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Effect of a 12-Week Interval Walking Training Programme on the Resting Blood Pressure of Women with Type 2 Diabetes in Makurdi, Benue State, Nigeria

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Abstract

This study assessed the effect of a 12-week interval walking training (IWT) programme on the resting blood pressure of women with type 2 diabetes (T2D) in Makurdi, Benue State. The study adopted the pretest-posttest quasi-experimental design. The study sampled 40 women, aged 45-65 years, with diabetes who met the inclusion criteria using a simple random sampling technique. A portable stadiometer (Seca 213, Germany) was used to measure participants' stature, while a digital weighing scale (HD-378, Tanita, Japan) was used to measure body mass. Participants' blood pressure was measured by auscultation using a stethoscope (Littman Classic III 3M, USA) and sphygmomanometer (Welch Allyn, USA). Mean and standard deviation were used to describe the demographic characteristics of the participants. Analysis of Covariance (ANCOVA) was employed to test the hypotheses at the 0.05 alpha level. Effect sizes were determined using partial eta squared (η^2p), according to Cohen's thresholds. The results of the study revealed that participation in a 12-week IWT programme resulted in a significant reduction in both resting systolic blood pressure (SBP) ($F (1, 39) = 219.547$, $p < 0.001$, partial $\eta^2p = .856$, AMD = −6.9 mmHg, 95% CI [−9.42, −4.31]) and resting diastolic blood pressure (DBP) ($F (1, 39) = 108.75$, $p < 0.001$, partial $\eta^2p = 0.746$, AMD = −5.9 mmHg, 95% CI [7.98, −3.82]) in women with T2D in Makurdi, Benue State. It was therefore recommended that hospitals in Makurdi consider institutionalizing structured IWT programmes within their diabetic clinics through an exercise prescription unit, where feasible, alongside standard clinical care, to reduce long-term risks.

Keywords: Type 2 diabetes; Interval walking training; Blood pressure; Women.

Introduction

Type 2 diabetes (T2D) is a major global public health challenge associated with significant morbidity and mortality. The International Diabetes Federation [IDF] (2025) estimates that 589 million adults (11.1%) worldwide are living with diabetes, over 90% of whom have T2D, with a projected rise to 853 million by 2050. In Africa, 24.6 million adults currently live with diabetes, and this number is expected to increase by 142% to 59.5 million by 2050, while approximately 72.6% of cases remain undiagnosed. Nigeria bears the highest diabetes burden in Africa, with about 3 million adults affected and projections indicating a rise to 6.6 million by 2050 (IDF, 2025). Evidence from Benue State also indicates a substantial burden, with reported prevalence rates ranging from 7.0% to 24.9% and a diabetes-related mortality rate of 8.61% (Teran et al., 2017; Ali et al., 2019). These trends call for an urgent need for effective interventions, particularly among women, who are disproportionately affected by key risk factors such as elevated cardiovascular risk (De Ritter et al., 2020) and higher body fat levels (Kautzky-Willer et al., 2023).

Diabetes is a chronic metabolic disorder with far-reaching complications. The International Diabetes Federation [IDF] (2025) states that diabetes occurs when the body cannot produce enough insulin or the body cannot effectively use the insulin it produces, leading to high levels of glucose (hyperglycaemia). In extreme cases, this can harm the cardiovascular system, eyes, kidneys, liver, and nerves. Clinicians diagnose diabetes in adults when glycated haemoglobin (HbA1c) is 6.5% or higher (48 mmol/mol or above) (IDF, 2025). Diabetes is also diagnosed when fasting plasma glucose is ≥ 126 mg/dL (7.0 mmol/L), or when 2-hour plasma glucose is ≥ 200 mg/dL (11.1 mmol/L) following a standard oral glucose tolerance test (OGTT) performed with 75 grams of anhydrous glucose dissolved in water (IDF, 2025). One of the most prevailing comorbidities associated with T2D is elevated blood pressure (hypertension). Hypertension (HTN) occurs when systolic blood pressure is ≥140/90 mmHg or higher in the clinic on three separate days, and if an individual is not taking any antihypertensive medications. At home, an average blood pressure of 135/85 mmHg or more over 5-7 days indicates HTN. Based on 24-hour monitoring, a consistent average of 130/80 mmHg or higher qualifies as HTN, especially if daytime readings reach 135/85 mmHg and nighttime readings reach 120/70 mmHg (Jones et al., 2025).

The HTN is a major comorbidity in individuals with type 2 diabetes (T2D), with a prevalence of approximately 66.3% in those individuals compared to 21.9% in normoglycemic individuals (Wang et al., 2015). It accounts for 35% to 75% of cardiovascular risk in T2D patients, and effective blood pressure control significantly reduces adverse outcomes (American Diabetes Association Professional Practice Committee, 2022; Yang et al., 2023; Elendu et al., 2024). Consequently, current guidelines recommend a blood pressure target of <130/80 mmHg for adults with T2D (Wang et al., 2025). This highlights the urgent need for targeted intervention to avert any adverse outcomes that could result from poor blood pressure control.

Structured physical activity is a first-line lifestyle intervention in the management of T2D, targeting glycaemic control, blood pressure, lipids, and fitness (Ahmad et al., 2023). In T2D, structured aerobic, resistance, and combined training over ≥8–12 weeks has been reported in the literature to reduce systolic and diastolic blood pressure by about 4–8 and 2–6 mmHg, respectively (Figueira et al., 2014; Heberle et al., 2020; Ambelu et al., 2023). High-intensity interval training (HIIT) in women with T2D similarly improves blood pressure and cardiometabolic risk, sometimes with lower time commitment than guideline volumes (Álvarez et al., 2016; Ahmad et al., 2023). This suggests that structured physical activity, particularly interval walking training, which is aerobic in nature, could serve as an effective non-pharmacological strategy for controlling blood pressure and reducing cardiovascular risk among women with T2D.

Interval walking training (IWT) has emerged as a low-cost, easy-to-perform, practical, evidence-based structured physical activity intervention for people with T2D. The IWT refers to a unique but easy-to-perform style of walking that combines slow walking for 3 minutes (at or below 40% VO_2 peak) and fast walking for 3 minutes (at or above 70% VO_2 peak), repeated at least 5 times for a session for 4 days or more in a week. (Masuki et al., 2019; Kitajima et al., 2023). Karstoft et al. (2024) described it as a form of walking that involves changing between slow and fast walking cycles. This approach helps individuals get through the more challenging parts of exercise, often resulting in better outcomes than simply trying to maintain a high intensity throughout. A study by Santiago, et al. (2018) indicate that both continuous and interval aerobic exercise sessions can lower systolic blood pressure shortly after exercise in T2D patients. Similarly, studies by Marcotte-Chénard et al. (2021) found that low-volume walking HIIT improved resting blood pressure but not ambulatory blood pressure. However, studies by Tsuda et al. (2022) and Kitajima et al. (2023) neither reported significant change in systolic nor diastolic blood pressure following interval walking training. These findings are inconsistent, and most studies are mixed-gender studies from developed countries. There is also a paucity of local data on IWT programmes specifically for women with T2D in Makurdi, Benue State. Looking at the high burden of cardiovascular risk in women with T2D, there is a compelling need to assess the effect of a 12-week interval walking training programme on the resting blood pressure of women with type 2 diabetes attending hospitals in Makurdi, Benue State. However, the study testd the hypotheses that there is no significant effect of a 12‑week interval walking training programme on resting systolic blood pressure of women with diabetes attending hospitals in Makurdi, Benue State and there is no significant effect of a 12-week interval walking training programme on resting diastolic blood pressure of women with diabetes attending hospitals in Makurdi, Benue State.

Methods

Study design and setting

The study employed a pretest-posttest quasi-experimental design. The study was conducted in Makurdi, Benue State, Nigeria. Makurdi was selected because it has major government hospitals which provide access to women receiving diabetes care. However, these hospitals lack structured physical activity programmes, making the area ideal for assessing the effectiveness of interval walking training.

Study population

The study population comprised all the 362 women with diabetes attending five government hospitals in Makurdi, Benue State: Benue State University Teaching Hospital (66), Federal Medical Centre Makurdi (93), Muhammadu Buhari Mother and Child Hospital (48), Family Support Hospital (64), and General Hospital North Bank Makurdi (71). These figures were obtained from hospital records and verified by the Benue State Hospitals Management Board, Makurdi (2025). Government hospitals were selected because they provide subsidized health care services for many women with diabetes.

Sample size and sampling technique

A sample of 40 women with T2D was drawn from two government hospitals that operate diabetic clinics in Makurdi: Federal Medical Centre (FMC) Makurdi and General Hospital North Bank Makurdi. The two hospitals were purposively selected for the study. Thereafter, the hospitals were assigned to the experimental and control groups by balloting. Consequently, FMC Makurdi was assigned to the experimental group and General Hospital North Bank, Makurdi, assigned to the control group. From each hospital, 20 eligible women were selected using simple random sampling without replacement. The identification numbers of all eligible women were written on equal-sized pieces of paper, folded, placed in a container, and mixed thoroughly. The pieces of paper were then drawn one after another until 20 participants were selected from each hospital. Each selected piece of paper was not returned to the container, ensuring that no participant was chosen more than once and that every eligible woman had an equal chance of selection. The decision to use 20 participants per group (N = 40 total) was based on practicality and the recommendations for the use of 20 to 30 participants per group in quasi-experimental studies (Polit & Beck, 2003). In order to assess the statistical sensitivity of this sample size, a formal power analysis was performed. Considering a two-tailed alpha level of $\alpha = .05$, two comparison groups ($n = 20$ per group), a sensitivity analysis in G*Power indicated that a total sample size of $N = 40$ provides 80% statistical power to detect a large effect size of $f = 0.45$ (equivalent to Cohen's $d \approx 0.90$).

Inclusion Criteria

Sedentary, women with type 2 diabetes aged 40–65 years were eligible for the study. Participants were overweight or obese (BMI ≥25 kg/m²), managed diabetes with oral hypoglycaemic drugs only, and had no contraindication to exercise. The choice of middle-aged women with T2D was because they are at increased risk of poor blood glucose control and serious cardiovascular and respiratory complications (IDF, 2025). Eligibility was determined by reviewing each participant's recent hospital records before enrolment.

Exclusion Criteria

Women were excluded if they were younger than 40 years and not overweight or obese. Women who were not overweight or obese were not included from the study because the study aimed to measure the effect of IWT on reducing body fat, a crucial aspect of T2D management. Women who had heart, lung, or musculoskeletal conditions that could limit exercise, used medications such as corticosteroids that affect body fat, or were pregnant or within 5 months postpartum were also excluded.

Data collection instrument(s)

Anthropometric Measurements

Body mass and stature of the participants were assessed to determine their body mass index (BMI). Participants' stature and body mass were measured using standardized instruments certified by the International Society for the Advancement of Kinanthropometry and in accordance with their protocol [ISAK] (Marfell-Jones et al., 2006).

A portable stadiometer (Seca 213, Seca GmbH & Co. KG, Germany, 2018) was used to measure stature. Participants stood barefoot with feet together on a flat platform. Bulky headwear or hairstyles, if any, were removed. The heels, buttocks, upper back, and head of the participant made contact with the vertical measuring rod. The head was held erect with the eyes looking forward so that the orbitale (lower margin of the eye socket) and the tragion (the notch superior to the tragus of the ear) were positioned in the Frankfort plane. The sliding headpiece was lowered gently onto the crown of the head. The stature was recorded to the nearest 0.001 meters at full inhalation.

Body mass was measured using a digital weighing scale (HD-378, Tanita, Japan, 2016). The scale was placed on a flat surface and switched on. When it displayed "0.0," the participant stood barefoot with feet centered on the sensors until the measurement stabilized. The participant stepped off once the body mass value appeared and was recorded to the nearest 0.1kg. The BMI of the participants was derived as a ratio of her body mass (in kilograms) to height (in meters) squared (kg/m²) according to Jakicic et al. (2001).

Blood Pressure Measurement

A calibrated analog monitor (Precisa N, SKU: 1447-141, R. Riester GmbH, Germany) and a stethoscope (Littman Classic III 3M, USA) were used to measure participant's resting systolic and diastolic blood pressure by auscultation. The inflatable cuff was wrapped around the upper arm following established protocols. The measurement of blood pressure was carried out in the morning, between 8:00 and 10:00 AM, to minimize the influence of circadian rhythms on the results. Two trial versions of the measurements were conducted on ten women with diabetes who were not part of the study at Muhammadu Buhari Mother and Child Hospital, Makurdi, before the actual data collection.

Blood pressure (BP) was measured according to the standardized protocol outlined in the 2025 AHA/ACC/AANP/AAPA/ABC/ACCP/ACPM/AGS/AMA/ASPC/NMA/PCNA/SGIM Guideline for the Prevention, Detection, Evaluation, and Management of High Blood Pressure in Adults (Jones et al., 2025). Participants sat quietly for at least five minutes before measurement. They sat with their arm supported at the level of the heart, palm facing up, and legs uncrossed. Participants were instructed to avoid caffeine, smoking, and exercise for at least 30 minutes before measurements. The cuff was placed snugly around the right upper arm at heart level, aligned with the brachial artery. The stethoscope bell was positioned just below the antecubital fossa, directly over the brachial artery. The cuff was inflated to 20 mmHg above the point where the first *Korotkoff* sound was detected; then the pressure was released gradually at a rate of 2–5 mmHg per second. Systolic blood pressure (SBP) was noted at the initial two *Korotkoff* sounds, and diastolic blood pressure (DBP) was noted at the point where the sounds disappeared. The BP was measured by the same trained assessor. At least two readings were obtained, and the average value was used for analysis to enhance measurement reliability.

Experimental Procedure

Ethical Considerations

Before the commencement of the experiment, ethical approval was obtained from both the Health Research Ethics Committee at the Federal Medical Centre, Makurdi (FMH/FMC/HREC/108/VOL.1) and the Benue State Hospitals Management Board, Makurdi (HMB/OFF/215/VOL.III/820). Based on the recommendations of American College of Sports Medicine. (2018), all eligible participants signed a written informed consent form and completed the Physical Activity Readiness Questionnaire (PAR-Q) prior to participating in the study. The study adhered to the Declaration of Helsinki, which sets forth the ethical guidelines for research involving human participants; ensuring their rights, dignity, and safety are protected, and that informed consent is obtained from all participants (World Medical Association, 2025). The researcher explained the purpose of the study in both Literal English and Pidgin English, ensuring that everyone, regardless of their literacy level, fully understood what participation entailed.

Before the commencement of the training programme, baseline measurements of body mass, stature and blood pressure were assessed for all eligible participants in the experimental and control groups. At the end of the training programme, blood pressure was assessed. This pretest-posttest design enabled comparison of the physiological changes between the experimental group, which received the interval walking training (IWT) intervention, and the control group, which maintained usual routine and standard medical care.

The 12-week supervised intervention was conducted four days a week—Tuesdays, Wednesdays, Thursdays, and Friday—from 5:00 p.m. to 6:30 p.m. to minimize the effect of circadian rhythms on the results. The training was conducted at Federal Medical Centre Makurdi, which provided a safe, open walking path suitable for group sessions. The programme began on July 8, 2025, and ended on October 2, 2025. Each session included a warm-up phase, alternating burst of slow walking and fast walking, and a cool-down phase. The protocol employed a stopwatch and a bell to regulate intervals, and a Rating of Perceived Exertion (RPE) scale to monitor exercise intensity. The programme was adopted from Hiroshi Nose (Nose et al., 2009) to boost accessibility to exercise and improve cardiovascular health.

Each session of the training began with a 5-minute warm up of light walking to get the muscles and joints ready. Then participants proceeded with walking together at a slow and comfortable pace on the open space. They then increased their speed until they reached a fast walking intensity equivalent to about 70% of VO_2 peak (RPE 6–7 where talking felt challenging) for 3 minutes. After 3 minutes, the bell signalled a shift back to slow walking (RPE 2–3 where holding a conversation was easy), allowing 3 minute-recovery. Each session of the programme ended with a 5-minute cool down of slow walking and stretching to relax the body. Participants completed five 6-minute intervals (30 minutes total) per session, performed four days per week. In one week, they completed at least 20 intervals (120 minutes) per week. Over the 12-week period, they completed at least 240 intervals (1440 minutes). This structured schedule was designed to balance exercising at a level above the anaerobic threshold, which significantly boosts aerobic capacity, followed by giving the body a chance to bounce back, supporting blood pressure control among women with diabetes in Makurdi.

Exercise intensity was prescribed according to the IWT protocol of Nose et al. (2009), which rates slow walking as ≤40% VO_2peak and fast walking as ≥70% VO_2peak. Direct measurement of VO_2peak was not feasible, hence intensity was guided using participants' walking pace and ratings of perceived exertion (RPE), consistent with community-based implementation of IWT.

Adherence and Attrition

Forty participants were recruited and completed the 12-week IWT programme, with no participant attrition. Attendance at supervised IWT sessions, indicated high adherence to the IWT protocol.

Data analysis

The data for this study were analyzed using the mean and standard deviation to describe the demographic characteristics of the participants. In order to test the hypotheses, Analysis of Covariance (ANCOVA) was employed to compare posttest mean values while controlling for pretest scores. Before the application of ANCOVA, the assumptions of normality, homogeneity of error variances, and homogeneity of regression slopes were examined. No significant violations of these assumptions were observed; hence, the use of ANCOVA was considered appropriate. Effect sizes were determined using partial eta squared (η^2p), interpreted as small (0.01), medium (0.06), and large (0.14) (Cohen, 1988). A probability level of $\alpha = 0.05$ or less was used to indicate statistical significance. All statistical analyses were carried out using SPSS 21.0 (IBM Corp., Armonk, NY, USA).

Results

Table 1: **Demographic Characteristics of the Participants (mean ± SD) (n=40).**

Variable	Experimental (n=20)	Control (n=20)
Age (years)	54.1 ± **6.7**	54.3 ± **7**.4
Stature (m)	1.6 ± 0.1	1.6 ± 0.1
Weight (kg)	75.3 ± **7**.5	78.3 ± 9.7
Body Mass Index (BMI) (kg/m²)	29.2 ± 2.3	29.8 ± 2.6

Table 1 indicated that participants in the experimental group had a mean age of 54.1 ± 6.7 years, while those in the control group had a mean age of 54.3 ± 7.4 years, suggesting that the participants were predominantly middle-aged women with type 2 diabetes. Mean stature was identical in both groups (1.6 ± 0.1 m). The mean body weight of the experimental group was 75.3 ± 7.5 kg compared with 78.3 ± 9.7 kg for the control group. Similarly, the mean body mass index (BMI) for the experimental group was 29.2 ± 2.3 kg/m² and 29.8 ± 2.6 kg/m² for the control group, indicating that the participants were generally overweight. The groups were comparable before the intervention.

Table 2: **Pre- and Post-Intervention Resting SBP and DBP of the Experimental and Control Groups**

Variable	Pre-Intervention Experimental(n=20)	Control (n=20)	Experimental(n=20)	Post-Intervention Control (n=20)
Resting SBP (mmHg)	138.6 ± **7.**3	138.7 ± **7.**8	131.7± **7.**6	138.3 ± **7.**8
Resting DBP (mmHg)	83.7 ± 3.7	85.3 ± 3.0	77.8 ± 4.8	85.1 ± 3.2

Table 2 indicated that, at baseline, both experimental and control groups had resting SBP values that were comparable (experimental: 138.6 ± 7.3 mmHg; control: 138.7 ± 7.8 mmHg). Following the 12-week intervention, the experimental group demonstrated a notable reduction in resting SBP to 131.7 ± 7.6 mmHg, corresponding to a mean decrease of 6.9 mmHg, whereas the control group showed only a minimal decrease to 138.3 ± 7.8 mmHg, corresponding to a mean decrease of 0.4 mmHg. Similarly, the experimental group demonstrated a marked reduction in resting DBP from 83.7 ± 3.7 mmHg at baseline to 77.8 ± 4.8 mmHg after the intervention, representing a mean decrease of 5.9 mmHg. In contrast, the control group indicated a slight reduction in resting DBP from 85.3 ± 3.0 mmHg to 85.1 ± 3.2 mmHg, corresponding to a mean decrease of 0.2 mmHg.

Table 3a: **ANCOVA of Effect of a 12-Week Interval Walking Training Programme on Resting Systolic Blood Pressure of Women with Diabetes in Hospitals in Makurdi, Benue State**

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial η^2
Corrected Model	2633.360[a]	2	1316.680	681.132	.000	.974
Intercept	2.277	1	2.277	1.178	.285	.031
Pre_Resting.SBP	2201.711	1	2201.711	1138.968	.000	.969
Groups	**424.401**	**1**	**424.401**	**219.547**	**.000**	**.856**
Error	71.524	37	1.933			
Total	732028.920	40				
Corrected Total	2704.884	39				

Results in table 3a indicate a statistically significant effect of a 12-week interval walking training programme on the resting systolic blood pressure of women with diabetes in hospitals in Makurdi, after adjusting for pretest resting systolic blood pressure (RSBP), $F (1, 39)) = 219.547$, $p= <0.001$, partial $\eta^2 = .856$. The intervention produced an adjusted mean difference (AMD) of −6.9 mmHg (95% CI [−9.42, −4.31]), compared with the control group. The large effect size suggests that the training programme accounted for approximately 85.6% of the variance in posttest resting systolic blood pressure between the groups, indicating that the intervention had substantial practical importance beyond chance variation. The pretest score was also a significant covariate, $F (1, 39) = 1139.0$, $p < 0.001$, $\eta^2 = 0.969$, demonstrating a strong relationship between pre- and post-intervention resting systolic blood pressure. The overall model was statistically significant, $F(2, 39) = 681.1$, $p < 0.001$, partial $\eta^2 = 0.974$.

Table 3b: **ANCOVA of Effect of a 12-Week Interval Walking Training Programme on Resting Diastolic Blood Pressure of Women with Diabetes in Hospitals in Makurdi, Benue State**

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial η^2
Corrected Model	1062.955[a]	2	531.477	200.347	.000	.915
Intercept	9.782	1	9.782	3.687	.063	.091
Pre_Resting.DBP	530.785	1	530.785	200.086	.000	.844
Groups	**288.489**	**1**	**288.489**	**108.750**	**.000**	**.746**
Error	98.153	37	2.653			
Total	266639.250	40				
Corrected Total	1161.108	39				

Results in Table 3b reveal a significant effect of the training programme on posttest resting diastolic blood pressure (RDBP) scores, after adjusting for pretest differences $F(1, 39) = 108.75$, $p < 0.001$, partial $\eta^2 p = 0.746$. The intervention produced an AMD of 5.9 mmHg (AMD = −5.9 mmHg, 95% CI [−7.98, −3.82) compared with the control group. The large effect size, according to Cohen's guidelines, suggests a substantial improvement in diastolic blood pressure relative to the comparison group after baseline differences were controlled, indicating that a substantial proportion of the variance in resting diastolic blood pressure improvement can be attributed to the intervention. The covariate (resting diastolic blood pressure scores) was also a significant predictor, $F(1, 39) = 200.09$, $p < 0.001$, indicating its relevance in the model. These findings demonstrate that the 12-week interval walking training programme had a practical and statistically significant effect on the resting diastolic blood pressure of the participants.

Discussion

The aim of the study was to assess the effect of a 12-week interval walking training programme on the resting systolic and diastolic blood pressure of women with type 2 diabetes attending hospitals in Makurdi, Benue State.

The findings of the study revealed that a 12-week interval walking training programme significantly reduced RSBP in women with type 2 diabetes (T2D) ($p < .05$). This finding is consistent with the systematic review by Moghetti et al. (2020), which concluded that supervised walking training improves blood pressure, with the greatest benefits observed when it is structured, supervised, and supported to enhance adherence. Similarly, Marcotte-Chénard et al. (2021) reported significant reductions in resting systolic blood pressure following a 12-week low-volume walking-based high-intensity interval training (HIIT) programme in older women with T2D. Furthermore, Saini et al. (2025) reported greater systolic blood pressure reductions following interval training compared with continuous aerobic training. The greater reduction observed in the present study compared with pooled estimates reported in previous studies could be attributed to participants' relatively high baseline blood pressure levels and good adherence to IWT programme, both of which are known to influence the magnitude of structured physical activity-induced blood pressure reductions. These findings suggest that structured interval walking training is an effective strategy for improving blood pressure control and reducing cardiovascular risk among women with T2D.

The findings of the present study also demonstrated that participation in a 12-week interval walking training programme significantly reduced RDBP in women with T2D. This finding aligns with previous studies demonstrating the effectiveness of IWT interventions in improving blood pressure outcomes. Marcotte-Chénard et al. (2021) reported significant reductions in resting diastolic blood pressure following a 12-week walking-based HIIT programme in older women with T2D, while Edwards et al. (2023) found that HIIT reduces resting diastolic blood pressure by approximately 2.5 mmHg across randomized controlled trials. Similarly, Ganjeh et al. (2023) reported that aerobic exercise lowers diastolic blood pressure in a dose-dependent manner. The observed reduction may be attributed to IWT-induced improvements in endothelial function and arterial and vascular function, leading to reduced peripheral blood flow and contributing to reductions in diastolic blood pressure. However, some studies have reported inconsistent findings. Tsuda et al. (2022) found no significant overall effect of IWT on DBP among community-dwelling older adults, although participants who accumulated greater amounts of fast walking experienced more substantial reductions in blood pressure. Relatedly, Kitajima et al. (2023) found no significant change in RDBP following 20 weeks of interval walking in adults with T2D. These differences may reflect variations in participant characteristics, intervention adherence, exercise dose, duration, and blood pressure assessment methods. Despite these inconsistencies, the significant reduction observed in the present study supports IWT as a practical and effective strategy for improving blood pressure control and reducing cardiovascular risk among women with T2D.

Study Limitations

Although this study demonstrates positive results, it is not without some limitations. The relatively small sample of women with T2D sampled from two public hospitals in Makurdi may have reduced the statistical power and limited the generalizability of the findings to men, patients in private hospitals, or rural populations. In addition, the lack of individual randomization in the quasi-experimental design may have introduced selection bias and limited causal inference. Also, participants continued their prescribed drugs for diabetes and hypertension during the intervention, which was not controlled, and may have confounded the observed effects on blood pressure. Finally, neither participants nor outcome assessors were blinded to group allocation, introducing the potential for performance and measurement bias.

Conclusion

This study demonstrates that a 12-week IWT programme may substantially reduce resting systolic and diastolic blood pressure in women with T2D in Makurdi, Benue State. The results suggest that IWT is a practical and low-cost non-drug intervention for improving blood pressure and reducing cardiovascular risk in this population. However, given the limitations of the study, further randomized controlled trials with larger sample sizes and more diverse populations are warranted. Hospitals in Makurdi may consider institutionalizing structured IWT programmes within their diabetic clinics through an exercise prescription unit, where feasible, alongside standard clinical care, to reduce long-term risks.

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