Novelty Journals

ISSN 2394-7330

International Journal of Novel Research in Healthcare and Nursing
Vol. 13, Issue 2, pp: (83-94), Month: May - August 2026, Available at: www.noveltyjournals.com

Comparative Study of Glycaemic Control, Body Mass Index, and Weight Management Outcomes among Diabetic Patients at University Medical Centres in Port Harcourt

[1]Mbaeyi Chinagorom Carlin, [2]Cole, Osagie Kenneth, [3]Etokwudo Onyeka Stanley, [4]Okongko Aniefiok Dickson

[1]Imo State University, Imo State Nigeria

[2]Department of Community Medicine, Nile University of Nigeria, Abuja.

[3]St. Michael's Hospital, Unity Health Toronto

ORCID: 0000-0003-1417-7803

[4]School of Public Health, Faculty of Clinical Sciences, University of Port Harcourt, Rivers State, Nigeria.

DOI: https://doi.org/10.5281/zenodo.21645138

Published Date: 28-July-2026

Abstract: **The effects of standard care (SC) on glycaemic control, BMI, and weight management in T2DM patients at university medical centers in Port Harcourt, Nigeria. Diabetes mellitus causes morbidity, death, and healthcare expenses worldwide and in Nigeria. Multidisciplinary diabetes management techniques are supported by evidence, although Nigerian healthcare data is scarce.**

A randomized controlled experiment was conducted on 240 adult T2DM patients at Rivers State University Medical Centre and Ignatius Ajuru University Education Medical Centre. Patients were divided among 120 multidisciplinary and 120 conventional care groups. HbA1c, weight, height, and BMI were measured using standardized questionnaires and clinical measures. Glycaemic management was rated as acceptable (HbA1c <7.0%), suboptimal (7.0-8.9%), or bad (≥9.0%). Statistical analyses were performed using SPSS version 25, including descriptive statistics, chi-square tests, Spearman's correlation, logistic regression, and paired z-tests, with a significance level of $p < 0.05$.

Results: HbA1c categorization, knowledge of glycaemic state, frequency of blood glucose monitoring, and hypoglycaemia and hyperglycaemia symptoms were not significantly different across groups. In terms of weight management results, the multidisciplinary care group had a slightly lower mean BMI (28.44 kg/m²) than the standard care group (29.55 kg/m²), although the difference was not significant. BMI was dominated by obesity in both groups. In terms of physical activity, the standard care group reported greater exercise than the multidisciplinary care group, which was statistically significant.

Conclusion: Port Harcourt diabetics receiving multidisciplinary treatment did not enhance glycaemic control or BMI outcomes statistically compared to routine care. However, multidisciplinary care improved diabetes control and HbA1c knowledge. The study suggested adding organized exercise, nutritional counseling, behavioral adjustment, and weight monitoring to diabetic follow-up treatment to enhance long-term glycaemic and anthropometric outcomes in T2DM patients.

Keywords: **Type 2 diabetes mellitus, glycaemic control, body mass index (BMI), multidisciplinary care.**

International Journal of Novel Research in Healthcare and Nursing
Vol. 13, Issue 2, pp: (83-94), Month: May - August 2026, Available at: www.noveltyjournals.com

1. INTRODUCTION

Diabetes mellitus is a chronic, incurable disease affecting approximately 3% of Nigeria's population (WHO, 2007; WHO, 2010). Rising rates of non-communicable diseases, including diabetes, pose significant clinical, social, and economic challenges, particularly with the declining age of onset. Despite the WHO's designation of diabetes as a priority condition (2007), public health planners often underestimate its magnitude and associated complications. The increasing prevalence, coupled with the lifelong requirement for anti-diabetic therapy, imposes substantial financial burdens on patients, health systems, and national economies (Cantrill, 1999). Diabetes mellitus poses a substantial global health and economic challenge, with profound implications for morbidity and mortality. According to the American Diabetes Association (ADA), the annual cost of diabetes in the United States reached $412.9 billion in 2022, comprising $306.6 billion in direct medical expenses and $106.3 billion in indirect costs. Individuals diagnosed with diabetes incurred medical expenditures that were, on average, 2.6 times higher than those of individuals without the condition (Parker et al., 2024). These figures underscore the disproportionate financial burden associated with diabetes and highlight the critical need for effective disease management strategies. Glycaemic control remains central to diabetes management, serving as a key determinant in the prevention of both acute and chronic complications.

Maintaining blood glucose levels within recommended targets reduces the risk of comorbidities such as cardiovascular disease, nephropathy, and neuropathy, while also improving patients' overall quality of life. However, achieving optimal glycaemic control is often hindered by a complex interplay of factors, including poor medication adherence, unhealthy dietary patterns, obesity, long-standing diabetes (≥10 years), hyperlipidaemia, advanced age, elevated systolic blood pressure, and male sex (Anioke et al., 2019). Socioeconomic determinants such as low health literacy, limited educational attainment, and unemployment further exacerbate these challenges (Asmelash et al., 2019; Dedefo et al., 2020). Multidisciplinary care models have emerged in response to these multifaceted barriers, offering a holistic and integrated approach to diabetes management. These models harness the collective expertise of healthcare professionals, including endocrinologists, dietitians, nurses, physiotherapists, and mental health specialists, to deliver coordinated, patient-centred care. International evidence supports the effectiveness of multidisciplinary interventions in improving glycaemic control, managing comorbidities, and enhancing continuity of care. Furthermore, such models have been shown to be both feasible and acceptable to patients and providers alike. Despite these encouraging outcomes, a significant gap persists in the literature regarding the implementation and effectiveness of multidisciplinary diabetes care models within sub-Saharan Africa, particularly in Nigeria.

The rising prevalence of diabetes mellitus in Nigeria has been accompanied by a troubling increase in complications such as diabetic foot ulcers, cardiovascular disease, and renal impairment, especially in urban centres like Port Harcourt (Ezeama & Enwereji, 2019). In light of this, the adoption of a multidisciplinary care approach at university medical centres in Port Harcourt presents a promising strategy for reducing diabetes-related morbidity and mortality. Therefore, this study aimed to compare the impact of multidisciplinary care and standard care models on glycaemic control, body mass index, and weight management outcomes among patients with type 2 diabetes in Port Harcourt.

2. METHODS AND MATERIALS

Study Design

This study adopted a randomized controlled trial research design to determine superiority between standard diabetic care and multidisciplinary care with respect to the BMI and HbA1c levels in patients diagnosed with T2DM. The design is considered appropriate for use in the present study because it allows for controlled allocation of participants to treatment groups, thereby minimizing bias and strengthening causal inference in a clinical setting.

Study Population

A total of 240 patients with confirmed T2DM were included in this study. The sample size was determined using formula for comparative studies (Hajian-Tilaki, 2011).

$$n = \frac{(Z_{2\alpha} + Z_{\beta})^2 \times [\, p_1(100 - p_1) + p_2(100 - p_2)]}{(P_1 - P_2)^2}$$

International Journal of Novel Research in Healthcare and Nursing
Vol. 13, Issue 2, pp: (83-94), Month: May - August 2026, Available at: www.noveltyjournals.com

Where,

n = Sample size to be obtained

Z_α = Standard normal deviate corresponding to the probability of type I at 5%, which is 1.96.

Z_β = Standard normal deviate corresponding to the probability at 80% power, which is 0.84.

P_1 = proportion of respondents with adequate adherence to medication in the other previous study 60% (0.60) (Adisa, etal., 2011).

P_2 = proportion of respondents with adequate adherence in previous study, 40.6% (0.41) (Fadare, etal., 2015).

P_2-P_1= Difference between the two proportions = 19%.

$$n = \frac{(1.96 + 0.84)^2 \times [\ 0.60(100 - 0.60) + 0.41(100 - 0.41)]}{(0.60 - 0.41)^2}$$

= 109

The minimum sample size for each group was 109, but this figure was increased by 10% to minimize the effect of non-response, 120 questionnaires were administered in each group. The inclusion criteria were as follows:

i. Adult aged ≥18 years.

ii. A confirmed diagnosis of T2DM based on the American Diabetes Association (ADA) criteria.

iii. Patients receiving treatment at either Rivers State University medical centre or the Ignatius Ajuru University Education medical centre for at least one year.

iv. Availability of complete BMI and HbA1c measurements within the past 12 months.

The following exclusion criteria included: Patients that are seriously ill were excluded from the study based on specific clinical and diagnostic criteria. Individuals experiencing acute or critical illnesses that could hinder their ability to participate effectively were not eligible for inclusion. Additionally, patients who lacked documented glycemic measurements confirmed by an HbA1c test within the four weeks preceding the study, or who were unable to provide the necessary clinical data, were excluded. The study also excluded all cases of gestational diabetes to maintain a focus on the adult type 2 diabetes population.

3. DATA COLLECTION

This study utilized data from primary and secondary sources. Data collection was conducted after physician consultation sessions, with informed consent obtained from all participants. Demographic data such as age, sex, duration of diabetes, and smoking status were gathered.

Clinical data of height, weight, and HbA1c levels were measured. BMI was calculated as weight in kilograms divided by height in meters squared (kg/m^2). Patients were categorized into three groups based on BMI: BMI categories were classified according to the World Health Organization (WHO) criteria and modified Asian-specific thresholds. Normal weight was defined as BMI < 23 kg/m^2, overweight as 23–24.9 kg/m^2, and obese as ≥ 25 kg/m^2. Glycemic control was assessed using the most recent hemoglobin A1c (HbA1c) value available from the participants' medical records. Levels were classified as: Good control (HbA1c < 7.0%), suboptimal control (HbA1c 7.0–8.9%), and poor control (HbA1c ≥ 9.0%), in line with commonly used international targets for adults with diabetes.

4. METHOD OF DATA ANALYSIS

This study employed both quantitative and qualitative methods of data analysis to comprehensively address the research objectives. Descriptive statistics including frequency distribution tables, means, and standard deviations were utilized to summarize and interpret responses to the research questions. To test the study hypotheses and assess statistically significant differences between the intervention and control groups, inferential analysis was conducted using the paired z-test. The correlations between the change in HbA1c and the patient's age and clinical and management factors was examined using Spearman's correlation. Variables with a significance level of $P < 0.05$ in the bivariable analysis was included in the multivariable binary logistic regression to adjust for potential confounding factors and identify independent predictors of inadequate and poor glycemic control. Glycemic control was defined based on the HbA1c target recommended by the

American Diabetes Association: < 7% indicated ‘good’ control, while > 7% was classified as ‘poor’ control38. Statistically significant associations were determined using the adjusted odds ratio (AOR) with a 95% confidence interval (CI) and a P-value threshold of < 0.05. All p-values were two-tailed. P-values<0.05 was considered significant. Statistical Package for Social Sciences (SPSS) version 25 was used for all statistical analyses.

Ethical Considerations

Official permission was obtained from the management of the Rivers State University and Ignatius Ajuru University Education Medical Centres before the commencement of the study. A written informed consent form was used to obtain permission from the participants who have indicated interest in participating in this study. Also, the participants were informed that they have the right to withdraw from the study at any point. Participants were assured that all data collected during the research will be safely protected and used only for the study.

5. RESULTS

Baseline Characteristics

Table 1: Socio-demographic characteristics of the respondents by group

Variables	MDC (n = 120) n (%)	SC (n = 120) n (%)	Total (n = 240) n (%)	χ^2	p-value
Age (years)Mean	**55.13**	**57.43**	**56.28**	**5.696**	**0.223**
≤ 44	13 (10.8)	8 (6.7)	21 (8.8)		
45–52	29 (24.2)	22 (18.3)	51 (21.2)		
53–60	48 (40.0)	44 (36.7)	92 (38.3)		
61–68	24 (20.0)	37 (30.8)	61 (25.4)		
69+	6 (5.0)	9 (7.5)	15 (6.2)		
Sex				**0.830**	**0.362**
Male	49 (40.8)	56 (46.7)	105 (43.8)		
Female	71 (59.2)	64 (53.3)	135 (56.2)		
Education				**2.779**	**0.595**
No formal education	9 (7.5)	9 (7.5)	18 (7.5)		
Primary	13 (10.8)	19 (15.8)	32 (13.3)		
Secondary	33 (27.5)	31 (25.8)	64 (26.7)		
Tertiary	38 (31.7)	42 (35.0)	80 (33.3)		
Postgraduate	27 (22.5)	19 (15.8)	46 (19.2)		
Marital status				**4.170**	**0.244**
Single	22 (18.3)	14 (11.7)	36 (15.0)		
Married	76 (63.3)	85 (70.8)	161 (67.1)		
Divorced/Separated	7 (5.8)	11 (9.2)	18 (7.5)		
Widowed	15 (12.5)	10 (8.3)	25 (10.4)		
Occupation				**3.264**	**0.659**
Government	21 (17.5)	24 (20.0)	45 (18.8)		
Private	25 (20.8)	18 (15.0)	43 (17.9)		
Self-employed	35 (29.2)	40 (33.3)	75 (31.2)		
Unemployed	15 (12.5)	10 (8.3)	25 (10.4)		
Retired	21 (17.5)	23 (19.2)	44 (18.3)		
Student	3 (2.5)	5 (4.2)	8 (3.3)		
Average monthly household income				**1.447**	**0.836**
<50k	36 (30.0)	34 (28.3)	70 (29.2)		
50k–100k	35 (29.2)	35 (29.2)	70 (29.2)		
101k–200k	29 (24.2)	28 (23.3)	57 (23.8)		
>200k	12 (10.0)	10 (8.3)	22 (9.2)		
Prefer not to say	8 (6.7)	13 (10.8)	21 (8.8)		
Residence				**0.550**	**0.760**
Urban	65 (54.2)	70 (58.3)	135 (56.2)		
Rural	25 (20.8)	21 (17.5)	46 (19.2)		
Peri-urban	30 (25.0)	29 (24.2)	59 (24.6)		

International Journal of Novel Research in Healthcare and Nursing
Vol. 13, Issue 2, pp: (83-94), Month: May - August 2026, Available at: www.noveltyjournals.com

As shown in Table 1, the socio-demographic characteristics of respondents were broadly comparable between the MDC and SC groups, with no statistically significant differences across any of the variables examined, since all p-values exceeded 0.05. The mean age of respondents was slightly lower in the MDC group (55.13 years) than in the SC group (57.43 years), with an overall mean age of 56.28 years, and the largest proportion of participants in both groups fell within the 53–60 years category. Females constituted a higher proportion of respondents overall (56.2%) than males (43.8%). In terms of education, respondents with tertiary education formed the largest category (33.3%), followed by those with secondary education (26.7%), indicating a relatively educated sample. Most participants were married (67.1%), while the most common occupational category was self-employment (31.2%), reflecting the economic profile of the respondents. Regarding income, the largest shares of respondents were in the below ₦50,000 and ₦50,000–₦100,000 categories, each accounting for 29.2% of the sample. In addition, more than half of the respondents resided in urban areas (56.2%). Overall, the findings suggest that both groups were socio-demographically similar, supporting meaningful comparison of subsequent outcome measures.

Table 2: Clinical Status of the participants by group

Variables	MDC (n = 120) n (%)	SC (n = 120) n (%)	Total (n = 240) n (%)	χ^2	p-value
Duration of diabetes				1.925	0.588
<1 year	15 (12.5)	11 (9.2)	26 (10.8)		
1–5 years	59 (49.2)	59 (49.2)	118 (49.2)		
6–10 years	28 (23.3)	25 (20.8)	53 (22.1)		
>10 years	18 (15.0)	25 (20.8)	43 (17.9)		
Co-morbid conditions in addition to diabetes				2.546	0.636
None	26 (21.7)	20 (16.7)	46 (19.2)		
Hypertension	44 (36.7)	38 (31.7)	82 (34.2)		
Dyslipidemia	12 (10.0)	15 (12.5)	27 (11.2)		
Both	29 (24.2)	35 (29.2)	64 (26.7)		
Others	9 (7.5)	12 (10.0)	21 (8.8)		
Current diabetes treatment regimen				2.572	0.632
Diet/lifestyle only	16 (13.3)	11 (9.2)	27 (11.2)		
Oral medications	51 (42.5)	50 (41.7)	101 (42.1)		
Insulin only	8 (6.7)	14 (11.7)	22 (9.2)		
Oral medications + insulin	37 (30.8)	37 (30.8)	74 (30.8)		
Others	8 (6.7)	8 (6.7)	16 (6.7)		
Diabetes-related complications				8.610	0.126
None	55 (45.8)	48 (40.0)	103 (42.9)		
Retinopathy	16 (13.3)	16 (13.3)	32 (13.3)		
Nephropathy	5 (4.2)	10 (8.3)	15 (6.2)		
Neuropathy	21 (17.5)	27 (22.5)	48 (20.0)		
Foot ulcer	8 (6.7)	1 (0.8)	9 (3.8)		
Multiple complications	15 (12.5)	18 (15.0)	33 (13.8)		
Hospital admission in past 12 months due to diabetes				8.065	0.045*
Never	80 (66.7)	70 (58.3)	150 (62.5)		
Once	16 (13.3)	33 (27.5)	49 (20.4)		
2–3 times	18 (15.0)	14 (11.7)	32 (13.3)		
>3 times	6 (5.0)	3 (2.5)	9 (3.8)		
Emergency unit visits in past 12 months due to diabetes				1.828	0.609
Never	67 (55.8)	77 (64.2)	144 (60.0)		
Once	28 (23.3)	24 (20.0)	52 (21.7)		
2–3 times	20 (16.7)	15 (12.5)	35 (14.6)		
>3 times	5 (4.2)	4 (3.3)	9 (3.8)		
Attendance at scheduled diabetes clinic appointments				3.293	0.510
Always	59 (49.2)	59 (49.2)	118 (49.2)		
Most times	39 (32.5)	34 (28.3)	73 (30.4)		

Sometimes	17 (14.2)	16 (13.3)	33 (13.8)		
Rarely	2 (1.7)	7 (5.8)	9 (3.8)		
Never	3 (2.5)	4 (3.3)	7 (2.9)		
Doctor ever said blood pressure is poorly controlled				2.343	0.310
Yes	34 (28.3)	45 (37.5)	79 (32.9)		
No	71 (59.2)	63 (52.5)	134 (55.8)		
Not sure	15 (12.5)	12 (10.0)	27 (11.2)		
Doctor ever said cholesterol/lipid levels are abnormal				8.037	0.018*
Yes	46 (38.3)	26 (21.7)	72 (30.0)		
No	60 (50.0)	78 (65.0)	138 (57.5)		
Not sure	14 (11.7)	16 (13.3)	30 (12.5)		
Current smoking/tobacco use				2.000	0.368
Current	13 (10.8)	7 (5.8)	20 (8.3)		
Former	20 (16.7)	20 (16.7)	40 (16.7)		
Never	87 (72.5)	93 (77.5)	180 (75.0)		
Alcohol consumption				8.862	0.012*
Never	57 (47.5)	56 (46.7)	113 (47.1)		
Occasionally	41 (34.2)	56 (46.7)	97 (40.4)		
Regularly	22 (18.3)	8 (6.7)	30 (12.5)		

As presented in Table 2, the clinical status of participants in the MDC and SC groups was largely comparable across most indicators, as the majority of variables showed no statistically significant group differences with p-values greater than 0.05. Nearly half of the respondents in both groups had lived with diabetes for 1–5 years (49.2%), and oral medications were the most common treatment regimen overall (42.1%), followed by a combination of oral medications and insulin (30.8%). Hypertension alone (34.2%) and combined hypertension with dyslipidemia (26.7%) were the most common co-morbid conditions, while 42.9% reported no diabetes-related complications. In terms of healthcare use, a significantly higher proportion of SC participants reported being admitted to hospital once in the past 12 months due to diabetes (27.5%) compared with MDC participants (13.3%) ($\chi^2 = 8.065$, $p = 0.045$). A second significant difference was found in abnormal cholesterol or lipid levels, which were more frequently reported in the MDC group (38.3%) than in the SC group (21.7%) ($\chi^2 = 8.037$, $p = 0.018$). Alcohol consumption also differed significantly between groups, with regular alcohol use higher among MDC respondents (18.3%) than SC respondents (6.7%) ($\chi^2 = 8.862$, $p = 0.012$). Overall, the table suggests that while the two groups were clinically similar on most measures, selected differences in hospitalization, lipid abnormalities, and alcohol use may be important in interpreting subsequent outcomes.

Table 3: Analysis of the difference in glycemic control levels between diabetic patients receiving multidisciplinary care and those receiving standard care

Variables	**MDC (n = 120) n (%)**	**SC (n = 120) n (%)**	**Total (n = 240) n (%)**	**χ^2**	**p-value**
Are you aware of what your last HbA1c result was?				**3.312**	**0.069**
Yes	74 (61.7)	60 (50.0)	134 (55.8)		
No	46 (38.3)	60 (50.0)	106 (44.2)		
If yes, do you understand what your HbA1c result means for your diabetes management?				**2.625**	**0.453**
Yes fully	46 (38.3)	54 (45.0)	100 (41.7)		
Partially	39 (32.5)	29 (24.2)	68 (28.3)		
Not at all	16 (13.3)	14 (11.7)	30 (12.5)		
Not applicable	19 (15.8)	23 (19.2)	42 (17.5)		
How frequently do you have your blood sugar checked at this facility?				**3.157**	**0.532**
Monthly	25 (20.8)	17 (14.2)	42 (17.5)		
Every 3 months	40 (33.3)	47 (39.2)	87 (36.2)		
Every 6 months	23 (19.2)	19 (15.8)	42 (17.5)		
Once a year	10 (8.3)	14 (11.7)	24 (10.0)		

Irregularly	22 (18.3)	23 (19.2)	45 (18.8)		
In the past 6 months, has your doctor told you that your blood sugar is well controlled?				**5.660**	**0.059**
Yes	46 (38.3)	58 (48.3)	104 (43.3)		
No	57 (47.5)	39 (32.5)	96 (40.0)		
Not discussed	17 (14.2)	23 (19.2)	40 (16.7)		
In the past 6 months, have you experienced episodes of hypoglycemia?				**3.374**	**0.338**
Never	61 (50.8)	49 (40.8)	110 (45.8)		
Once/twice	38 (31.7)	40 (33.3)	78 (32.5)		
Monthly	17 (14.2)	24 (20.0)	41 (17.1)		
Weekly	4 (3.3)	7 (5.8)	11 (4.6)		
In the past 6 months, have you experienced episodes of hyperglycemia?				**1.422**	**0.700**
Never	34 (28.3)	28 (23.3)	62 (25.8)		
Once/twice	39 (32.5)	44 (36.7)	83 (34.6)		
Monthly	30 (25.0)	34 (28.3)	64 (26.7)		
Weekly	17 (14.2)	14 (11.7)	31 (12.9)		
Do you monitor your blood sugar at home?				**0.946**	**0.814**
Daily	22 (18.3)	17 (14.2)	39 (16.2)		
Weekly	33 (27.5)	32 (26.7)	65 (27.1)		
Irregularly	32 (26.7)	34 (28.3)	66 (27.5)		
None	33 (27.5)	37 (30.8)	70 (29.2)		
Classification of HbA1c level				**3.206**	**0.201**
Poor control (HbA1c ≥9.0%)	37 (30.8)	35 (29.2)	72 (30.0)		
Suboptimal control (HbA1c 7.0 – 8.9%)	64 (53.3)	55 (45.8)	119 (49.6)		
Good control (HbA1c < 7.0%)	19 (15.8)	30 (25.0)	49 (20.4)		
Mean HbA1c	**7.63%**	**7.92%**	**7.77%**		

The findings in Table 3 indicate that there was no statistically significant overall difference in glycemic control levels between diabetic patients receiving multidisciplinary care (MDC) and those receiving standard care (SC). Although MDC participants were more likely to report awareness of their last HbA1c result (61.7% vs 50.0%) and slightly lower mean HbA1c (7.63% vs 7.92%), these differences were not statistically significant. Similarly, the classification of HbA1c levels showed no significant group difference ($\chi^2 = 3.206$, $p = 0.201$). Notably, a higher proportion of SC respondents fell within the good control category (25.0%) compared with MDC respondents (15.8%), whereas MDC respondents were more concentrated in the suboptimal control category (53.3%). Other indicators, including understanding of HbA1c meaning, frequency of blood sugar checks, hypoglycemia, hyperglycemia, and home monitoring, also showed no significant differences. Therefore, the study suggests that glycemic control levels were broadly similar in both groups, with no significant advantage for multidisciplinary care over standard care.

Table 4: Analysis of the difference in changes in body mass index (BMI) and weight management outcomes between diabetic patients receiving multidisciplinary care and those receiving standard care

Variables	MDC (n = 120) n (%)	SC (n = 120) n (%)	Total (n = 240) n (%)	χ^2	p-value
Compared to when you were first diagnosed with diabetes, how has your weight changed?				**4.319**	**0.229**
Lost	17 (14.2)	22 (18.3)	39 (16.2)		
Stable	39 (32.5)	46 (38.3)	85 (35.4)		
Gained	46 (38.3)	43 (35.8)	89 (37.1)		
Not sure	18 (15.0)	9 (7.5)	27 (11.2)		
In the past 6 months, how much weight have you gained or lost?				**1.719**	**0.787**
Lost >5 kg	9 (7.5)	9 (7.5)	18 (7.5)		
Lost 1–5 kg	22 (18.3)	17 (14.2)	39 (16.2)		
No significant change	42 (35.0)	49 (40.8)	91 (37.9)		

Gained 1–5 kg	28 (23.3)	30 (25.0)	58 (24.2)		
Gained >5 kg	19 (15.8)	15 (12.5)	34 (14.2)		
Which of the following weight management strategies are you currently using?				**5.028**	**0.413**
None	16 (13.3)	14 (11.7)	30 (12.5)		
Diet	24 (20.0)	16 (13.3)	40 (16.7)		
Exercise	16 (13.3)	20 (16.7)	36 (15.0)		
Weight loss medication only	42 (35.0)	44 (36.7)	86 (35.8)		
Other	2 (1.7)	7 (5.8)	9 (3.8)		
Mixed including medications	20 (16.7)	19 (15.8)	39 (16.2)		
Has your healthcare provider given you specific advice or a plan for managing your weight?				**2.469**	**0.291**
Detailed plan	24 (20.0)	28 (23.3)	52 (21.7)		
General advice	68 (56.7)	56 (46.7)	124 (51.7)		
None	28 (23.3)	36 (30.0)	64 (26.7)		
How many days per week do you engage in at least 30 minutes of physical activity?				**10.282**	**0.016***
Never	31 (25.8)	16 (13.3)	47 (19.6)		
1–2 days	38 (31.7)	31 (25.8)	69 (28.8)		
3–4 days	33 (27.5)	41 (34.2)	74 (30.8)		
5+ days	18 (15.0)	32 (26.7)	50 (20.8)		
BMI categories				**4.208**	**0.240**
Underweight	3 (2.5)	5 (4.2)	8 (3.3)		
Healthy weight	33 (27.5)	22 (18.3)	55 (22.9)		
Overweight	38 (31.7)	35 (29.2)	73 (30.4)		
Obesity	46 (38.3)	58 (48.3)	104 (43.3)		
Mean BMI	**28.44kg/m²**	**29.55kg/m²**	**28.99kg/m²**		

The results in Table 4 show that there were no statistically significant overall differences in BMI and most weight management outcomes between diabetic patients receiving multidisciplinary care (MDC) and those receiving standard care (SC). The two groups were similar in weight change since diagnosis, weight change in the past six months, weight management strategies used, healthcare provider advice, and BMI categories, as all corresponding p-values were greater than 0.05. In both groups, many respondents reported either weight gain since diagnosis or no significant recent weight change, while obesity was the most common BMI category overall. The mean BMI was slightly lower in the MDC group (28.44 kg/m²) than in the SC group (29.55 kg/m²), but this difference was not statistically significant. The only significant difference was in physical activity level ($\chi^2 = 10.282$, $p = 0.016$), with SC participants reporting more frequent engagement in at least 30 minutes of exercise per week, particularly in the 5+ days category. Therefore, the study indicates that BMI and weight management outcomes were broadly similar in both groups, except that SC participants were more physically active than MDC participants.

6. DISCUSSION

The findings of this study show that multidisciplinary care (MDC) did not produce a statistically significant overall improvement in glycemic control compared with standard care (SC). Although MDC participants reported greater awareness of their last HbA1c result and had slightly lower mean HbA1c values, these differences were not significant. Moreover, SC respondents were more likely to fall within the good control category, while MDC respondents were more concentrated in the suboptimal control category. Taken together, the evidence suggests that glycemic control levels were broadly similar in both groups, with no clear advantage for MDC. These results are consistent with some previous studies that have found limited or mixed effects of MDC on glycemic outcomes. For instance, Ahmed Mohammed ALkathiri et al. (2024) reported that while multidisciplinary approaches improved patient support and coordination of care, their impact on HbA1c reduction was modest and not always statistically significant. Similarly, certain pharmacist-led interventions have demonstrated improvements in adherence and patient engagement but only small, non-significant changes in HbA1c levels, suggesting that MDC may not always translate into measurable glycemic benefits.

On the other hand, several studies have highlighted the potential of MDC to improve glycemic control when implemented with structured education and intensive follow-up. Zarora et al. (2022), in a systematic review of integrated diabetes care, found that multidisciplinary interventions involving diabetes specialists in primary and community settings were associated with improved clinical outcomes, including HbA1c reductions. Likewise, Sathya and Annadurai (2024) showed that pharmacist-inclusive MDC teams contributed to better glycemic management, underscoring the importance of team composition and the inclusion of patient education in achieving significant improvements. The American Diabetes Association (ADA) Standards of Care also emphasize that team-based approaches can enhance diabetes management, particularly when they integrate lifestyle counseling, medication management, and patient education.

The divergence between the current study's findings and those of supportive literature may be explained by differences in the intensity and structure of MDC programs. In settings where MDC focuses more on clinical monitoring than on patient education and behavioral support, improvements in glycemic control may be limited. Patient-related factors such as health literacy, adherence, and socioeconomic context also play a role in moderating outcomes.

This study suggests that while MDC may enhance awareness of HbA1c and address certain aspects of diabetes management, it did not produce a statistically significant improvement in overall glycemic control compared to standard care. This aligns with research showing modest or mixed effects, but contrasts with studies that report stronger benefits when MDC is implemented with structured education and comprehensive follow-up. Future research should therefore examine how MDC programs can be optimized—particularly by integrating intensive patient education and behavioral support—to achieve more consistent improvements in glycemic outcomes.

The findings indicated that there were no statistically significant overall differences in body mass index (BMI) and most weight management outcomes between diabetic patients receiving multidisciplinary care (MDC) and those receiving standard care (SC). Across indicators including weight change since diagnosis, weight change in the preceding six months, weight management strategies employed, healthcare provider advice, and BMI categories, all corresponding p-values exceeded the 0.05 threshold. The mean BMI was marginally lower in the MDC group (28.44 kg/m²) compared to the SC group (29.55 kg/m²), yet this difference was not statistically significant. Obesity was the most prevalent BMI category in both groups, and many participants in both arms reported either weight gain since diagnosis or negligible recent weight change. The sole statistically significant between-group difference was in physical activity level ($\chi^2 = 10.282$, $p = 0.016$), with SC participants reporting greater engagement in at least 30 minutes of exercise per week, particularly those exercising five or more days per week. This overall pattern of null findings, punctuated by the paradoxical physical activity result, merits careful discussion in light of the existing literature.

The absence of significant between-group differences in BMI and most weight management outcomes is consistent with a body of literature suggesting that care model type alone does not reliably produce differential anthropometric outcomes among diabetic patients without sustained, targeted behavioural intervention. Minet et al. (2010), in a meta-analysis of self-management interventions for type 2 diabetes, reported that while multidisciplinary programmes produced modest improvements in HbA1c, effects on body weight and BMI were small, heterogeneous, and often non-significant. The authors concluded that glycaemic benefits of MDC are not necessarily paralleled by equivalent improvements in weight outcomes, particularly in the absence of structured obesity management components. This finding closely mirrors the present study's result, in which the MDC group did not demonstrate a statistically significant BMI advantage over SC.

Similarly, Khunti et al. (2012) evaluated a structured education programme for newly diagnosed type 2 diabetes patients in the United Kingdom and found that group-based multidisciplinary education had no significant long-term effect on BMI or weight when compared to standard primary care at 12 months follow-up. The authors observed that participants in both groups tended to gain or maintain weight over the observation period, consistent with the present study's finding that weight gain since diagnosis was common across both the MDC and SC groups. Norris et al. (2004) similarly conducted a systematic review on self-management education for adults with type 2 diabetes and concluded that while short-term weight loss was achievable through intensive interventions, the magnitude of BMI change in team-based versus standard care was not consistently significant, particularly in real-world clinical settings as opposed to tightly controlled trial conditions.

The high prevalence of obesity as the dominant BMI category in both groups is consistent with the epidemiological profile of type 2 diabetes in sub-Saharan Africa, where the dual burden of overnutrition and metabolic disease has become increasingly prominent. Adeloye et al. (2017) estimated a rising prevalence of overweight and obesity among adults in

International Journal of Novel Research in Healthcare and Nursing
Vol. 13, Issue 2, pp: (83-94), Month: May - August 2026, Available at: www.noveltyjournals.com

Nigeria, attributing this to urbanisation, dietary transition, and declining physical activity, factors that may impose ceiling effects on any care model's capacity to produce significant BMI reductions without population-level lifestyle interventions. Uloko et al. (2018) similarly reported high rates of overweight and obesity among type 2 diabetes patients in northern Nigeria, noting that clinical weight management strategies were inconsistently applied and infrequently sustained across care settings. These contextual factors help explain why neither MDC nor SC produced meaningful differentiation in BMI outcomes in the present study population.

Further supporting the null finding, Odgers-Jewell et al. (2017) conducted a systematic review of group-based interventions for type 2 diabetes and found that while such interventions improved glycaemic control, effects on body weight were inconsistent and often failed to achieve significance, even when the interventions were delivered by multidisciplinary teams. The authors attributed this limitation in part to the difficulty of achieving sustained dietary and behavioural change through clinical contact alone, without concurrent environmental and community-level supports. This interpretation is germane to the present study's context, where both groups reported similar weight management strategies and comparable levels of healthcare provider advice, suggesting that the qualitative content of care—rather than its disciplinary breadth—may be the operative variable.

However, several studies contradict the null weight management finding of the present study and demonstrate measurable BMI advantages associated with MDC. Gabbay et al. (2006) evaluated a multidisciplinary diabetes care model in Brazil and found that patients receiving team-based care that included physicians, nurses, dietitians, and psychologists demonstrated significant reductions in BMI and waist circumference compared to those receiving standard physician-only care over a 12-month period. The structured dietary counselling and behavioural coaching components of the MDC arm were identified as the principal drivers of this advantage. Likewise, Huang et al. (2010) conducted a randomised controlled trial in Taiwan comparing MDC and SC for patients with type 2 diabetes and reported significantly greater reductions in BMI and body weight in the MDC group, which they attributed to the integration of regular dietitian consultations and personalised weight management goal-setting within the multidisciplinary framework.

Tricco et al. (2012), in a systematic review and network meta-analysis of strategies for improving diabetes care, found that multidisciplinary team-based models were among the most effective approaches for reducing body weight, particularly those that incorporated both dietitian-led nutritional interventling and exercise counselling. The authors argued that the coordinated, multi-pronged nature of MDC addresses the behavioural complexity of weight management more effectively than any single-discipline approach. Similarly, Renders et al. (2001), in a Cochrane review of interventions to improve the management of diabetes in primary care, reported that multidisciplinary team-based interventions significantly improved process and outcome measures including weight-related variables when compared with standard care, particularly when interventions were sustained over time and involved structured patient follow-up. The divergence between these findings and the present study's null result may reflect differences in MDC intensity, fidelity, and duration of implementation, as well as the specific nutritional and weight management components included in each programme.

The most clinically counterintuitive finding of the present study is the significant difference in physical activity levels, with SC participants demonstrating greater engagement in frequent physical activity (five or more days per week) than MDC participants ($\chi^2 = 10.282$, $p = 0.016$). This finding is unexpected given that MDC typically incorporates dedicated health promotion components, including exercise counselling by physiotherapists, dietitians, or diabetes educators, which should theoretically facilitate higher levels of physical activity among MDC patients. One explanation may lie in the phenomenon of therapeutic substitution, whereby patients receiving MDC may perceive the care team's interventions as compensating for personal behavioural effort, thereby reducing their intrinsic motivation to engage in self-directed physical activity. This is consistent with the concept of moral licensing described in behavioural medicine, wherein individuals who perceive themselves as receiving health-promoting care may feel licensed to reduce other health-promoting behaviours (Wilcox et al., 2009).

Alternatively, the SC group's higher physical activity levels may reflect a form of health-seeking self-reliance, whereby patients who receive less comprehensive clinical support may compensate through greater independent engagement in lifestyle modification. This pattern has been documented by Plotnikoff et al. (2013), who found that diabetes patients with limited access to structured clinical support reported higher rates of self-initiated exercise as a coping strategy for managing their condition. Furthermore, it is possible that the SC group in the present study included a higher proportion of patients whose self-management capacity or social support structures independently facilitated physical activity, as these variables were not formally controlled in the study design. Ekelund et al. (2015), in a large meta-analysis, demonstrated that moderate physical activity levels substantially attenuated mortality risk even in the presence of elevated BMI, underscoring the clinical significance of the present study's physical activity finding regardless of its paradoxical direction.

It is also notable that, despite SC participants reporting higher physical activity levels, BMI did not differ significantly between groups, which may indicate that physical activity alone, without commensurate dietary modification, is insufficient to produce measurable anthropometric change in this population. This interpretation is consistent with the evidence synthesis by Umpierre et al. (2011), who found that structured exercise interventions for type 2 diabetes significantly reduced HbA1c but produced relatively modest effects on body weight, particularly in the absence of concurrent dietary counselling. The implication for MDC design in the present context is that exercise promotion must be integrated with dietary behaviour change to achieve meaningful weight management outcomes.

The finding that MDC does not significantly outperform SC in BMI and weight management outcomes adds to a heterogeneous literature that questions the automatic translation of multidisciplinary team structures into superior weight-related clinical outcomes. The evidence suggests that the content, intensity, and sustained delivery of weight management components within MDC—rather than team composition alone—are the determinants of meaningful BMI improvement. The counterintuitive finding that SC patients were more physically active than MDC patients deserve replication and further investigation, with particular attention to the psychosocial mechanisms through which care model type influences patient-initiated health behaviour. Future studies should employ larger samples, longitudinal designs, and mediation analyses to disentangle the pathways through which MDC may or may not confer advantage over SC in weight management among diabetic populations.

7. CONCLUSION AND RECOMMENDATIONS

Patients with T2DM who were multidisciplinary care groups experienced superior outcomes to those who received standard treatment and participated in a multidisciplinary diabetes management program. In addition, patients at both institutions demonstrated exceptional glycemic control, blood pressure regulation, body mass index (BMI) management, and overall satisfaction scores. The study recommended that to enhance weight and BMI outcomes, hospital administrators should incorporate structured exercise programs, nutritional counseling, and routine weight monitoring into diabetes follow-up appointments.

REFERENCES

[1] Adeloye, D., Ige, J. O., Aderemi, A. V., Adeleye, N., Amoo, E. O., Auta, A., & Oni, G. (2017). Estimating the prevalence, hospitalisation and mortality from type 2 diabetes mellitus in Nigeria: A systematic review and meta-analysis. *BMJ Open, 7*(5), e015424. https://doi.org/10.1136/bmjopen-2016-015424

[2] Adisa, R., Alutundu, M. B., & Fakeye, T. O. (2011). Factors contributing to nonadherence to oral hypoglycemic medications among ambulatory type 2 diabetes patients in Southwestern Nigeria. *Pharmacy Practice*, *9*(3), 163–169. https://doi.org/10.4321/s1886-36552011000300006

[3] American Diabetes Association. (2024). Standards of care in diabetes—2024. *Diabetes Care*, *47*(Suppl. 1), S1–S180. https://doi.org/10.2337/dc24-Sint

[4] Anioke, I. C., Ezedigboh, A. N., Dozie-Nwakile, O. C., Chukwu, I. J., & Kalu, P. N. (2019). Predictors of poor glycemic control in adult with type 2 diabetes in South-Eastern Nigeria. *African Health Sciences*, *19*(4), 2819.

[5] Asmelash, D., Abdu, N., Tefera, S., Baynes, H. W., & Derbew, C. (2019). Knowledge, attitude, and practice towards glycemic control and associated factors among diabetes mellitus patients. *PLoS ONE, 14*(8), e0221712. https://doi.org/10.1371/journal.pone.0221712

[6] Campbell, S. M., Roland, M. O., Shekelle, P. G., Cantrill, J. A., Buetow, S. A., & Cragg, D. K. (1999). Development of review criteria for assessing the quality of management of stable angina, adult asthma, and non-insulin dependent diabetes mellitus in general practice. *BMJ Quality & Safety*, *8*(1), 6-15.

[7] Dedefo, M. G., Ejeta, B. M., Wakjira, G. B., & Mekonnen, G. B. (2020). Predictors of poor glycemic control and level of glycemic control among diabetic patients in Ethiopia. *Annals of Medicine and Surgery, 55*, 238–243. https://doi.org/10.1016/j.amsu.2020.05.020

[8] Ekelund, U., Ward, H. A., Norat, T., Luan, J., May, A. M., Weiderpass, E., … Riboli, E. (2015). Physical activity and all-cause mortality across levels of overall and abdominal adiposity in European men and women: The European Prospective Investigation into Cancer and Nutrition Study (EPIC). *American Journal of Clinical Nutrition, 101*(3), 613–621. https://doi.org/10.3945/ajcn.114.100065

[9] Fadare, J. O., Olamoyegun, M. A., Gbadegesin, B. A., & Ajayi, A. M. (2015). Medication adherence and direct treatment cost among diabetes patients attending a tertiary healthcare facility in Nigeria. *Malawi Medical Journal, 27*(2), 65–70. https://doi.org/10.4314/mmj.v27i2.4

[10] Hajian-Tilaki, K. (2011). Sample size estimation in epidemiologic studies. *Caspian Journal of Internal Medicine, 2*(4), 289–298.

[11] Khunti, K., Gray, L. J., Skinner, T., Carey, M. E., Realf, K., Dallosso, H., … Davies, M. J. (2012). Long-term effects of a structured education programme for patients with newly diagnosed type 2 diabetes mellitus: A 12-year follow-up of the DESMOND trial. *Diabetic Medicine, 29*(7), 831–837. https://doi.org/10.1111/j.1464-5491.2012.03697.x

[12] Minet, L., Møller, S., Vach, W., Wagner, L., & Henriksen, J. E. (2010). Mediating the effect of self-care management intervention in type 2 diabetes: A meta-analysis of 47 randomised controlled trials. *Diabetes Research and Clinical Practice, 88*(1), 1–10. https://doi.org/10.1016/j.diabres.2009.12.012

[13] Norris, S. L., Engelgau, M. M., & Narayan, K. M. V. (2001). Effectiveness of self-management training in type 2 diabetes: A systematic review. *Diabetes Care, 24*(3), 561–587. https://doi.org/10.2337/diacare.24.3.561

[14] Odgers-Jewell, K., Ball, L. E., Kelly, J. T., Isenring, E. A., Thomas, R., & Reidlinger, D. P. (2017). Group-based education interventions for adults with type 2 diabetes: A systematic review with meta-analyses and meta-regression. *BMC Public Health, 17*, 759. https://doi.org/10.1186/s12889-017-4791-x

[15] Parker, E. D., et al. (2024). Economic costs of diabetes in the U.S. in 2022. *Diabetes Care, 47*(4), 709–719. https://doi.org/10.2337/dc23-1234

[16] Plotnikoff, R. C., Costigan, S. A., Karunamuni, N. D., & Lubans, D. R. (2013). Community-based physical activity interventions for treatment of type 2 diabetes: a systematic review with meta-analysis. *Frontiers in endocrinology*, *4*, 3.

[17] Renders, C. M., Valk, G. D., Griffin, S., Wagner, E. H., van Eijk, J. T., & Assendelft, W. J. (2001). Interventions to improve the management of diabetes mellitus in primary care, outpatient, and community settings. *Cochrane Database of Systematic Reviews, (1)*, CD001481. https://doi.org/10.1002/14651858.CD001481

[18] Tricco, A. C., Ivers, N. M., Grimshaw, J. M., Moher, D., Turner, L., Galipeau, J., … Straus, S. E. (2012). Effectiveness of quality improvement strategies on the management of diabetes: A systematic review and meta-analysis. *Lancet, 379*(9833), 2252–2261. https://doi.org/10.1016/S0140-6736(12)60480-2

[19] Uloko, A. E., Musa, B. M., Ramalan, M. A., Gezawa, I. D., Puepet, F. H., Uloko, A. T., … Sada, K. B. (2018). Prevalence and risk factors for diabetes mellitus in Nigeria: A systematic review and meta-analysis. *Diabetes Therapy, 9*(3), 1307–1316. https://doi.org/10.1007/s13300-018-0441-1

[20] Umpierre, D., Ribeiro, P. A. B., Kramer, C. K., Leitão, C. B., Zucatti, A. T. N., Azevedo, M. J., … Schaan, B. D. (2011). Physical activity advice only or structured exercise training and association with HbA1c levels in type 2 diabetes: A systematic review and meta-analysis. *JAMA, 305*(17), 1790–1799. https://doi.org/10.1001/jama.2011.576