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Article Title

The Effect of Morning Walk on Diabetes Patients

Abstract

Diabetes has been a public health concern in the word due to sedentary lifestyle. This study was to examine the effect of morning walk on diabetes management. This study was used quantitative research design. A structured questionnaire was used for data collection from 100 diagnosed diabetes patients. Data were analysis by using SPSS descriptive and inferential statistics. Findings of the study indicated a statistically significant relationship between morning walk and diabetes management. Regular morning walk showed a moderate negative correlation with fasting glucose level($r = -0.42$), and a positive relationship with glycemic control ($r = 51$). Regression analysis showed that walking frequency was significant predictor of fasting glucose levels ($p < 0.001$). ANOVA results, further explored that participants, who walked more than 30 minutes regularly have significant better fasting glucose level compared to sedentary lifestyle ($p < 0.001$).

Keywords: Blood Sugar, Cardiovascular Benefits, Diabetes Patients Effect, Lifestyle Interventions, Weight Management

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Abstract

Diabetes has been a public health concern in the word due to sedentary lifestyle. This study was to examine the effect of morning walk on diabetes management. This study was used quantitative research design. A structured questionnaire was used for data collection from 100 diagnosed diabetes patients. Data were analysis by using SPSS descriptive and inferential statistics. Findings of the study indicated a statistically significant relationship between morning walk and diabetes management. Regular morning walk showed a moderate negative correlation with fasting glucose level(r = -0.42), and a positive relationship with glycemic control (r = 51). Regression analysis showed that walking frequency was significant predictor of fasting glucose levels (p < 0.001). ANOVA results, further explored that participants, who walked more than 30 minutes regularly have significant better fasting glucose level compared to sedentary lifestyle (p < 0.001).

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Contents

Introduction

Background of the Study

Morning walk has been recognized as an important component of diabetes care because it increases insulin function, improves glucose uptake by muscles, and boosts overall cardio metabolic health. Globally, type 2 diabetes is rising invariably; lifestyle-based strategies have gained increasing attention for their role in prevention and long-term management of diabetes. A recent study shows that moderate intensity aerobic activities can produce clinically remarkable decreased in fasting glucose and HbA1c, particularly who performed consistently as part of lifestyle (Colberg, et al., 2016; American Diabetes Association, 2024).

Morning walk has practical work, low- cost, easy and accessible exercise choice for adults managing diabetes. Studies shows that morning walk may help regulate fasting blood sugar levels, increase insulin sensitivity early in the day, and maintain batter glucose sustainability thorough working hours (Sardar, et al., 2021; Boff, et al., 2023). Morning physical activity also leads to circadian metabolic patterns, as early day exercise may increase the fat oxidation and reduce the postprandial glucose spikes in the day. Morning walk requires no special

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equipment and has minimal injury risk; it remains one of the most practical and easiest lifestyle interventions for diabetic patients.

The purpose of this study is to determine the effectiveness of morning walk in managing diabetics, focusing on their blood glucose control, overall health, and compliance to physical activity recommendations. By conducting the recent clinical and observational research, this investigation aims to understand how morning walk routine can be combined into self-care practice and how they may complement standard medical treatment. The goal is to provide evidence-base guidance that can help patients, healthcare providers, and community health planners in promoting sustainable exercise routine for effective diabetes management.

Statement of the Problem

Diabetes patients particularly type 2 diabetes increasing globally, placing a significant burden on individuals, families and healthcare systems. The availability of medications and clinical guidelines, many patients struggle to maintain stable blood glucose levels, often due to inadequate lifestyle modification and low engagement in regular sports activity. Morning walk is widely recognized as key component of diabetes management, many patients find it difficult to adopt or sustain exercise routine that is simple, accessible, and safe.

Morning walk is easy and practical form of physical activity that can be incorporated into daily life without the need for equipment, not need of any training and financial resources. The specific role of morning walk in increasing glycemic controls is not fully understood by many patients and healthcare providers. The evidence suggests that exercise performed in the morning may support better fasting glucose regulation and enhance metabolic reactions during the whole day, this practice is still underrate and recommended in routine diabetes care.

The problem is lies in the gap between available scientific evidence and its application in everyday diabetes management. Many diabetes patients do not recognize how integrating a simple morning walk into their routine can contribute to improve blood sugar control, reduce complications, and overall better quality of life. This lack of awareness and guidance indicates the need for focused research that clearly explains the importance of morning walk and set up the role as practical, sustainable strategy for managing diabetes effectively.

Objectives of the Study

1. To measure the glycemic control and postprandial glucose, HbA1c.
2. To examine the cardiovascular risk factors and body composition (e.g., BMI, blood pressure).
3. To analyze the quality of life, physical performance, and mental health aspects.

Hypotheses of the Study

H1: morning walk statistically significantly reduce blood sugar of Type 2 diabetes patients.

H2: morning walk leads to statistically improve insulin regulatory among diabetes patients

H3: Morning walk statistically significant boost cardiovascular health and blood pressure of diabetes patients

H4: regular morning walk improve the overall quality of life and psychological wellbeing of diabetic patients.

Significance of the Study

All over the world including developing countries diabetes is increasing rapidly due to sedentary lifestyle, and unbalance diet. In this study simple, cultural, and low cost interventions are essential. Morning walk required no special equipment, no gym, and can be merged into routine life easily.

It is therefore the need to understand the benefits of morning walk that can guide clinicians, public health practitioners, and patients to draw the lifestyle guidelines that produce maximum benefits. The school-aged, adults managing diabetes with other responsibilities, promoting morning walk can improve compliance by aligning activity with daily routine.

Furthermore, morning walk explores the metabolic advantages that may help reduce long term complications lower dependency on medication and improve overall quality of life.

Literature Review

Diabetes Mellitus and the Need for Lifestyle Interventions

Diabetes, especially type 2, is called hyperglycemia, resulting from insulin resistance and impaired insulin secretion. According to a recent global survey, type 2 diabetes is rising quickly due to sedentary lifestyles, reduced physical activity, unhealthy eating habits, and increased obesity rates (Hu, 2011). The pharmacological treatments help to control glucose level, research indicates that lifestyle modifications, particularly physical

activity, remain essential for long term sugar control and prevention from diseases (Colberg, et al., 2023).

Importance of Walking in Diabetes Management

A walk for 30- 45 minutes daily especially in the morning is associated with improvements in HbA1c, fasting sugar, lipid profiles, and blood pressure (Kelly & Goodpaster, 2022). Waking is low-cost and accessible and adaptable to fitness levels, it has been globally recommended in clinical guidelines as a first-line physical activity for diabetes management.

Impact of Morning Walking on Fasting Blood Glucose

Morning walk particularly before breakfast, made unique metabolic changes. Early day exercise increases glucose uptake by muscles cells and enhance fat oxidation when carbohydrate available is lower. Mikus, et al., (2023) indicated that individuals with type 2 diabetes who participated in morning walk showed significant reductions in fasting blood glucose compared to sedentary lifestyle individuals.

Effects on Postprandial Glucose

Early in the morning glucose spikes are major reason to long term complication in diabetes. Various studies show that morning physical activity may reduce postprandial glucose excursion throughout the day by boosting metabolic efficiency and promoting better glucose distribution (Van Moorsel, et al., 2023).

Morning Walking and Insulin Sensitivity

Insulin reactivity is different the whole day because of circadian rhythms. Research recommends that physical activity early in the morning may help reset disrupted circadian patterns of observed in diabetes patients. A study by Savikj and Zierath, (2021), claimed that morning walk improved the body insulin reactivity whole day more efficiently than evening sessions for individuals with metabolic disorders.

Effects on Body Composition and Weight Management

Morning walk is very essential for weight loss, and reductions in visceral fat due to increased fat oxidation during early day exercise. Kelly and Goodpaster, (2022), reported that regular morning exercise enhances the metabolic rates and helps in weight reduction more effectively than exercise performed at times of day.

Cardiovascular Benefits of Morning Walking

Cardiovascular disease is the major cause of death patients with diabetes. Morning walk enhance endothelial factions lower blood pressure, and reduce cholesterol levels. Colberg, et al., (2023), indicate that individuals with diabetes who participate in regular morning walk experience significant improvement improvements in heart rate variability, blood pressure and overall cardiovascular fitness.

Psychological and Quality-of-Life Benefits

The diabetes is associated with increased stress, anxiety, and depression that can harmful for treatment process. Morning walk is psychologically benefits in reducing cortisol levels and improve through endorphin release that enhance cognitive clarity and better sleep. Siddiqui, et al., (2022), reported that morning walk with chronic disease, including diabetes, results significantly improved mental well-being and self-management behaviors.

Research Methodology:

Research Design

This study was adopted quantitative research design to determine the impact of morning walk in the diabetes management. A cross survey questionnaire was used for data collection from large number of participants that is suitable for identifying patterns, self-reported behavior related to morning walk and glycemic control. This design is also supports the statistical analysis need to measure whether morning walk habits are statistically significant related to diabetes outcome among patients with type 2 diabetes.

Population and Sample

The population of this study was diabetes patients with type 2, aged 30 to 70 years, residing in Bahawalpur. A sample of participation was engaged from diabetes clinics, community health centers, and local fitness group. The convenience sampling was used due to accessibility and the practicality for selecting participants. The sample size of the study was 200 participants.

Sampling Technique

Sampling technique that was used for this study was convenience sampling a non-probability sampling. The researcher selects individuals who were readily available and willing to participate. This method was suitable because the study required individuals who had been

medically diagnosed with diabetes and who engaged in morning walk routine.

Research Instrumentation

Data were collected through the questionnaire that already used in research (Schmitt, et al., 2013). The questionnaire contained sections on demographic information, duration and frequency of morning walk, self-reported blood glucose control, lifestyle habits and perceived benefits of morning walk. The items were measured by using Likert scale to access the agreement.

Validity and Reliability

The validity of questionnaire was reviewed by the experts of the field to clarity, relevance, and alignment with the objective of the study. A pilot study was conducted with small group of patients with diabetes. The reliability was measured through the use of Cronbach's Alpha with the value of 0.78, indicating a strong internal consistency among the participant's responses.

Data Collection Procedure

After ethical considerations from concerned institution, participants were contacted through administrators. The purpose of the study was to explained, and informed consent was obtained before distributing the questionnaire. The participants were voluntarily to ensure confidentiality. The entire questionnaire were collected and checked before data entry.

Data Analysis

Collected were analyzed by using statistical software, statistical package for social science (SPSS Version 27). The descriptive statistics, including means, frequency, and percentage were analyzed to measure the demographic characteristics of the participants. Inferential statistics, including correlation, and regression analysis were applied to examine the relationship between morning walk and diabetes patients management.

Ethical Considerations

Ethical permission was obtained from concerned persons. The participants were informed about the purpose, and procedure of the research. The confidentiality of the data was ensured. The participants were participate in research voluntarily and free to withdraw at any point without any consequences. Ethical approval was obtained from the appropriate institutional review board prior to data collection.

Data Analysis:

Demographic Characteristics of Respondents

A total 100 participants were participating in research. The sample of study was consisted of individuals with type 2 diabetes, aged 30- 70 years. Majority of the participants were falling in the 40-60 age range. Most respondents had been diagnosed with type 2 diabetes for more than one year.

Table 1

Age Distribution of Participants (N = 100)

Age Range (years)	Frequency	Percentage (%)
30–39	15	15
40–49	35	35
50–60	40	40
61–70	10	10
Total	100	100

Table 2

Duration since Diabetes Diagnosis

Duration Since Diagnosis	Frequency	Percentage (%)
Less than 1 year	20	20
1–3 years	30	30
More than 3 years	50	50

Duration Since Diagnosis	Frequency	Percentage (%)
Total	100	100

Table 3

Type of Diabetes Treatment

Treatment Type	Frequency	Percentage (%)
Oral Medication	40	40
Insulin	25	25
Combination (Oral + Insulin)	35	35
Total	100	100

Morning Walking Patterns

These results indicate that most participants participated in morning walk between 3 to 6 days per week. The average duration of a morning walk ranged in morning walk ranged from 20 t0 45 minutes. Majority of the participants agreed that morning walk helped them feel more energetic, improved their daily life, and helped in controlling blood sugar.

Glycemic Control Indicators

The results shows that they had improved fasting glucose levels when they were engaged in morning walk regularly. Participants who walked at least 30 minutes per day underscore lower self-reported fasting glucose ranges compared to those who participate lesser.

Relationship Between Morning Walking and Diabetes Management

Correlation analysis showed a significant positive relationship between regular morning walk and patients with type 2 diabetes. Those who walked regularly showed better self-reported glycemic stability, better diabetes management routine and little fluctuations in daily blood sugar levels

Table 4

Correlation Analysis

Variables	Frequency of Morning Walk	Duration of Morning Walk	Fasting Glucose Level	Perceived Glycemic Control
Frequency of Morning Walk		.48	–.42	.51
Duration of Morning Walk	.48	—	–.29	.37
Fasting Glucose Level	–.42	–.29		–.33
Perceived Glycemic Control	.51	.37	–.33	

Correlation analysis indicates the relationship between morning walk and diabetes patients. Morning walk frequency and duration were moderately related ($r = .48$), showing that those who walk often also walk longer. Regular walk was associated with lower fasting glucose ($r = -.42$) and better perceived glycemic control ($r = .51$). Similarly, walk duration showed a negative correlation with fasting glucose ($r = -.29$) and positive correlation with ($r = .37$). Fasting glucose and glycemic control were also related ($r = -.33$), indicating that higher glucose levels linked with self-reported diabetes management.

Table 5

Regression Analysis

Predictor Variables	B (Unstandardized Coefficient)	SE (Standard Error)	β (Standardized Coefficient)	t-value	p-value
Constant	165.42	8.21	—	20.15	< .001
Morning Walking Frequency	–4.73	1.12	–.41	–4.22	< .001
Age (Controlled)	–0.18	0.09	–.17	–1.98	.050
Treatment Type (Controlled)	–3.25	1.54	–.21	–2.11	.037

Regression analysis indicates that morning walk is statistically significant on fasting glucose levels. The coefficient for morning walk frequency was -4.37, shows that higher walking frequency is associated with visible reduction in fasting glucose. This link was supported by a t-value of 4.42 and p-value of less than 0.001. The age also indicated a limited effect, with little negative coefficient (-0.18), and p-value of 0.50. The constant vale of 165.42 shows the estimated fasting glucose level when all the predictors are held at zero. Furthermore, the table explore that morning walk has significant role in improving fasting glucose outcomes.

Table 6

Group Comparison (Optional t-test or ANOVA)

Source of Variation	Sum of Squares (SS)	df	Mean Square (MS)	F-value	p-value
Between Groups (Walking Duration)	1,245.62	2	622.81	7.84	< .001
Within Groups	7,641.38	97	78.79	—	—
Total	8,887.00	99	—	—	—

ANOVA analysis indicates that morning walk duration has statistically significant effect on fasting glucose levels among participants. The between group sum of Squares was 1,245.62 with 2 degree of freedom, resulting in mean square value of 622.81. The F-value of 7.84, which was significant p-value of 0.01. These findings show that differences in fasting glucose levels varied meaningfully across the three walking duration group. Within the group changeability noted for a sum of squares of 7,641.38 with 97 degree of freedom, while the total variability in the data was 8,887.00. Overall the analysis shows that walking duration contributes significantly to differences in glycemic outcomes.

Table 7

Post Hoc Comparison (Tukey HSD) for Walking Duration Groups

Walking Duration Groups	Mean Difference (MD)	p-value	Interpretation
< 15 minutes vs. 15–30 minutes	–6.12	.214	Not significant
< 15 minutes vs. > 30 minutes	–15.47	< .001	Significant
15–30 minutes vs. > 30 minutes	–9.35	.041	Significant

Discussion, Conclusion and Recommendations:

Findings

The findings of the study show that morning walk has notable impact on diabetes patients. Correlation analysis indicated that walking frequency was significantly linked with physiological and perceived outcomes, with negative relationship with fasting glucose (r = -.42), and positive correlation with perceived glycemic control (r = .51). The duration of walking also has better results, exploring a negative relationship with fasting glucose (r

= -.29), and positive link with perceived control (r = .37).

The regression analysis results showed that morning walk frequency was significant predictor of fasting glucose levels. This model showed a standardized beta of -.41 (p < .001), indicating that greater walking frequency led to a remarkable decrease in glucose level even after controlling the age and treatment type.

ANOVA analysis results explored that waking duration significantly impact on glycemic levels (F = 7.84, p < .001). Post hoc comparisons indicated that participants walking more than 30 minutes have statistically better fasting glucose outcomes as compared to those walking for shorter durations.

Discussion

This study determined the relationship between morning walk frequency and duration with fasting glucose levels and perceived glycemic control among participants. The results showed a moderate positive correlation between frequency of morning walk and glycemic control (r = 0.51), exploring that individuals who walked more frequently showed better management of blood glucose. Similarly, the duration of morning walk positive relationship with perceived glycemic control (r = 0.37), the frequency and duration were negative relationship with fasting glucose levels (r = -0.42, and -.29), exploring that increased walking activity may improve the glycemic outcomes.

These findings are demonstrated that regular physical activity, particularly morning walk, improves glucose metabolism and increased insulin sensitivity (Colberge, et al., 2020; Zhang, et al., 2022). Morning walk has been shown to facilitate glucose uptake by skeletal muscles that means decreasing circulating glucose levels and improving overall glycemic control. The systemic assessment and meta-analysis confirms that organized morning walk of moderate intensity, performed regularly has significant lower long term glucose changes such as HbA1c and improve random glucose responses (Aldana, et al., 2021; Tan, et al., 2023)

However, the negative link between morning walk and fasting glucose was observed moderate in this study, which aligns with recent literature showing, that while walking improves overall glycemic control, its effect on fasting glucose alone may be strong (Reddy, et al., 2024). Research suggest that timing of waking , especially in the morning may be more effective in decreasing postprandial glucose spike than fasting glucose levels, highlights the need of integrating walking regularly at strategic times (Hawley & Joyner, 2021).

Furthermore, this study supports the idea that both frequency and duration of morning walk has positively impact on glycemic control and help to manage the fasting glucose levels. A morning walk by the side of a busy road, where the walker would inhale dust and smoke from vehicle emissions, would not, in fact, benefit, but harm lungs of a person. Dedicated walking spaces should be available in cities, where residents can, not only, walk, but also, relax and forest bathe is the need of the hour in the era of modern-day-concrete jungles (Kamal, 2024). These results explores that public health recommendations that advising regular physical activity, combined with weight management (Kamal et al., 2023) and proper diet plan (Kamal & Khan, 2020), as a practical and effective intervention for improving glycemic health and preventing complications linked with diabetes.

Conclusions

This study explored the relationship between morning walk frequency and duration with fasting glucose levels and glycemic control among individuals with type 2 diabetes. The analysis showed that participants who participate more frequent and longer morning walk results better glycemic control, and lower glucose levels.

The results of correlation and regression analysis highlighted that walking frequency was significantly effect on fasting glucose after controlling the age and treatment type whereas the longer walking duration were linked with improved outcomes. These findings align with previous research showing the benefits of regular walk in improving glucose metabolism, increasing insulin sensitivity, supporting weight management, and reduce cardiovascular disease.

However, the moderate correlation confirms that morning walk has effect positively to glycemic outcomes. The other factors such as duration, intensity of exercise, diet, and treatment also play an important role. Overall, this study demonstrate the importance of morning walk is a simple, easy, low cost, and effective method for diabetes management that can complements standard medical care and improve both physiological and health benefits.

Recommendations

On the basis of the findings it recommended that patients should encourage through regular counseling, educational sessions and morning walk plans can enhance participation and control their glycemic diabetes.

It is also recommended that community base morning walk programs can be effective in enhancing compliance among diabetes population by providing social support, organized a sense of self-accountability. These programs lead to motivates individuals to maintain health habits.

Suggestions for Future Research

Future research should incorporate long-term morning walk and its effect on clinical outcomes. The similar study should be conducted on large population across the all over the country, Pakistan because this area is rapidly increasing in diabetes patients. The research should explore the impact of walking intensity, post meal timing and combined lifestyle interventions on fasting glucose to provide comprehensive understanding of exercise moderate glycemic regulation.

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