EFFECT OF HIGH INTENSITY SMALL SIDED GAMES ON CARDIORESPIRATORY FITNESS AND MUSCLE ENDURANCE AMONG FUTSAL PLAYERS

MUHAMMAD ANAS BIN MOHD SALIP

D20192090785

SULTAN IDRIS EDUCATION UNIVERSITY

2023

EFFECT OF HIGH INTENSITY SMALL SIDED GAMES ON CARDIORESPIRATORY FITNESS AND MUSCLE ENDURANCE AMONG FUTSAL PLAYERS

MUHAMMAD ANAS BIN MOHD SALIP

THESIS PRESENTED TO QUALIFY FOR A BACHELOR OF SPORT SCIENCE (COACHING) WITH HONOUR

FACULTY OF SPORT SCIENCE AND COACHING
SULTAN IDRIS EDUCATION UNIVERSITY

2023

DECLARATION

I hereby declare that the content of this thesis, which I have given the title Effect of High Intensity Small Sided Games On Cardiorespiratory Fitness and Muscle Endurance Among Futsal Players, is entirely my own original writings, with the exception of the quotations from other sources that have been properly cited. I also confirm that this thesis has never before been submitted to Sultan Idris Education University or any other institution for a degree.

Muhammad Anas Bin Mohd Salip
……..… AnaS .....

Verified by:

……
(Dr. Nor Aijratul Asikin Binti Mohamad Shalan)
Supervisor
Department of Coaching Science
Faculty of Sport Science and Coaching
Sultan Idris Education University

Date: ……

APPROVAL OF SUBMISSION

This thesis entitled Effect of High Intensity Small Sided Games On Cardiorespiratory Fitness and Muscle Endurance Among Futsal Players prepared by Muhammad Anas Bin Mohd Salip was certified to meet the required standard for submission in partial fulfilment of the requirements for the award Bachelor of Sport Science (Coaching Science) with honour at Sultan Idris Education University.

……
(Dr. Nor Aijratul Asikin Binti Mohamad Shalan)
Supervisor
Department of Coaching Science
Faculty of Sport Science and Coaching
Sultan Idris Education University

Date: ……

……
(Dr. Ali Bin Md Nadzalan)
Course Coordinator
Department of Coaching Science
Faculty of Sport Science and Coaching
Sultan Idris Education University

Date: ……

ACKNOWLEDGEMENT

First of all and importantly, I want to thank Allah SWT for enabling me to successfull y finish this thesis in spite of several difficulties and barriers because of His bounty and grac.

My supervisor, Dr. Nor Aijratul Asikin, deserves special recognition for igniting my interest in health and wellbeing and for overseeing this thesis. I appreciate your support as I progressed academically, your encouragement, your willingness to answer my inquiries, and the chances you provided for me. Additionally, I would like to thank Dr. Aijratul for reviewing this thesis and for her helpful suggestions whenever I ran into a roadblock. The fitness enthusiasts who took part in my survey for my research study are likewise appreciated.

Lastly, I would like to thank my beloved parents, family and friends for helping me in completing this study such as providing money in advance and finding related references and always praying for my every effort and success.

EFFECT OF HIGH INTENSITY SMALL SIDED GAMES ON CARDIORESPIRATORY FITNESS AND MUSCLE ENDURANCE AMONG FUTSAL PLAYERS

ABSTRACT

Cardiorespiratory fitness is one of the most important components in futsal sports covering physical fitness, muscle endurance, and being a measure for an athlete. There is a lack and limited study about the effect of small sided games on VO_2max performance among male futsal players. The main purpose of this study was to measure the difference in VO_2max, lactate threshold and muscle endurance levels after 4 weeks of high intensity small sided games training. Fourteen male futsal players were purposely selected to involved in this study, selected to tournament (n=7), non-selected for first team (n=7). Both groups of players were assigned to do high intensity small sided games of futsal for 4 weeks. The data were collected twice, prior to intervention (pre-test) and after completion of the intervention (post-test). The results of the study found that there was a difference between the two groups as well as between the pre and post-test. In pre-test, group 1 showed 12.48% (p=0.10) higher in VO_2max, 7.01% (p=0.02) in VT1 and 16.02% (p=0.01) in VT2. In post-test, only VO_2max show significant difference when group 1 show 9.51% (p=0.09) higher than group 2. In comparison to pre-test, group 1 shows significant increase for VO_2max [5.07% (p=0.002)] and RER [12.55% (p=0.002)] in post-test. Whereas group 2 only showed a significant increase in RER, 6.97% (p=0.04) in post-test. As for muscle endurance, group 1 scored 13.42% (p=0.0015) in pre-test and 9.24% (p=0.0005) in post-test compare to group 2 ($p<0.01$). It also shows an increase of 2.6% for group 1 and 6.79% for group 2 in post-test than in pre-test. It can be concluded that 4 weeks of high intensity small sided game training can improve a futsal player's cardiorespiratory and muscular endurance.

KESAN PERMAINAN SISI KECIL BERINTENSITI TINGGI TERHADAP KECERGASAN KARDIORESPIRATORI DAN KETAHANAN OTOT DALAM KALANGAN PEMAIN FUTSAL

ABSTRAK

Kecergasan kardiorespiratori adalah salah satu komponen terpenting dalam sukan futsal meliputi kecergasan fizikal, daya tahan otot, dan menjadi ukuran bagi seseorang atlet. Terdapat kekurangan dan kajian terhad tentang kesan permainan sisi kecil terhadap prestasi VO_2max di kalangan pemain futsal lelaki. Tujuan utama kajian ini adalah untuk mengukur perbezaan dalam VO_2max, ambang laktat dan tahap daya tahan otot selepas 4 minggu latihan permainan kecil berintensiti tinggi. Empat belas pemain futsal lelaki telah dipilih untuk terlibat dalam kajian ini, dipilih ke kejohanan (n=7), tidak dipilih untuk berada dalam pasukan (n=7). Kedua-dua kumpulan pemain telah ditugaskan untuk melakukan permainan sisi kecil futsal berintensiti tinggi selama 4 minggu. Data dikumpul sebanyak dua kali iaitu sebelum intervensi (ujian pra) dan selepas selesai intervensi (ujian pasca). Hasil kajian mendapati terdapat perbezaan antara kedua-dua kumpulan dan juga antara ujian pra dan pasca. Dalam ujian pra, kumpulan 1 menunjukkan 12.48% (p=0.10) lebih tinggi dalam VO_2max, 7.01% (p=0.02) dalam VT1 dan 16.02% (p=0.01) dalam VT2. Dalam ujian pasca, hanya VO2max menunjukkan perbezaan yang signifikan apabila kumpulan 1 menunjukkan 9.51% (p=0.09) lebih tinggi daripada kumpulan 2. Berbanding dengan ujian pra, kumpulan 1 menunjukkan peningkatan yang ketara untuk VO_2max [5.07% (p=0.002)] dan RER [12.55% (p=0.002)] dalam ujian pasca. Manakala kumpulan 2 hanya menunjukkan peningkatan yang ketara dalam RER iaitu 6.97% (p=0.04) dalam ujian pasca. Bagi daya tahan otot pula, kumpulan 1 mendapat lebih 13.42% (p=0.0015) dalam ujian pra dan 9.24% (p=0.0005) dalam ujian pasca berbanding kumpulan 2 ($p<0.01$). Ia juga menunjukkan peningkatan sebanyak 2.6% bagi kumpulan 1 dan 6.79% bagi kumpulan 2 dalam ujian pasca berbanding ujian pra. Dapat disimpulkan bahawa latihan permainan sisi kecil yang berintensiti tinggi selama 4 minggu dapat meningkatkan daya tahan kardiorespiratori dan otot pemain futsal.

CONTENTS

LIST OF TABLE

LIST OF FIGURE

APPENDIX LIST

CHAPTER 1

INTRODUCTION

1.1 Research background

All daily physical activities that a person performs involve physiological fitness, which is in the cardiorespiratory fitness (CRF) component. It was related to the circulatory and respiratory systems' ability to maintain oxygen supply during physical activity. CRF is mainly increased by aerobic endurance exercise but in some cases or diseased populations a small benefit can be achieved by muscular strength exercise (Pollock et al 2000). The less force that needs to be produced while doing physical activity the better a person's cardiorespiratory rate. It will not always be stable, except by doing physical activity or exercise either regularly or periodically according to the condition of the body.

Cardiorespiratory fitness (CRF) has at least 11 main components under two categories: health-related physical fitness and skill-related fitness. All of those components are involved in all daily physical activities and are affected by body condition. There are five components of health-related physical fitness: 1) body composition; 2) flexibility; 3) muscular strength; 4) muscular endurance; and 5) physical fitness. Health-related physical fitness refers to those aspects of fitness that have a close relationship with positive health outcomes (Corbin et al., 2000). Meanwhile, there are six components of skill-related fitness: 1) agility, 2) speed, 3)

strength, 4) balance, 5) coordination, and 6) reaction time. Skill-related physical fitness is made up of aspects of physical fitness and motor skills that facilitate performance in sports and active games (Caspersen et al., 1985).

Cardiorespiratory fitness (CRF) is most often measured by VO_2max and lactate threshold to evaluate endurance capacity. VO_2max can be defined as the maximum integrated capacity of the pulmonary, cardiovascular, and muscular systems to uptake, transport, and utilize O_2 (Poole et al., 2008). Many studies show the use of VO_2max measurement for most sports, such as football, volleyball, and netball. It is because this method is the most accurate and trusted to evaluate the CRF level of all people. A person's VO_2max is the gold standard of assessing their cardio-respiratory endurance (Buttar et al. 2019). While lactate threshold is the exercise intensity at which the blood concentration of lactate or lactic acid begins to increase rapidly, in other words, lactate threshold is defined as the intensity of exercise at which lactate begins to accumulate in the blood at a faster rate than it can be removed (Hutchison, A, 2016). It is often expressed as 85% of the maximum heart rate or 75% of the maximum oxygen intake. When exercising at or below the lactate threshold, any lactate produced by the muscles is removed by the body without it building up.

To measure the VO_2max and lactate threshold, we must use either the two type of test which field test or laboratory test. The laboratory test needs more equipment to be done, like a treadmill and ergometer machine, and a lot of procedures. In the hands, there are field test to measure the cardiorespiratory fitness, they demonstrate important advantages, such as low operating costs, ease of application and access to test locations, and the opportunity to evaluate a large number of subjects simultaneously (Neha, 2019). Field tests have many examples, such as the 12-minute run test, shuttle run, and yo-yo test.

This cardiorespiratory fitness test has been linked to futsal. Futsal is played by two teams of five players, one of whom is the goalkeeper. There are unlimited substitutions permitted. Unlike some other forms of indoor soccer, it is played on a hard court surface marked by lines; walls or boards are not used. It is played with a smaller, harder, lower-bouncing ball than football. The surface, ball, and rules favour ball control and passing in small spaces. It is characterized as a high-intensity intermittent sport that imposes high physical, technical, tactical, and psychological demands on players (Barbero-Alvarez et al., 2008). It is accepted that professional futsal players cover distances of more than 4000 m in a match (Dogramaci et al., 2011). Similar to soccer, futsal has become a contemporary research area, with authors quantifying various physical and technical demands (Yiannaki et al. 2020).

1.2 Problem Statement

Many researchers around the world have mostly found that any training that involves an aerobic component will increase cardiorespiratory and muscle endurance levels. This is basically included in the training programme that lasts more than four weeks with a frequency of literally four times a week. Michael et al. (2018) stated specifically that it is generally agreed that optimal training frequency generally appears to be achieved with 3–5 workouts per week. However, there has been little research into the effect of small-sided games on VO_2max performance in male futsal players.

1.3 Objective

a) To measure the difference in VO_2max before and after 4 weeks of high intensity small sided games training among futsal players.
b) To measure the difference in lactate threshold before and after 4 weeks of high intensity small sided games training among futsal players.
c) To measure the difference in muscle endurance before and after 4 weeks of high intensity small sided games training among futsal players.

1.4 Hypothesis

H1 There is a significant effect of 4 weeks of high intensity small sided games on VO_2max performance of futsal players.

H2 There is a significant effect of 4 weeks of high intensity small sided games on lactate threshold performance of futsal players.

H3 There is a significant effect of 4 weeks of high intensity small sided games on muscle endurance performance of futsal players.

1.5 Limitation of study

This study was limited to fourteen participants of UPSI futsal players because there only have 24 players overall. All participants were in a good condition that free from any injury. To measure the VO_2max and lactate threshold, laboratory test been used because it provides the ability to control the test intensity level and it's a real-time monitoring compared to the field

test. All the players participated in the training program of small sided games after the pre-test and before post-test.

1.6 Delimitation of study

The players with relatively serious injuries will be excluded from this study. Players who are also taking supplements and medications will also be excluded because they may affect the result.

1.7 Operational definition

There are several word and component that have been used in this study, such as:

1) Cardiorespiratory

Cardiorespiratory means "ability to deliver and carry oxygen to muscle." The term of cardiorespiratory is the ability of the heart, lungs, and vascular system to deliver oxygen-rich blood to working muscles during sustained physical activity (Loprinzi et al. 2017).

2) Muscle endurance

Muscle endurance means the "ability to repeat or hold a movement." Muscle endurance refers to the ability of a muscle or muscle group to repeat a movement many times or to hold a particular position for an extended period of time (Loprinzi et al. 2017).

3) VO_2max

VO_2max means the maximal oxygen consumption or the maximal aerobic capacity. VO_2max is a valid index measuring the limits of the cardiorespiratory system`s ability to transport oxygen from the air to the tissues at a given level of physical conditioning and oxygen availability (Castellani et al., 2006).

4) Lactate threshold

Lactate threshold means the maximal effort or intensity that body can maintain for an extended period of time with little or no increase in lactate in the blood and the intensity. Production of lactate in the muscle increase in a curve manner with increasing work load or with percentage utilization of VO_2max. The level at which abrupt increase in blood lactate is observed has been described as individual's lactate threshold (Ghosh, A. 2004).

5) Futsal

Futsal is the format of small sided football with a five-aside game including goalkeeper, played in a hard surface court around 20m width and 40m length. There are unlimited substitutes in futsal, and it is being played with a smaller, harder, lower-bouncing ball than football, which is played for 20 minutes for 2 half (Daniel, 2014).