EFFECT OF FUNCTIONAL EXERCISE (6 MINUTES WALK TEST) IN HEALTHY ADULT MALES

BY

ABUMERE OSEMUDIAME TIMOTHY

(BMS2101596)

DEPARTMENT OF PHYSIOLOGY

SCHOOL OF BASIC MEDICAL SCIENCES

COLLEGE OF MEDICAL SCIENCES

UNIVERSITY OF BENIN, BENIN CITY, NIGERIA.

SUPERVISED BY

DR. E.O. AIHIE.

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DEDICATION

I dedicate my project work to God Almighty for helping me complete this task. Also to my family for their constant love and support.

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ABSTRACT

The six-minute walk test (6MWT) is a simple, low-tech, safe and well established, self-paced assessment tool to quantify functional exercise capacity in adults. This study was aimed to investigate the effect of functional exercise on blood glucose, o2 saturation, pulse rate, distance covered and borg scale in healthy adult males at the University of Benin. Eighty-nine(89) healthy young adult males aged 18-29 years were recruited for this study. A straight hallway was used at the University of Benin. A 30m hallway was used to carry out the test. Two small cones were placed at both ends on the 30m mark to indicate the turnaround points. The subjects' Body Mass Index (BMI) was calculated before the test. The pre and post-test vitals were measured and recorded. The statistical analysis was done using Graph Pad Prism statistical package Version 8.1. The standard error of mean (SEM) was used in tables and graphs to display the results.The dependent and independent variable means were compared using the student t-test. $P<0.05$ was accepted as significant. Based on the results, the six-minute walk test led to a significant reduction in blood glucose levels in young adult males. The test also resulted in a significant increase in the Borg scale (perceived exertion). However, there was no significant reduction in oxygen saturation levels after the exercise.

CHAPTER ONE

1.0 INTRODUCTION

The ability to walk serves as a recognized parameter for assessing both physiological performance and quality of life (Cazzoletti et al., 2022). Several field-based walking tests have been developed to evaluate exercise capacity in patients with chronic cardiac and respiratory disorders. Among these, the six-minute walk test (6MWT) remains a pivotal assessment tool, offering critical insights into functional exercise capacity, therapeutic efficacy, and clinical prognosis. Its simplicity, reproducibility, and ability to integrate cardiopulmonary and musculoskeletal responses make it one of the most widely adopted functional tests in clinical and research settings (Giannitsi *et al*., 2019). The 6 Minute Walk Test is a sub-maximal exercise test used to assess aerobic capacity and endurance. It is a well-established tool for assessing and monitoring functional status in patients with chronic obstructive pulmonary disease. It is equally applicable in the evaluation and therapeutic follow-up of individuals with heart failure, congenital cardiac anomalies, interstitial lung disorders, and pulmonary arterial hypertension (Agarwala and Salzman, 2020; da Silva *et al.,* 2024). Overall, the six-minute walk test (6MWT) is a cost-effective, practical tool that yields clinically meaningful data capable of influencing therapeutic decisions across a range of conditions. The test is self-paced, following standardized protocols and verbal encouragement, as subjects are instructed to walk as far as possible along a flat, measured corridor for six minutes, with the total distance recorded in meters (American Thoracic Society, 2002).

The 6MWT is primarily used to evaluate treatment response in patients with moderate to severe cardiac or pulmonary diseases (American Thoracic Society, 2002). In addition to its diagnostic and monitoring applications, the 6MWT serves as a useful tool for preoperative risk assessment. Patients attaining less than 70% of their predicted six-minute walking distance prior to pulmonary surgery demonstrate a markedly higher likelihood of postoperative pulmonary complications (Santos *et al*., 2016). The 6MWT is valuable in evaluating other conditions, including idiopathic pulmonary fibrosis, cystic fibrosis, and sarcoidosis (du Bois *et al*., 2011; Martin *et al.,* 2013; Baughman and Lower, 2007). A healthy adult typically walks 400 to 700 m. A distance of 300 m walked is associated with poor prognosis in conditions such as chronic obstructive pulmonary disease, heart failure, and pulmonary hypertension. Significant decline over time suggests disease progression. Test results are influenced by demographic factors, including age, sex, height, and weight (Matos *et al.,* 2025). Although having a higher 6MWD is typically preferable to having a lower 6MWD, there is no "cliff" or particular absolute 6MWD at baseline that is more predictive than any other. Instead, the 6MWD should be seen as a continuum. It is crucial to have a steady 6MWD throughout time. According to Harrison et al. (2015), an improved 6MWD is also beneficial, but only if it indicates that the person is not becoming worse. By itself, an improving 6MWD is not expected to have a significant impact on survival (Harrison *et al.,* 2015).

1.1 JUSTIFICATION OF STUDY

it's a simple, reliable, and cost-effective way to objectively measure a patient's functional exercise capacity. It is a crucial tool for assessing the impact of chronic lung and heart diseases, evaluating treatment efficacy, and predicting prognosis, with a change of over 60 meters often considered clinically significant. This study will explore the six minute walk test and provide relevant feedback on the importance of this test, to help show it as an alternative to more expensive cardiopulmonary and musculoskeletal functional tests.

1.2 AIM

To study the effect of functional exercise (6 minutes walk test) on blood glucose, O2 saturation, pulse rate, distance covered and Borg scale in Healthy adult males.

1.3 RESEARCH QUESTIONS

1. Does the 6MWT have any effect on glucose levels and pulse rate?

2. Is there any significant correlation between O2 saturation and the 6 minute walk distance(6MWD)?

3. Is there any significant correlation between borg scale and the 6 minute walk distance(6MWD)?

1.4 SPECIFIC OBJECTIVES

1. To evaluate the effects of six minute walk test on glucose levels, pulse rate, O2 saturation of healthy young male adult subjects.

2. To ascertain if there is a significant correlation between 6MWD and O2 saturation.

3. To ascertain if there is a significant correlation between 6MWD and borg scale.

1.5 SCOPE OF STUDY

The study scope is on functional exercise in healthy adult male subjects, comprehensive review on existing and original research. The study will focus on the following areas:

Distance covered in the 6MWT

Oxygen saturation (SpO_2)

Blood glucose

Borg scale

Pulse rate

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 THE SIX MINUTE WALK TEST (6MWT)

The 6-minute walk test (6MWT) measures the maximum distance a participant can walk in six minutes on a firm, flat surface, moving at their own pace (Fell *et al.*, 2022). According to the American Thoracic Society (ATS) Guidelines from 2002, the test should be conducted on a 30-meter pathway. Patients walk back and forth, are allowed to stop or rest if necessary, and should be given standardized phrases of encouragement to stay motivated (Crapo *et al.*, 2002).

The test is popular because it is easy to use, requires no special equipment or advanced skills, and is similar to an everyday activity (Belle et al., 2012; Chetta *et al.*, 2006). The main result of the 6MWT is the total distance covered in six minutes, known as the 6-minute walk distance (6MWD) (Belle *et al.*, 2012). This distance is clinically and scientifically useful because it correlates with maximal oxygen consumption (Ng and colleagues, 2013; Salbach and colleagues, 2015).

The 6MWD can be interpreted as an absolute value or by comparing it to an anticipated distance derived from reference formulas. This comparison helps clinicians assess exercise capacity, prescribe exercise intensity, evaluate the effectiveness of treatment interventions in cardiopulmonary and neurological rehabilitation, and prepare patients for community reintegration (Bellet *et al.*, 2012; Salbach *et al.*, 2015).

A distance of 400 to 700 meters is considered typical for healthy people, while a distance of less than 350 meters is considered abnormal or is linked to an increased risk of death (Chetta *et al.*, 2006; Helmi *et al.*, 2009).

2.2 HISTORY OF THE SIX MINUTE WALK TEST

The six-minute walk test (6MWT), which evolved from an earlier 12-minute version, was first introduced in 1976 to evaluate exercise tolerance in patients with chronic obstructive pulmonary disease (COPD). This simple, cost-effective, safe, and easy-to-administer tool has proven reliable for assessing functional capacity (Casanova et al., 2007). In the test, patients are asked to walk as far as possible along a flat, 30-meter corridor over six minutes, with the distance covered—known as the six-minute walk distance (6MWD) in meters—serving as the primary outcome (Agarwala and Salzman, 2020). The conceptual foundation of the 6MWT traces back to Kenneth H. Cooper's work in 1968, where he identified a strong correlation between distance run in 12 minutes and maximal oxygen uptake (VO_2 max) measured on a treadmill among healthy U.S. Air Force personnel (Cooper, 1968). This idea was adapted by McGavin and colleagues, who applied a 12-minute walking test to patients with chronic lung disease (McGavin et al., 1976; McGavin et al., 1978). In 1982, Butland and colleagues compared 2-, 6-, and 12-minute walking tests and found high correlations among them. They observed that patients walked farther in the initial two minutes, that performance was most consistent between the 6- and 12-minute versions, and that longer tests showed greater variability—interpreted as improved discriminative ability (Butland et al., 1982). The 6-minute duration emerged as an optimal balance between clinical utility and patient burden. Since then, various performance characteristics of the test have been documented (Elpern et al., 2000). To promote consistency, the American Thoracic Society published standardized guidelines for conducting the 6MWT in 2002 (American Thoracic Society, 2002).

2.3 PHYSIOLOGY OF THE 6MWT

The primary physiological mechanism important to the 6MWT is the dynamic communication between the heart and lungs during exercise. In general, deoxygenated blood returns to the right side of the heart via the veins and is pumped by the right ventricle into the pulmonary artery. As it flows through the pulmonary capillaries surrounding the alveoli, gas exchange takes place: oxygen diffuses into the blood, while carbon dioxide is expelled into the alveoli. The newly oxygenated blood then travels to the left heart, where the left ventricle propels it into the systemic circulation to supply organs and support aerobic metabolism. The neurological and musculoskeletal systems also contribute by coordinating minute ventilation with cardiac output to match the changing oxygen demands and carbon dioxide production during different levels of exercise intensity. Impairment in any of the cardiac, pulmonary, neurological, or musculoskeletal systems can lead to reduced exercise tolerance (Orcioli-Sliva *et al*., 2024).

2.4 ADVANTAGES AND LIMITATIONS OF THE SIX-MINUTE WALK TEST (6MWT)

Unlike traditional pulmonary function tests, the 6MWT captures extrapulmonary factors commonly seen in chronic respiratory conditions, including muscle weakness, frailty, cardiovascular limitations, and sarcopenia. It requires minimal equipment or specialized training and is considered low-risk and feasible in routine clinical settings (Celli *et al*., 2008; Gale *et al*., 2018; Agarwala and Salzman, 2020).

The test is quick, inexpensive, and generally well-tolerated by patients (Singh *et al*., 2014; Brown and Nathan, 2018). Changes in 6MWD and related metrics are predictive of morbidity and mortality in chronic lung diseases and can help evaluate treatment efficacy in this straightforward field test, which involves walking as far as possible in a 30-meter corridor over six minutes (Holland *et al.*, 2014). The 6MWT closely mirrors real-world daily activities, provides a valid measure of functional exercise capacity, and is sensitive to improvements from exercise-based rehabilitation in individuals with chronic respiratory disease (Singh *et al.*, 2014; Brown and Nathan, 2018; du Bois *et al.*, 2011). It is reproducible, practical for use in large cohorts, and better reflects everyday physical demands than laboratory-based testing (McLaughlin et al., 2013; McLaughlin *et al.*, 2009). Studies confirm that the 6MWT is valid (stable across repeated measures), responsive (changes align with disease progression and survival outcomes), and reliable (consistent over time) (du Bois *et al.*, 2011; Heresi and Dweik, 2011). However, the 6MWT remains highly sensitive to procedural variations. Standardization is critical, with careful attention needed to oxygen supplementation, assistive devices, track design, verbal encouragement, and strict adherence to pre- and post-test protocols (Agarwala and Salzman, 2020). The test does not identify specific limiting mechanisms during exercise, and results can be influenced by non-cardiopulmonary factors such as age, sex, height, and body weight (Heresi and Dweik, 2011).

Although rare, adverse events have been reported, particularly significant oxygen desaturation below 80%, which may necessitate test termination

(Jenkins and Čečins, 2011). Instances of tachycardia or chest pain are uncommon, and no long-term sequelae have been associated with these events (Holland *et al*., 2014).

2.5 FACTORS INFLUENCING PERFORMANCE IN THE SIX-MINUTE WALK TEST (6MWT)

2.5.1 Physiological Factors

1. Age

Advanced age is associated with reduced exercise tolerance and stamina, leading to shorter distances covered during the 6MWT. Studies consistently show that aging negatively impacts test performance (Pang *et al*., 2020).

2. Cardiovascular fitness

Individuals with superior cardiorespiratory fitness demonstrate greater endurance and walk farther in the 6MWT, underscoring the role of aerobic capacity in functional performance (Hulzebos *et al*., 2020).

2.5.2 Psychological Factors

1. Motivation

High levels of motivation, goal-directed behavior, and positive mindset significantly enhance 6MWT outcomes. Motivated individuals tend to achieve greater walking distances (Senefeld *et al*., 2017).

2.Anxiety and Depression

Psychological distress, including anxiety and depression, impairs exercise tolerance and reduces 6MWT performance. Patients reporting higher symptom burden typically walk shorter distances (Al-Nawwas *et al*., 2019).

2.5.3 Environmental Factors

1. Altitude

Higher altitudes reduce oxygen availability, leading to diminished exercise capacity and shorter 6MWD compared to sea level (Ward *et al*., 2015).

2. Temperature and Humidity

Extreme heat, cold, or high humidity can compromise endurance and overall performance during the 6MWT (Borg *et al*., 2018).

2.6 INDICATIONS AND CONTRAINDICATIONS

The 6MWT is used to measure a subject's exercise tolerance and prognosis depending on the principal condition (American Thoracic Society, 2002). Since multiple organ systems are engaged during physical activity, the 6MWT serves as a valuable tool for evaluating conditions that impair any of these systems. In pulmonary medicine, it is extensively applied in patients with chronic obstructive pulmonary disease (COPD) (Aalstad *et al*., 2018; Celli *et al*., 2016). The 6MWT is also used to assess functional limitations arising from neurological and muscular disorders, including fibromyalgia, Parkinson's disease, multiple sclerosis, and spinal muscular atrophy (Falvo and Earhart, 2009; Goldman *et al*., 2008; Montes *et al.,* 2010; Pankoff *et al*., 2000).

The sole established absolute contraindication to performing the 6MWT is a recent acute coronary syndrome—specifically unstable angina or myocardial infarction—occurring within 30 days prior to the test (American Thoracic Society, 2002). Additionally, other absolute contraindications to field walking tests including syncope, acute respiratory failure, or any noncardiopulmonary condition that could be worsened or precipitated by exercise—should also be taken into account (Holland *et al*., 2014).

Relative contraindications include severe, uncontrolled hypertension and a resting heart rate greater than 120 bpm. Although the 6MWT is a self-paced test, which reduces the likelihood of events resulting from excessive exercise levels, clinician judgment is still necessary when deciding to proceed with testing, as with any other test (American Thoracic Society, 2002).

2.7 BORG SCALE

Rate of Perceived Exertion (RPE) is a subjective measure of how intensely you feel your body is working during physical activity. It reflects your personal perception of effort, combining factors like muscle fatigue, breathing rate, and overall strain.

The RPE scale was created in the 1960s by Swedish psychologist Gunnar Borg and is commonly known as the Borg Rating of Perceived Exertion. The factors that influence RFE are The RPE scale includes the following: How fast you're breathing, how fast your heart is beating, how tired your muscles are, how much you're sweating. It is a useful test for cheecking one's rate of fatigue after a physical exercise (Helms *et al.,* 2016).

2.8 BMI

Body mass index (BMI) is a medical screening tool that measures the ratio of your height to your weight to estimate the amount of body fat you have. Healthcare providers calculate BMI by using weight in kilograms (kg) divided by the square of height in meters (m2) (Zierle-Ghosh and Jan 2021).

Table 2.1: BMI values and their classification

BMI VALUES(KG/M^2)	CLASSIFICATION
< 18.5	Underweight
18.5 - 24.9	Normal weight
25.0 - 29.9	Overweight
30.0 - 34.9	Class I obesity
35.0 - 39.9	Class II obesity
≥ 40.0	Class III obesity

2.9 CLINICAL SIGNIFICANCE OF THE SIX-MINUTE WALK TEST (6MWT)

In patients with chronic obstructive pulmonary disease (COPD), pulmonary arterial hypertension, idiopathic pulmonary fibrosis (IPF), and those awaiting lung transplantation, both baseline 6MWD and changes over time are strong predictors of morbidity and mortality. These metrics inform clinical management and trial endpoints (Agarwala and Salzman, 2020). Poor 6MWT performance is also independently linked to adverse outcomes in renal failure and chronic liver disease (Alameri et al., 2007; Bučar et al., 2016).

Despite its utility, the 6MWT has limitations as a standalone measure of exercise capacity (Casano, 2023). It cannot identify specific causes of dyspnea, hypoxemia, or exercise limitation, nor does it measure peak oxygen uptake (VO_2 peak), though it correlates with cardiopulmonary exercise testing in some contexts (ATS Committee on Proficiency Standards for Clinical Pulmonary Function Laboratories, 2002).

Among healthy adults, average 6MWD ranges from 400 to 700 meters (Enright, 2003), a finding replicated across diverse populations (Britto et al., 2013; Chetta et al., 2006). The test reflects physiological responses to interventions such as lung volume reduction surgery, though its sensitivity varies with pharmacologic treatments (Celli et al., 2016). In chronic lung diseases, typical 6MWD falls between 300 and 450 meters (Holland et al., 2014). A 6MWD ≤350 meters is particularly prognostic of increased mortality, hospitalization, and exacerbations in COPD (Celli et al., 2016). In peripheral artery disease, 6MWT distance correlates more strongly with daily physical activity than treadmill testing (McDermott et al., 2014).

2.10.1 Chronic Obstructive Pulmonary Disease (COPD)

The 6MWD captures both pulmonary and extrapulmonary manifestations of COPD, making it a robust clinical marker (Agarwala and Salzman, 2020). While forced expiratory volume in one second (FEV_1) classifies disease severity, 6MWD may outperform FEV_1 as a mortality predictor in severe COPD (Pinto-Plata et al., 2004). Longitudinal data show that changes in 6MWD occur independently of spirometric shifts, confirming its role as an autonomous prognostic indicator (Karanth and Awa, 2017). Thus, actual 6MWT results can help gauge overall disease burden in COPD (Daniel et al., 2022).

2.10.2 Idiopathic Pulmonary Fibrosis (IPF)

The 6MWT has gained prominence in IPF management, both in research and routine care (Brown and Nathan, 2018; Fernández et al., 2018). Baseline testing provides critical prognostic insights, exercise capacity data, and oxygen requirements during activity. Desaturation to SpO_2

<88% during unassisted 6MWT is a well-established marker of poor survival (Flaherty et al., 2006).

Large-scale clinical trials have yielded the most reliable evidence on 6MWT utility in IPF (du Bois et al., 2011, 2014; Nathan et al., 2015). These studies confirmed strong associations between 6MWD and lung function, quality of life, and dyspnea severity. Additional research supports integrating 6MWD with dyspnea scores, forced vital capacity (FVC), and diffusing capacity for carbon monoxide (DLCO) for comprehensive risk stratification (Mancuso et al., 2014).

CHAPTER THREE

3.0 MATERIALS AND METHODS

3.1 MATERIALS

Pulse oximeter

Borg scale

Stopwatch

Sphygmomanometer

Spirometer

Worksheet

Glucometer

Stadiometer

2 cones

A chair and a table

3.2 SUBJECT AND STUDY AREA

The study involved 89 healthy male adult participants between the ages of 18-29yrs and a BMI range of 18-25kg/m2 from the University of Benin students.

3.3 INCLUSION CRITERIA

Healthy subjects between the age of 18-29yrs

Subjects whose BMI range was between 18 - 25

Male subjects only

3.4 EXCLUSION CRITERIA

Subjects who had surgeries recently (within 6 months prior to the 6MWT)

Subjects who experienced shortness of breath

Unhealthy students

3.5 ETHICAL CONSIDERATION

Ethical approval for this study was obtained from the Research Ethics Committee, College of Medical Sciences, University of Benin, Benin City before the commencement of the study (CMS/REC/01/VOL2/791).

3.6 STUDY DESIGN

3.6.1 Measurement of 30m walkway

A straight hallway in the University of Benin Physiology building was used.

The hallway was measured using a tape to mark out 30m with intervals of 3m indicated.

2 cones where placed at both ends of the 30m mark to indicate the turnaround points.

3.6.2 Participant preparation

1. Subjects were educated about the 6-minute walk test procedure.
2. Subjects were given questionnaires along with a consent form to fill.
3. Subjects were to wear comfortable clothing and appropriate shoes.
4. Subjects could use their usual walking aids during the test (cane, walker, etc.).
5. Subjects were allowed to take a light meal before early morning or early afternoon tests.
6. Subjects should not have exercised vigorously within 2 hours of beginning the test

7. Subjects were asked to walk at their own pace to cover as much distance as possible in 6 minutes but not jog or run.
8. Subjects were permitted to quit whenever they wanted.

3.6.3 Six minute walk test

1. The Subjects BMI was measured.
2. The Subjects were asked to rest for at least 10 minutes before their pre- test.
3. The Subjects are informed about the test procedure, including the goal of walking as far as possible within six minutes.
4. The Subjects walked back and forth the cones on the 30m hallway.
5. Standardized encouragement phrases (as per ATS guidelines) are given at set intervals to maintain consistency.
6. The number of laps walked was counted and recorded.
7. The total number of laps walked was multiplied by 60 meters to get the total number of meters walked.
8. After the test the vitals will be taken again

3.7 MEASUREMENT OF PARAMETERS

3.7.1 Distance covered in the 6MWT

At the end of the 6MWT, the distance covered by the subjects were measured in meters. The total number of laps walked was multiplied by 60 to get the total number of meters walked.

3.7.2 Oxygen saturation (SpO2)

This was obtained using a digital pulse oximeter. The pulse oximeter was placed on one of the fingers for about one minute and the value was recorded.

3.7.3 Blood glucose

The subjects blood glucose was measured using a glucometer. A lancet is put in a lancing device and is used to pierce the thumb and the blood is put in a strip and the readings are taken.

3.7.4 Borg scale

The subjects were asked to rate their exertion on the scale of 0 - 10 taking into consideration feelings of fatigue, physical stress.

3.8 STATISTICAL ANALYSIS

Data obtained from the 6MWT was performed with Graph Pad Prism Version 8.1. The standard error of mean (SEM) was used in the graphs to display the results. The dependent and independent variable means were compared using the student t-test. $P<0.05$ was accepted as significant.

CHAPTER FOUR

4.0 RESULT

4.1 RESULTS OF STATISTICAL ANALYSIS

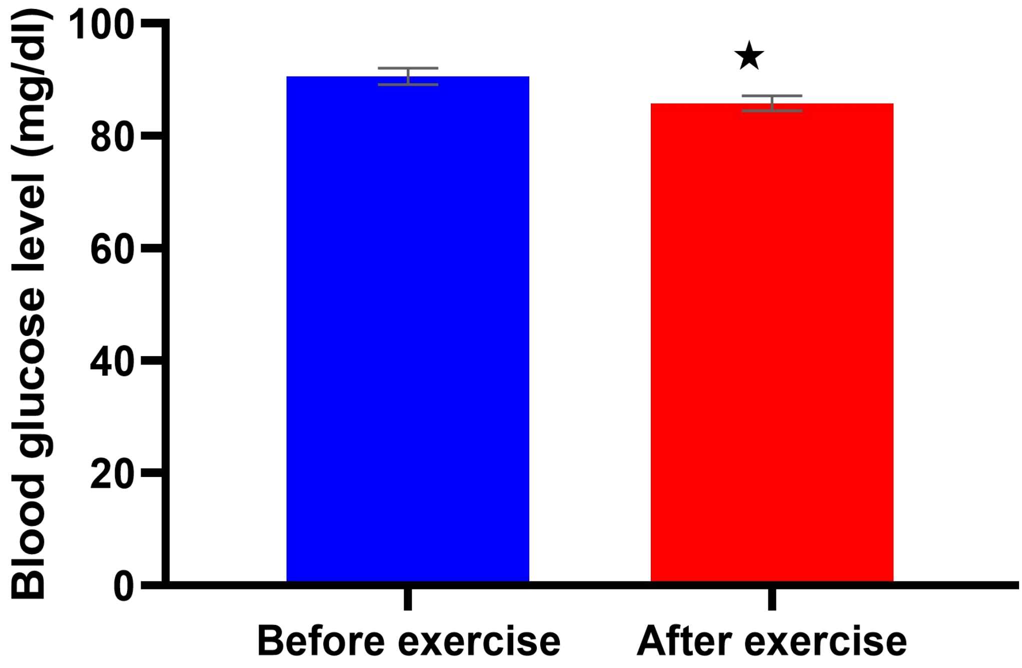

Figure 4.1: Showed blood glucose level before and after six (6) minute walk exercise in young adult male

There was a significant reduction after exercise relative to before the exercise

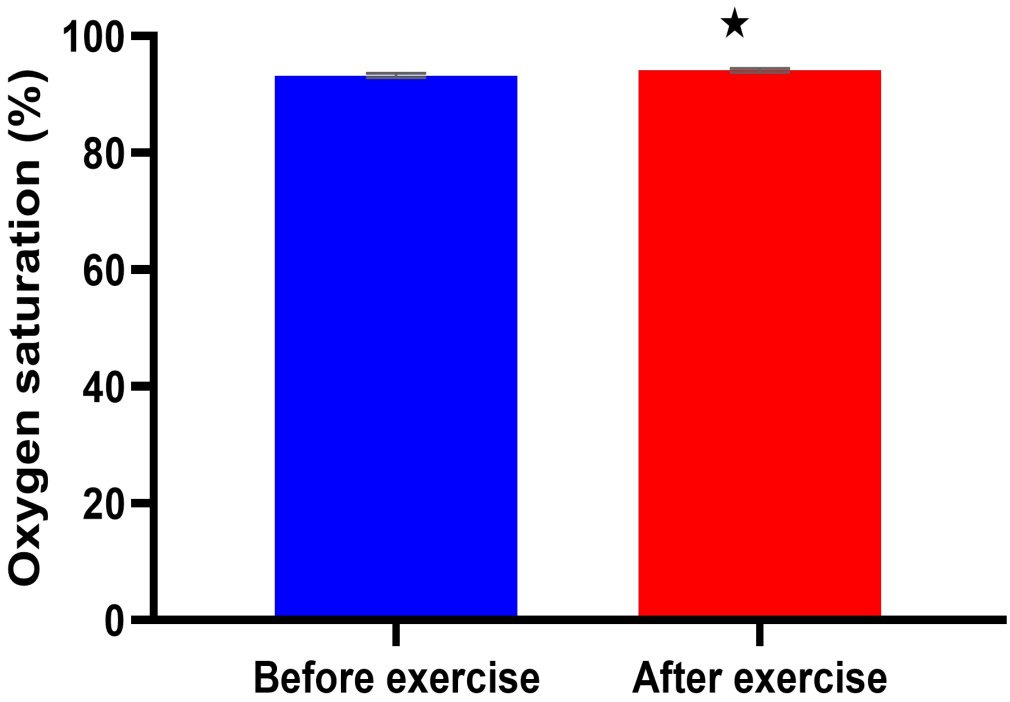

Figure 4.2: Showed oxygen saturation level before and after six (6) minute walk exercise in young adult male

There was no significant reduction after exercise relative to before the exercise.

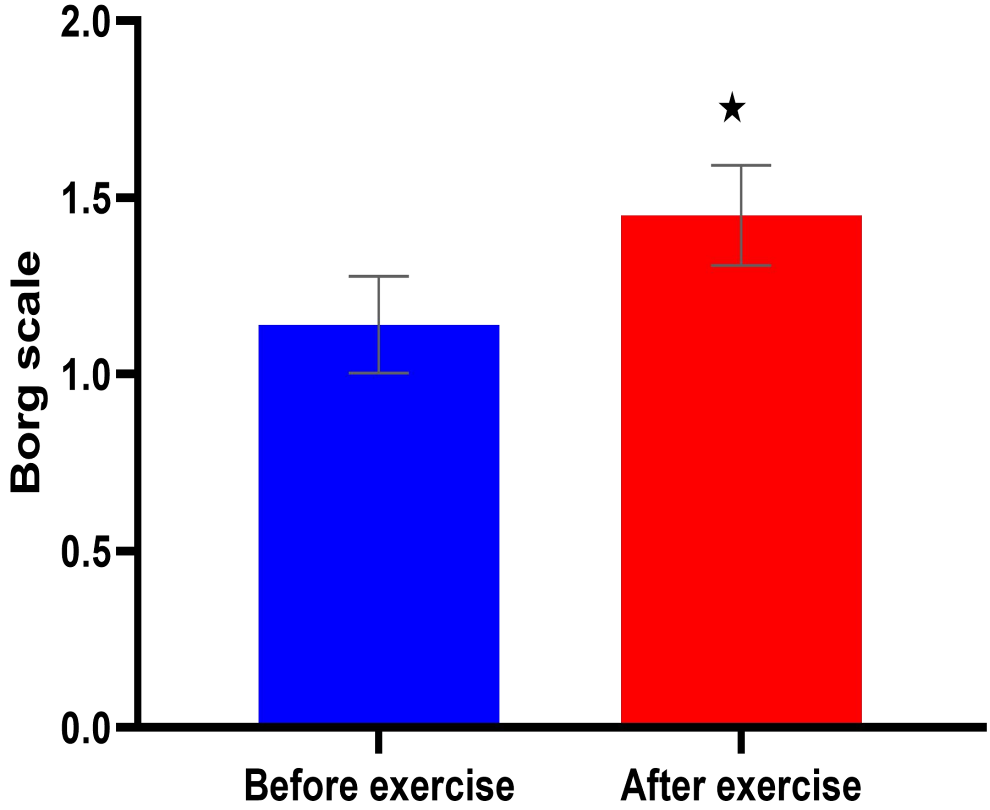

Figure 4.3: Showed Borg scale before and after six (6) minute walk exercise in young adult male

There was a significant increase after exercise relative to before the exercise

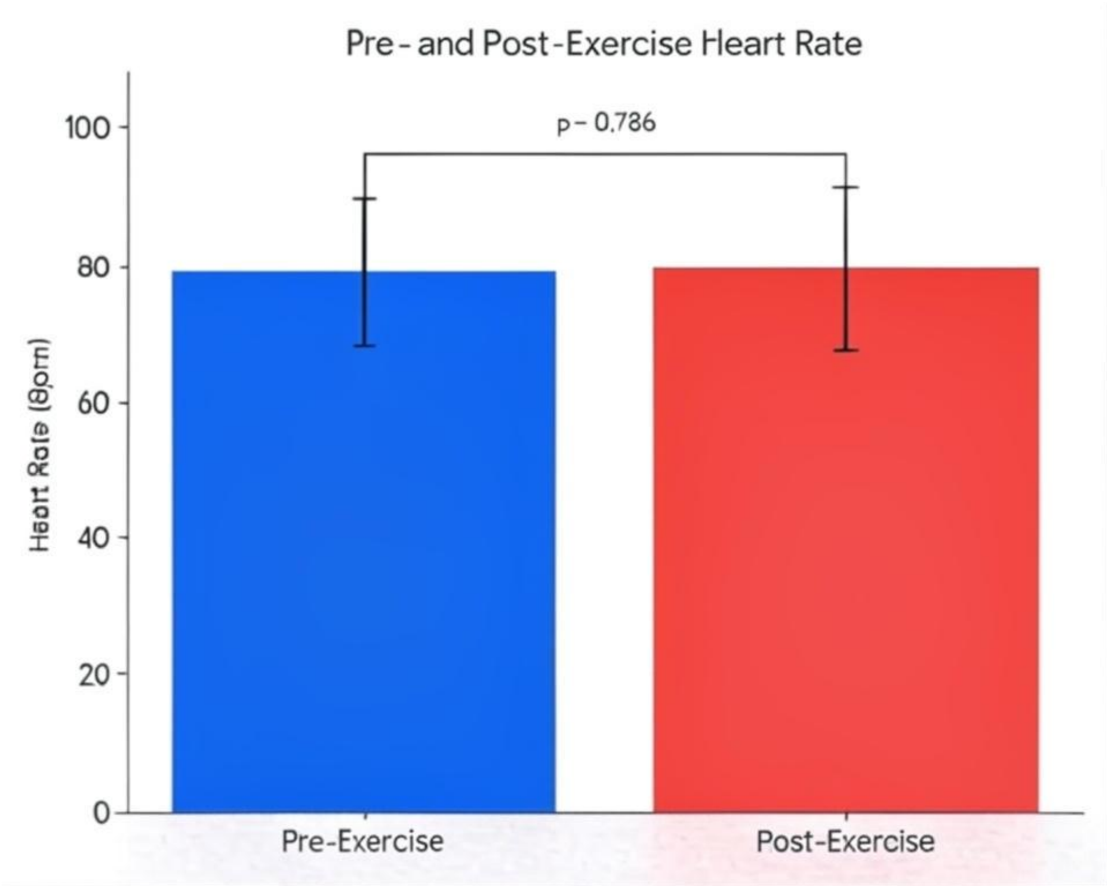

Figure 4.4: Showed Heart rate level before and after six (6) minute walk exercise in young adult male

There was no significant reduction after exercise relative to before the exercise.

CHAPTER FIVE

DISCUSSION AND CONCLUSION

5.1 DISCUSSION

This study aimed to evaluate the effect of the 6-minute walk test (6MWT) on various physiological parameters in healthy adult males11. The discussion of the findings is organized according to the parameters measured.

Oxygen saturation and distanced walked (SpO2)

The results indicated that there was no significant reduction in oxygen saturation (SpO2) after the 6MWT2. This finding is consistent with the study population, which consisted of healthy young adult males with a normal BMI range.

In a healthy individual, the cardiorespiratory system is expected to maintain adequate tissue oxygenation during sub-maximal exercise like the 6MWT. The absence of desaturation suggests that the participants' respiratory function was easily able to meet the increased metabolic demand of the exercise. This contrasts with clinical populations, such as patients with COPD or heart failure, where a drop in SpO2 during the 6MWT is a common and clinically significant finding.

Borg scale

There was a significant increase in the Borg Scale rating after the exercise6. The Borg Scale is a subjective measure used to rate a participant's perceived exertion, including feelings of fatigue and physical stress. This result is expected and confirms that the 6MWT, while sub-maximal, was perceived by the participants as a form of physical exertion. The significant increase from the pre-test (resting) state to the post-test state validates that the 6-minute walk induced a measurable level of physical effort.

Heart rate

The analysis of heart rate (pulse rate) showed no significant reduction (or change)after the exercise, as visualized in Figure 4.4. This finding, while perhaps counter-intuitive for an exercise test, is plausible within the context of this specific study. The subjects were healthy young males (18-29 years). It is highly likely that their cardiovascular fitness level is high, resulting in a very rapid heart rate recovery after a sub-maximal test. By the time the post-test vitals were recorded, their heart rates may have already returned to, or very near, their baseline resting levels.

Blood glucose

The study found a significant reduction in blood glucose levels in the healthy adult males after they completed the 6-minute walk test (6MWT). This was a key finding, as evaluating the test's effect on glucose was one the primary objectives. This result demonstrates that even a moderate, sub-maximal exercise like the 6MWT is sufficient to enhance glucose consumption. The conclusion drawn is that the 6MWT effectively shows how this form of functional exercise can beneficially influence metabolic responses in healthy individuals.

5.2 CONCLUSION

The six-minute walk test (6MWT) reduced blood glucose levels and significantly increased perceived exertion (Borg scale) among healthy young adult males, indicating that even moderate functional exercise can enhance glucose consumption and induce noticeable physical effort. However, oxygen saturation remained stable, suggesting that the exercise intensity was not sufficient to cause significant respiratory compromise. Overall, the 6MWT effectively demonstrates how submaximal exercise can beneficially influence metabolic and cardiovascular responses in healthy individuals.

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APPENDIX

SIX MINUTES WALK TEST QUESTIONNAIRE

Subject Session

1. Are you currently taking any medications? [ ] Yes [ ] No

If yes, please specify:

____

____

____

____

2. Have you had an ECG test in the last 5 months?[ ] Yes [ ] No

If yes, what was the result? ___________________________________

3. Have you had any recent surgery? [ ] Yes [ ] No

If yes, please specify the type and date:

____

____

4. Have you had a heart attack in the last 4 weeks? [ ] Yes [ ] No

5. Have you experienced chest pain in the last 4 weeks? [ ] Yes [ ] No

6. Do you mind if a blood sample is taken for this test? [ ] Yes [ ] No

7. Please describe your current state of health:

8. Do you smoke? [ ] Yes [ ] No

If yes, how many cigarettes per day? ___________________

9. Do you experience shortness of breath? [ ] Yes [ ] No

If yes, please describe when it occurs and how severe it is:

____

____

____

____

10. Are you asthmatic? [ ] Yes [ ] No

11. When was your last meal?

Please signify in hours:

____