A COMPARATIVE STUDY OF ANTHROPOMETRIC CHARACTERISTICS AND PHYSICAL FITNESS BETWEEN ELITE AND JUNIOR CANOE POLO IN MALAYSIA



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UNIVERSITI PENDIDIKAN SULTAN IDRIS 2023











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THESIS SUBMITTED TO FULFILL THE REQUIREMENTS FOR THE DEGREE OF BACHELOR OF SPORTS SCIENCE (COACHING SCIENCE) WITH HONORS





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FACULTY OF SPORT SCIENCE AND COACHING UNIVERSITI PENDIDIKAN SULTAN IDRIS 2023











DECLARATION OF AUTHENTICITY OF WRITING

I hereby acknowledge that this thesis entitled A Comparative Study of Anthropometric Characteristics and Physical Fitness Between Elite and Junior Canoe Polo in Malaysia is based on my own work except for the quotations that have been duly acknowledged. I also declare that this thesis has never before been submitted for a degree or other award at Universiti Pendidikan Sultan Idris or at any other institution.







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APPROVAL FOR SUBMISSION

This thesis entitled A Comparative Study of Anthropometric Characteristics and Physical Fitness Between Elite and Junior Canoe Polo in Malaysia prepared by Nurul Sazila binti Rashidin has been confirmed as meeting the standard required for submission in fulfilling part of the requirements to be awarded a Bachelor of Sports Science (Science Coaching) with honors at Universiti Pendidikan Sultan Idris.





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APPRECIATION

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A COMPARATIVE STUDY OF ANTHROPOMETRIC CHARACTERISTICS AND PHYSICAL FITNESS BETWEEN ELITE AND JUNIOR CANOE POLO **IN MALAYSIA**

ABSTRACT

The aimed of this study was to compare the anthropometric characteristics and physical fitness components between elite and junior team canoe polo in Malaysia. Participants were 20 elite paddlers and 20 junior paddlers of Johor and Wilayah Persekutuan state (n=40; male: 20 and female: 20). Participants underwent an anthropometric measurement (height, body mass, body mass index, body fat, skeletal muscles mass, visceral fat and arm span) and physical fitness test (push up, sit up, back extension, plank and 1.6km). The result of this study shows that there is a significant difference between elite and junior in body mass (t=2.582, 0.015, p<0.05), skeletal muscles (t=4.780, 0.030, p<0.05), visceral fat (t=2.318, 0.026, p<0.05) and arm span (t=2.693, p<0.05)0.011, p<0.05). There is also a significant difference in all physical fitness components between elite and junior team such as push up (t=3.874, 0.000, p<0.05), sit up (t=2.787, 0.000, p<0.05), sit up (t=0.000, 0.000,0.008, p<0.05), back extension (t=2.279, 0.029, p<0.05), plank (t=4.679, 0.000, p<0.05) and 1.6km fitness test (t=-3.085, 0.004, p<0.05). In conclusion, the result showed that the paddlers with longer arm span have more advantages in canoe polo. In terms of fitness level, muscular strength, muscular endurance and aerobic capacity are essential components to excel in this sport. This finding helps coaches to conducting talent identification programs and planning training program for athletes.

Keywords: Canoe polo, Anthropometric, Physical Fitness





KAJIAN PERBANDINGAN CIRI-CIRI ANTROPOMETRI DAN KECERGASAN FIZIKAL ANTARA ELIT DAN JUNIOR KANU POLO DI MALAYSIA

ABSTRAK

Matlamat kajian ini adalah untuk membandingkan ciri-ciri antropometrik dan komponen kecergasan fizikal antara pasukan elit dan junior kanu polo di Malaysia. Peserta ialah 20 atlet elit dan 20 atlet junior dari negeri Johor dan Wilayah Persekutuan (n=40; lelaki: 20 dan perempuan: 20). Peserta menjalani pengukuran antropometrik (tinggi, jisim badan, indeks jisim badan, lemak badan, jisim otot rangka, lemak viseral dan arm span) dan ujian kecergasan fizikal (tekan tubi, duduk, sambungan belakang, papan dan 1.6km). Hasil kajian ini menunjukkan terdapat perbezaan yang signifikan antara elit dan junior dalam jisim badan (t=2.582, 0.015, p<0.05), otot rangka (t=4.780, 0.030, p<0.05), lemak viseral (t=). 2.318, 0.026, p<0.05) dan arm span (t=2.693, 0.011, p<0.05). Terdapat juga perbezaan yang ketara dalam semua komponen kecergasan fizikal antara pasukan elit dan junior seperti tekan tubi (t=3.874, 0.000, p<0.05), sit up (t=2.787, 0.008, p<0.05), back extension (t). =2.279, 0.029, p<0.05), plank (t=4.679, 0.000, p<0.05) dan ujian kecergasan 1.6km (t=-3.085, 0.004, p<0.05). Kesimpulannya, hasil kajian menunjukkan bahawa atlet dengan arm span yang lebih panjang mempunyai lebih banyak kelebihan dalam kanu polo. Dari segi tahap kecergasan, kekuatan otot, daya tahan otot dan kapasiti aerobik adalah komponen penting untuk cemerlang dalam sukan ini. Penemuan ini membantu jurulatih menjalankan program mengenal pasti bakat dan merancang program latihan untuk atlet.

Kata kunci: Kanu Polo, Antropometrik, Kecergasan Fizikal







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CHAPTER 1

INTRODUCTION

1.1 Introduction

Canoe polo is one of competitive disciplines of kayaking sport that combined paddling and throwing the ball. This sport is played by two teams which is included five players each team and played on a rectangular pitch such as open water or swimming pool. The kayak that is used in canoe polo is different with other kayaking sport which is canoe polo lighter and more difficult to control. The ball in canoe polo is the same that is used in water polo and controlled by hand or by paddle. The period for the matches is 10 minutes over two halves and in that time the players need to score into a goal to consider them as a winner for that match. Canoe polo is a contact team game which is the tactics and positional play are important along with the strength, speed and fitness of the individual athletes.

Canoe sport in Malaysia was be evolved through education in 1952 at Lumut, Perak. After 30 years, canoe polo was introduced in 1980s at Pulau Pinang, Malaysia. First international canoe polo competition that Malaysia have been competed was on year of 1985, which is First Asian Canoe Polo Championship in Kobe, Japan and got third place in that competition. Until 1996, Malaysia Canoe Association (MASCA) invited a coach from Indonesia to train future canoe polo coaches. Since then, canoe



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polo sport become popular among canoe sport enthusiast in Malaysia and competed in many international competitions such as world championship, Asian games and several of national players were invited to played with other club in canoe polo league at China. The highest achievement is achieved rank 9th in world championship, 2nd place in Asian Games and 2nd place for under 21 years old in Asian Canoe Polo Championship.

When talking about success, there are a lot of factors that influence the success of athlete in any level such as state, national or international. Even though there is a lot of achievement have been achieved, the performance of each player must be developed and maintain to improve their gameplay, as well as developing new athletes. As we know, canoe polo sport involving upper body movement and less involving in lower body movement. This is because it is combined paddling canoe and throwing the ball. Most of the athlete must have a suitable physical characteristics, endurance or strength of upper body due to specific sport skills such as passing, rolling, controlling and shooting. To have a good passing, rolling, controlling and other skills, the athlete need a good and suitable physiological characteristic. Physiological characteristics will help to identify a difference of characteristic and fitness level among athletes and will assist the coaches to prepare a suitable training for their athlete. Physiological characteristics can be measured by anthropometry measurements, aerobic fitness or others.

In this study, the process to identify physiological characteristics on canoe polo players is by measuring their anthropometry and physical fitness component. According to Centers for Disease Control and Prevention (1988), anthropometry is the study of the measurement of the human body in terms of the dimensions of bone, muscle and fat. Based on previous research, anthropometry plays an important role in built of the body with various measurement of the body segment which is suitable with





particular game and sport also essentially helpful to success in the game especially in canoeing and kayaking game (Shashikant, 2018). Anthropometry measure may help to identify an athlete with better physical and physiological according to the needs of that sport. Besides that, previous research also showed that anthropometry measures can help to compare physiological characteristics between the athletes to identify the suitable playing position in matches (Mohsen, 2017). This because in canoe polo there are play position such as attacker, defender and goalkeeper. Each play position has difference anthropometry components such as position goalkeeper that suitable to an athlete with higher body height (Mohsen, 2017). Other than anthropometry measurement, aerobic fitness also can measure the physiological characteristics of an athlete.

Besides anthropometry measurement, physical fitness component is a factor to identify physiological characteristics or determine the fitness level of an athlete. Physical fitness refers to the ability of the body's systems to collaborate efficiently in order to maintain health and perform daily living activities. It is an essential factor in sports performance specially in any sport that involving an interval of aerobic, endurance and strength. As we know, canoe polo sport is a high-intensity intermittent sport that require periods of high effort followed with periods of lower intensity (Mohsen & Scott; Sheykhlouvand et al, 2017). It is also mainly covered by the aerobic energy system because the recovery between high-intensity also reliant on aerobic metabolism (Mohsen & Scott, 2018). This very emphasis on the athlete endurance, aerobic fitness and strength to ensure the athlete can survive throughout the match. By measuring the physical fitness, it can help to identify the endurance, aerobic capacity and strength in the athlete.







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Thus, in order to get successful performance among athlete there a lot of factors that need to consider such as anthropometric measurement, physical fitness or other factors. Each coaches play a role to identify these factors before and after training program to monitor athlete performance and increase their gameplay in the match. Therefore, this study conducted to identify the anthropometric measurement and physical fitness between elite and junior canoe polo in Malaysia.

1.2 Problem Statement

Physical characteristics in any sport is an important factor that influence the performance of athlete especially in canoe polo. This proven by a lot of previous research that have studied about physical characteristics of athlete in many types of sports. In canoe sports, research primarily focused on athletes' physiological testing in order to determine the physical fitness level and designing training program to optimize physiological fitness (Aitken & Neal, 1992; Gao et al, 2021). Physical characteristics such as anthropometry measure and physical fitness are important in determine the performance of canoe polo athletes. According to Shashikant and Sunil (2018), anthropometry measurement can determine a specific body builds with various body segment measurement which is help to success in any game. This is because body size in canoe polo is important to ensure the athlete perform better. Other than that, physical fitness also needed in canoe polo due to the game is mainly covered by the endurance, aerobic energy system and strength which is require high effort and followed by lower intensity (Forbes et al, 2013; Mohsen & Forbes, 2017).









However, the study of a comparison of anthropometry measures between elite and junior canoe polo in Malaysia were conducted because there are less previous studies about anthropometry measurement among canoers in Malaysia. The previous studies also do not specifically focus on canoe polo discipline even though Malaysia canoe polo team have proven that they can compete with another elite national team. According to Mohsen and Forbes (2017), the study of anthropometry measure among canoe polo players may help to determine the body size that suitable with playing position in the game which is give advantage to the players. This may help the coaches to prepare a suitable training program to achieve their objectives and put the players in suitable playing position. Besides that, even though Malaysia canoe polo elite team and junior team have proven their achievement in highest level such as world championship and Asian championship but, these canoe polo sport still unknown and less getting

Furthermore, there are lack of previous studies about comparison between elite athletes and junior athletes especially in canoe sport. Most of previous study only focused on identifying a group of athletes such as a group of elite or junior athletes only. A lack of research in comparing elite and junior athletes can put any coach at a disadvantage. This is because the coaches may have a problem in choosing and selecting their team players. Other than that, the previous studies also lack study about physical fitness in canoe polo in Malaysia. Physical fitness is an essential factor that contribute to successful performance in canoe polo because canoe polo involves endurance, aerobic and anaerobic activities which is require high effort and followed by periods of lower intensity. This proven in Mohsen and Forbes (2017), which is canoe polo players should have high cardiorespiratory system and well-developed anaerobic power.







Thus, in order to improve canoe polo performance in Malaysia this study conducted to compare the differences of anthropometry measurement and physical fitness between elite and junior canoe polo team. The aspects that will be focus by researcher in terms of weight, height, body fat, skeletal muscle and others. This is because physical or physiological characteristics and aerobic fitness are important factors in order to achieved success in the team.

1.3 Research Objectives

The objective of this study is to compare the differences of anthropometric characteristics and physical fitness level between elite and junior canoe polo in Malaysia based on characteristics measured.

The specific objectives in this study:

- 1. To describe the athlete background (age, gender, weight, height and level of participation).
- 2. To determine the level of anthropometric characteristics on elite and junior canoe polo team.
- 3. To determine the level of physical fitness on elite and junior canoe polo team.
- 4. To compare the anthropometric characteristics between elite and junior canoe polo team.
- 5. To compare the physical fitness level between elite and junior canoe polo team.







1.4 Research Question

This study conducted to find the answer for these questions:

- 1. What is the background of athlete (age, gender, weight, height and level of participation)?
- 2. What is the level of anthropometric characteristics amongst elite and junior canoe polo team?
- 3. What is the level of physical fitness amongst elite and junior canoe polo team?
- 4. What is the difference of anthropometric characteristics between elite and junior canoe polo team?
- 5. What is the difference of physical fitness between elite and junior canoe polo

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1.5 The Significance of Research

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The result of this study may help or become a guidance to the coaches, management and any sport organization leaders about the information of anthropometry characteristics and physical fitness level on athletes to improve team performance. This is the importance of study:

a) This study may help the coaches to identify each player that meets the needs of this canoe polo such as body weight, body height, muscles mass, aerobic fitness or others. This is because the players need to paddling fast, turn fast, controlling





the boat while handling the ball and shooting the ball into goal and have high level of aerobic capacity to able to survive throughout the match.

b) The information from anthropometric measurement, aerobic fitness and fitness level also can help the coaches to know and understand what the players need and help to provide a proper training program for them. Anthropometric measurement information also may help the coaches to identify a proper playing position for each player. A player with big body and taller may played in goalkeeper (GK) position (Mohsen, 2017).





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1.6 Research Conceptual Framework



Diagram 1.1 Research Conceptual Framework



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1.7 Operational Definition

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The terminologies of this study are operationalized as follows:

1.7.1 Anthropometric characteristics

Anthropometric is a process of measurement of the human body in terms of the bone, muscle and fat that used in this study. Based on Centers for Disease Control and Prevention (1988), anthropometry is the study of the measurement of the human body in terms of the dimensions of bone, muscle and fat. The examples of anthropometric measures are weight, standing height, recumbent length, skinfold thicknesses, circumferences, limb lengths and breadths. The information of these measurement or combinations of these measurements can describe the body size, proportion and distribution of body fat and lean body mass (J Eaton-Evans, 2005).

1.7.2 Physical fitness

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Physical fitness is one of parameter that will be measure in this study. The component of physical fitness that will be measures in this study are 1.6km, push up, sit up, back extension and plank. Physical fitness refers to the ability of the body's systems to collaborate efficiently in order to maintain health and perform daily living activities. In case of sport performance, the athletes need a proper or high physical fitness level to represent any type of sports to ensure the athletes can performed well.

1.7.3 Elite team

In context of this study, elite team is referring to Malaysia's canoe polo players that competed in national team. Elite team meaning is a selected group that is superior in terms of ability or qualities than the rest of a group.





1.7.4 Junior team

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In context of this study, junior team is referring to Johor's canoe polo players that competed in state level such as national game, state game or others. The meaning of junior team is a player who lack in the experience, lack of ability and quality or have a quality that same age with them.

1.7.5 Canoe Polo

Canoe polo is a competitive team sport that the researcher conducted a study to compare the anthropometric measures and aerobic fitness among the players. Canoe polo game consist of two 10 minutes game periods with 3 minutes interval between periods (International Canoe Federation, 2011). Canoe polo consist of contacting games, fast and a very high discipline tactical game. It is also involving a lot of specific sport skills such as paddling, controlling, throwing, rolling and others (Christiano et al, 2012). The players in canoe polo need to have a big body size and high aerobic and anaerobic capacities capabilities.

1.8 Research Limitations

1.8.1 Research scope/Delimitation

This study conducted in area of training center of canoe polo national team and state team which is Kompleks Sukan Kanu Negeri Johor and Kuala Lumpur Canoe Club. The result of study is encompassing all elite canoe polo team and junior canoe polo team that training in Kompleks Sukan Kanu Negeri Johor and Kuala Lumpur Canoe Club only. It cannot represent other state canoe polo team and other national team





because the researcher study on Johor canoe polo team and Malaysia canoe polo team only. Other than that, the result of study also includes the study aspects based on what the researcher can measure using the instrument on the players and not study other aspects that do not related with anthropometric characteristics, aerobic fitness and fitness level.

1.8.2 Research limitation

The accuracy of the result in this study is depends on the commitment of player to attend at research location. The expertise of using the equipment during the study also one of the research limitations. Besides that, the time that allocated during the study might be not enough due to the players have training, lack of researcher's assistance and less amount of equipment.

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