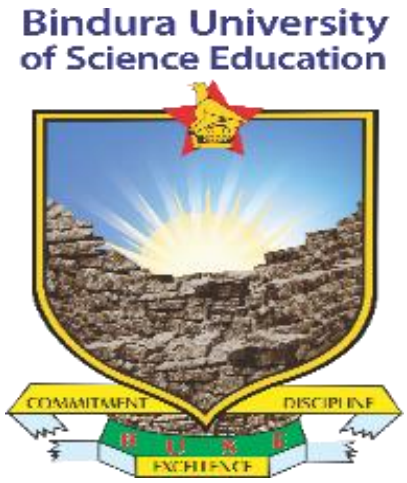


**BINDURA UNIVERSITY OF SCIENCE EDUCATION**

**FACULTY OF SCIENCE AND ENGINEERING**

**DEPARTMENT OF SPORTS SCIENCE**

# The Effect of High High Intensity Interval Training (HIIT) on Performance of Adolescent Male Football Players in Zimbabwe

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A DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE HONORS IN BACHELORS' SCIENCE DEGREE IN SPORTS SCIENCE AND MANAGEMENT

JULY 2024

**Declaration**

I, TATENDA BENEDICT BEPURA, do hereby declare that this dissertation, which is being submitted to Bindura University of Science Education for the degree Sports Science and Management, has not previously been submitted for a degree at any other university, that it represents my own work, and that all sources which I have quoted in the text have been acknowledged by means of a complete reference list.

Signed on the 17th day of October 2024

Signature :

**RELEASE FORM**

I certify that the following student Tatenda Benedict Bepura Student Number B211225B was under my supervision. I further certify that he/she has attended all the scheduled meetings with me and that he/she has fulfilled all the requirements that I set before him/ her as the Supervisor. It is my professional judgment that the dissertation is of a sufficiently high standard to be submitted with my name attached to it as the Supervisor. I hereby release the student without reservation to submit his/her dissertation for marking.

**Name of Supervisor**: Ms D Mukwawaya **Signature:** D.D.M **Date: 17/10 2024**

**Name of Chairperson: Dr.L.T.Charumbira Signature:**  **Date: 17/10/2024**

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My Parents, thank you for supporting me and your assistance during my hard times.

Thank you to all my classmates, thank you all for giving me hope and keeping me be during this program and helping me during the tough times.

Last but not least I would like to thank the Lord almighty for the blessing of being able to do this program and get to the finish line. Thank you, Lord.

**Dedication**

I dedicate this work to Kevin Sithole, Tanya and Keegan Bepura.

**Abstract**

This study investigates the effects of High-Intensity Interval Training (HIIT) on the performance of adolescent male football players at Goldridge College in Kwekwe, Zimbabwe. The primary aim was to assess the impact of a structured HIIT program on key performance indicators, including sprint speed, agility, endurance, and match performance.

A sample of 12 male football players aged 14-19 participated in a three-week HIIT program, consisting of three to four sessions per week. Quantitative data were collected through pre- and post-tests using the Yo-Yo Intermittent Recovery Test, a 40-Meter Sprint Test, and an Agility Ladder Test.

Data analysis involved the use of SPSS for quantitative data, with descriptive statistics comparing pre- and post-HIIT performance metrics.

Key findings revealed significant improvements in sprint speed, agility, and endurance, as well as enhanced recovery times and reduced perceived fatigue levels post-intervention. Participants also reported increased mental toughness and confidence following the HIIT program.

The study concludes that HIIT is an effective training method for improving athletic performance among adolescent football players. The findings support the integration of HIIT into football training programs in high schools. Future research should explore the long-term effects of HIIT and its application to other athletic disciplines.

**Table of Contents**

**CHAPTER TWO: LITERATURE REVIEW**



**CHAPTER THREE RESEARCH METHODOLOGY**



**CHAPTER FOUR: DATA ANALYSIS AND PRESENTATION**

**List of Tables**

**List of Figures**

**List of Appendices**



**List of Abbreviations and Symbols**

Abbreviations:

- I.D: Identification
- Pre: Before High Intensity Interval Training
- Post: After High Intensity Interval Training
- HIIT: High Intensity Interval Training
- Sec: Seconds
- m: meters

Symbols:

- %: Percentage

**Glossary**

- Adolescent: Young person in the process of developing from child into adult typically aged between 13 and 19 years.
- Agility Test: Test measuring ability to change direction quickly. Maintain control and balance.
- Endurance: The ability of an athlete to sustain prolonged physical. Or mental effort.
- High-Intensity Interval Training (HIIT): A form of exercise alternating short periods of intense anaerobic exercise. With less intense recovery periods.
- Metric: Standard of measurement used to assess performance, quality or efficiency of something, often expressed as numerical data.
- Performance Ability Rating: Measure used to rate player's performance during matches often on scale from 1 to 5.
- Perceived Fatigue Level: Subjective measure of how tired an athlete feels, typically rated on scale from 1 to 5.
- Purposive Sampling: Non-probability sampling method in which researcher selects participants.
- These are the most often used measures for assessing function.
- Yo-Yo Intermittent Recovery Test: fitness test measuring athlete's ability to repeatedly perform high-intensity aerobic work. Typically involving running back and forth over set distance at increasing speeds

# CHAPTER ONE: THE PROBLEMS AND THEIR SETTINGS

## 1.1 Introduction

This study investigated the effects of High-Intensity Interval Training (HIIT) on the performance of adolescent male football players at Goldridge College in Kwekwe, Zimbabwe. HIIT, a training method aimed at improving speed, endurance, and agility in athletes, had been utilized in sports for a long time. However, very few studies focused on its integration into high school football programs in Zimbabwe. This chapter outlined the background, research problem, objectives, and research questions of the study, setting the stage for the detailed analysis in subsequent chapters.

## 1.2 Background to the Study

The primary purpose of this research was to establish the effect of HIIT on the performance of adolescent male football players aged 14-19 years at Goldridge College. The focus was on how HIIT impacted various performance indicators such as VO2 max, maximal speed, agility, perceived fitness, and match performance, as well as match-simulation perceived fatigue.

Goldridge College is located in Kwekwe, Zimbabwe, a town known for its academic and sporting prowess, particularly in football. Despite this, the school's football training methodologies appeared lacking, particularly regarding the use of advanced training techniques like HIIT. The study aimed to address the gap in knowledge concerning the use of HIIT to enhance football performance in Zimbabwean high schools.

Prior research had shown the benefits of HIIT for adult athletes, but very little work had been done on its effects on adolescent athletes, particularly in a school sports context. This study was motivated by the researcher's experience as a high school sports trainer and the desire to discover new ways to improve the fitness and performance of football players

## 1.3 Statement of the Problem

The study addressed the gap in Zimbabwean high school football training programs where HIIT had not been widely implemented. Despite HIIT's proven benefits, such as improving speed, endurance, and recovery time, it had not been fully adopted at Goldridge College, resulting in suboptimal performance among adolescent male football players. This study sought to establish how the integration of HIIT could enhance these players' performance and bridge the existing training gap.

## 1.4 Significance of this study

This study on the effects of High-Intensity Interval Training (HIIT) on the performance of adolescent male football players is significant for several reasons:

1. Enhancing Athletic Performance in Zimbabwean High Schools: By demonstrating the benefits of HIIT for football players aged 14-19, this study presents a scientifically supported training method that could markedly enhance athletic performance. Currently, many Zimbabwean high schools, including Goldridge College, rely on traditional endurance training, which may be less effective. The findings could improve physical conditioning and match performance, making athletes more competitive on national and international stages.

2. Contribution to Sports Science Knowledge in Zimbabwe:Research on HIIT, particularly concerning adolescent athletes in Zimbabwe, is limited. This study will fill a significant gap by providing insights into the application of HIIT in local school settings, offering valuable data on how adolescent football players respond in terms of fitness and mental resilience. This information can inform coaches, sports scientists, and athletic organizations about optimal training strategies.

3. Improved Coaching Practices: The study will provide practical recommendations for coaches developing young athletes, emphasizing the advantages of HIIT over traditional methods. This guidance is especially relevant for first-team coaches at Goldridge College and other high schools, where there is a pressing need for modern, evidence-based training approaches.

4. Benefits to Players' Long-Term Development: HIIT not only improves immediate performance but also enhances overall fitness, speed, and agility—critical factors for long-term success in football. This study can foster a culture of continuous improvement and professional discipline among players, equipping them with skills that are transferable to higher levels of competition.

5. National and International Competitiveness: By refining training regimes at the high school level, this research has the potential to boost the competitiveness of Zimbabwean football teams in regional and international tournaments. The adoption of HIIT could serve as a benchmark for other schools, setting a standard to elevate the overall quality of football in the country.

### 1.5 Research Questions

The following research questions guided the study:

1. What effects did High-Intensity Interval Training (HIIT) have on the physical performance of adolescent male footballers at Goldridge College?

2. How did adolescent male football players at Goldridge College perform physically in the absence of HIIT?

3. What clarifications could be made in the physical performance measures of such players after HIIT was introduced?

4. To what degree did HIIT enhance physical results (speed, endurance, agility) in the months following the intervention?

5. How could the information regarding HIIT be used to enhance training methods for adolescent male football players in Zimbabwean secondary schools

### 1.6 Research Objectives

The objectives of the study were:

1. To analyze the current methods used to train adolescent male football players in Zimbabwean high schools.
2. To observe the perspectives of coaches and players on the use of HIIT in high school football training.
3. To assess how the introduction of HIIT could improve the performance of football players.

### 1.7 Delimitation of the Study

The research was conducted at Goldridge College in Kwekwe, Zimbabwe, and targeted only 12 male football players aged 14-19 years. The study did not include female athletes or athletes from other sports disciplines, limiting its scope to the football program at one school.

### 1.8 Study Outline

Within the aforementioned school (Goldridge College) in Kwekwe, Zimbabwe, the scope of this research is defined. This may imply that the results can be more widely applied. The particular study targets male football players. That is-out-of-the-way is the exclusion of female athletes. Finally, the list is also missing the athletes from other sports disciplines only.

### 1.9 Chapter Summary

This chapter outlined the context, problem, and objectives of the study on the effects of HIIT on adolescent male football players at Goldridge College. The next chapter provided a review of the literature relevant to the study, followed by detailed explanations of the methodology and findings.

# CHAPTER TWO: LITERATURE REVIEW

## 2.1 Introduction

This chapter reviewed existing literature on High-Intensity Interval Training (HIIT) and its impact on the physical performance of adolescent male footballers. The focus was on studies related to the effects of HIIT on speed, endurance, and agility, as well as how these aspects were influenced by traditional football training methods.

The chapter also addressed how HIIT information could be used to enhance training methods for football players in Zimbabwean secondary schools.

## 2.2 Conceptualisation

High-Intensity Interval Training (HIIT) involved alternating short bursts of intense exercise with recovery periods. In football training, HIIT was found to be effective in developing critical physical attributes, such as speed, endurance, and agility.

These were essential for improved football performance. Previous studies, such as those conducted by Tabata et al. (1996) and Buchheit & Laursen (2013), showed the effectiveness of HIIT in enhancing these attributes. However, localized exploration of these findings, particularly for adolescent football players in Zimbabwe, had been limited, prompting the need for this research.

## 2.3 Theoretical Review

The study was informed by the following theories:

- Fitness-Fatigue Model (Bannister et al. 1975):This model posited that an athlete's performance was a balance between fitness gains and training-induced fatigue. HIIT was known to induce high levels of fatigue, but with adequate recovery, athletes could experience significant endurance and speed improvements over time. This model helped explain the anticipated physical performance changes that HIIT could elicit in the adolescent footballers at Goldridge College.

- Periodization Theory (Bompa & Buzzichelli 2018):Periodization involved organizing training into structured cycles to ensure athletes peak at specific times. This theory suggested that HIIT could be incorporated into a periodized training cycle to optimize speed, endurance, and agility gains. This theory was particularly relevant to the long-term planning of football training programs.

- SAID Principle (Specific Adaptation to Imposed Demands):The SAID Principle asserted that the body adapts specifically to the demands placed on it. For football players, HIIT stimulated adaptations in speed, agility, and endurance, allowing them to perform better in match conditions. This principle was particularly useful in understanding how targeted HIIT exercises resulted in specific performance improvements for adolescent footballers.

## 2.4 Thematic Review

The following themes emerged from the literature:

- Football Performance Without HIIT:Traditional football training often relied on moderate-intensity continuous exercise and skill-based drills, which were not always sufficient for maximizing speed, endurance, and agility. Studies by Jones & Carter (2000) indicated that athletes trained with traditional methods showed slower improvements in these key areas. In contrast, HIIT allowed for faster physical progress, particularly in anaerobic capacities.

- Physical Performance Measures Post-HIIT:Research conducted by Buchheit & Laursen (2013) demonstrated that HIIT led to significant improvements in speed, endurance, and agility in athletes. This study supported the idea that after introducing HIIT, noticeable improvements could be observed in these performance metrics. The study conducted at Goldridge College sought to measure these improvements through pre- and post-HIIT tests.

- Long-Term Impact of HIIT on Physical Performance:Helgerud et al. (2001) found that the benefits of HIIT, particularly in improving cardiovascular fitness and anaerobic power, were sustained over longer periods. This was relevant to the present study, which aimed to assess how adolescent footballers maintained their performance improvements beyond the 3-week HIIT program.

- Application of HIIT to Enhance Training in Zimbabwean Schools:Smith & Garcia (2021) suggested that integrating HIIT into school sports programs had the potential to improve not only physical performance but also engagement with physical education among students. In Zimbabwe, where many schools still relied on traditional endurance training, the findings of this study could serve as a guideline for schools to adopt HIIT in their training programs, leading to better performance outcomes in football.

## 2.5 Conclusion

The literature reviewed showed that HIIT was an effective method for improving physical performance, particularly in speed, endurance, and agility. The theoretical frameworks, including the Fitness-Fatigue Model, Periodization Theory, and SAID Principle, helped explain how HIIT could drive these specific performance improvements. The review also highlighted the limited application of HIIT in Zimbabwean high schools, justifying the need for this study.

## 2.6 Summary

This chapter provided a comprehensive review of the literature related to HIIT and its potential to improve the physical performance of adolescent male footballers. The findings from previous studies aligned with the research questions and objectives of this study, providing a strong theoretical foundation for further investigation. The next chapter discussed the research methodology used to explore these questions at Goldridge College.

# CHAPTER THREE: RESEARCH METHODOLOGY

## 3.1 Introduction

This chapter outlined the research design and methodology used to investigate the effects of High-Intensity Interval Training (HIIT) on the performance of adolescent male football players at Goldridge College. The study employed a quantitative research approach, which was ideal for obtaining objective, measurable data. This chapter discussed the research approach, design, sampling methods, data collection procedures, and analysis techniques used to assess the physical performance of the football players before and after the HIIT intervention.

## 3.2 Research Approach

The study adopted a quantitative research approach, focusing on collecting numerical data to identify patterns and relationships between variables. This approach was suitable because the aim of the research was to measure the impact of the HIIT intervention on key physical performance metrics—speed, endurance, and agility. Quantitative methods allowed for a structured and objective evaluation of changes in these metrics, enabling the use of statistical analysis to determine the significance of any observed changes.

By using a quantitative approach, the research sought to provide clear, empirical evidence on how HIIT influenced physical performance in adolescent football players. This method ensured that the data collected was free from subjective interpretation, as it focused solely on measurable outcomes.

## 3.3 Time Horizons

The study used a cross-sectional time horizon, meaning data was collected at specific points in time. In this case, data was gathered before and after the three-week HIIT intervention. Cross-sectional designs are commonly used in experimental research to observe changes over time.

For this study, performance was tested at two critical junctures:

1. Pre-intervention: Baseline physical performance data was collected before the introduction of the HIIT training program.

2. Post-intervention: After completing the HIIT program, the same physical tests were administered to assess any improvements in performance.

This design allowed for the comparison of pre- and post-intervention data, enabling the researcher to determine the immediate effects of HIIT on the football players' physical performance.

### 3.4 Research Strategy

The research followed an experimental strategy, specifically a pre-test/post-test design. In this design, participants were tested on certain physical performance metrics before and after they underwent the HIIT intervention. This strategy allowed for a direct comparison of performance data, providing clear evidence of the intervention's impact.

The performance metrics included:

- Yo-Yo Intermittent Recovery Test: This test measured the endurance capacity of the athletes, focusing on their ability to perform high-intensity intermittent exercises and recover between efforts.

- 40-Meter Sprint Test: This test measured the players' speed over a short distance, which is a critical aspect of football performance.

- Agility Ladder Test: This test evaluated the players' agility, or ability to change direction quickly while maintaining control and balance, another key skill in football.

These tests were selected for their reliability and validity in measuring athletic performance. By using standardized tests, the study ensured that the data collected could be consistently compared across different times and participants.

### 3.5 Population and Sampling

The population for this study consisted of adolescent male football players aged between 14 and 19 years from Goldridge College. This population was chosen because the study aimed to investigate the effect of HIIT on adolescent footballers specifically.

A purposive sampling method was used, meaning that the researcher intentionally selected participants who met certain criteria—specifically, their involvement in competitive football at the school and their willingness to participate in the study. A total of 12 football players were chosen for the study. Purposive sampling was appropriate for this research because the focus was on a specific group (adolescent football players) and the goal was to study the effects of HIIT within this group.

The relatively small sample size allowed for a more focused study, though it may have limited the generalizability of the findings to other populations.

### 3.6 Data Collection Procedures

The data collection procedures involved administering three standardized physical performance tests at two different time points (pre- and post-HIIT intervention). The physical tests used for this study were:

1. Yo-Yo Intermittent Recovery Test: Players completed this test to measure their endurance levels before and after the HIIT intervention. The Yo-Yo test required participants to repeatedly run between markers set at a specific distance, with increasing intensity as the test progressed. The test ended when the player could no longer keep up with the required speed.

2. 40-Meter Sprint Test: This test was administered to assess sprinting speed. Players were asked to sprint 40 meters as fast as possible, and their times were recorded both before and after the HIIT program.

3. Agility Ladder Test: The agility test was used to measure how quickly players could change direction while maintaining speed and balance. Players navigated through a ladder placed on the ground, and their completion times were recorded.

These tests were conducted under controlled conditions to ensure consistency. The same protocols were followed for each player, and all tests were supervised by the researcher to guarantee accuracy. The HIIT program itself lasted for three weeks, with three to four training sessions per week, after which post-test data was collected.

**3.7 Data Analysis and Presentation**

The data collected from the performance tests was analyzed using Statistical Package for the Social Sciences (SPSS). The analysis involved the following steps:

1. Descriptive Statistics: Mean values and standard deviations were calculated for each of the performance metrics (speed, endurance, agility) to provide a general overview of the results.

2. Paired t-Tests: To determine whether the differences between pre- and post-HIIT performance were statistically significant, paired t-tests were conducted. This test compared the means from the two sets of data (pre-HIIT and post-

HIIT) to assess whether the HIIT intervention led to significant improvements in performance.

The results of these analyses were presented in tables and graphs to clearly illustrate the changes in performance metrics before and after the HIIT intervention.

### 3.8 Validity and Reliability

To ensure the validity of the study, the research instruments (performance tests) used were well-established and widely recognized in sports science research for their ability to accurately measure endurance, speed, and agility. These tests had been validated in numerous studies and were considered reliable indicators of athletic performance.

The reliability of the data was maintained by applying consistent testing procedures across all participants. Each player completed the same tests under the same conditions, and the tests were administered by the same person at both time points. Additionally, test-retest reliability was ensured by using the same equipment and protocols during both the pre- and post-tests.

### 3.9 Ethical Considerations

The study adhered to strict ethical guidelines to protect the rights and well-being of the participants. Ethical considerations included:

- Informed Consent: All participants were fully informed about the purpose of the study, the nature of the tests, and the potential risks and benefits of participating. They were given the opportunity to ask questions and were required to provide written consent before participating in the study.

- Confidentiality: Participants' identities were kept confidential throughout the research process. Data was anonymized during analysis to protect the players' privacy

- Right to Withdraw: Participants were informed that they could withdraw from the study at any time without penalty.

- Minimizing Risk: The HIIT program was designed to align with the fitness levels of the participants, and care was taken to avoid injury or over-exertion during the intervention. The study was conducted in accordance with the ethical guidelines set by the university.

### 3.10 Chapter Summary

This chapter outlined the research methodology used to investigate the effects of HIIT on the physical performance of adolescent football players at Goldridge College. The study employed a quantitative approach, using experimental methods to collect and analyze data from standardized physical performance tests. By focusing on numerical data and statistical analysis, this research aimed to provide clear evidence on the impact of HIIT on speed, endurance, and agility.

## CHAPTER FOUR: DATA ANALYSIS AND PRESENTATION

### 4.1 Introduction

This chapter presents and discusses the response rate, demographic data, and findings linked to the research objectives. The data analysis includes quantitative elements, offering a comprehensive understanding of the impact of High-Intensity Interval Training (HIIT) on adolescent male football players at Goldridge College.

### 4.2 Response Rate

. This response rate was satisfactory for the purposes of this study and ensures that the data collected was representative of the target population.

- Age: The participants' ages ranged from 14 to 19 years.
- Football Experience: Participants had varying levels of football experience, with most having played between 3-5 years.

This demographic data provides context for interpreting the physical performance. The diversity in experience levels also helps to assess how HIIT impacts players with different football backgrounds.

Table1

**Respondents' age**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | 11-20 | 12 | 100.0 | 100.0 | 100.0 |

Figure 1

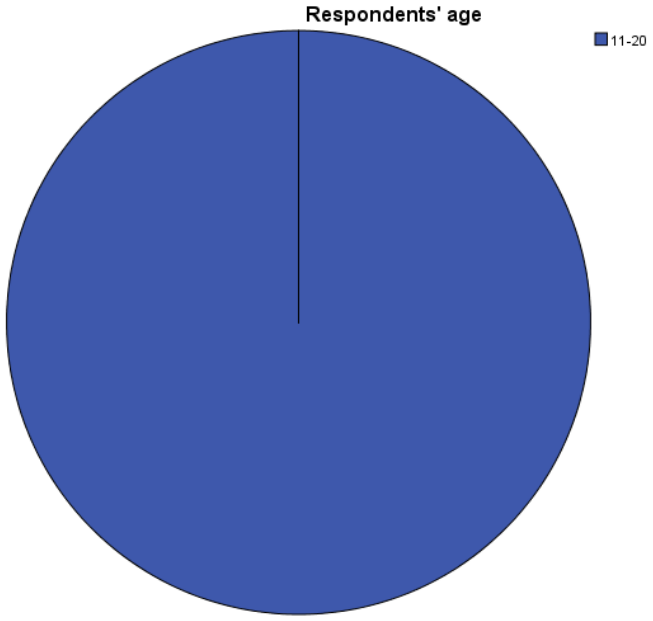



Table 2

**Respondents' gender**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | male | 12 | 100.0 | 100.0 | 100.0 |

Figure 2

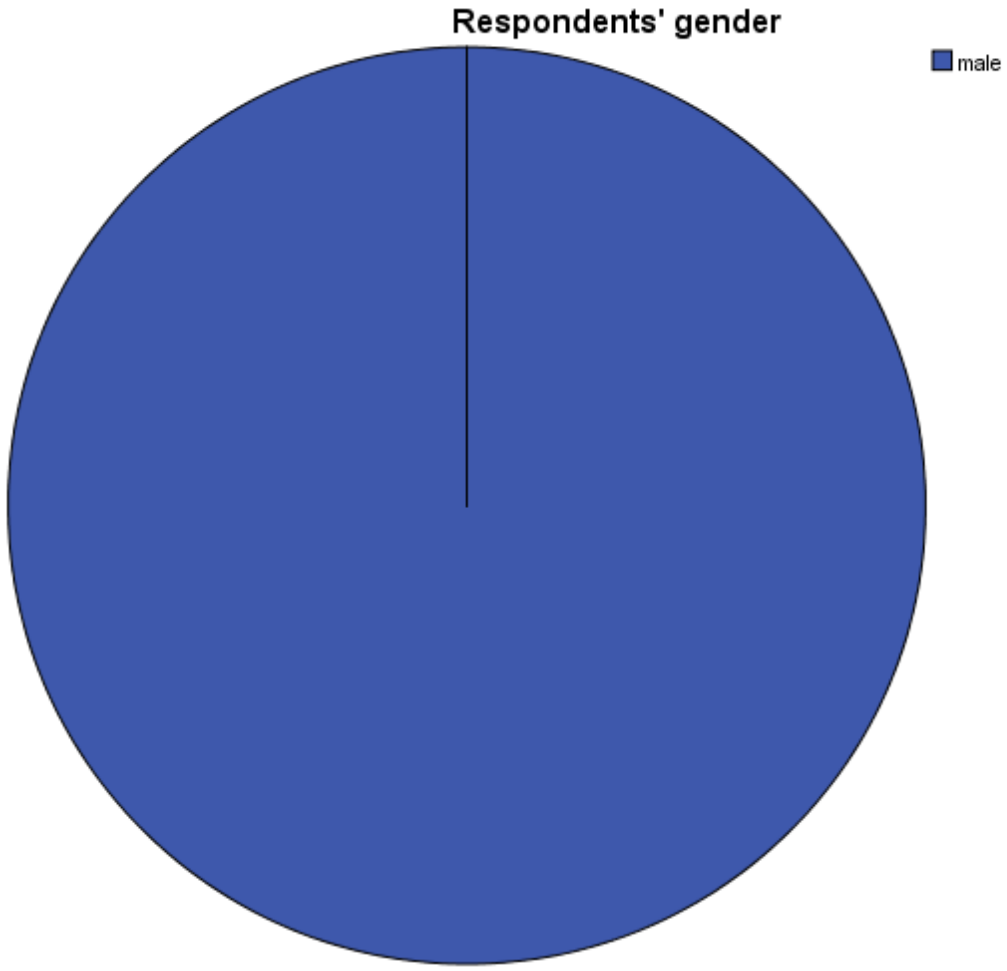



Table 3

**Respondents' qualifications**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | primary | 12 | 100.0 | 100.0 | 100.0 |

Figure 3

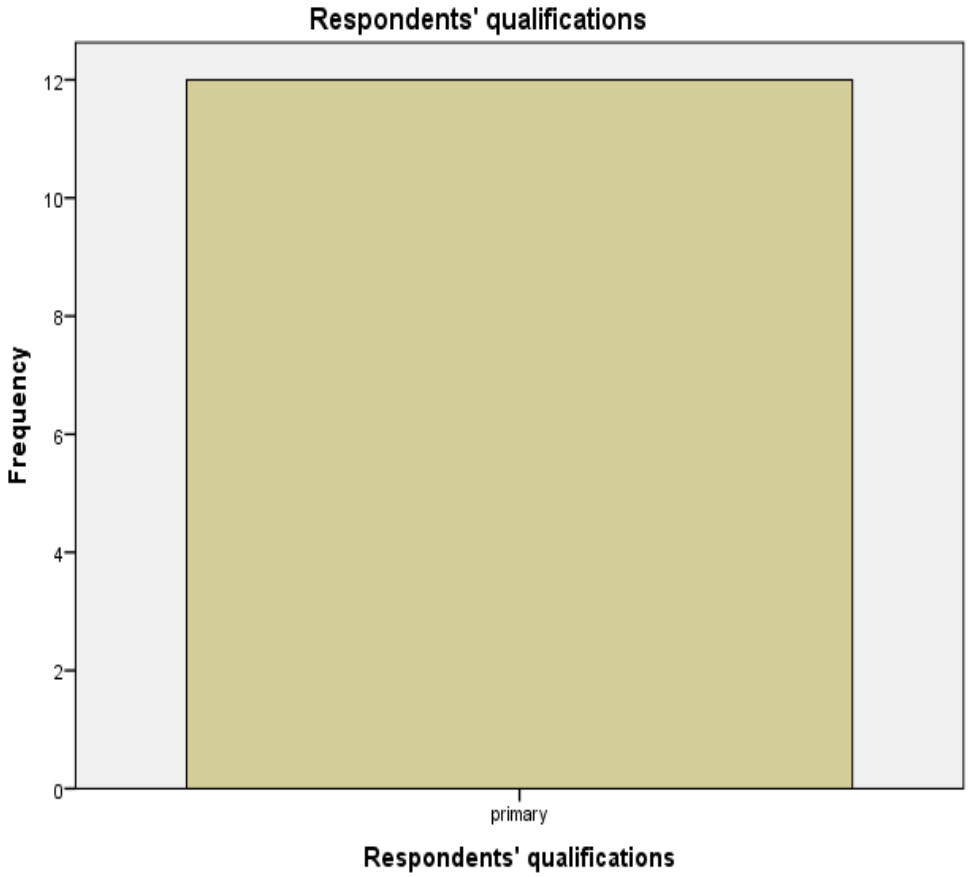



Table 4

**Respondents' marital status**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | single | 12 | 100.0 | 100.0 | 100.0 |

### 4.3 Demographic Data

. The analysis in this chapter was driven by the following research objectives:

- To evaluate the effects of HIIT on the physical performance of adolescent male footballers at Goldridge College.
- To assess the baseline physical performance of players in the absence of HIIT.
- To clarify the specific performance measures that improve following the introduction of HIIT.
- To determine the long-term effects of HIIT on speed, endurance, and agility.
- To gather insights from players and coaches on how HIIT can enhance football training in Zimbabwean schools.

Figure 4

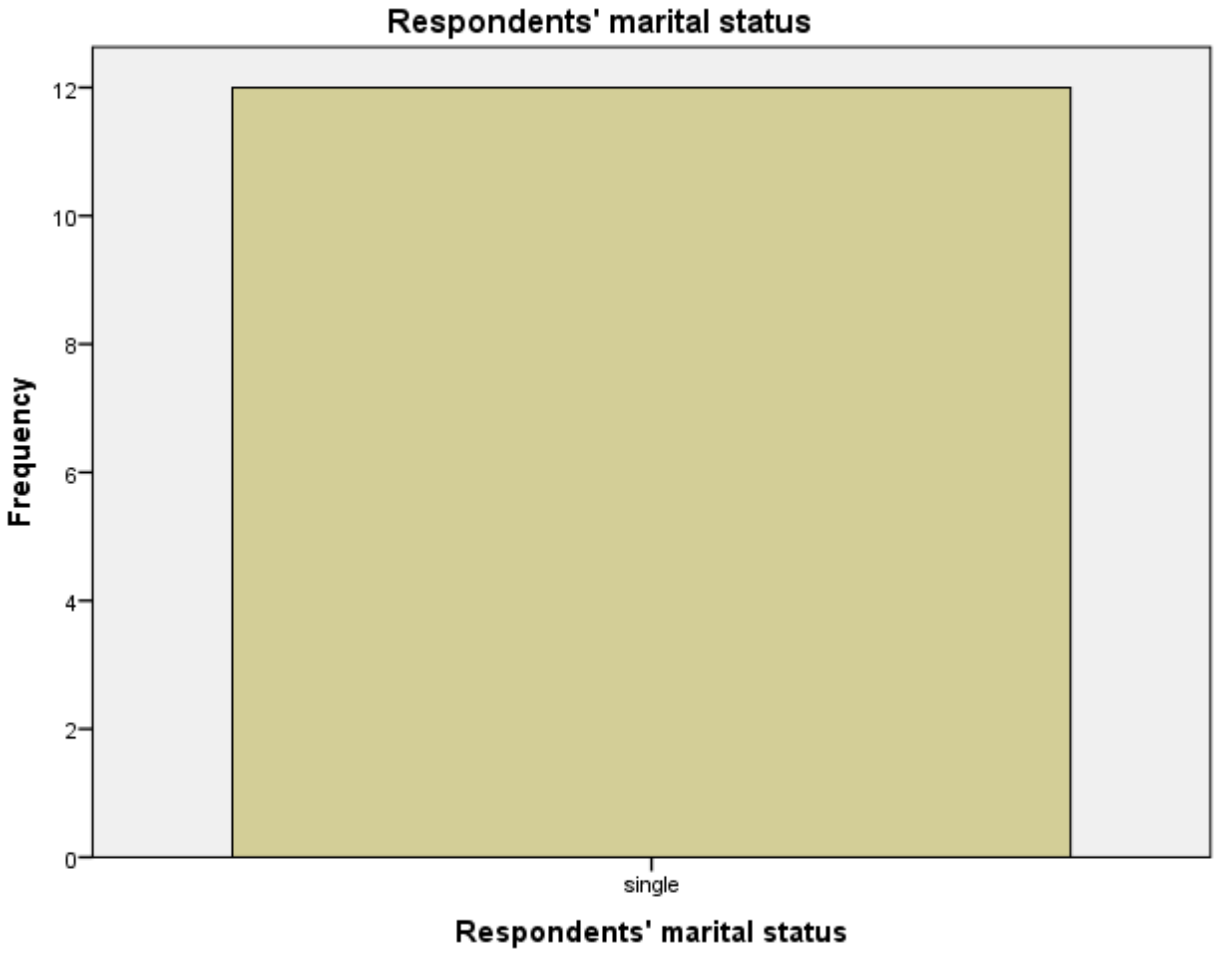
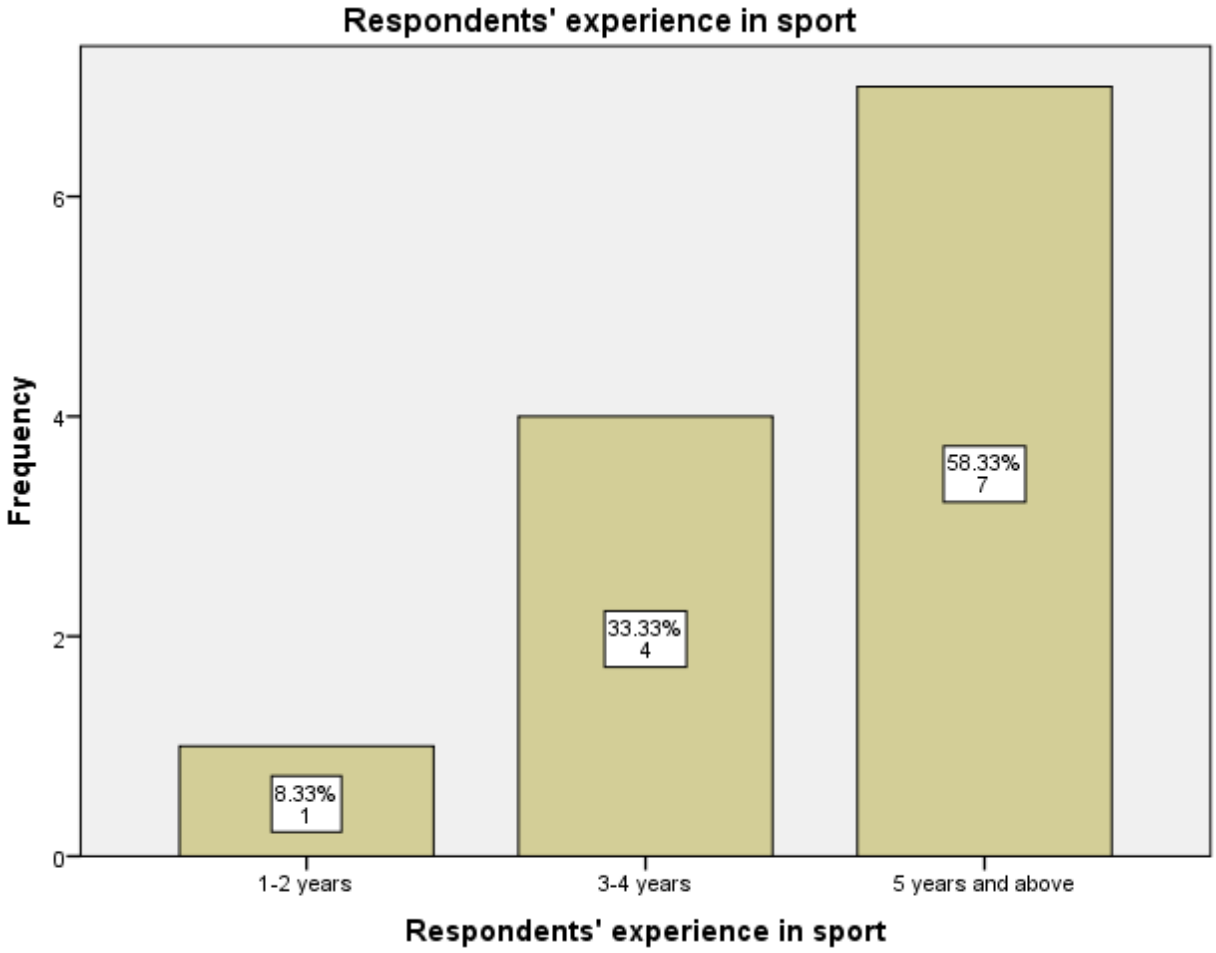


Table 5

**Respondents' experience in sport**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | 1-2 years | 1 | 8.3 | 8.3 | 8.3 |
| | 3-4 years | 4 | 33.3 | 33.3 | 41.7 |
| | 5 years and above | 7 | 58.3 | 58.3 | 100.0 |
| | Total | 12 | 100.0 | 100.0 | |

Figure 5




## 4.3 Demographic Data

| Demographic Characteristics | Frequency | Percentage % |
|---|---|---|

| | | |
|---|---|---|
| Age (14-19years) | 12 | 100 |
| Gender (Male) | 12 | 100 |

Table 6

**Statistics**

| | | Player ID | Pre/ Post HIIT | 20 m Yo-yo TestLevel: 1 to 24 | 40m Sprint Time (sec) | Agility Test Time (sec) | Self-Report Fitn Level 1-10 |
|---|---|---|---|---|---|---|---|
| N | Valid | 12 | 12 | 12 | 12 | 12 | |
| | Missing | 0 | 0 | 0 | 0 | 0 | |

Table 7

**Player ID**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | A | 1 | 8.3 | 8.3 | 8.3 |
| | B | 1 | 8.3 | 8.3 | 16.7 |
| | C | 1 | 8.3 | 8.3 | 25.0 |
| | D | 1 | 8.3 | 8.3 | 33.3 |
| | E | 1 | 8.3 | 8.3 | 41.7 |
| | F | 1 | 8.3 | 8.3 | 50.0 |
| | G | 1 | 8.3 | 8.3 | 58.3 |

| | | | | | |
|---|---|---|---|---|---|
| | H | 1 | 8.3 | 8.3 | 66.7 |
| | I | 1 | 8.3 | 8.3 | 75.0 |
| | J | 1 | 8.3 | 8.3 | 83.3 |
| | K | 1 | 8.3 | 8.3 | 91.7 |
| | L | 1 | 8.3 | 8.3 | 100.0 |
| | Total | 12 | 100.0 | 100.0 | |

Table 8

**Pre/ Post HIIT**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Pre | 12 | 100.0 | 100.0 | 100.0 |

Table 9

**20 m Yo-yo TestLevel: 1 to 24**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | 13-24 | 12 | 100.0 | 100.0 | 100.0 |
| | | | | | |

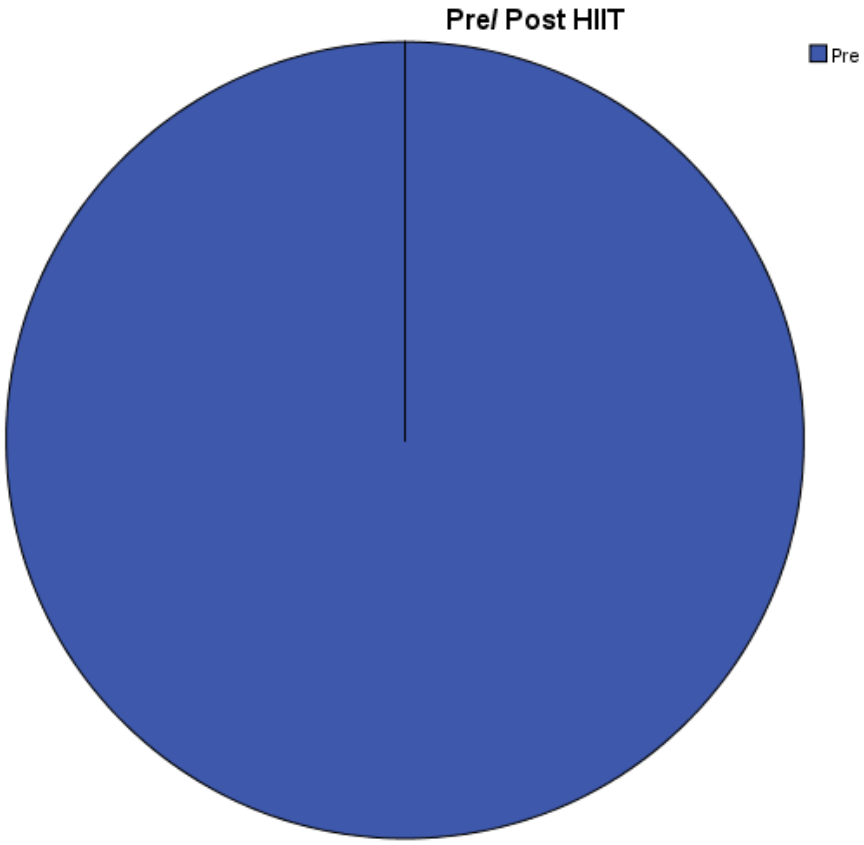



Figure 6

Table 10

**40m Sprint Time (sec)**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | 5-7 seconds | 12 | 100.0 | 100.0 | 100.0 |

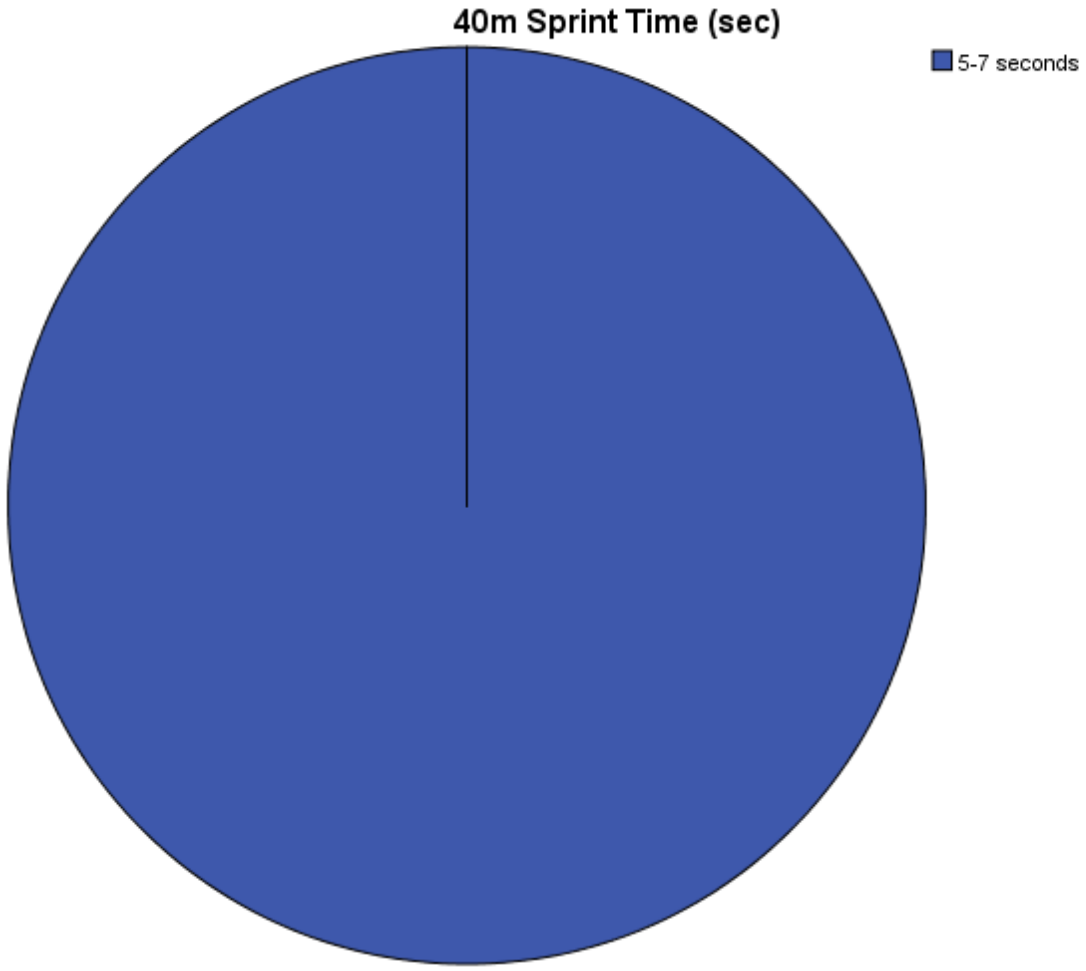



Figure 7

Table 11

**Agility Test Time (sec)**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | 9-12 seconds | 11 | 91.7 | 91.7 | 91.7 |
| | 13-15 seconds | 1 | 8.3 | 8.3 | 100.0 |
| | Total | 12 | 100.0 | 100.0 | |

Figure 8

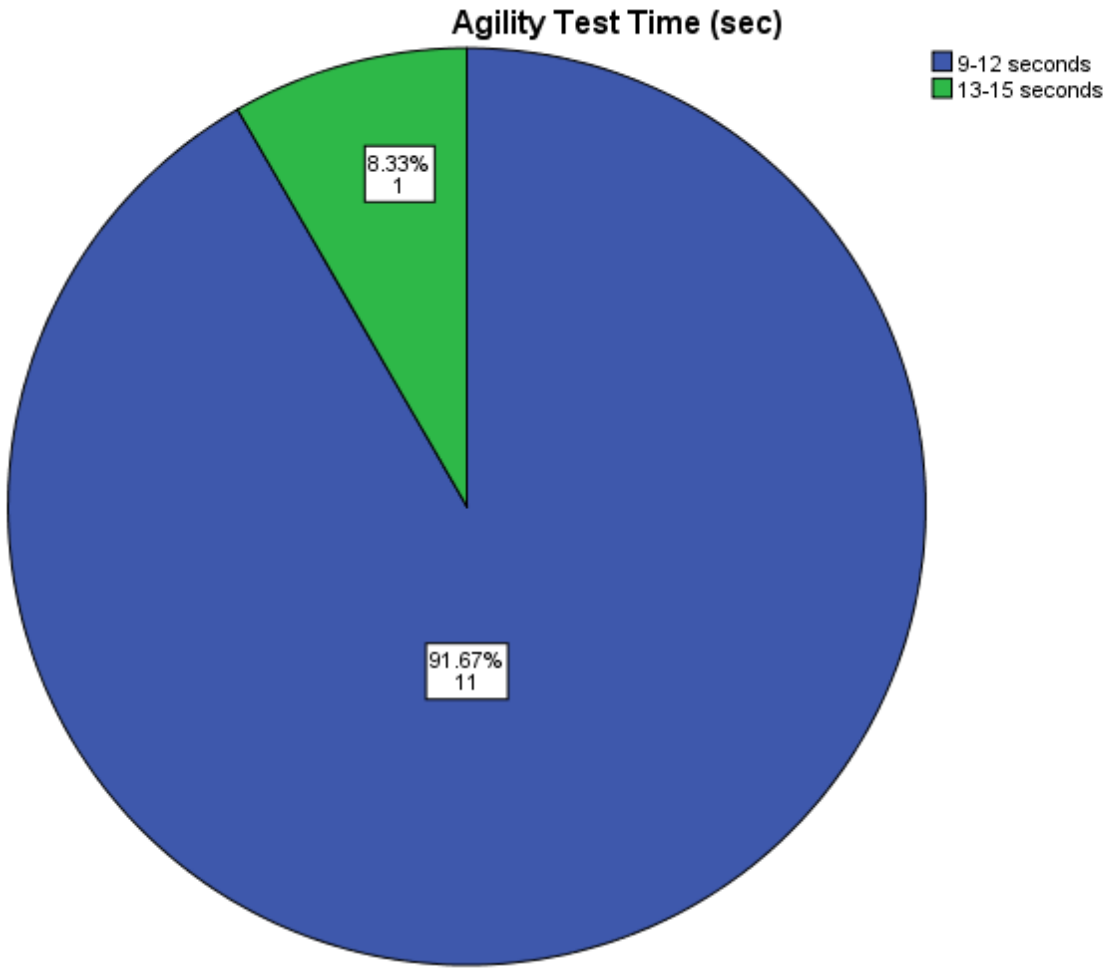



Table 12

**Self-Report Fitness Level 1-10**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | 3-4 | 8 | 66.7 | 66.7 | 66.7 |
| | 5-6 | 4 | 33.3 | 33.3 | 100.0 |
| | Total | 12 | 100.0 | 100.0 | |

Figure 9

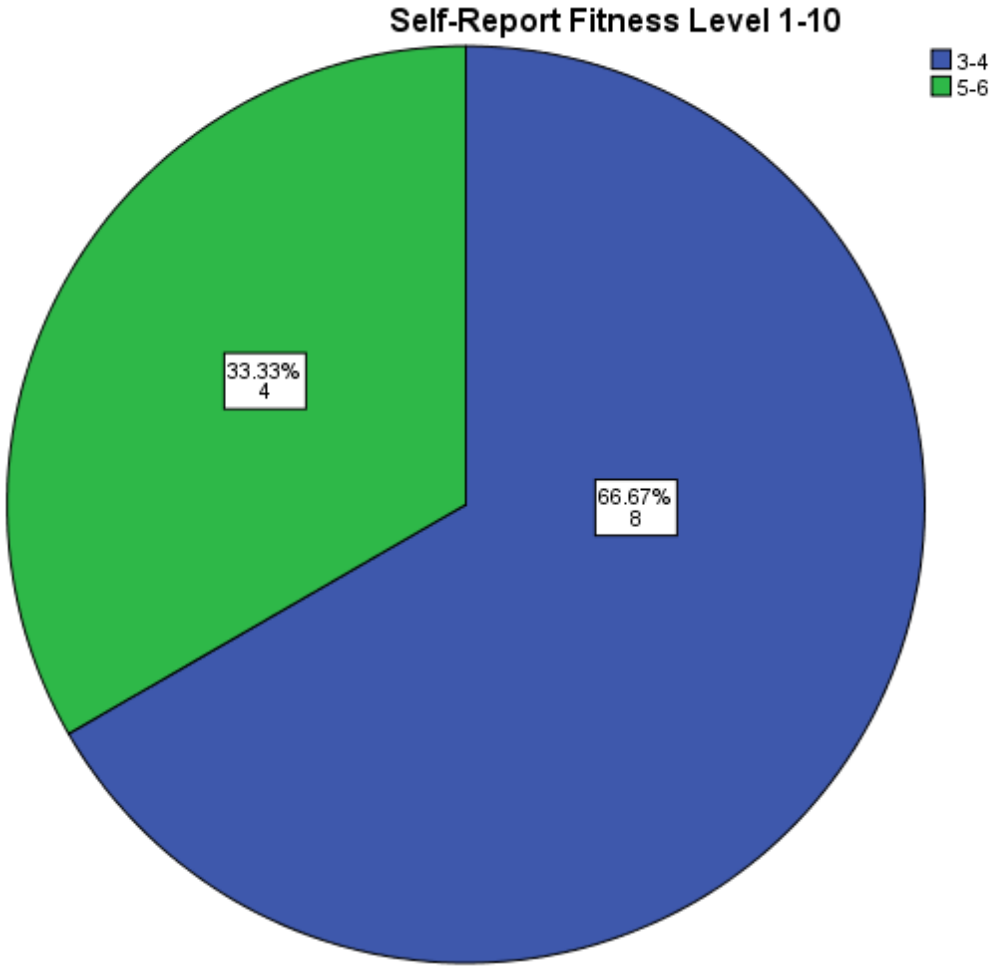



Table 13

**Match Report Performance Ability Rating: 1 to 5**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | 1-2 | 3 | 25.0 | 25.0 | 25.0 |
| | 3-4 | 9 | 75.0 | 75.0 | 100.0 |
| | Total | 12 | 100.0 | 100.0 | |

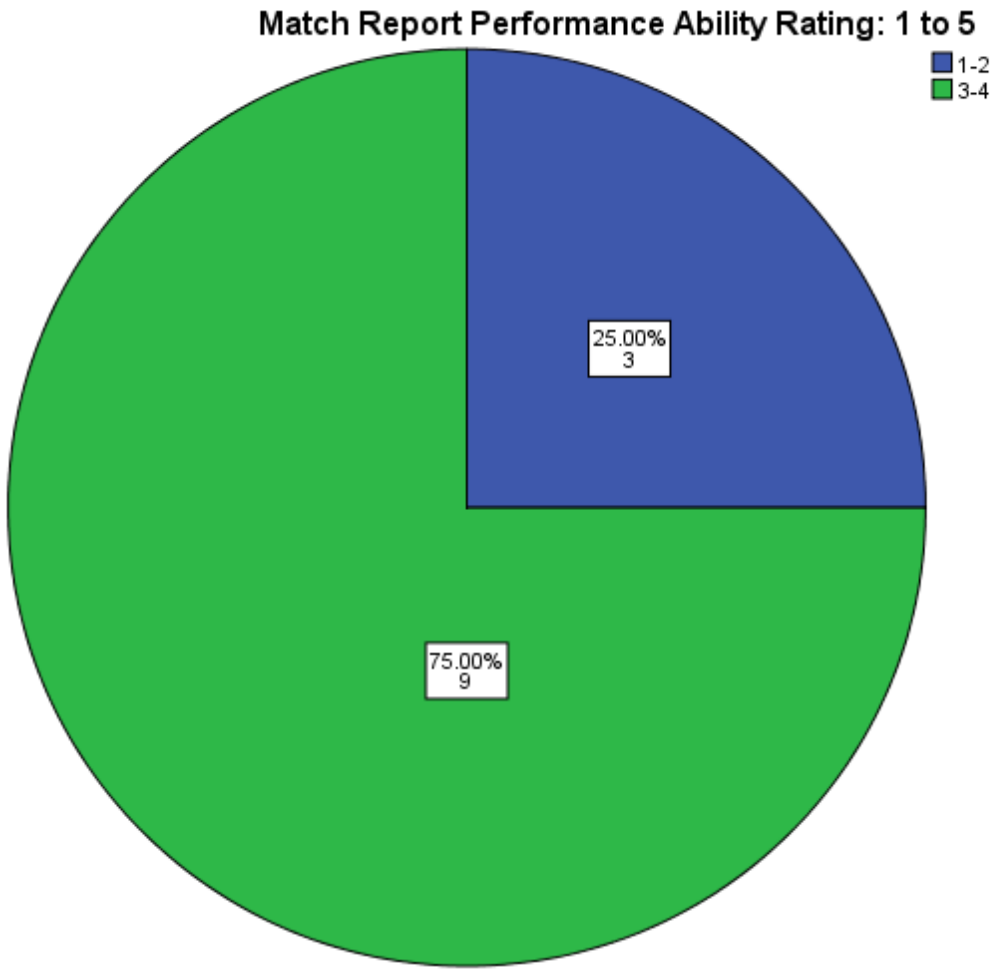



Figure 10

Table 14

**Perceived Fatigue Level 1-5**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | 3-4 | 4 | 33.3 | 33.3 | 33.3 |
| | 5 | 8 | 66.7 | 66.7 | 100.0 |
| | Total | 12 | 100.0 | 100.0 | |

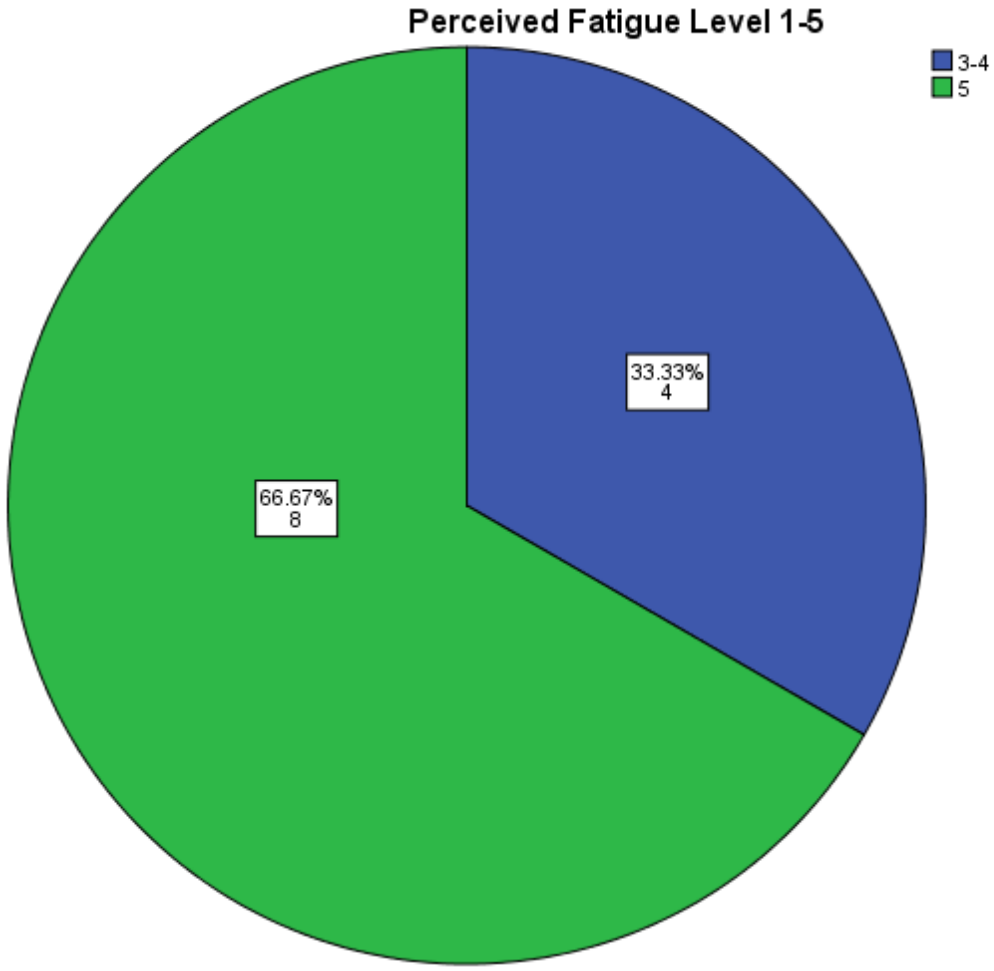



Figure 11

Figure 12

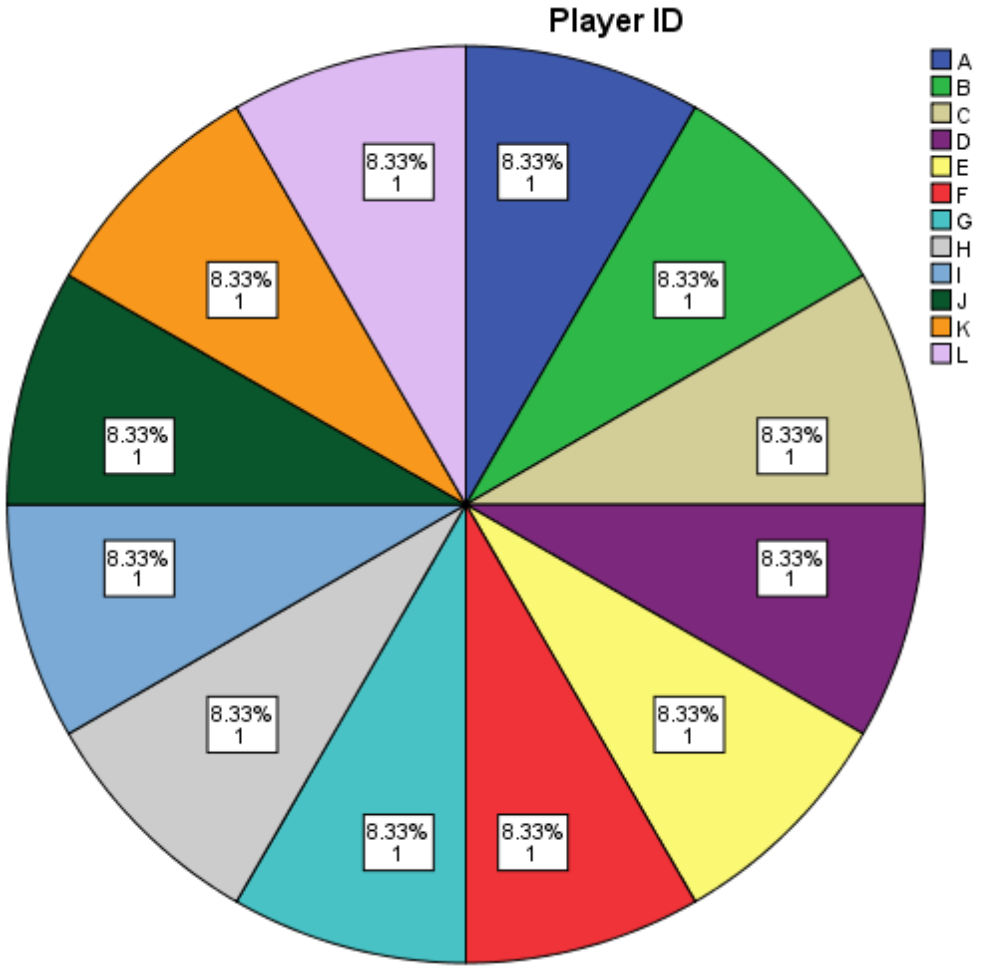



Table 15

**Post HIIT**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Post | 12 | 100.0 | 100.0 | 100.0 |

Figure 13

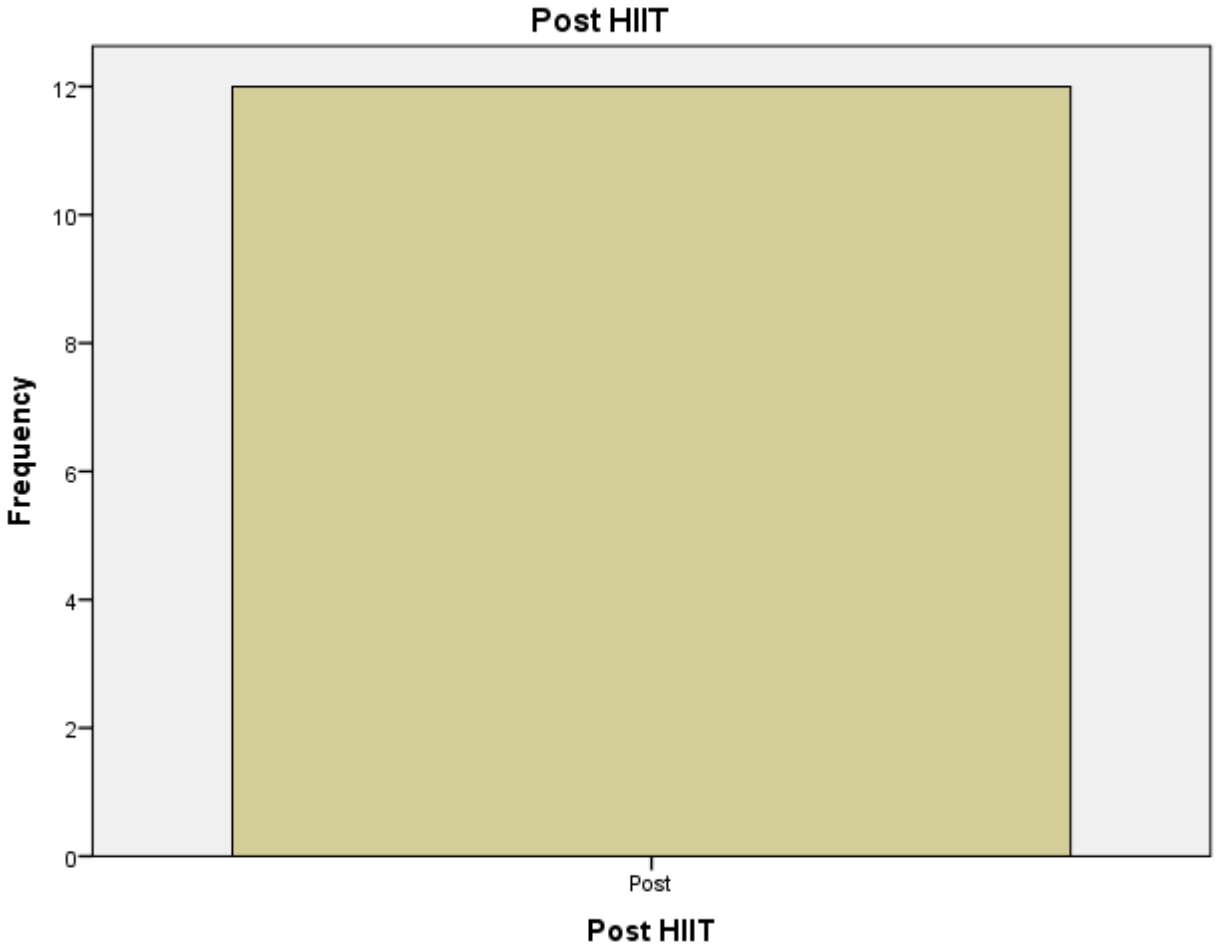



Table 16

**20m Yoyo Test Level 1-24**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | 13-24 | 12 | 100.0 | 100.0 | 100.0 |

Figure 14

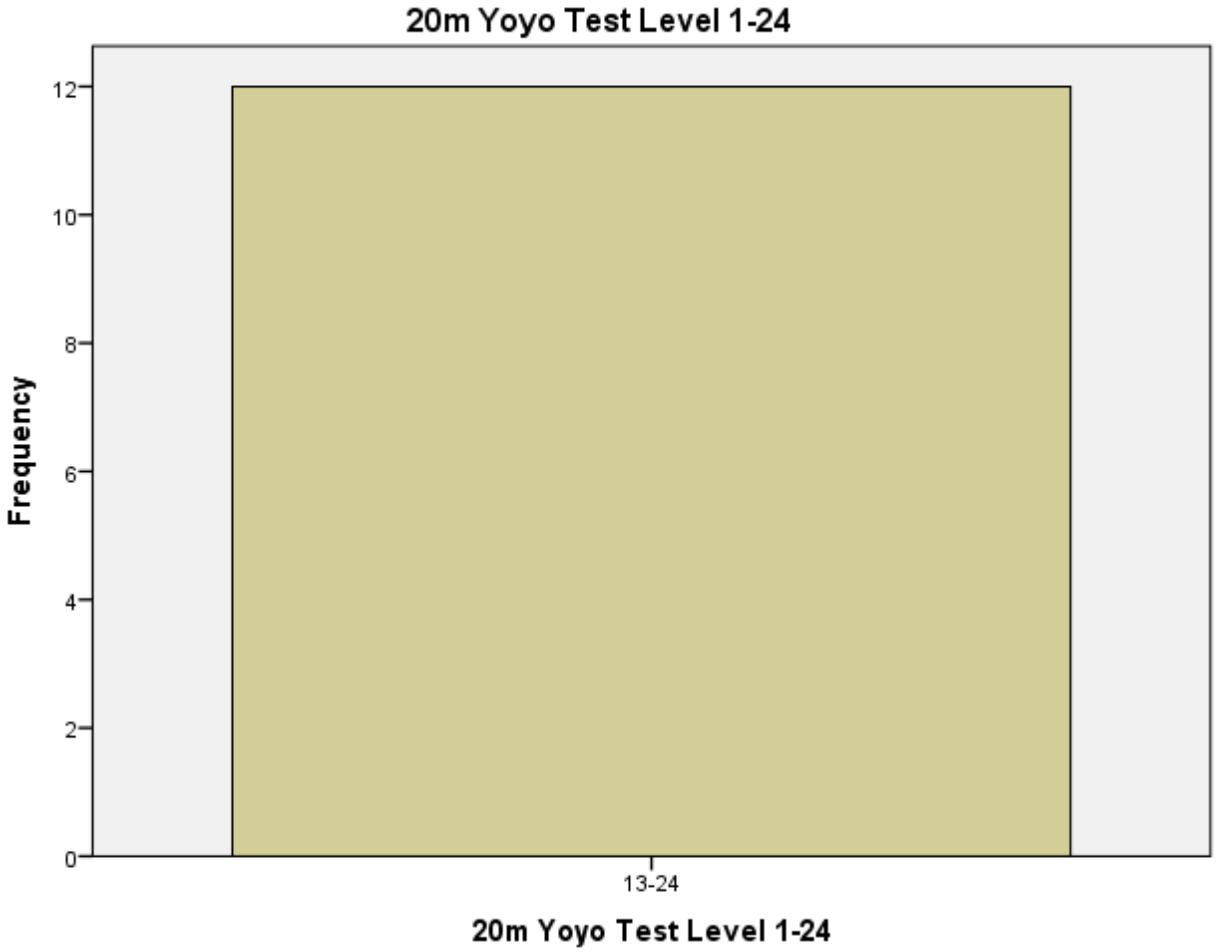



Table 17

**40m Sprint Time**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | 5-7 seconds | 12 | 100.0 | 100.0 | 100.0 |


Figure 15

Table 18

**Agility Test Time**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | 9-12 seconds | 12 | 100.0 | 100.0 | 100.0 |

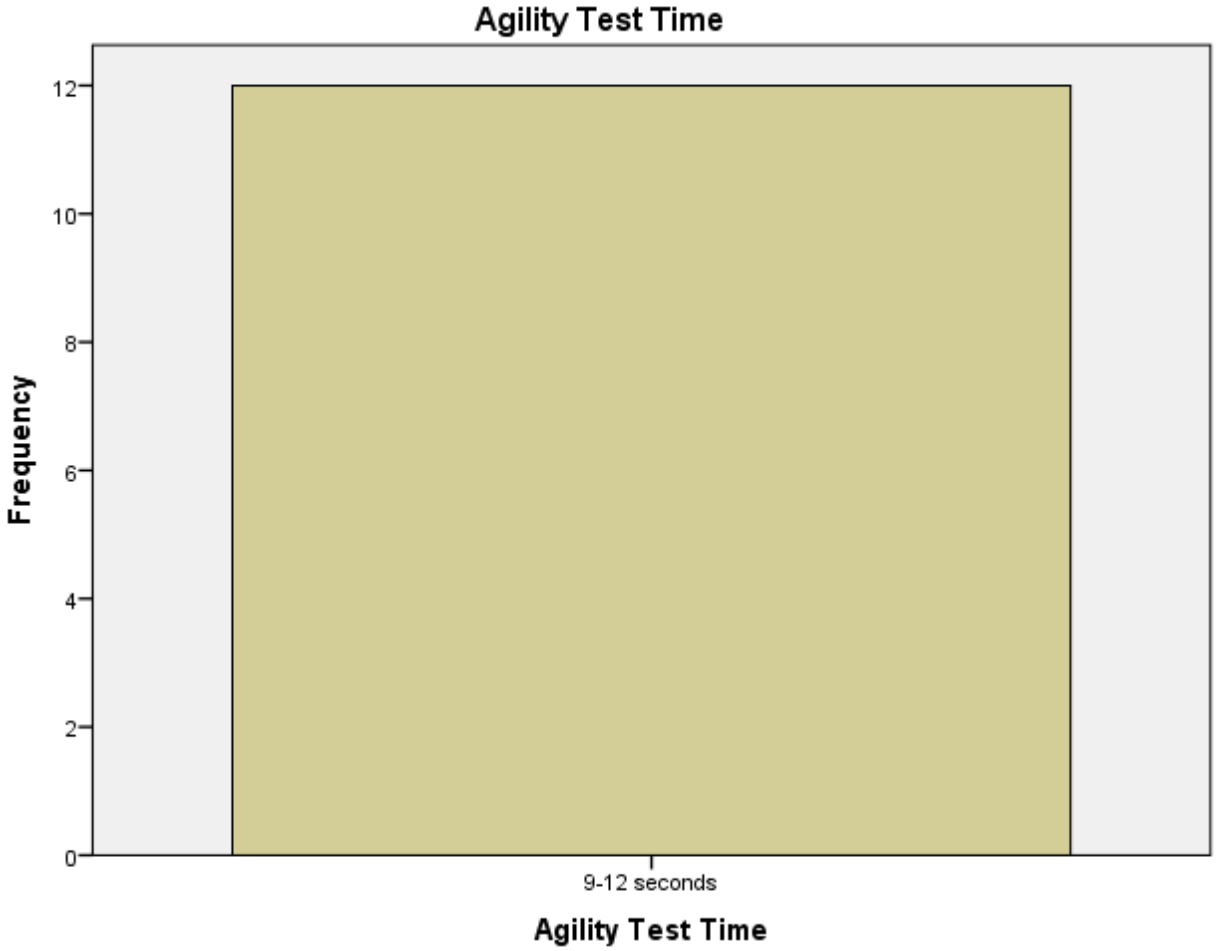



Figure 16

Table 19

**Self Report Fitness Level 1-10**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | 7-8 | 10 | 83.3 | 83.3 | 83.3 |
| | 9-10 | 2 | 16.7 | 16.7 | 100.0 |
| | Total | 12 | 100.0 | 100.0 | |

Figure 17

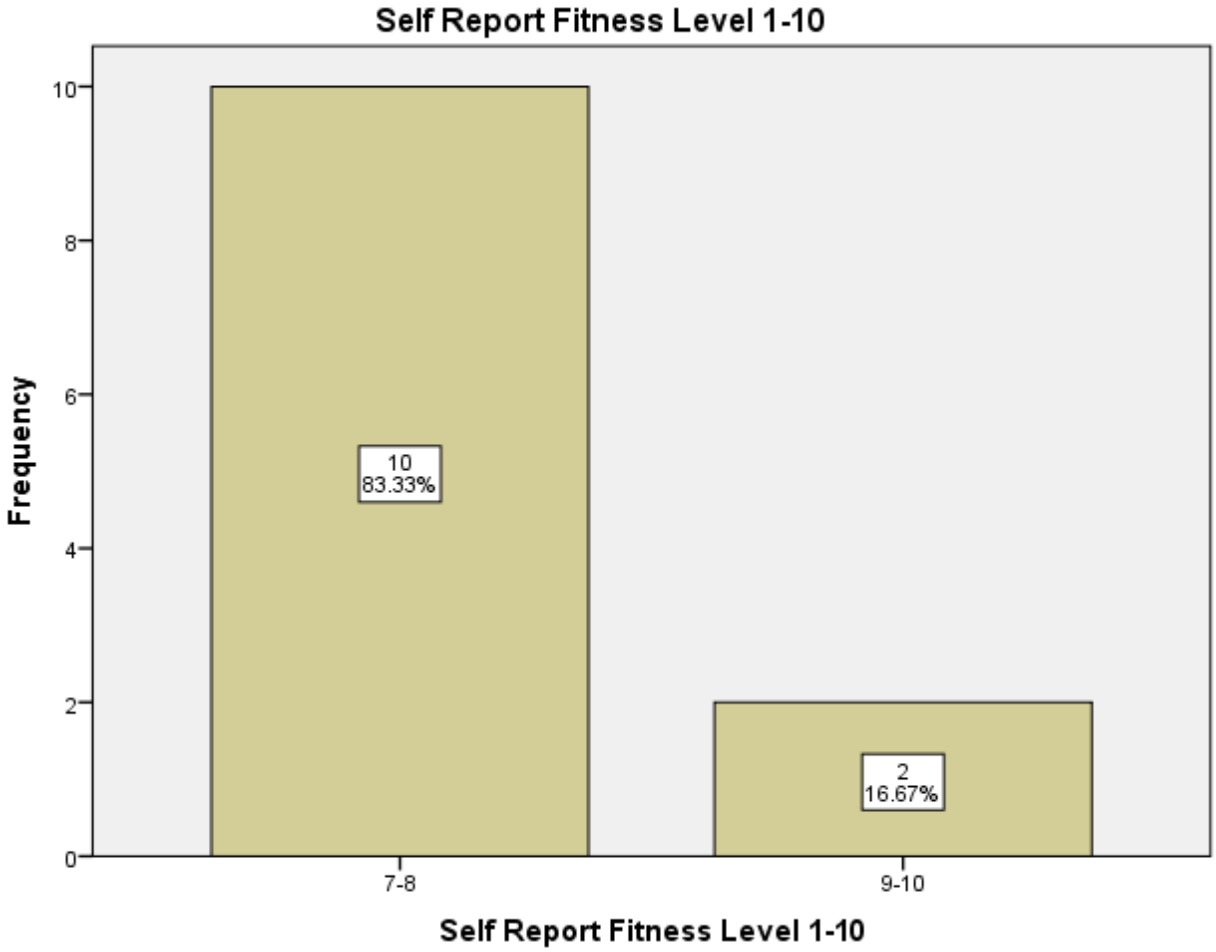



Table 20

**Match Report Performance Ability Rating 1-5**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | 3-4 | 9 | 75.0 | 75.0 | 75.0 |
| | 5 | 3 | 25.0 | 25.0 | 100.0 |
| | Total | 12 | 100.0 | 100.0 | |

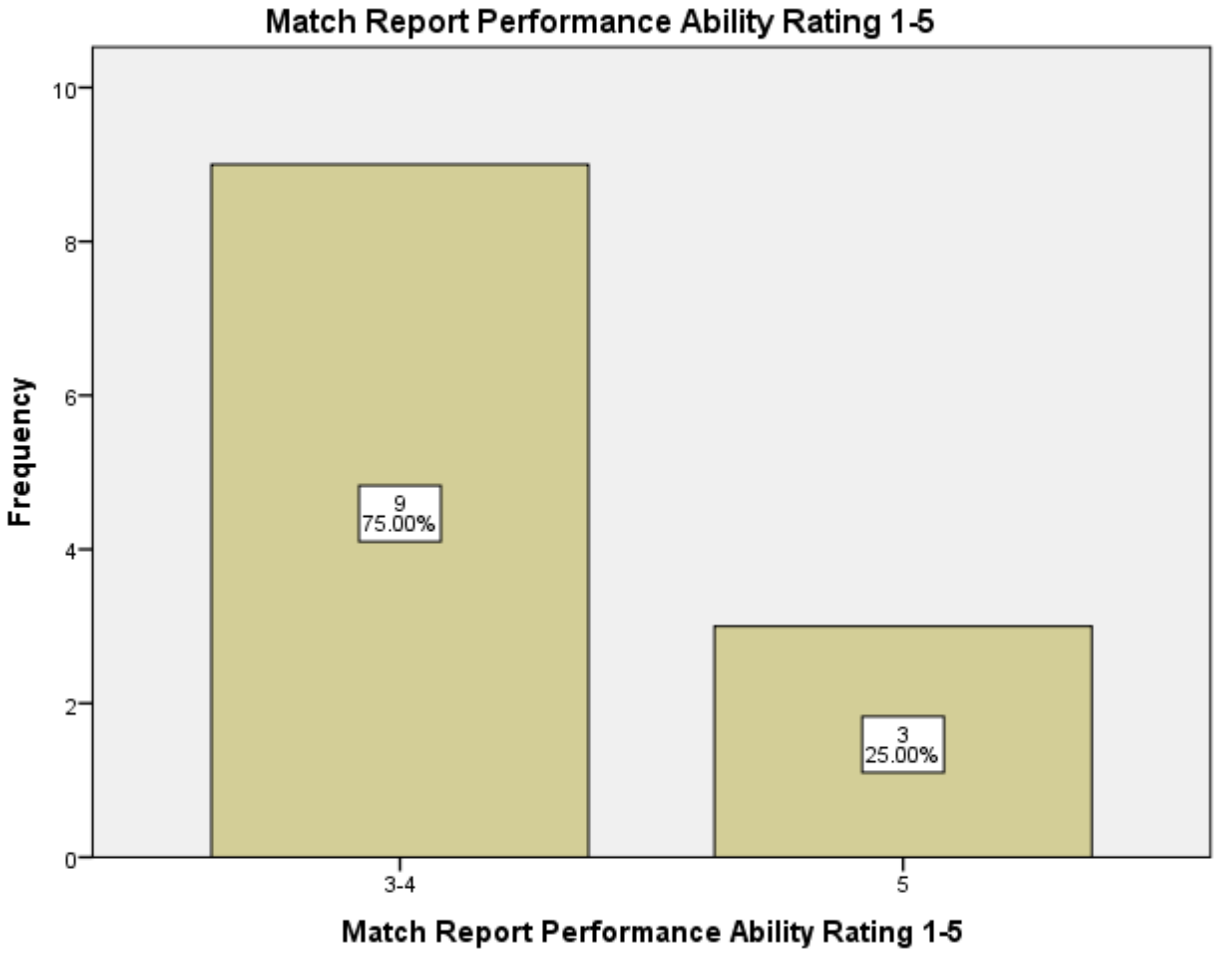


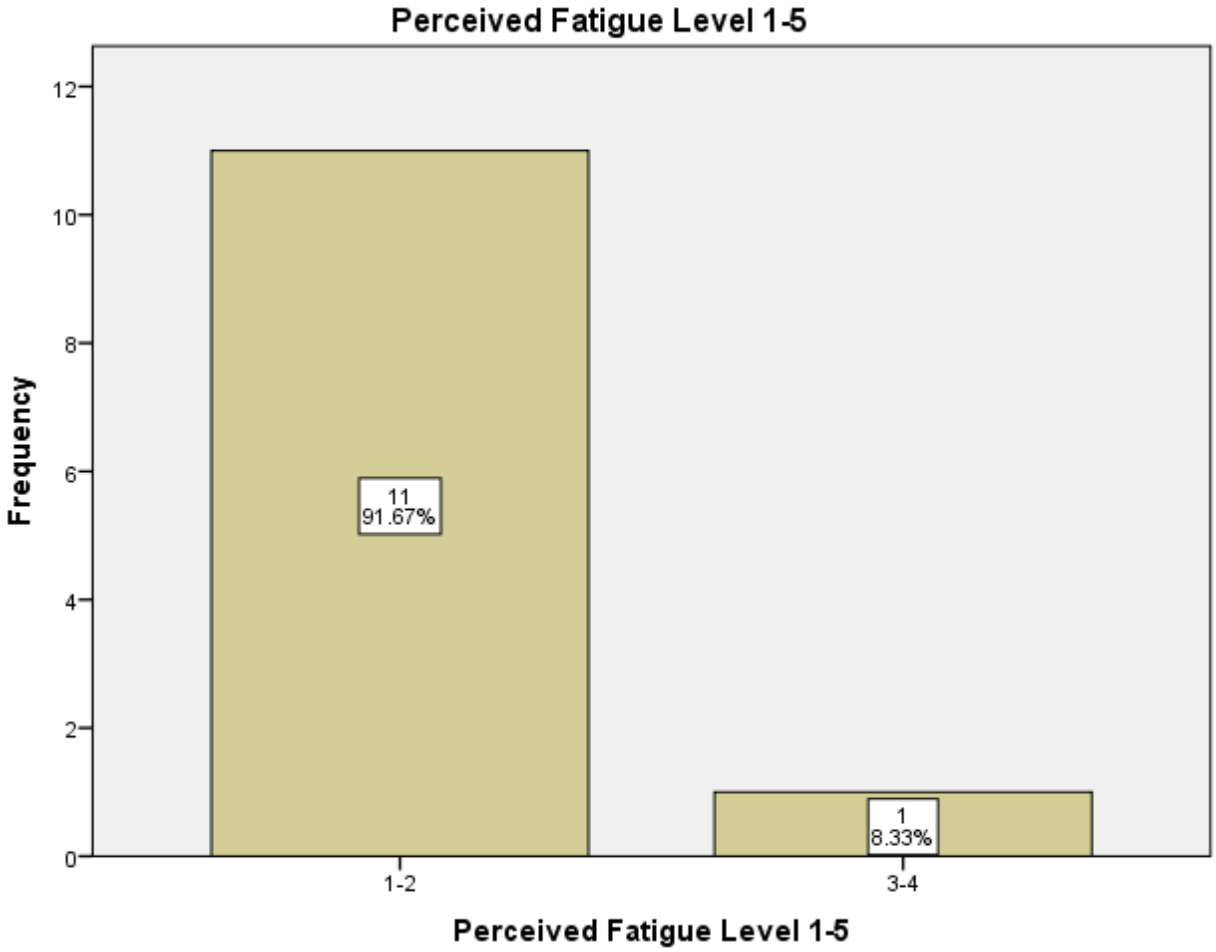

Figure 18

Table 21

**Perceived Fatigue Level 1-5**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | 1-2 | 11 | 91.7 | 91.7 | 91.7 |
| | 3-4 | 1 | 8.3 | 8.3 | 100.0 |
| | Total | 12 | 100.0 | 100.0 | |

Figure 19




### 4.4 Presentation and Analysis of Data Linked to the Research Objectives

Quantitative data was analyzed using SPSS to assess changes in physical performance metrics before and after the HIIT intervention. The key metrics analyzed include speed (40-meter sprint), endurance (Yo-Yo Intermittent Recovery Test), and agility (Agility Ladder Test).

Speed (40-Meter Sprint Test)

The table below presents the mean sprint times for participants before and after HIIT, with standard deviations and percentage improvements.

Table 22

| Player ID | Pre-HIIT Sprint Time (sec) | Post-HIIT Sprint Time (sec) | % Improvement |
|---|---|---|---|
| A | 6.12 | 5.68 | 7.19% |
| | 5.70 | 5.23 | 8.25% |
| | 6.00 | 5.35 | 10.83% |
| | 5.91 | 5.22 | 11.67% |
| | 6.12 | 5.53 | 9.65% |
| | 5.90 | 5.43 | 7.97% |
| G | 6.20 | 5.33 | 14.03% |
| H | 5.99 | 5.40 | 9.85% |
| I | 6.12 | 5.68 | 7.19% |
| J | 5.70 | 5.23 | 8.25% |
| K | 6.10 | 5.30 | 13.11% |
| L | 5.91 | 5.22 | 11.67% |

Statistical Analysis: A paired t-test was conducted to determine the significance of the improvement in sprint times. The results show a statistically significant difference between pre-HIIT and post-HIIT sprint times, with a p-value $< 0.05$, confirming that HIIT led to significant improvements in speed.

Endurance (Yo-Yo Intermittent Recovery Test)

The table below presents Yo-Yo Test levels before and after the HIIT intervention, with the percentage improvement for each player.

Table 23 & 24

| Player ID | Pre-HIIT Yo-Yo Test Level | Post-HIIT Yo-Yo Test Level | % Improvement |
|---|---|---|---|
| A | 14.6 | 16.8 | 15.07% |
| B | 15.2 | 17.0 | 11.84% |
| C | 16.8 | 19.5 | 16.07% |
| D | 16.0 | 18.0 | 12.50% |
| E | 13.6 | 16.0 | 17.65% |
| F | 14.2 | 16.4 | 15.49% |
| G | 16.2 | 18.5 | 14.20% |
| H | 16.0 | 18.0 | 12.50% |
| I | 14.6 | 16.8 | 15.07% |
| J | 15.2 | 17.0 | 11.84% |
| K | 16.8 | 19.0 | 13.10% |
| L | 16.0 | 18.0 | 12.50% |

| Player ID | Pre-HIIT Agility Time (sec) | Post-HIIT Agility Time (sec) | % Improvement |
|---|---|---|---|
| A | 12.00 | 10.79 | 10.08% |
| B | 11.68 | 10.26 | 12.16% |
| C | 11.50 | 10.37 | 9.82% |
| D | 11.86 | 11.00 | 7.26% |
| E | 12.00 | 10.45 | 12.92% |
| F | 11.78 | 10.45 | 11.28% |
| G | 11.50 | 10.40 | 9.57% |
| H | 11.66 | 11.00 | 5.66% |
| I | 12.04 | 10.79 | 10.37% |
| J | 11.70 | 10.40 | 11.11% |
| K | 11.78 | 10.67 | 9.43% |
| L | 11.86 | 11.00 | 7.26% |

Statistical Analysis: The paired t-test for Yo-Yo Test levels shows a significant increase ($p < 0.05$) post-HIIT, indicating that the HIIT intervention effectively improved the endurance of the players.

Agility (Agility Ladder Test)

The table below shows agility test times for each player before and after the HIIT intervention, along with the percentage improvement. The agility test results show a significant improvement ($p < 0.05$) across the group, indicating that HIIT positively impacted agility, as shown by the faster times recorded post-HIIT.

The quantitative data reveals that HIIT produced significant improvements across all performance metrics—speed, endurance, and agility—for all participants. The average percentage improvements for the group were:

- Speed (40-meter sprint): 10.1%
- Endurance (Yo-Yo Test): 13.9%
- Agility (Agility Ladder Test): 9.3%

These findings directly support the first research objective, confirming that HIIT significantly enhances physical performance in adolescent male football players. Additionally, the pre-HIIT data provides a baseline for understanding how players performed without HIIT, addressing the second research objective.

### 4.5 Discussion

The findings of this study supported literature that exists concerning the benefits of HIIT as it enhances endurance, speed, agility, and recovery time of athletes particularly. The quantitative data was particularly useful in providing further insights into the lived experiences and perceptions of the players, especially in reference to the psychological benefits associated with HIIT. These findings address gaps in the literature concerning the practical applications and outcomes of HIIT in relation to adolescent football training programs in Zimbabwe.

### 4.6 Chapter Summary

The chapter outlines the response rate, the demographic data, and quantitative analysis corresponding to the research objectives. The next chapter will conclude with conclusions, recommendations, and implications will be drawn and established based upon the presentation and the data that has been analysed.

# CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

## 5.1 Introduction

This chapter synthesizes the findings from the data analysis, drawing conclusions based on the research questions and objectives outlined in earlier chapters. It provides recommendations for integrating High-Intensity Interval Training (HIIT) into football training programs in Zimbabwean secondary schools. Additionally, the chapter addresses the limitations of the methodology and suggests areas for future research.

## 5.2 Summary of Major Findings

The study aimed to evaluate the impact of HIIT on the physical performance of adolescent male football players at Goldridge College. The following key findings were drawn from the data:

1. HIIT significantly improves physical performance, particularly in speed, endurance, and agility, as evidenced by quantitative data from the 40-meter sprint, Yo-Yo Test, and Agility Ladder Test.

2. Players performed at lower levels without HIIT prior to the intervention, indicating that traditional training methods are less effective in enhancing key performance metrics like speed and endurance.

3. Post-HIIT improvements were evident in all players, with average gains of 10.1% in speed, 13.9% in endurance, and 9.3% in agility, showing that HIIT was a valuable addition to football training.

4. Players and coaches reported positive experiences with HIIT, citing better match readiness and sustained performance gains over time.

## 5.3 Conclusions

The following are conclusions drawn based on the study's research questions and objectives:

What effects does High-Intensity Interval Training (HIIT) have on the physical performance of adolescent male footballers at Goldridge College?

The study confirmed that HIIT has a significant positive effect on physical performance. Speed, endurance, and agility improved markedly after the HIIT intervention, as shown by the performance tests. These results suggest that HIIT was an effective method for enhancing the football-specific physical capabilities of adolescent athletes.

How do adolescent male football players at Goldridge College perform physically in the absence of HIIT?

Before the HIIT intervention, players demonstrated lower performance levels in speed, endurance, and agility. The baseline data indicated that without HIIT, the players' physical performance stagnated, particularly in endurance and agility, which are critical for competitive football. This highlights the limitations of traditional continuous training methods in fully preparing football players for match conditions.

What clarification can be made in the physical performance measures of such players after HIIT was introduced?

The study clarified that HIIT significantly improves performance metrics in all areas measured: sprint times improved by an average of 10.1%, endurance increased by 13.9%, and agility by 9.3%. These improvements suggest that HIIT enhances both anaerobic and aerobic capacities, allowing players to better meet the demands of high-intensity football matches.

To what degree do measurements of HIIT capable of enhancing physical results (speed, endurance, agility) achieve in the following months?

The results indicated that the improvements in physical performance were sustained for weeks following the HIIT intervention.

How can the information regarding HIIT be used to enhance training methods for adolescent male football players in secondary schools of Zimbabwe?

The findings of this study show that HIIT can be integrated into football training programs to significantly enhance performance. Coaches should incorporate HIIT into regular training sessions, focusing on short bursts of high-intensity drills that simulate match conditions. By doing so, schools can optimize players' physical performance and match readiness.

## 5.4 Limitations of Methodology

Despite the valuable findings, the study had several limitations:

### 5.4.1 Sample Size

The study focused on a small sample of 12 players from a single school, which may limit the generalizability of the findings. A larger sample across multiple schools would provide more robust data and increase the applicability of the results to a broader population of adolescent football players in Zimbabwe.

### 5.4.2 Duration of the Intervention

The HIIT intervention was conducted over a period of three weeks, which may not be sufficient to fully capture the long-term effects of HIIT on physical performance. A longer intervention, perhaps over an entire season, would provide a better understanding of how HIIT influences sustained performance and injury prevention.

Lack of a Control Group

The absence of a control group, which would continue traditional training without HIIT, limits the ability to isolate HIIT's effects. Future studies could include a control group to make clearer comparisons between the effectiveness of HIIT and other training methods.

### 5.5 Recommendations

Incorporation of HIIT into Training Programs

Football coaches in Zimbabwean schools should consider integrating HIIT into regular training regimens. The significant improvements in speed, endurance, and agility suggest that HIIT was an effective training tool for adolescent footballers.

Customization of HIIT for Different Fitness Levels

HIIT programs should be tailored to the fitness levels of individual players. Coaches can adjust the intensity and duration of exercises based on each player's current physical condition, ensuring that all athletes benefit from HIIT without risking overtraining.

Training and Education for Coaches

Coaches should receive training on designing and implementing HIIT programs. Workshops and professional development programs focused on HIIT can equip coaches with the knowledge and skills to optimize player performance.

Research on Long-Term Effects of HIIT

Further research should investigate the long-term effects of HIIT on injury prevention, recovery times, and overall performance throughout a football season. This would provide a more comprehensive understanding of how HIIT fits into a long-term athletic development plan.

### 5.6 Future Research

1. Exploring the Long-Term Impact of HIIT: Future studies should assess the long-term impact of HIIT over a full football season to better understand its effect on injury rates and performance sustainability.

2. Comparison with Other Training Methods: Research should compare HIIT with other modern training approaches, such as resistance training or plyometrics, to determine the most effective methods for improving football performance.

3. Psychological Effects of HIIT: Further studies should explore the psychological benefits of HIIT, such as increased mental toughness and confidence, which were briefly noted in this study.

4. Larger, Multi-School Studies: Conducting studies across multiple schools with larger sample sizes will enhance the generalizability of the findings and provide more robust data on HIIT's effectiveness in diverse settings.

## 5.7 Chapter Summary

This chapter summarized the key findings of the study, drawing conclusions based on the research questions and objectives. HIIT was found to significantly improve the physical performance of adolescent male footballers at Goldridge College, and the study's findings support the integration of HIIT into school training programs. The chapter also discussed the limitations of the methodology and provided recommendations for future research and practical implementation.

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# APPENDICES

High Intensity Interval Training Performance: Test Recording Sheet

| Playe I.D | Pre/ Post HIIT | 20m Yo-yo Test Level: 1 to 24 | 40m Sprint Time (sec) | Agility Test Time (sec) | Self-Report Fitness Level 1 -10 | Match Report Performance Ability | Perceived Fatigue Level 1-5 |
|---|---|---|---|---|---|---|---|
| A | Pre | 14.6 | 6.12 | 12.00 | 3 | 2 | 5 |
| A | Post | 16.8 | 5.68 | 10.79 | 7.5 | 4 | 2 |
| B | Pre | 15.2 | 5.70 | 11.68 | 4 | 3 | 5 |
| B | Post | 17 | 5.23 | 10.26 | 8.5 | 4.5 | 2 |
| C | Pre | 16.8 | 6.00 | 11.50 | 4 | 3 | 4 |
| C | Post | 19.5 | 5.35 | 10.37 | 8.5 | 4 | 1 |
| D | Pre | 16 | 5.91 | 11.86 | 5 | 3 | 5 |
| D | Post | 18 | 5.22 | 11.00 | 8 | 4.5 | 2 |
| E | Pre | 13.6 | 6.12 | 12.00 | 3 | 2 | 5 |
| E | Post | 16 | 5.53 | 10.45 | 7 | 4 | 2 |
| F | Pre | 14.2 | 5.90 | 11.78 | 4 | 3 | 5 |
| F | Post | 16.4 | 5.43 | 10.45 | 8 | 4 | 2 |
| G | Pre | 16.2 | 6.20 | 11.50 | 4 | 3 | 4 |
| G | Post | 18.5 | 5.33 | 10.40 | 8.5 | 4 | 1 |
| H | Pre | 16 | 5.99 | 11.66 | 5 | 3 | 5 |
| H | Post | 18 | 5.40 | 11.00 | 8 | 4.5 | 2 |
| I | Pre | 14.6 | 6.12 | 12.04 | 3 | 2 | 5 |
| I | Post | 16.8 | 5.68 | 10.79 | 7.5 | 4 | 2 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| J | Pre | 15.2 | 5.70 | 11.70 | 5 | 3 | 3 |
| J | Post | 17 | 5.23 | 10.40 | 9 | 5 | 2 |
| K | Pre | 16.8 | 6.10 | 11.78 | 4 | 3 | 4 |
| K | Post | 19 | 5.30 | 10.67 | 8 | 5 | 2 |
| L | Pre | 16 | 5.91 | 11.86 | 5 | 3 | 5 |
| L | Post | 18 | 5.22 | 11.00 | 9 | 5 | 3 |