Lubaga Journal of Health Research
Home page link: https://lubagajournals.com/index.php/ljhr/index

Knowledge towards adherence to lifestyle modification among type 2 diabetic patients attending the diabetic clinic at Mbarara Regional Referral Hospital. A cross-sectional study.

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Submitted: January 08, 2026
Accepted: March 30, 2026
Published: May 17, 2026

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Abstract

Background: Type 2 diabetes mellitus presents an escalating global public health challenge, placing a severe structural burden on healthcare systems and community resources worldwide. In Uganda, the disease manifests as a critical chronic health crisis. This study aimed to determine the knowledge towards adherence to lifestyle modification among type 2 diabetic patients attending the diabetic clinic at Mbarara Regional Referral Hospital.

Methodology: A descriptive cross-sectional study design employing quantitative research methods was conducted among 52 T2D patients using a simple random sampling technique. Data was collected using a pretested structured questionnaire and analysed using descriptive statistics (SPSS). Findings were then presented in tables and figures.

Results: Overall, the majority of respondents (40.4%) were aged 58 years and above, and 57.7% were male. A majority (84.6%) had received diabetes education, and 55.8% rated their knowledge of diabetes management as very good. Over half (53.8%) were familiar with the recommended dietary guidelines, and 84.6% recognised the importance of a high-fibre diet. Most (69.2%) reported checking their blood glucose daily, and 51.9% identified aerobic exercises as the most beneficial.

Conclusion: While most T2D patients demonstrated good knowledge towards lifestyle modification, adherence was hindered by financial challenges and the complexity of required lifestyle adjustments.

Recommendation: Healthcare providers should prioritise health education programs, establish patient support groups and implement affordable nutrition and physical activity programs for patients with type 2 diabetes to promote adherence to lifestyle modifications.

Keywords: Type 2 diabetes mellitus, Adherence, Lifestyle modification, Insulin resistance.

Background

Type 2 diabetes mellitus (T2DM) is a significant global health challenge, affecting an estimated 463 million adults worldwide (International Diabetes Federation, 2019). The prevalence of T2DM is increasing rapidly, driven by factors such as urbanisation, sedentary lifestyles, and unhealthy diets. Countries like the United States, China, and India are among the top contributors to the global burden of T2DM (World Health Organisation, 2018). In the United States, for example, diabetes affects over 34 million adults, with significant economic and healthcare implications (Centres for Disease Control and Prevention, 2020). The Centres for Disease Control and Prevention (CDC) reports that diabetes is the leading cause of kidney failure, lower-limb amputations, and new cases of blindness among adults. Similarly, in China, T2DM has become a major public health concern, with an estimated 114 million adults living with the condition (International Diabetes Federation, 2019). In Japan, the prevalence of diabetes is estimated to be around 9%, with significant implications for healthcare services (NCD Risk Factor Collaboration, 2016). Brazil, with a large and growing population, is also experiencing a significant burden of T2DM, with an estimated 16 million adults living with the condition (International Diabetes Federation, 2019).

In Africa, the prevalence of T2DM is rising rapidly, driven by urbanisation, lifestyle changes, and an ageing population (Hall et al., 2018). The International Diabetes Federation estimates that over 19 million adults in Africa live with diabetes, with this number expected to increase to 41 million by 2030 (International Diabetes Federation, 2019). In South Africa, diabetes is a leading cause of morbidity and mortality, with significant economic

implications (Peer et al., 2018). In Nigeria, the prevalence of T2DM is estimated to be around 4%, with significant implications for healthcare services (Ulasi et al., 2018). Tanzania, with a large and growing population, is also experiencing a significant burden of T2DM (Kibirige et al., 2019). In Uganda, the Ministry of Health is grappling with the rising prevalence of non-communicable diseases, including diabetes, estimated at 2%, with type 2 diabetes accounting for the majority of cases (Ministry of Health Uganda, 2015; Kibirige et al., 2019), amidst a backdrop of communicable diseases. Adherence to lifestyle modification remains a significant challenge for many patients (Nam et al., 2018). This study aimed to determine the knowledge towards adherence to lifestyle modification among type 2 diabetic patients attending the diabetic clinic at Mbarara Regional Referral Hospital.

Methodology

Study design

The study employed a descriptive cross-sectional design with quantitative methods of data collection and analysis, thereby providing a more comprehensive understanding of the research problem and increasing the validity and reliability of the findings.

Study setting

The study was conducted at Mbarara Regional Referral Hospital, a prominent healthcare facility located in Mbarara City, Uganda. It is situated approximately 260 kilometres (162 miles) southwest of Kampala City. Location: Mbarara City, Western Uganda. Latitude -0.6043° or 0° 36' 15" south, Longitude 30.6653° or 30° 39' 55" east. The hospital serves as a major referral centre for patients in the surrounding areas, offering a range of medical services, including a dedicated diabetic clinic that provides specialised care and management. The diabetic clinic offers regular check-ups, medication management, health education, and lifestyle counselling to patients with diabetes. Given its location and specialised services, the hospital's diabetic clinic attracts a significant number of patients with type 2 diabetes, making it an ideal setting for assessing adherence to lifestyle modifications in this population.

Study population

The study was conducted among type 2 diabetic patients attending the diabetic clinic at Mbarara Regional Referral Hospital in Mbarara city, Uganda, focusing on adult patients (aged 18 years and above) who have been diagnosed with type 2 diabetes and are receiving care and management at the hospital's diabetic clinic.

Sample size determination

The Krejcie and Morgan 1970 table was used to determine the sample size for this study, where Population (N) = 60, Sample(S) =52

Since the target population was 60 respondents, a sample of 52 was selected. This number fitted the recommended sample size for the research. This table was chosen for its convenience, precision, and wide acceptance in research, ensuring that the sample size is representative of the population and enhancing the validity and reliability of the study's findings.

Sampling method

A probability sampling method, specifically simple random sampling, was used to select a representative sample of 52 respondents. The method was chosen because it provided a representative sample of the population, reduced selection biases and thus increased the generalizability of the findings.

One hundred four (104) rolled papers with equal numbers written on Yes or No were obtained. Type 2 diabetic patients were allowed to select a single paper at random, and all who selected Yes were enrolled in the study. Each day, thirteen (13) respondents were selected for four (4) days to make a total of 52 participants.

Inclusion criteria

The study included only type 2 diabetic patients aged 18 years or older who received treatment at the hospital's diabetic clinic and consented to participate.

Exclusion Criteria

The study excluded all hospitalised type 2 diabetic patients, those with severe complications requiring immediate medical attention, and newly diagnosed patients who have not yet established a treatment plan.

Independent Variable

Knowledge towards adherence to lifestyle modifications among type 2 diabetic patients.

Dependent Variable

The dependent variable in this study is adherence to lifestyle modifications among patients with type 2 diabetes. This includes adherence to dietary recommendations, physical activity, and other lifestyle changes that are crucial for managing diabetes effectively.

Research instruments

A pretested, structured, self-administered questionnaire was utilised as the primary data collection tool to collect quantitative data from a sample of type 2 diabetic patients attending Mbarara Regional Referral Hospital. The questionnaire was made up of two sections, section A-bio demographic characteristics of the type 2 diabetic patients, section B-knowledge on adherence to lifestyle modifications towards adherence to lifestyle modifications among type 2 diabetic patients. This was translated into the local language, "Runyankole", prior to the commencement of the study for easy understanding. Questions were both closed-ended and open-ended.

Data collection procedures

After completing the research proposal, an introductory letter was obtained from the research ethics committee, Lubaga Hospital Training School. This was taken to Mbarara Regional Referral Hospital seeking permission to conduct the study. Upon receiving permission to conduct the study, a self-introduction was provided to the

respondents, and explanations about the topic were offered to patients attending the diabetic clinic. The study participants were asked to sign a consent form and were given a self-administered questionnaire to complete, with assurances of confidentiality and anonymity. The questionnaire was well-designed and concise, and patients were allowed to ask questions if needed. Once completed, the questionnaires were collected and reviewed for completeness. The questionnaire data were analysed to assess adherence to lifestyle modifications and identify factors associated with adherence among type 2 diabetic patients. The study adhered to all relevant ethical guidelines and protocols to ensure the rights and welfare of participants were protected. Data was collected on 4 different days, picking 13 respondents each day, and all participants on each day had an equal chance of being selected for the study.

Data management

Data management involved several steps to ensure the accuracy, confidentiality, and integrity of the collected data. Data from the self-administered questionnaires were checked for completeness and consistency, and then coded. The data was cleaned and validated to ensure accuracy and consistency. All data was stored securely in a password-protected database, accessible only to authorised personnel.

Data analysis

The collected data was sorted and analysed manually using tally sheets and coded, then the results were presented in the form of statistical tables, pie charts, bar graphs and figures by using a statistical software package (e.g. SPSS)

Quality assurance

Validity

Validity was ensured by setting questions that aligned with the research objectives and the study's aim.

Reliability

Reliability was ensured by pre-testing the data collection tool on 15 type 2 diabetic patients from Kakoba Health Centre IV two weeks before commencing the formal study, to ensure the tool's consistency and dependability. The tool was then retested among 8 type 2 diabetic patients to finalise the editing and ensure no mistakes remained in the questionnaire.

Ethical Considerations

Following Approval of the research proposal by the research committee, an introductory letter from the Principal Lubaga Hospital Training Schools was obtained, introducing the investigator to the research ethics committee of Mbarara Regional Referral Hospital. Upon approval from the facility administration and the research ethics committee, voluntary consent was obtained from type 2 diabetic patients at the clinic before data collection. The study started when the participants had clearly understood the study objectives. Participants were informed about free entry and exit from the study when needed. Respondents were assured of the utmost confidentiality for all information they provided, and their names did not appear on the questionnaires. They were clearly and thoroughly explained to participants, and participants understood and voluntarily consented to participate in the study.

Results

Table 1: Showing social demographic characteristics of respondents

Variables		Frequency	Percentage
Respondents age	18 - 27 Years	5	9.6
	28 - 37 Years	7	13.5
	38 - 47 Years	9	17.3
	48 - 57 Years	10	19.2
	58 Years and above	21	40.4
Sex	Male	30	57.7
	Female	22	42.3
Respondents' level of education	Primary	11	21.2
	Secondary	19	36.52
	Tertiary	13	25.0
	Non	9	17.3
Occupation of the respondents	Employed	8	15.4
	Self-employed	24	46.2
	Retired	15	28.8
Duration of diabetes of the respondents	Less than 1 year	8	15.4
	1-5 years	17	32.7
	More than 5 years	27	51.9

From table 1, it is showed that nearly to half 21 (40.4%) of the respondents were aged 58 years and above, followed by 10(19.2%) who were aged between 48 to 57 years, 9(17.3%) aged between 38 to 47 years, 7(13.7%)

aged between 28 to 37 years and a few 5(9.6%) were aged between 18 to 27 years. Regarding gender, most 30 (57.7%) of the respondents were male and a few 22 (42.3%) were female. Concerning education level, most 19 (36.5%) of the respondents had secondary level, followed by 13(25.0%) with tertiary level education, 11(21.2%) with primary level education, and a minority of 9(17.3%) had never attended school. In relation to the occupational status, most 24 (46.2%) of the respondents were self – employed, 15(28.8%) were in retirement, and a few 8 (15.4%) were employed. Pertaining to the duration of diabetes, more than half 27(51.9%) of the respondents had diabetes for more than 5 years, followed by 17(32.7%) who had diabetes for 1-5 years, and a few 8, 15.4%) had diabetes for less than 1 year.

Knowledge on Adherence to Lifestyle Modification among Type 2 Diabetic Patients.

Figure 1: Showing whether respondents received diabetes education.

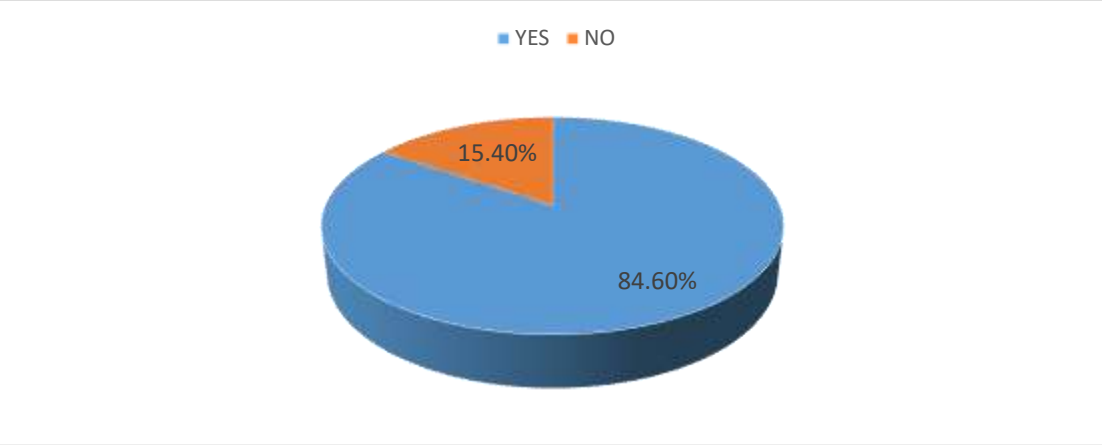

Figure 1 shows that 44 (84.6%) respondents received diabetes education, while 8 (15.4%) did not.

Table 2: showing how patient rate knowledge of diabetes management

Response	Frequency	Percent
Excellent	13	25.0
Very good	29	55.8
Good	8	15.4
Fair	2	3.8
Total	52	100.0

Table 2 shows that the majority, 29 (55.8%) of the respondents rated their knowledge of diabetes management as very good, and a minority, 2 (3.8%), rated it as fair.

Figure 2: Showing respondents' familiarity with the recommended dietary guidelines for diabetes management

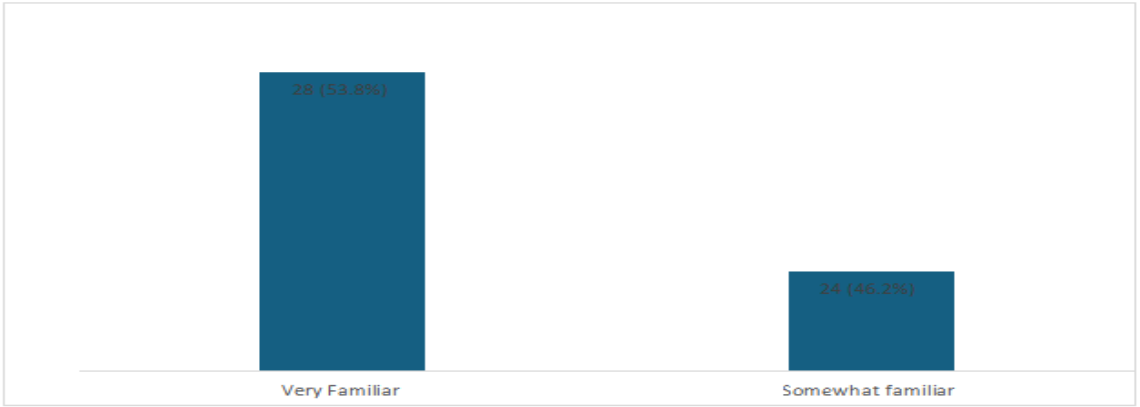

Figure 2 shows that the majority, 28 (53.8%), of respondents were very familiar with the recommended dietary guidelines for diabetes management, and a minority, 24 (46.2%), were somewhat familiar with them.

Table 3: Showing respondents' knowledge about foods recommended for people with type 2 diabetes, how often to check their blood glucose levels, the recommended exercises for diabetic patients and how often to exercise per week.

Variable	Response	Frequency (n)	Percentage (%)
Foods recommended for type 2 diabetic patients	Foods high in sugar	3	5.8
	Foods high in salt	3	5.8
	Foods high in fibre	44	84.6
	Foods high in fat	2	3.8
How often should you check blood glucose levels	Daily	36	69.2
	Weekly	9	17.3
	Monthly	7	13.5
Exercises recommended for T2D patients	Aerobic exercises	27	51.9
	Resistance exercises	13	25.0
	Flexibility exercises	8	15.4
	High-intensity interval training	4	7.7
How often do T2D patients aim to exercise per week?	1-2 times	6	11.5
	3-4 times	37	71.2
	5-7 times	6	11.5
	Daily	3	5.8

Table 3 shows that majority 44(84.6%) of the respondents knew that foods high in fiber are the foods recommended for people with type 2 diabetes, followed by same number 3(5.8%) respondents who knew that foods high in sugar and salt respectively were recommended, and minority 2 (3.8%) knew that foods high in fats are the foods recommended for people with type 2 diabetes.

The majority, 36 (69.2%) of the respondents knew that people with type 2 diabetes check their blood glucose levels daily, followed by 9 (17.3%) who knew that people with type 2 diabetes check their blood glucose levels weekly. A minority (7, 13.5%) knew that people with type 2 diabetes check their blood glucose levels monthly. More than half 27(51.9%) of the respondents were aware that aerobic exercises are recommended for people with type 2 diabetes, 13(25%) performed resistance exercises, followed by 8(15.4) who performed flexibility exercises, and a minority of 4 (7.7%) knew that high-intensity interval training is recommended for people with type 2 diabetes.

The majority, 37 (71.2%) of the respondents knew that people with type 2 diabetes aim to exercise 3 – 4 times per week, followed by the same number, 6(11.5%), who aimed to exercise 1-2 times and 5-7 times per week, and minority 3 (5.8%) knew that people with type 2 diabetes aim to exercise daily per week.

Discussion

Socio-demographic data of respondents

The study's findings revealed that the majority of the respondents (40.4%) were aged 58 years and above, which implies that older adults are more likely to develop type 2 diabetes. Healthcare providers should prioritise providing education and more support to this age group. This could be due to weakened immunity associated with old age and stress. This is consistent with previous studies (IDF, 2019) showing that type 2 diabetes increases with age.

Regarding gender, the study found that most (57.7%) of the respondents were male, which is consistent with a previous study (WHO, 2020), which shows that men have 25% chance more likely to develop type 2 diabetes than women. However, this finding contradicts other studies (Klein et al., 2018) that suggest that 35.4% of women are more likely to develop type 2 diabetes due to hormonal changes during menopause, highlighting the need for further research to understand the relationship between sex and type 2 diabetes.

The majority of respondents had attained secondary education. This could be because people with higher education are more likely to have better health literacy and be more aware of the importance of managing their diabetes. This is consistent with a study by Mengistu et al. (2024) in Ethiopia, which found that patients with type 2 diabetes who had good knowledge of their condition and disease process and a glucometer at home were more likely to be adherent. A high level of education is associated with proper self-care practices and better glycemic control, with 41.5% of patients demonstrating good lifestyle modification practices.

Knowledge on Adherence to Lifestyle Modification among Type 2 Diabetic Patients

The study revealed that 84.6% of the respondents received diabetes education. This means that diabetic patients attending the diabetic clinic at Mbarara Regional Referral Hospital in Mbarara City receive education on diabetes. This agreement with the findings of the study by The International Diabetes Federation (IDF, 2020), which found a 0.6% reduction in HbA1c levels for

patients who received diabetes self-management education, recommends that patient education should be a key component of diabetes management, and that patients should have access to accurate and reliable information about their condition.

The study found that 55.8% of the respondents rated their knowledge of diabetes management as very good. This implied that patients at Mbarara Regional Referral Hospital in Mbarara City desired diabetes education. This could be due to healthcare provider initiatives focused on individualised care and follow-up programs at Mbarara Regional Referral Hospital. This agrees with a study by ADA (2022), which found that patient education programs should be tailored to meet the individual needs of patients with type 2 diabetes.

The study results show that 53.8% of the respondents were familiar with the recommended dietary guidelines for diabetes management. When patients are familiar with recommended dietary guidelines for diabetic management, they can better control their blood sugar. This implies that patients at Mbarara Regional Referral Hospital are aware of the importance of healthy eating; therefore, continuous diabetic dietary education should be encouraged. This was consistent with the study by Peer et al. (2020) in South Africa, which found that 60% of patients with good knowledge of diabetes management demonstrated good adherence to lifestyle modification recommendations, resulting in improved glycemic control and reduced risk of complications.

Research also found that 84.6% of respondents knew that foods high in fibre are recommended for people with type 2 diabetes. This may be because patients are aware of the benefits of high-fibre diets. This concurred with the results of a systematic review by Nam et al. (2018), which found that 85% of patients knew that high-fibre foods were beneficial, and this was associated with better adherence to lifestyle modifications, highlighting the importance of dietary education.

The study found that 69.2% of the respondents knew that people with type 2 diabetes check their blood glucose levels daily. This may be because the health workers at Mbarara regional referral provide ongoing support and education; as a result, these patients have acquired self-management skills that have improved their health outcomes. This is consistent with a study by Mwangi et al. (2020), which found that 65% of patients demonstrated good adherence to lifestyle modification because of an understanding of the importance of monitoring their blood glucose levels and adjusting their diet and exercise accordingly, and that these patients had better glycemic control.

The study revealed that (51.9%) of the respondents knew that aerobic exercises are recommended for people with type 2 diabetes. This aerobic exercise aids in weight loss and maintenance and also helps the body use insulin more effectively, reducing blood sugar levels. This agreed with the study by Abebe et al (2022), which revealed that 45.7% of patients who understood the importance of self-care practice and adherence to diet, exercise, self-monitoring of blood glucose, respectively were more likely to adhere to lifestyle modifications compared to patients with less knowledge about self-care practice like diet, physical activity, self-monitoring of blood glucose, who had poor glycemic control.

Moreover, the study's findings revealed that 71.2% of respondents knew that people with type 2 diabetes aim to exercise 3–4 times per week. Regular exercise results in improved insulin response, better blood sugar control, weight management and reduced risk of complications. This concurred with a study by Li et al. (2024), which revealed that 60% of patients who understood the importance of monitoring their blood glucose levels and adjusting their diet and exercise accordingly had better glycemic control.

Conclusions

Most of the respondents had very good knowledge of diabetes management, a significant portion was familiar with the recommended dietary guidelines for diabetes management, more of the participants identified the foods high in fiber as the foods recommended for people with type 2 diabetes, checked their blood glucose levels daily, agreed that aerobic exercises are recommended for people with type 2 diabetes, aimed to exercise 3 – 4 times per week.

Recommendation

The ministry should consider providing financial support or subsidies for healthy food options and physical activity programs to reduce the financial burden on patients.

The hospital management should ensure that healthcare providers have access to ongoing training and resources on diabetes management, enabling them to provide high-quality care and support to patients.

Health workers should consistently be trained to address the specific challenges faced by patients, such as financial constraints and a lack of support.

Patients are advised to seek support from family members, peers, or community health workers to help them remain consistent with their treatment plans. Patients are encouraged to openly communicate with health workers about any challenges they face with lifestyle modifications, including financial constraints or lack of support, so that appropriate alternatives and support can be provided.

Implications for nursing practice

Nurses are key health workers in the management of diabetes; therefore, the results of the study emphasise the need for the adoption of a holistic approach towards the management of diabetes. Hence, nurses must ensure that patients fully understand the importance of adhering to lifestyle recommendations and the potential consequences of non-adherence, thereby improving their lifespan in living with diabetes.

Acknowledgement

First and foremost, praise and honour go to the Almighty God for the gift of life, health, blessings and favour He has bestowed on me. It is for Him that this dissertation has been possible. Thank you, Lord.

Special thanks to my supervisor, Mr Kimera Donatus, for his time and effort in making this research report a success. Thank you very much, and may God bless you.

I would like to acknowledge the Principal, Sr. Namuddu Jane Frances, and her entire staff for providing us with a conducive environment that has enabled us to undertake our studies. Thank you very much, and God bless you.

To the administration of Mbarara Regional Referral Hospital for providing me with conducive conditions, environment and support during the research study.

To all my friends and classmates, thank you for your time and resources throughout this academic journey, and I wish you all the best in your endeavours.

Special gratitude goes to my parents and siblings for being there during my academic period. Your support, I cannot take it for granted, accept my appreciation and remain blessed.

List of abbreviations

T2DM: Type 2 Diabetes Mellitus
WHO: World Health Organisation
MOH: Ministry of Health
HbA1c: Glycated Haemoglobin
ADA: American Diabetes Association
DSME: Diabetes Self-management Education
IDF: International Diabetes Federation
CDC: Centres for Disease Control and Prevention
NCD: Non-Communicable Diseases

Source of funding

The study was not funded.

Conflict of interest

The author declares that there was no conflict of interest.

Author contributions

VT- Developed and investigated the study.
DK- Supervised the study.
JFN- Supervised the study.

Data availability

Data is available upon request.

Informed consent

Written informed consent was obtained from all participants prior to their inclusion in the study. Participants were informed about the purpose of the study, procedures involved, potential risks and benefits, and their right to withdraw at any time without penalty.

Author biography

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