale (VAS) methods were used to measure baseline medication adherence levels. Pill count involved calculating the number of pills consumed relative to the prescribed dosage, while the VAS method required participants to rate their adherence on a scale from zero to ten, with zero indicating no adherence and ten indicating full adherence. Medication adherence levels were measured at baseline, first follow-up, and second follow-up visits for both Diaβcare and control groups.

Statistical Analysis:

Descriptive statistics, such as means, standard deviations, frequencies, and proportions, were used to summarize baseline sociodemographic characteristics, clinical profiles, medication adherence, and outcome measures. Sociodemographic and mobile phone usage profiles between the Diaβcare and control groups were compared using the Z-test. The mean difference in medication adherence levels (assessed by pill count and VAS technique) between two groups at each follow-up visit was compared using a two-sample Wilcoxon rank sum (Mann–Whitney) test.At each follow-up visit, the HbA1C, SBP, LDL, TG, and BMI values were compared between the Diaβcare and control groups using an unpaired t-test. A result was deemed statistically significant if $P < 0.05$. Statistical analyses were performed using IBM SPSS v21.0.

Exploratory Endpoints and Additional Analyses

HbA1C Associations between changes in two groups were explored.

Results and Discussion

The study illustrates similar demographic characteristics between the Diaβcare and usual care groups, each comprising 170 participants. Across both groups, mean age stood at 64 years (SD ± 8) for Diaβcare and 61 years (SD ± 8.6) for usual care. Gender distribution, marital status, education, occupation, and BMI remained consistent between the two cohorts. Table 1 presents the baseline socio-demographics and clinical profile of the study populations. The analysis of mobile phone usage patterns among participants in the Diaβcare (n = 170) and usual care group (n = 170) delineates notable trends. In the Diaβcare group, 29% reported using two mobile phones, compared to 12% in the usual care group, with a non-significant Z-test result (0.64, p = 0.34). Regarding SMS habits, 21% of Diaβcare participants reported sending messages compared to 17% in the usual care group, showing no significant difference (Z-test = 0.68, p = 0.41). Furthermore, the analysis found minimal disparities in MMS usage and SMS reading habits between the two groups. However, the sources of received SMS messages exhibited some variability, with cricket

updates showing a statistically significant difference between the groups (Z-test = 3.45, p = 0.01). Table 2 represents the assessment of mobile device use behavior among the study population. The study assessed medication adherence levels using both the pill count and Visual Analog Scale (VAS) methods across three time points: Visit 2, 3, & 4. In the Diaβcare group, participants displayed notable improvements in medication adherence levels over the study duration. By the second visit, the mean medication adherence level, measured by the pill count method, was 76.4% (±6.8), increasing to 88.6% (±5.8) at the third visit, and further rising to 94.9% (±1.87) by the fourth visit. Similarly, medication adherence levels measured by the Visual Analog Scale (VAS) method showed a consistent upward trend, with mean levels at 86.4% (±7.8), 91.9% (±3.8), and 98.3% (±1.42) at visits two, three, and four, respectively. Conversely, the usual care group demonstrated relatively stable medication adherence levels throughout the study. Mean adherence levels, measured by both the pill count and VAS methods, showed minimal fluctuations across visits, with values ranging from 75.25% (±6.2) to 76% (±7.9) for the pill count method and from 85.2% (±8.2) to 82.5% (±8.2) for the VAS method. These findings suggest that the Diaβcare intervention led to improved medication adherence compared to usual care, as evidenced by both pill count and VAS measurements across multiple follow-up time points. Table 3 provides an analysis of medication adherence among the study groups. The analysis of medication adherence differences between the Diaβcare group, receiving pharmacist-directed counseling with mobile message reminders, and the usual care group, managed by a physician, at each follow-up visit provides valuable insights into the effectiveness of the intervention. For the pill count method, significant differences were observed between the two groups across follow-up visits. From Visit 2 to 3, the Diaβcare group exhibited a substantial increase in medication adherence, with a mean difference of 9.8 (±5.7) units, compared to a marginal change of 0.07 (±4.8) units in the usual care group (P < 0.001, Z = 9.78). Similarly, from Visit 3 to 4, the Diaβcare group showed a notable increase of 11.7 (±6.7) units, while the usual care group demonstrated a modest rise of 0.65 (±12.4) units, indicating significant differences between the groups (P < 0.001, Z = 12.56).Likewise, using the Visual Analogue Scale (VAS) method, significant disparities were evident in medication adherence between the Diaβcare and usual care groups. From Visit 2 to 3, the Diaβcare group displayed a substantial improvement in adherence, with a mean difference of 8.7 (±6.2) units, compared to 0.97 (±4.92) units in the usual care group (P < 0.001, Z = 8.89). Similarly, from Visit 3 to 4, the Diaβcare group demonstrated a noteworthy increase of 10.7 (±5.9) units, while the usual care group exhibited a smaller rise of 0.6 (±6.2) units, indicating significant differences between the groups (P < 0.001, Z = 11.74). The consistent and significant differences between the groups underscore the effectiveness of the Diaβcare intervention in promoting adherence to medication regimens among patients with diabetes. Table 4 illustrates the analysis of medication adherence differences between the two groups at follow-up visit. The comparison of clinical outcomes between the Diaβcare and usual care groups at baseline and the end of the study period revealed significant differences in several parameters. Notably, in the Diaβcare group, there was a substantial reduction in A1C levels from baseline (7.97 ± 0.76) to the end of the study (7.03 ± 0.38), with a mean difference of -0.94 (p < 0.001). Conversely, the usual care group showed a less pronounced change in A1C levels (baseline: 7.88 ± 0.67; end of study: 7.81 ± 1.02), with a non-significant mean difference of -0.08 (p = 0.671). Similarly, significant improvements were observed in systolic blood pressure (p < 0.001) and fasting blood glucose levels (p < 0.001) in the Diaβcare group compared to the usual care group. However, differences in diastolic blood pressure, total cholesterol, triglycerides, LDL-C, HDL-C, and BMI between the two groups were not statistically significant at the end of the study period. Table 5 compares the clinical outcomes between the Diaβcare and control groups. These findings underscore the efficacy of the Diaβcare intervention in improving glycemic control and certain cardiovascular risk factors compared to usual care. The findings of this study contribute to the growing body of evidence supporting the effectiveness of pharmacist-led interventions, such as the Diaβcare program, in enhancing medication adherence and improving clinical outcomes among elderly patients with type 2 diabetes mellitus (T2DM). With the prevalence of diabetes escalating, particularly in countries like India, innovative strategies are imperative to mitigate its impact and improve patient outcomes [15]. The integration of mobile technology, specifically SMS reminders, into healthcare interventions has emerged as a promising approach to address the multifaceted challenges of chronic disease management, especially among elderly populations. Previous research has highlighted the potential of SMS interventions in improving glycemic control and health behaviors among diabetic patients [16]. However, the superiority of SMS-based interventions over traditional educational methods remains inconclusive, particularly in middle- and low-income countries, underscoring the need for further investigation. In this context, our study adds to the existing literature by evaluating the efficacy of a pharmacist-initiated counseling program coupled with SMS reminders in enhancing medication adherence and clinical outcomes among elderly

patients with T2DM.The results of our study demonstrate a significant improvement in medication adherence among participants enrolled in the Diaβcare compared to those receiving usual care. Both pill count and Visual Analog Scale (VAS) measurements consistently showed higher adherence levels in the Diaβcare group across multiple follow-up visits. These findings are consistent with previous research indicating that pharmacist-led Diaβcare can positively influence medication adherence among patients with chronic diseases [14,17,18,19,20]. Moreover, our study revealed significant improvements in clinical outcomes, particularly glycemic control, in the Diaβcare group compared to usual care. Participants in the Diaβcare group exhibited a substantial reduction in HbA1C levels, indicative of improved long-term glycemic control, compared to the usual care group. Additionally, significant improvements were observed in systolic blood pressure and fasting blood glucose levels in the Diaβcare group, highlighting the broader impact of pharmacist-led interventions on cardiovascular risk factors among elderly diabetic patients. The effectiveness of the Diaβcare intervention in improving medication adherence and clinical outcomes can be attributed to several factors. First, the structured counseling sessions conducted by pharmacists provided participants with personalized education and support, empowering them to better manage their diabetes and adhere to their medication regimens. Second, the use of SMS reminders served as a convenient and accessible tool for reinforcing medication adherence and fostering patient engagement. By leveraging mobile technology, the Diaβcare program transcended barriers related to geographical distance and accessibility, making it particularly suitable for elderly patients who may face challenges in accessing healthcare services. The involvement of pharmacists and other healthcare professionals in enhancing medication adherence among elderly diabetic patients is crucial for improving health outcomes and reducing the burden of complications associated with diabetes, ultimately leading to better quality of life and reduced healthcare costs [21]. This collaborative approach ensures comprehensive patient care, tailored education, and ongoing support, addressing the unique needs and challenges faced by this vulnerable population. Despite the promising results of our study, several limitations warrant consideration. First, the study was conducted at a single outpatient diabetic clinic, limiting the generalizability of findings to other settings. Future research should explore the scalability and feasibility of implementing similar interventions in diverse healthcare settings, including primary care clinics and community pharmacies. Second, the study duration was limited to 12 months, precluding long-term assessment of intervention effects on clinical outcomes and sustainability of behavior change. Longitudinal studies with extended follow-up periods are needed to evaluate the durability of intervention effects and identify potential barriers to sustained medication adherence. The integration of pharmacist-initiated counseling and SMS reminders, as demonstrated in the Diaβcare program, represents a promising approach to enhancing medication adherence and improving clinical outcomes among elderly patients with T2DM. Our findings underscore the importance of pharmacist-led Diaβcare in optimizing patient care and addressing the complex challenges associated with chronic disease management. Moving forward, collaborative efforts between healthcare providers, policymakers, and technology developers are needed to scale up and sustain innovative interventions like Diaβcare, ultimately improving health outcomes for elderly diabetic patients worldwide.

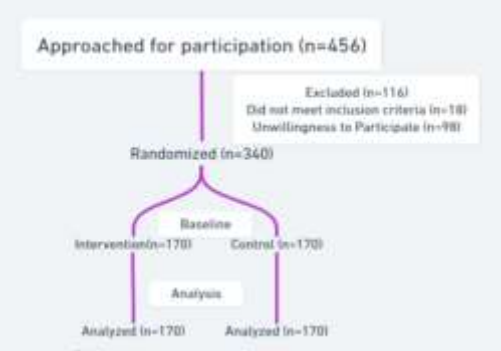

Figure 1. Flow Chart of the Participants.

Table 1. Baseline socio-demographics and clinical profile of study populations.

Variables	Diaβcare (n = 170)	Control (n = 170)	Total (n = 340)	Z-score	P value
Mean age (±SD)	64±8	61±8.6	62.5±8.55	-	0.21
Gender					
Male	86	88	174	0.16	0.90
Female	84	82	166	0.16	0.90
Marital status					

Continued table 1

Single	54	40	94	0.18	0.67
Married	110	122	232	0.19	0.72
Other	6	8	14	0.23	0.69
Education					
No education	66	68	134	0.34	0.82
Primary school	22	20	42	0.39	0.74
High school	50	48	98	0.21	0.76
College/university	32	34	66	1.28	0.21
Occupation					
Farmer	64	62	126	0.16	0.93
Housewife	78	78	156	0.31	0.68
Private job	20	20	40	0.14	0.78
Government job	4	5	9	0.28	0.89
Others	4	5	9	0.33	0.74
BMI (kg/m2)	29±6	28.2±5	28.6±5.5	-	0.98
One or more comorbidities					
One comorbidity	55	58	113		
More comorbidities	31	32	63		
Asthma	9	10	19		
CAD	9	8	17		
COPD	11	8	19		
Heart failure	28	26	54		
Hypertension	15	15	30		
Myocardial infarction	6	10	16		
Stroke	14	16	30		
Duration of diabetes (years)					
≤2 years	54	62	116	0.52	0.56
3–9 years	76	70	146	0.89	0.24
≥10 years	40	38	78	0.21	0.81

SD = Standard deviation, Diaβcare group = Pharmacist-directed counselling with mobile message reminder, Control = usual care by physician

Table 2. Assessment of mobile device use behavior among the study population

Characteristics of use of mobile phones	Diaβcare (n = 170)	Control (n = 170)	Total (n = 340)	Z-test	P value
Use of two mobiles					
YES	12	29	41	0.64	0.34
NO	158	141	299		
Habit of sending SMS					
YES	21	17	30	0.68	0.41
NO	149	153	302		
Habit of sending MMS					
YES	4	1	5	1.25	0.72
NO	166	169	335		
Habit of reading SMS					
YES	139	132	291	1.51	0.11
NO	31	38	69		
Typical Sources of received SMS					
Advertisement	87	98	185	0.18	0.76
Bank	21	26	47	2.23	0.06
Cricket	13	9	22	3.45	0.01
Friends	12	7	19	1.25	0.23

Continued table 2.

News	6	8	14	0.21	0.82
Relatives	22	15	37	3.47	0.08
Others	9	7	16	0.47	0.84

SD = Standard deviation, Diaβcare group = Pharmacist-directed counselling with mobile message reminder, Control = usual care by physician, MMS = Multi-media Messages

Table 3. Analysis of medication adherence among the study groups

Visits	Diaβcare group (mean ± SD)	Usual care group (mean ± SD)	P value	Z value
Pill count method				
Visit 2 to 3	9.8±5.7	4.8±0.07	<0.001	9.78
Visit 3 to 4	11.7±6.7	12.4±0.65	<0.001	12.56
VAS method				
Visit 2 to 3	8.7±6.2	4.92±0.97	<0.001	8.89
Visit 3 to 4	10.7±5.9	6.2±0.6	<0.001	11.74
SD = Standard deviation, Diaβcare group = Pharmacist-directed counselling with mobile message reminder, Control = usual care by physician, VAS = Visual Analogue Scale				

Table 4. Analysis of medication adherence differences between the two groups at follow-up visit

Groups	Visit 2 (mean ± SD)	Visit 3 (mean ± SD)	Visit 4 (mean ± SD)
Mean medication adherence levels at each visit by pill count method			
Diaβcare group	76.4±6.8	88.6±5.8	94.9±1.87
Usual care group	75.25±6.2	76 ±7.9	74.6±8.9
Mean medication adherence levels at each visit by VAS method			
Diaβcare group	86.4±7.8	91.9±3.8	98.3±1.42
Usual care group	85.2±8.2	82.5±8.2	81.6±8.5
SD = Standard deviation, Diaβcare group = Pharmacist-directed counselling with mobile message reminder, Control = usual care by physician			

Table 5. Comparison of clinical outcomes between Diaβcare and control group

Outcome measures	Diaβcare Group (n=170)				Usual care group (n=170)			
	Baseline Mean ± SD	End of study Mean ± SD	Mean difference	P value	Baseline Mean ± SD	End of study Mean ± SD	Mean difference	P value
A1C (%)	7.97 ± 0.76	7.03 ± 0.38	-0.94	<0.001	7.88 ± 0.67	7.81 ± 1.02	-0.08	0.671
Systolic BP (mm Hg)	136.57 ± 20.10	126.32 ± 18.22	-10.25	<0.001	136.82 ± 19.23	135.72 ± 17.24	1.1	0.41
Diastolic BP (mm Hg)	91.18 ± 8.52	88.80 ± 8.21	-2.38	0.035	92.46 ± 11.82	93.50 ± 7.90	1.03	0.558
FBG (mg/dL)	234.96 ± 59.29	204.68 ± 43.68	-30.28	<0.001	248.13 ± 32.08	225.48 ± 65.91	-22.65	0.001
TC (mg/dL)	207.37 ± 42.15	202.59 ± 31.81	-4.78	0.148	212.92 ± 36.10	223.87 ± 34.39	1.95	0.178
Triglyceride (mg/gL)	152.60 ± 75.5	155.67 ± 37.61	3.07	0.052	158.48 ± 68.17	162.78 ± 55.65	3.29	0.025
LDL- C (mg/dL)	104.41 ± 26.32	98.92 ± 20.78	-5.49	0.001	114.22 ± 32.16	116.62 ± 30.80	1.78	0.295
HDL-C (mg/dL)	42.72 ± 7.80	42.50 ± 7.48	-0.20	0.014	45.80 ± 9.66	45.59 ± 8.87	-0.20	0.681
BMI (kg/m2)	27.9 ± 4.21	27.1 ± 3.12	-0.8	0.1286	28.6 ± 5.19	27.9 ± 4.83	0.7	0.008
SD = standard deviation; A1C= Glycosylated Hb; BP = Blood Pressure; FBG = Fasting Blood Glucose; TC = Total Cholesterol; LDL – C = Low-density cholesterol; HDL-C = High density cholesterol; BMI = Body Mass Index								

Conclusion

In conclusion, the pharmacist-initiated Diaβcare program stands as a highly recommended strategy for managing chronic diseases, particularly among elderly individuals grappling with type 2 diabetes mellitus. This innovative approach has showcased remarkable effectiveness in bolstering medication adherence and fostering positive shifts in crucial clinical parameters. The success of this program underscores the pivotal role pharmacists play in augmenting patient care and ultimately, health outcomes. By leveraging their expertise, pharmacists can significantly contribute to improving the quality of life for individuals navigating chronic illnesses like diabetes. The Diaβcare program's tailored interventions and patient-centered focus highlight its potential as a cornerstone in holistic healthcare delivery. Its implementation offers a promising avenue for addressing the multifaceted challenges associated with chronic disease management, offering tangible benefits to both patients and healthcare systems alike.

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Conflicts of Interest

There is no conflict of interest regarding the publication of your manuscript.

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Nil

Ethics Statements

This study was approved by the Institution Review Board, JSS College of Pharmacy, Ooty, Tamil Nadu (IRB Approval number: JSSCP/IRB/08/2022-2023 dated:11.02.2023).

Author Contribution

Sivasankaran Ponnusankar: Study conception and design; Suguna Kotte: Data collection; Hunsur Nagendra Vishwas and Vishwanathan Balasubramaniam: Analysis and interpretation of results; Suguna Kotte and Sivasankaran Ponnusankar: Draft manuscript preparation. All authors reviewed the results and approved the final version of the manuscript.

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