

# Comparison of Physical Activity Level between Persons with and Persons without Diabetes in Kenya

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**Abstract Background:** The number of persons with diabetes is expected to double, from 529 million in 2021 to 1.31 billion in 2050 with low and middle-income countries being the most affected by this increase. Although physical activity is a key to preventing or delaying the consequences of diabetes findings of studies conducted elsewhere indicate that persons with diabetes are less physically active compared to persons without diabetes. **Objectives:** To compare the level of physical activity between persons with and persons without diabetes in Kenya. **Methods:** This was a cross-sectional quantitative study using secondary data from the Demographic and Health Surveys (DHS) Program. The data were originally collected for the 2022 Kenya demographic and health survey. After computing summary statistics for the variables being analyzed, multivariate analysis of variance was done for the independent variable (diabetes status) and three outcome variables (number of days of exercise per week, number of minutes of exercise per week, and number of hours spent seated per day). **Results:** The mean number of exercise days per week as well as the mean number of exercise minutes per week is lower for people who have ever, than those who have never, been told that they have diabetes while the mean number of hours spent seated on a typical day is higher for people who have ever, than those who have never, been told that they have diabetes. There was no significant effect of knowing whether one has diabetes or not in terms of number of exercise days per week, number of minutes of exercise per week, and number of hours spent seated per day,  $V = .000$ ,  $F(3, 24594) = 1.56$ ,  $p = .196$ . Separate univariate analysis of variances on the outcome variables also indicates that there was no significant effect of knowing whether one has diabetes or not in terms of number of exercise days per week,  $F(1, 24596) = 3.249$ ,  $p = .071$ , number of minutes of exercise per week,  $F(1, 24596) = 0.022$ ,  $p = .881$ , and number of hours spent seated per day,  $F(1, 24596) = 1.214$ ,  $p = .27$ . **Conclusion:** There is no difference in the level of physical activity between persons with and persons without diabetes in Kenya. There is therefore a need to explore the determinants of, and interventions needed in order to increase, physical activity among persons with diabetes in Kenya.

**Keywords:** physical activity, exercise, diabetes, high blood sugar

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## 1. Introduction

An increase in diabetes cases and diabetes mortality rate is being registered worldwide [1]. The number of persons with diabetes is expected to double, from 529 million in 2021 to 1.31 billion in 2050 [2]. Low and middle-income countries are the most affected by this increase [1]. Projections indicate that the number of persons with diabetes in sub-Saharan Africa will increase from 14.2 million in 2015 to 34.2 million in 2040 [3]. Current estimates indicate that 1% of both men and women aged from 15 to 49 years in Kenya are having diabetes [4]

There are several health complications associated with diabetes and World Health Organization recommends 150 to 300 minutes of moderate physical activity or 75 to 150 minutes of vigorous physical activity per week in order to

avoid or delay the consequences of diabetes [5]. Research findings indicate that physical activity can help persons with diabetes to control their blood sugar levels [6]. Physical activity is also associated with reduced incidences of diabetes-related complications [7].

Results of a study conducted in the USA indicated that few persons were physically active among persons with compared to persons without diabetes [8]. Similar results were also found in Lebanon [9]. However, after being advised to exercise more, the number of persons who engaged in physical activity was higher among persons with diabetes compared to persons without diabetes who received the same advice [9]. Our literature search did not reveal any study that compared the level of physical activity between persons with and persons without diabetes in Kenya. Findings from such study would guide policy makers in general and healthcare providers in formulating and implementing policies that aim at

improving the health of people with diabetes in Kenya, thence this study.

## 2. Methods

This was a cross-sectional quantitative study using secondary data from the Demographic and Health Surveys (DHS) Program. The population for this study consisted of men and women aged from 15 years to 49 years in Kenya. The data were primarily collected from all counties of Kenya for the 2022 Kenya demographic and health survey. The sampling procedure for the primary data collection is explained elsewhere [4].

The Null hypothesis for this study stated that there is no difference in the level of physical activity between persons with and persons without diabetes. In other words, in Kenya, the level of physical activity is similar between persons with and persons without diabetes. The alternative hypothesis stated that there is a difference in the level of physical activity between persons with and persons without diabetes. In other words, in Kenya, the level of physical activity differs between persons with and persons without diabetes.

Permission to access and use the data was granted on January 4, 2024. The original dataset consisted of several variables of which only four were relevant for this study. The dataset was then filtered using as inclusion criteria the availability of data for the variable: have you ever been told by a doctor or other healthcare worker that you have high blood sugar or diabetes. Furthermore, all cases with missing data for the variables: for how many days do you do moderate to vigorous intensity activity in a week, for how many minutes do you do moderate to vigorous intensity activity in a week, and how many hours do you spend seated in a typical day were deleted list-wise. This resulted in a sample of 24,598 respondents.

Data were analyzed using the Statistical Program for the Social Sciences (SPSS) version 21. After computing summary statistics for the variables being analyzed, multivariate analysis of variance was done for the independent variable (diabetes status) and three outcome variables (number of days of exercise per week, number of minutes of exercise per week, and number of hours spent seated per day).

## 3. Results

There were 24,598 respondents of whom 24,386 had never been told by a doctor or other healthcare worker that they had high blood sugar or diabetes while 212 had ever been told that they had high blood sugar or diabetes.

As presented in Table 1, the mean number of exercise days per week as well as the mean number of exercise minutes per week is lower for people who have ever, than those who have never, been told that they have diabetes

while the mean number of hours spent seated on a typical day is higher for people who have ever, than those who have never, been told that they have diabetes.

Levene's test of equality of variances indicated that the assumption of homogeneity of variances has been met for all the dependent variables, number of exercise days per week ( $p = .105$ ), number of minutes of exercise per week ( $p = .895$ ), and number of hours spent seated per day ( $p = .782$ ).

Using Pillai's trace, as presented in Table 2, there was no significant effect of knowing whether one has diabetes or not in terms of number of exercise days per week, number of minutes of exercise per week, and number of hours spent seated per day,  $V = .000$ ,  $F(3, 24594) = 1.56$ ,  $p = .196$ . Furthermore, separate univariate analysis of variances on the outcome variables, as presented in Table 3, also indicates that there was no significant effect of knowing whether one has diabetes or not in terms of number of exercise days per week,  $F(1, 24596) = 3.249$ ,  $p = .071$ , number of minutes of exercise per week,  $F(1, 24596) = 0.022$ ,  $p = .881$ , and number of hours spent seated per day,  $F(1, 24596) = 1.214$ ,  $p = .27$ .

Given these statistical test results, we fail to reject the null hypothesis stating that there is no difference in the level of physical activity between persons with and persons without diabetes. In other words, in Kenya, the level of physical activity is similar between persons with and persons without diabetes.

**Table 1. Descriptive Statistics**

|                                      | Have diabetes | Mean   | Std. Deviation | N     |
|--------------------------------------|---------------|--------|----------------|-------|
| Number of days per week exercises    | No            | 4.55   | 2.040          | 24386 |
|                                      | Yes           | 4.30   | 1.945          | 212   |
|                                      | Total         | 4.55   | 2.039          | 24598 |
| Number of minutes per week exercises | No            | 904.59 | 1120.131       | 24386 |
|                                      | Yes           | 893.03 | 1145.160       | 212   |
|                                      | Total         | 904.49 | 1120.325       | 24598 |
| Number of hours per day seated       | No            | 3.85   | 3.345          | 24386 |
|                                      | Yes           | 4.10   | 3.226          | 212   |
|                                      | Total         | 3.85   | 3.344          | 24598 |

**Table 2. Multivariate Tests**

|           | Effect             | Value | F                     | Hypothesis df | Error df  | Sig. |
|-----------|--------------------|-------|-----------------------|---------------|-----------|------|
| Intercept | Pillai's Trace     | .189  | 1906.248 <sup>b</sup> | 3.000         | 24594.000 | .000 |
|           | Wilks' Lambda      | .811  | 1906.248 <sup>b</sup> | 3.000         | 24594.000 | .000 |
|           | Hotelling's Trace  | .233  | 1906.248 <sup>b</sup> | 3.000         | 24594.000 | .000 |
|           | Roy's Largest Root | .233  | 1906.248 <sup>b</sup> | 3.000         | 24594.000 | .000 |
|           | Pillai's Trace     | .000  | 1.561 <sup>b</sup>    | 3.000         | 24594.000 | .196 |
| Diabetes  | Wilks' Lambda      | 1.000 | 1.561 <sup>b</sup>    | 3.000         | 24594.000 | .196 |
|           | Hotelling's Trace  | .000  | 1.561 <sup>b</sup>    | 3.000         | 24594.000 | .196 |
|           | Roy's Largest Root | .000  | 1.561 <sup>b</sup>    | 3.000         | 24594.000 | .196 |
|           | Pillai's Trace     | .000  | 1.561 <sup>b</sup>    | 3.000         | 24594.000 | .196 |

a. Design: Intercept + Diabetes

b. Exact statistic

**Table 3. Tests of Between-Subjects Effects**

| Source          | Dependent Variable        | Type III Sum of Squares | df    | Mean Square   | F        | Sig. |
|-----------------|---------------------------|-------------------------|-------|---------------|----------|------|
| Corrected Model | Exercise days per week    | 13.503 <sup>a</sup>     | 1     | 13.503        | 3.249    | .071 |
|                 | Exercise minutes per week | 28071.340 <sup>b</sup>  | 1     | 28071.340     | .022     | .881 |
|                 | Seated hours per day      | 13.580 <sup>c</sup>     | 1     | 13.580        | 1.214    | .270 |
| Intercept       | Exercise days per week    | 16453.131               | 1     | 16453.131     | 3958.373 | .000 |
|                 | Exercise minutes per week | 679162752.683           | 1     | 679162752.683 | 541.088  | .000 |
|                 | Seated hours per day      | 13294.679               | 1     | 13294.679     | 1188.843 | .000 |
| Diabetes        | Exercise days per week    | 13.503                  | 1     | 13.503        | 3.249    | .071 |
|                 | Exercise minutes per week | 28071.341               | 1     | 28071.341     | .022     | .881 |
|                 | Seated hours per day      | 13.580                  | 1     | 13.580        | 1.214    | .270 |
| Error           | Exercise days per week    | 102234.233              | 24596 | 4.157         |          |      |
|                 | Exercise minutes per week | 30872381049.876         | 24596 | 1255178.934   |          |      |
|                 | Seated hours per day      | 275053.998              | 24596 | 11.183        |          |      |
| Total           | Exercise days per week    | 611143.000              | 24598 |               |          |      |
|                 | Exercise minutes per week | 50996102300.000         | 24598 |               |          |      |
|                 | Seated hours per day      | 640008.000              | 24598 |               |          |      |
| Corrected Total | Exercise days per week    | 102247.737              | 24597 |               |          |      |
|                 | Exercise minutes per week | 30872409121.216         | 24597 |               |          |      |
|                 | Seated hours per day      | 275067.577              | 24597 |               |          |      |

a. R Squared = .000 (Adjusted R Squared = .000)

b. R Squared = .000 (Adjusted R Squared = .000)

c. R Squared = .000 (Adjusted R Squared = .000)

## 4. Discussion

This study's objective was to compare the level of physical activity between persons with and persons without diabetes. Statistical test results for this study indicate that the level of physical activity is similar between persons with and persons without diabetes in Kenya. Considering the benefits of physical activity [6,7] one would expect persons with diabetes to engage more in physical activity than persons without diabetes. However, other studies too have found the contrary [8,9]. This could be due to the fact that persons with diabetes do not know that they need to be more physically active and the reasons why. It could also be possible that there are other factors that prevent persons with diabetes in Kenya from being more physically active. Studies elsewhere indicated that among persons with diabetes, those who had higher body mass index, more comorbidities, higher perceived stress, and lower health-related quality of life were least physically active [10].

## 5. Conclusion and Recommendations

Diabetes is a health concern especially in countries with low and middle-income. While study findings indicate that physical activity is beneficial preventing or delaying diabetes-related complications, there is no difference in the level of physical activity between persons with and persons without diabetes in Kenya. There is therefore a need to explore the determinants of, and interventions needed in order to increase, physical activity among persons with diabetes in Kenya.

## Conflict of Interest Statement

The authors have no competing interests

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