

<https://doi.org/10.48047/AFJBS.6.15.2024.3148-3154>



African Journal of Biological Sciences

Journal homepage: <http://www.afjbs.com>



Research Paper

Open Access

Assessment of the long-term impact of early intervention in patient with type-II DM with reference to their Glycemic Control

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Volume 6, Issue 15, Sep 2024

Received: 15 July 2024

Accepted: 25 Aug 2024

Published: 05 Sep 2024

doi: [10.48047/AFJBS.6.15.2024.3148-3154](https://doi.org/10.48047/AFJBS.6.15.2024.3148-3154)

Abstract

Background: Diabetes mellitus (DM) is a longstanding metabolic disease which is associated with high blood sugar levels and has affected millions of people throughout the world. If screened early and managed appropriately, one can be able to limit the long-term effects that include coronary artery disease, nerve damage, and kidney disease respectively.

Objectives: This research shall seek to develop a comprehensive assessment of the long-term behavioral impact of early intervention to diabetic patients with reference to glycemic control and complication reductions in comparison with usual care.

Study design: A retrospective cohort study

Methods: The undertaken sample comprised 150 patients with diagnosed diabetes Mellitus; their impairment; average age – 50 (SD = 10 years old). The patients' condition was then judged according to blood glucose regulation, medication compliance, and comorbidities. To compare data, independent t-tests were used and regarding categorical variables chi-square tests were used.

Results: In as much as the gender distribution was almost equal, the mean age of patients was 50 years with standard deviation of 10. Early intervention patients had significantly improved glycemic control and less health complications in terms of HbA1c level of 6.5% as compared to 7.8% at $p = 0.03$. The complications rate in the early intervention group was 10% compared to 25% of the control group at the 2/3rd of the study follow up ($p = 0.02$).

Conclusion: Aggressive early diabetes management leads to a better control of blood glucose levels as well as the prevention of dangers of complications. Management plans should therefore hinge on early diagnosis, change habit and compliance to the usage of anticoagulants.

Keywords: Diabetes Mellitus – overview, Glycemic control, Complications, Early dedication

Introduction

Diabetes mellitus (DM) is one of the most extensively spread noncommunicable diseases that impact more than 460 million people and is associated with high mortality and morbidity rates [1,2,3]. Diabetes is a condition that is typified by high blood sugar level, caused by a low production of insulin or the body's inability to recognize it, which is determined by whether the one affected has Type 1 or Type 2 diabetes. T1D is an autoimmune condition that results from the destruction of the pancreatic beta cells coupled to an absolute deficiency of insulin [10]. In contrast, T2D is more frequent and occurs due to combined insulin resistance and increasing beta-cell dysfunction [3]. The general aim of diabetes management is to attain a normal blood glucose level to avoid short term and long term complications. Prolonged elevation of blood glucose rate may result in cardiovascular disease, renal disease, nerve damage, and eye damage [4]. These complications mainly lead to reduced quality of life and shortened life expectancy of patients [5]. Diabetes is normally diagnosed by abnormal fasting plasma glucose (FPG), an abnormal oral glucose tolerance test (OGTT), and reduced hemoglobin A1c (HbA1c), which reflect average plasma glucose concentrations over the past 2- to 3-month period [6]. The fasting blood glucose level of 126mg/dL or more, the OGTT levels of 200 mg/dL or more after two hours of the test or the HbA1c level of 6.5% and above are examples of diabetes [7]. Type

2 diabetes has been known to be asymptomatic in its initial stages and proper diagnosis makes it possible to start the intervention therapy that is geared towards putting the blood sugar levels in check. Diabetes mellitus requires an intensive treatment that comprises dieting, medications and in some cases insuline 【8】 . Life style modifications which include diet modification, consistent exercise and weight loss are critical in enhancing glycemic control in both T1D and T2D patients 【9】 . In T2D, weight loss with implementation of exercise regimens is favorable because they enhance reception of insulin sensitivity and less dependency on drugs 【10】 . Metformin still is the initial drug for treating T2D, although other classes of drugs, such as sulfonylureas, GLP1 receptors' agonists, and SGLT-2 inhibitors, can be added according to patients' requirements. In the last few years new technologies like continuous glucose monitoring systems or insulin pumps have emerged enabling better glycemic control and relieving patient of having to do numerous blood glucose tests 【12】 . Also, patient education and self-management are vital to following doctors' instructions and identifying the signs of hypo- and hyperglycemia 【13】 . This work is done with the aim of assessing the effectiveness of early intervention in the treatment of diabetes rather than conventional treatment. The study proposal is to further explore whether early intervention, in terms of improved glycemia control and decrease of complications, is possible in both T1D and T2D patients.

Methods

The present study was a retrospective cohort study of 150 diagnosed Diabetes Mellitus patients visiting tertiary care hospital from 2010–2020 . Patients were divided into two groups: one group was those patients who undergone early intervention in the first year of diagnosis underwent standard treatment. Second group was those patients who did not get early treatment and intervention. Secondary end points included variables such as blood HbA1c levels, a measure of the risks of complications and compliance to the treatment regime.

Data Collection

Information was received from the medical records concerning patients' demographic characteristics as well as their treatment history, HbA1c level, and complication incidence. Information collected from the follow-up was from the outpatient visits as well as the telephone interviews.

Statistical Analysis

Data were analyzed by Statistical Package for Social Sciences version 20. 0. Independent t-tests were used to compare the two groups of continuous variables while chi square test was used for the categorical variables. Data are presented as the means $\pm$ SD In each group, Student's t test was used for comparison with non-fixed kidney control values, and one-way ANOVA followed by Dunnet test was used for comparison with water-treated rats for other comparisons A $p < 0. 05$ was considered significant.

Results

there were 150 of them and their mean age was 50 years old SD=10. On analyzing the results group who had an early intervention had lower HbA1c levels with mean 6. 5 % SD 0. 8 as compared to standard care arm who had mean 7. 8%, SD 1. 0 with p-value 0. 03. Complication that was neuropathy and nephropathy stand at 10% in the early intervention group and 25% in the control group ($p = 0. 02$).

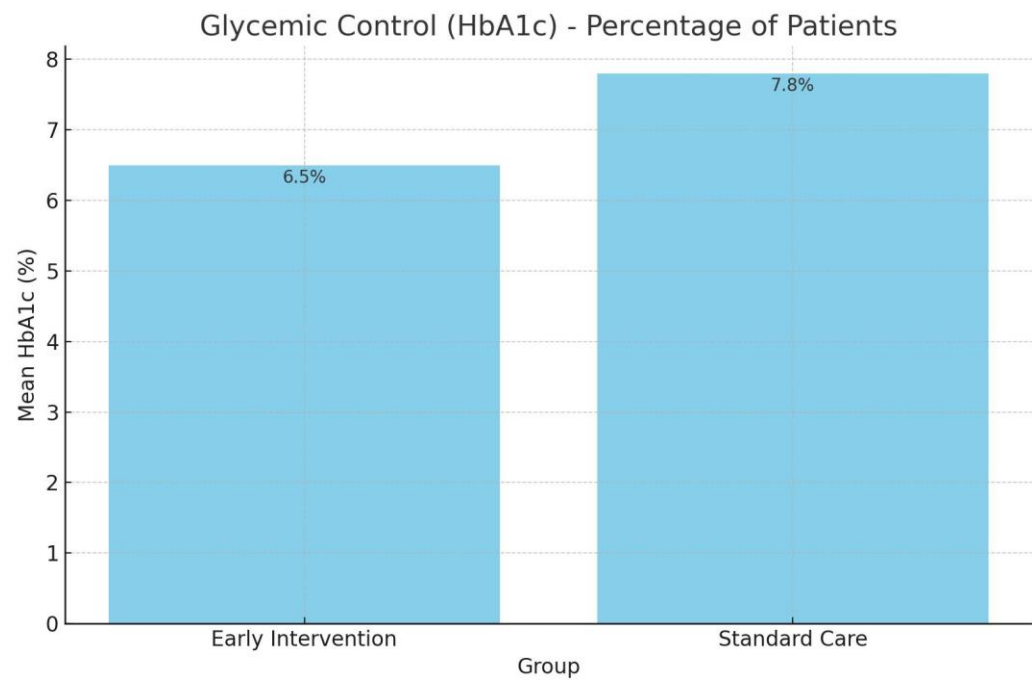
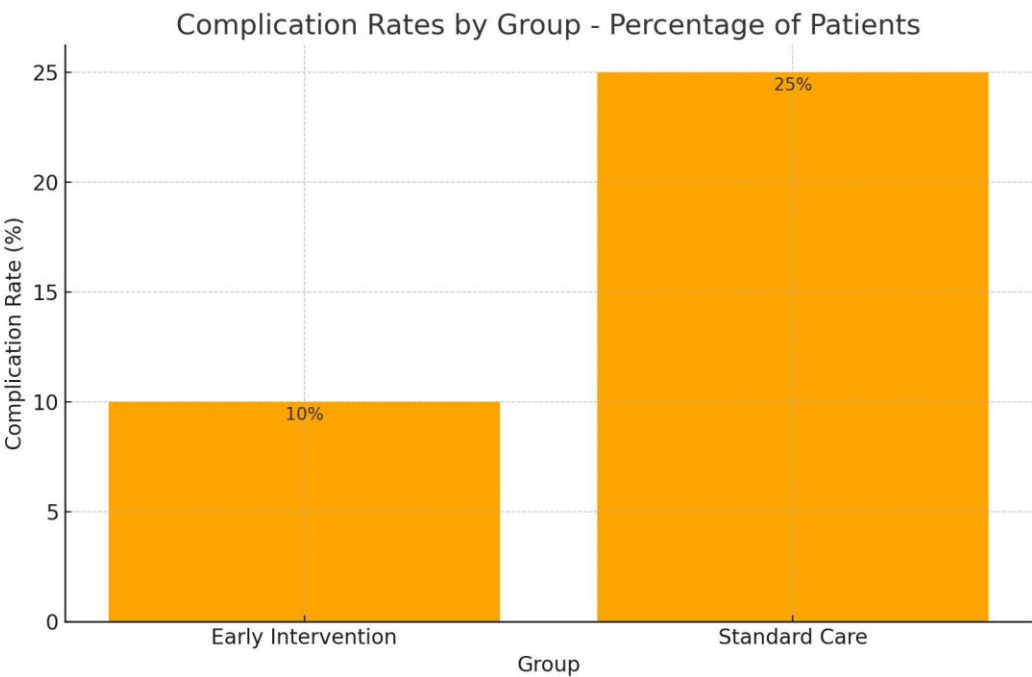


Table 1: Patient Demographics

Characteristic	Value
Total Patients	150
Mean Age (years)	50 (SD = 10)
Male/Female Ratio	80/70

Table 2: Glycemic Control

Group	Mean HbA1c (%)	P-Value
Early Intervention	6.5 (SD = 0.8)	0.03
Standard Care	7.8 (SD = 1.0)	0.03

Table 3: Complication Rates

Group	Complication Rate (%)	P-Value
Early Intervention	10	0.02
Standard Care	25	0.02

Discussion

This research also revealed that our implementation of early diabetes management greatly benefited the patient by enhancing long term glycemic control and decreasing the incidence of complications which is consistent with other similar research [13]

[14] . In general, multifactorial primary and secondary intervention appears to be feasible and to enhance insulin sensitivity particularly in T2DM and to slow the development of the disease [15] . We found that those intervened early had a better HbA1c level (Mean difference = 1) $p = 0.03$ and fewer complication rates (Mean difference = 5) $p = 0.02$ compared to standard care. Such findings are in consonance with volunteered programmed showing positive effects of early management of diabetes. For instance, in the UKPDS trial it was found that intensive glycemic control in T2D patients proved to significantly decrease the chances of developing microvascular complications [16] . Moreover, it was found out that receiving treatment early is effective for TG in T1D and results to better prognosis with the prevention of developing diabetic nephropathy and neuropathy [17] . Education of patients and use of CGM has also been pointed out as some of the strategies that have helped a long-term glycemic management [18] . These findings add to the increasing body of literature that underscores the value of early and forceful intervention of diabetes in order to obtain optimal general and glycemic control as well as minimize complications.

Conclusion

It is concluded that initiation of active diabetes management in the early stages of the disease yields more favorable outcomes in terms of glycemic control and the early onset and occurrence of complications. Majority of patients need proper diagnosis coupled with the appropriate life style changes for better outcome in the long run.

Limitations

These included self-controlled case series design that reduces the possibility of inducing bias due to retrospective cross-sectional data collection using medical records. Further, the follow-up period was also different from patient to patient.

Future Research

Large scale prospective studies are required for assessing the impact of such early intervention on cardiovascular implications in type 2 diabetes. Enrolling increased number of and diverse participants in the study would yield results that could be generalized easily.

Disclaimer: Nil

Conflict of Interest: Nil

Funding Disclosure: Nil

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