

**EFFECT OF RESISTANCE TRAINING, BODYWEIGHT
TRAINING AND THEIR COMBINATION ON SELECTED
PHYSICAL FITNESS COMPONENTS OF KABADDI PLAYERS**

कबड्डी खिलाड़ियों के चयनित शारीरिक फिटनेस घटकों
पर प्रतिरोध प्रशिक्षण, शारीरिक भार प्रशिक्षण और उनके संयोजन का प्रभाव

A

Thesis

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DEDICATED TO
MY FAMILY, FRIENDS
AND WELL-WISHERS

PREFACE

The purpose of this study was to investigate the effect of resistance training, bodyweight training and their combination on selected physical fitness components of kabaddi players. Only hundred (100) inter collegiate kabaddi players were selected from colleges affiliated with Veer Narmad South Gujarat University, Surat. (n=100) men Kabaddi players, who participated in Veer Narmad South Gujarat University, Surat Intercollegiate Kabaddi tournament during the year 2020-2023, The subjects' age ranged from 18 to 25 years old. The study also indicated that there was a difference in selected physical fitness components such as speed, endurance, agility, flexibility, muscular endurance, upper body strength, and lower body strength among male kabaddi players between the three experimental and control groups. The selected subjects were divided at random into four groups of twenty five each (n=25). Group I underwent resistance training, Group II underwent bodyweight running, Group III underwent combined resistance training and bodyweight training, and group IV acted as control group. The post-tests were conducted on the above said dependent variables after the experimental period of twelve weeks for all the four groups. Analysis of covariance (ANCOVA) statistical technique was used to test the adjusted post-test mean differences among the experimental groups. If the adjusted post test result was significant, the Scheffe's posthoc test was used to determine the significance of the paired mean differences. The level of significance was set at $p < 0.05$ of all the cases. There would be significant difference on selected physical fitness components among resistance training, bodyweight training and combined training (resistance and bodyweight training) groups and control group.

Key Words : Speed , Endurance , Agility , Flexibility , Muscular Endurance , Upper body strength , Lower body strength.

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CHAPTER – I

INTRODUCTION



1.1 Introduction

The common people should put an emphasis on sports for a variety of reasons, not just for fun. It assists people in staying healthy and fit so they may get employment and establish themselves in their lives. Sport, without a doubt, plays the biggest role in modern culture when it comes to leisure time usage. Everyone, regardless of age or gender, is generally in favor of sports.

Today, sports are a global trend. Performance in sports has become increasingly necessary and significant over the past few decades. Sports have never been as prevalent, organized, or significant as they are today. It plays a well-known role in contemporary society. It matters greatly to a person, a team, a country, and even the entire globe. Compared to United Nations participation, more nations compete in the Olympic Games.

Sport is a valuable component of the physical education curriculum. Physical education gives students the chance to develop physically, socially, emotionally, and morally in a competitive setting. The most effective means to get social acceptance and prestige in contemporary culture are through sports and games. The terms "motor ability" and "general athletic ability" are interchangeable. Successful athletic skill performance is influenced by a variety of elements. In the majority of advanced and developed nations, the understanding of how children learn and develop motor skills is very scientific and extensive, which may have aided them in reaching a level of general fitness with the development of essential player skills like power, speed, agility, balance, reaction time, etc. **(Clarke, 1976).**

Sports and games have been a part of human life virtually from the beginning of time. Consider it a requirement for his survival. Hunting has been essential to humanity and has become a part of his culture. Whether it was for food, housing, safety from wild animals or other adversaries, or just for fun, games and sports have become an integral component of human society. Sports and games act as a powerful unifying factor and have a significant impact on both national and global integration **(Singh 2004).**

Games and sports are irreplaceable gifts for every person alive today. It promotes a healthy lifestyle that resolves many of the health problems we face in daily life. Many

people choose to pursue this job and become well-known on a global scale. Sport participants now have new options to reach their sport's top performance through the use of advanced technologies in sport training.

Sports provide a purpose in society. Sports change along with culture. Early games were simplistic and had few options. As the cities evolved, clubs were formed, and interclub rivalry started, the roles are currently shifting based on the number of participants and the area. Finally, as transportation improved and long distance travel times were shortened by steamboats and railways, cities competed against one another. In the end, there was competition on a local, national, and worldwide level with corresponding governing bodies. Publicity for a performance at its highest level is one of the sports that provide the most enjoyment. Achieving the highest level requires skill development, mental rigidity, years of dedicated practice, and devotion.

All physical activities that attempt to use, maintain, or enhance physical fitness while also entertaining individuals through informal or organized involvement are considered sports. Sport may be competitive, with the ability to choose a winner or winners through objective criteria, and it may also involve some skill, especially at higher levels. There are several sports, from those with only one player up to those with hundreds of players participating at once, either in teams or individually. Although some non-physical pursuits, such card and board games, are occasionally referred to be sports, a sport is typically understood to be founded in physical athleticism **(Wuest, 1987)**.

Physical education is a vital type of nonverbal communication, much like any other kind of art, and is defined as "the art and science of movement." Primitive people's physical education was informal and unstructured, with survival as its primary goal. The first people to offer physical instruction some structure were the Greeks. Plato, a Greek philosopher, is quoted by Bucher as saying the following about physical education. Except incidentally, they are not meant to train the body; rather, they are meant to ensure proper harmony between initiative and energy on the one hand, and reason on the other, by tuning to the appropriate pitch **(Seidal and Reick, 1974)**.

Physical education, which has a lot to do with the human body in addition to the intellectual and sociological aspects of life, is now referred to as the "human

engineering" process. Because of this, physical educators need to have a firm grip on the physical performance of the body to recognize its best application. The application of current scientific knowledge of the relevant regulation is currently necessary for the physical educator or coach to be effective in the fields of athletic training and high performance games and sports.

The ability of the heart, blood vessels, lungs, and muscles to function at their best is known as physical fitness. The best health possible is necessary for enthusiastic and enjoyable involvement in daily activities and leisure pursuits, which is what is meant by optimal efficiency. Fitness at its peak enables a lifestyle that the unfit are unable to live. The entire body must exert strong effort in order to build and sustain physical fitness. The USA Council of Physical Fitness and Sports states that one should have "enough physical capacity to deal with [life's] physical requirements." Sports performance is correlated with physical fitness. "Sports performance is the unity of execution and result of a sports action or a complex sequence of action measured or evaluated according to socially determined and agreed upon norms," **Schanbal (1987)**.

Any physical exercise causes changes in the body's physiology, biochemistry, and psychology. A physical activity's volume, repetitions, intensity, and density—the frequency with which it is performed—all influence how effective it is. These elements, also known as the training variables, should be taken into account when planning the dynamics of training. A competition should be modeled after its psychological and effective traits. Describe the component to emphasize during the training phase prior to a competition to achieve the desired performance goal. It is important to highlight the laws of volume for endurance sports and speed and power sports. Ultimately, training difficulty is essential for sports that call for complex talents.

Physical fitness can be defined as a person's capacity to satisfy the demands of a given task. It is supported by particular sciences such as pediatric and adult physiology, biochemistry, biomechanics, and sports medicine. It generally comprises of components related to physical strength, flexibility, and anaerobic and aerobic fitness. All competitors use one or more of these components of fitness during their daily practice, regardless of performance level, sex, or age. Depending on the nature and demands of the sport, different levels of fitness are required. Consequently, the

most crucial components of physical fitness for each activity must be covered in training programs.

"Physical fitness is the cornerstone of dynamic and creative intellectual activity. It is not only one of the most important keys to a healthy body." This remark emphatically conveys the value of physical fitness. However, you are doing yourself a disservice if you have previously led a sedentary lifestyle and unhealthy eating habits. As a result, maintaining physical fitness requires not only a good diet but also a proper exercise routine.

Physical fitness is the ability to enjoy life and achieve our goals without putting too much pressure or exhaustion on ourselves. It serves as a barrier against age-related diseases and the desire for youth even as we become older. It enables a person to go about their daily activities with enthusiasm, confidence, and lack of anxiety or fatigue.

Since ancient times, training planning has been employed for the Olympic Games or for military goals, albeit in a primitive form. The first competitor who is known to have applied the concept of periodization in the sixth century BC was the Greek athlete milon from the city of Croton. He trained a bull calf by carrying it around on his back every day until it was old enough to be trained. A higher degree of exercise stress is required to induce overload and promote physiological adaptations as levels of a certain fitness component rise.

Training:

Training is a methodical technique designed to increase a sportsman's skill level and build his or her character for a better performance in a certain game or sporting event.

Sports training is a process that takes time and is progressive in nature; it cannot be completed in a single day. Additionally, it fosters a player's overall development and empowers him to make significant societal contributions. Performance in sports is mostly dependent on motor abilities and strategies specific to that activity or game.

Training is a program of physical activity intended to enhance an athlete's abilities and boost their energy capacity for a specific event; as a result, training is crucial for the development of physical fitness components **(William and Sperryn, 1976)**.

Training is a systematic, scientific program of physical activities and conditioning exercises intended to increase a participant's athletic ability and physical fitness. Training is the process of becoming ready for an occasion or cause, such as an athletic competition, a nursing career, or operational performance in military conflict (**Kerr, 1982**).

With the aid of physical exercises, sport training involves participation on all three levels—physical, technical, and intellectual. To perform at the highest level, athletes and players participate in a planned process. Thus, the means and methods of training as well as the overall planning, organization, implementation, and assessment of training are greatly influenced by the type and structure of sports performance. Understanding the nature and structure of athletic performance must be regarded as the first and possibly most crucial step in successfully preparing athletes for higher performance. This information must also serve as the foundation for the process of identifying and developing athletic talent.

In order to achieve a goal, complicated sports motor performance, ability to act, and behaviors are changed by measurements of content, methods, and organization throughout sports training (**Sing, 1991**).

Training for games and sports is no longer a myth, and they do not appreciate a carefree attitude, but they do offer chances for scientific application and validation. It is acknowledged that training is a highly specialized science. With the aid of electromyography, experts working in physical education are attempting to comprehend the numerous aspects impacting skeletal and muscular activity throughout a variety of human actions. They are also engaged in analyzing the biomechanics of the study of sports skills. They are constantly researching the variables that affect these movements and performance, such as strength, limb length, mass, inertia, proportions, and angular and linear velocity (**Millar and Nelson, 1973**).

Physical training refers to the techniques used to improve the physical fitness components, such as how to increase arm and shoulder strength, improve aerobic endurance, strengthen and relax muscles, and match workouts and programs to the demands of particular sports. Sports training, on the other hand, strives to improve performance in athletic competition. Sports training is done in a planned and organized

way to obtain high performance. Sports instruction is based on organized facts and ideas. First, a system that will best enable high performance must be created based on the intended sports training. It is always evaluated, planned, coordinated, and carried out by a coach, a sports teacher, or another individual. The goal of sports training is to uncover latent potential and make the athlete aware of it. It also wants to develop these reserves further. The athletes manage their daily schedules in order to be able to work out once or twice a day with maximum effectiveness.

Effects of Training:

Training enables the body to develop strength and endurance over time, enhance skill levels, and increase motivation, ambition, and self-assurance. Athletes can learn more about their sport through training, and they can also learn the value of maintaining a healthy body and mind.

According to **Hardayal Singh, 1984** - Vigorous exercise increases blood flow, blood and lymph flow through the muscles, supplying the cells with oxygen and nutrients and eliminating waste. Accelerated workout and strengthening of the heart's own fibers. Exercise also promotes growth and strengthens tendons, ligaments, muscles, and bones.

Training necessitates a correct assessment of the sportsperson's capacity, strengths, and weaknesses, which must then be planned and formed so that his strengths are further developed and his weaknesses are identified and eliminated. While practice primarily focuses on enhancing the control of muscle action by the neurological system, training enhances the functions of the circulatory, respiratory, and muscular systems. To raise the players' standards of performance and their level of physical condition, many training techniques have been used frequently.

Bodyweight Training:

Bodyweight workouts and bodyweight exercises are both forms of strength training that make use of the body's own mass as a source of resistance against gravity. A variety of biomotor skills, including strength, power, endurance, speed, flexibility, coordination, and balance, can be improved with bodyweight exercises. Sports enthusiasts and professional athletes are increasingly embracing this type of strength training. Simple movements like pushing, pulling, squatting, bending, twisting, and

balancing are used in bodyweight training. Among the most popular bodyweight exercises are the sit-up, the push-up, and the pull-up.

According to research in the journal *Physiology and Behavior*, body-weight exercises are a type of resistance training that contribute to muscle growth "independent of an external load." It does, however, more than that. A small sample of young women participated in a 10-week body-weight workout program, and Polish researchers observed increases in seven out of nine physical fitness criteria. With a 33% rise, aerobic capacity saw the highest gains. Lower-body power saw a 6% rise, while muscle endurance—particularly in the core—rose by 11%. Even flexibility improved as a result of the workout.

Advantage of Bodyweight Training:

While certain workouts might require equipment, the majority can be done with just your body weight. Common household materials, like as a bath towel for towel curls, often suffice for exercises needing equipment, or alternatives can be devised (for instance, using a horizontal tree branch to perform pull-ups). Since access to a gym or specialized equipment may not be possible while traveling or on vacation, bodyweight exercises are convenient. Bodyweight exercise also has the benefit of being free.

Bodyweight exercises demonstrate that getting healthy does not have to be difficult. Bodyweight exercises are the best if you're wanting to improve your general health, flexibility, and strength. Here are some advantages that might help you create a complete bodyweight workout schedule for yourself.

Weight training, on the other hand, concentrates on one or two muscular groups at once. Compound exercises are used in a calisthenics training because they work numerous muscular groups simultaneously. As a result, it is better for burning calories than weight training, which includes isolated motions that don't demand much effort.

Resistance Training:

Resistance training, often known as strength training or weight training, involves applying resistance to the muscular contraction in order to increase skeletal muscle size, anaerobic capacity, and strength.

Resistance training is founded on the idea that when needed, the body's muscles will strive to overcome a resistance force. Your muscles get stronger when you perform resistance training frequently and regularly.

The fundamentals of weight training are largely the same as those of strength training, and they involve adjusting the reps, sets, pace, exercise types, and weight moved in order to produce the desired increases in strength, endurance, and size. The objectives of the person completing the exercise will determine the precise combinations of reps, sets, workouts, and weights. Both sets with higher reps and sets with lower reps can be performed using different weights.

Programs for resistance training have generally emphasized one plane of motion (usually the sagittal plane) while stressing the development of a muscle's maximum strength. Training plans should be created using a progressive approach that emphasizes the right exercise selection, all muscle actions, and repetition tempos because all muscles function eccentrically, isometric ally, and concentrically in all three planes of motion (sagittal, frontal, and transverse) at different speeds. Strength must be viewed as a result of activating the neuromuscular system rather than as a function of muscle because muscle is controlled by the central nervous system.

Muscles or groups of muscles are overworked during strength training, the muscular tissue is given time to adjust, and then the muscle is overworked once more. This is effective at the cellular level because overloading results in small rips in the muscle cells. Your body quickly repairs the injury, and the harmed muscles renew and get stronger. In order to assist your muscles heal and get stronger after working out, testosterone, insulin like growth factor, growth hormone, proteins, and other nutrients rush there.

A great way to promote gains in muscular size, strength, power, and local muscular endurance is through resistance exercise. Gains from training, however, are reliant on performing the necessary amount of training at a relatively high intensity, and these parameters typically need to rise as training advances for gains to persist (**Alcaraz, et al., 2008**).

The biggest benefit of weight training is that it targets particular muscle groups to enhance their explosive power. In order to increase the explosive strength of his calf

and leg muscles, for example, a raider who employs his leg muscles in footwork and leg thrusts during the raid can use weight training. Weightlifting not only improves fitness but also boosts injury resistance.

Exercises known as resistance trainings force the muscles to contract against an external resistance in the hopes of gaining more strength, tone, mass, and endurance. In addition to boosting muscle strength and bone density, resistance training can also help you lose body fat. Resistance training, often known as weight training or strength training, involves pitting muscles against a weight or resistance in order to increase skeletal muscular strength, anaerobic endurance, and growth. A well-rounded exercise regimen should include both aerobic and weight training to build athletes' heart and lung capacity and fitness, as well as strength training to enhance bone, bone density, joint function, muscle, ligament, and tendon strength (**Kraemer, 2003**).

For new clients, strength gains can happen quickly with strength training and can rise with an organized, progressive resistance training regimen. An increase in the number of motor units recruited, especially early in a training program, is one element in increasing strength. Up until a recruitment plateau is achieved, using greater loads increases neural demand and the recruitment of more muscle fibers; thereafter, further gains in strength come through fiber hypertrophy.

Importunes of Resistance Training:

As weaker wounded muscles can be strengthened to their pre-injury state with the help of weight training exercises, this training is also advantageous for injured sportspeople who can use the appropriate sort of weight training exercises under professional guidance to recover from the injury. There are several ways to lift weights, including multi-gyms with various exercise stations, lifting with free weights like medicine balls, sandbags, dumbbells, and barbells of varying weights, etc. The athlete should begin with modest weights and gradually add weight. To achieve the optimum benefits, he should progressively raise the weight as the workout becomes easier.

The advantages of weight training for athletes, both competitive and leisure. Resistance training programs frequently have positive effects on athletic performance, muscle size growth, and improvements in strength and power. Resistance training has additionally been proposed as a way to lower the likelihood of musculoskeletal

injuries, or perhaps even to lessen the severity of such injuries. Although there aren't many studies showing how resistance training reduces injury rates directly, the physiological changes it causes in bone, connective tissue, and muscle suggest that people who engage in such training programs will be better protected against harm. The majority of these workouts don't require any special equipment. These workouts automatically correlate one's own body weight with the load intensity. When using workouts that use one's own body weight as resistance and other situations where weight training equipment is not available **(Singh, 1991)**.

Combining Bodyweight and Weight Training:

Bodyweight training is often believed to be the more natural way to exercise in the fitness community. But humans have been using heavy weightlifting for fitness goals for a very long time. So the question is, is weight training or bodyweight training better?

The truth is that none of them can be done better on their own unless you have a specific goal in mind, like increasing your muscle mass, losing weight, improving your fitness solely, etc. In actuality, it will be more advantageous to combine the two methods. Absolutely nothing is wrong with doing that.

Calisthenics by themselves can be helpful for developing a great physique, but they won't give you a massive bodybuilder's physique; instead, they will give you a lean, sexy gymnast physique. There are many people with respectable, attractive bodies who merely perform calisthenics. The ability to control strength, volume, and mass makes heavy weightlifting more effective while trying to develop a muscular physique. In contrast, with calisthenics, you must rely more on your muscles growing primarily from muscle strength. Therefore, combining the two methods would be the best choice if your goal is to have a muscular body with the most strength, speed, and endurance.

Here, I'll discuss the benefits of mixing calisthenics with weight training as well as any potential drawbacks. I will also instruct you on what to do and how to do it.

"Train your body by paying close attention to weightlifting and calisthenics.

You will receive strength, beauty, and conviction as a result."

Advantages of Combining both Methods:**Flexibility and Strength**

With various bodily motions, calisthenics aims to improve overall body strength, fitness, and flexibility. However, lifting weights can aid to increase the strength and size of skeletal muscles. You gain both flexibility and strength at the same time when you combine the two techniques in harmony.

Agility and Stamina

In the gym, you can activate your fast-twitch muscle fibers by lifting big weights. You gain strength and speed as a result. Calisthenics can help both aerobic and muscular conditioning. Your slow-twitch muscle fibers are engaged, which contributes to an improvement in your stamina.

Relaxation

You must mentally prepare for each workout if you want to mix the two techniques. Heavy weightlifting aids in the regulation of your arousal. Calisthenics postures, on the other hand, cause you to perspire and promote relaxation. This aids in reducing tension.

Training the body and the mind

Both your physical and emotional health will benefit from using a well-balanced blend of the two approaches. Combining the two techniques keeps you active all day and boosts your confidence.

Maintenance

Your metabolism will be boosted by weight training, which will aid in weight loss, bone density growth, and joint flexibility preservation. Calisthenics, however, gives you a superior appearance in terms of your body's shape and muscle balance.

It's important to balance the use of both approaches. It's important to think about HARMONY. If not, you risk overtraining by performing one type of exercise at an excessively high intensity, volume, concentration, or frequency.

The majority of bodyweight exercises are complex or whole-body workouts. It's difficult to locate exercises that exclusively target certain muscles. When you lose fat, your body gradually loses resistance and muscular mass, so it does not grow in proportion to strength. (For example, you do not grow 5 pounds of muscle mass for

every additional 5 pounds lifted on average). To improve resistance, do increasingly intense variations of exercises for each muscle group.

Don't be too sure of yourself. You should gradually incorporate weights into your calisthenics workout. You can perform 50 sets of overhead press and triceps pushdowns, but it doesn't mean you'll be able to accomplish a single handstand pushup.

You must maintain perfect control of your body during workouts or you will pull or damage some muscles. When you use large weights when you aren't ready, you will always injure that specific region of your body. Another disadvantage of overtraining with bodyweight is that you lose flexibility and develop an uneven or disproportionate body structure.

Although combining both methods is good when done in proportion, it necessitates sufficient information, direction from a trainer, appropriate machines, timings, and so on. Otherwise, you risk being harmed or suffering an interior or external injury.

Kabaddi:

Kabaddi is a contact sport that began in Ancient India and is now practiced by thousands of people in towns and villages around the country. Kabaddi is derived from the Tamil phrase Kai - pidi, which literally means "(let's) Hold Hands," which is an important component of the game. In India, it is the state sport of Tamil Nadu, Punjab, and Andhra Pradesh (Roy et. al. 2014).

Kabaddi has grown in popularity around the world. Kabaddi is both an offensive and defensive sport. The attack, in particular, is an individual endeavor, whereas defense is a collaborative one. Physical fitness is an essential component of athletic performance and achievement. The level of performance is directly linked to the quality of a utilization value. That is, the higher the level of fitness. The greater a person's ability to achieve a better level of performance (Williams, 1962).

Kabaddi is a classic outdoor game that is played with minor variations throughout India and most of Asia. It's a traditional backyard and homegrown game. Kabaddi is a sport that reaches out to the masses. The fact that it has become a popular televised sport reflects the shifting tastes of India's sporting audiences. Not only has kabaddi impacted the Indian athletic environment, but it has also transformed the lives of the sport's players and other stakeholders. The league is just going to get bigger. The once-

modest kabaddi is now a vibrant and exciting property and brand that has the potential to develop into a full-fledged sport and entertainment package.

Physical Ability of Kabaddi Players:

The ability of the neuromuscular system to complete specified tasks is referred to as motor fitness. Fundamental motor skills are common motor tasks that follow precise patterns. The majority of sports and movement skills are improved versions of fundamental motor skills. Motor fitness is a broader phrase that encompasses five motor performance components that are essential for athletic success: power, speed, agility, balance, and response time. To achieve their goal in kabaddi, players must have motor, physical, and physiological components.

Kabaddi is a fighting sport in which agility is required for both offensive and defensive techniques; speed and aggression, respectively. Height is definitely an advantage, especially when it comes to increasing offense (**Sundarrajan 1979**). Kabaddi is a team sport that requires speed, stamina, endurance, strength, and ability. Although it is a team event, individual health is critical to the team's performance (**Pandey & Sardar, 2016**).

The game demands agility, muscular co-ordination, breath holding capacity, explosive power, upper and lower body strength, speed, aerobic and anaerobic endurance, flexibility, core strength, quick response and a great deal of presence of mind.

In Kabaddi, specific fitness in terms of strength, sprint, and agility is required, which prepares the athlete to meet the physiological and psychological difficulties that come his way during his professional sport career. Both attackers and defenders must have remarkable physical stamina, aerobic fitness, anaerobic fitness, dynamic balance, agility, individual proficiency, neuromuscular coordination, lung capacity, quick reflexes, intelligence, and presence of mind.

The researcher, who is a kabaddi player, competed at various levels. In this event, the researcher also serves as a qualified Coach and official. The researcher aimed to investigate the effects of resistance training, bodyweight training, and combination training on physical fitness components among kabaddi players based on his expertise and interaction with specialists in the area. Furthermore, relatively little research on kabaddi players has been conducted. As a result, the study concluded that it.

1.2 Statement of the Problem

The purpose of this study was to investigate the effect of resistance training, bodyweight training and their combination on selected physical fitness components of kabaddi players.

The study also indicated that there was a difference in selected physical fitness components such as speed, endurance, agility, flexibility, muscular endurance, upper body strength, and lower body strength among male kabaddi players between the three experimental and control groups.

1.3 Objective of the Study

- To study the effectiveness of resistance training on selected physical fitness components among kabaddi players.
- To study the effectiveness of bodyweight training on selected physical fitness components among kabaddi players.
- To study the effectiveness of resistance training on selected physical fitness components among kabaddi players.
- To study the combined effect of resistance and bodyweight training on physical fitness components.
- To find out which experimental training will be more effective in improving the selected physical fitness components of kabaddi players.

1.4 Delimitation

The following factors were delimited of the study:

- The subjects for the present study were delimited to men Kabaddi players only.
- Only hundred (100) inter collegiate kabaddi players were selected from colleges affiliated with Veer Narmad South Gujarat University, Surat.
- The subjects' ages ranged from 18 to 25 years old.
- The selected subjects were divided at random into four groups of twenty five each (n=25). Group I underwent resistance training, Group II underwent bodyweight running, Group III underwent combined resistance training and bodyweight training, and group IV acted as control group.
- The study was delimited to the following dependent variables.

Physical Fitness Components:

- Speed
- Endurance
- Agility
- Flexibility
- Muscular Endurance
- Upper body strength
- Lower body strength
- The duration of the training period was restricted to twelve weeks.

1.5 limitation

The following limitations were considered when interpreting the study's findings.

- Some factors such as reasonable behaviors such as living style, daily routine, food, and climatic conditions were not considered in the study.
- Past experience of the subjects in the field of sports and games, which could influence training and data, was not taken into account.
- It was not determined whether the subjects participated in other physical activities and benefited from them.
- Another limitation of this study is that no particular motivating strategy will be employed when collecting before and post test data, which may affect performance.

1.6 Hypotheses

The following hypotheses were developed for the purpose of the study based on the findings of previous research and the investigator's understanding.

1. There would be a significant improvement on selected physical fitness components due to the effect of resistance training programme.
2. There would be a significant improvement on selected physical fitness components due to the effect of bodyweight training programme.
3. There would be a significant improvement on selected physical fitness components due to the combined effect of resistance and bodyweight training programme.

4. There would be significant difference on selected physical fitness components among resistance training, bodyweight training and combined training (resistance and bodyweight training) groups and control group.

1.7 Definition and Explanation of the Terms

Physical Fitness

Physical fitness is the capacity to do daily chores with speed, without undue effort, and with enough energy to enjoy leisure activities and deal with emergencies.

- **Hockey, 1989**

Resistance Training

Resistance training is a common sort of strength training for increasing skeletal muscle strength and size. It employs gravity's weight force to counteract the force created by muscle through concentric or eccentric contraction.

- **Wikipedia**

Bodyweight Training

Bodyweight exercises are a sort of strength training in which you utilize your own weight to produce resistance against gravity.

Speed

It is the ability to realize the functional capacity of the engine under certain conditions in the shortest possible time.

Endurance

Endurance refers to your body's capacity to perform a workout for an extended amount of time.

Agility

The capacity to control the body's ability to shift position and direction rapidly and accurately is referred to as agility.

- **Consul, 1997**

Flexibility

Flexibility is an individual's capacity to move the body and its parts across as wide a range of motion as possible without causing damage to the articulations and muscle attachments.

- **Barrow and gee, 1979**

Muscular Endurance

It is a muscle's ability to repeat identical actions or pressures or to sustain a given level of tension over time.

- **Johnson and Nelson (1982)**

Upper Body Strength

Upper body strength is the body's ability to produce maximal force on an external object with a single maximum effort of the upper body muscles.

Lower Body Strength

Lower body strength is the body's ability to produce maximal force on an external object with a single maximum effort of the lower body muscles.

1.8 Significance of the Study

1. The study could help physical education teachers discover the level of physical fitness of their students.
2. This study was bring new information to combined training with bodyweight and resistance programmes.
3. The study aided coaches, sports experts, and physical educators in developing a better training program for game performance and player progress.
4. The study was useful for sports administrators, physical educators, and coaches since it revealed the impact of training on physical fitness components.
5. The findings of this study may serve as a foundation for additional intense research in this field in a large population.
6. The results of this study may be used to bring out the effective players among the college students.

CHAPTER – II

REVIEW OF LITERATURE



2.1 Introduction

This chapter presents a review of related literature to the current study that the researcher could have gathered to give background information for assessing the importance of this investigation and interpreting its findings.

2.2 Reviews Related to Resistance Training

Mustafa et al. (2022) was to investigate the effects of strength training on the fitness and body composition of Peshawar district university students. The participants were (N=70) female students from Peshawar's Govt Frontier College for Women. The eight-week training schedule (five days per week) was established and consists of a variety of physical exercises such the 30- and 400-meter runs, sit-ups, jumping jacks, badminton, and volleyball games. The impact of exercise on the body composition and fitness of university students was investigated using a paired t test. The results demonstrated that force training had a substantial impact on flexibility, hip circumference, chest circumference, biceps skin fold, and 30-meter run. Strength training enhances college ladies' overall strength and helps them become more physically fit and leaner.

Chanderasear (2021), study was to examine the effect of weight training exercises on selected fitness parameters of college-level male handball players. To achieve the aim of the study, the participating college level handball players were randomly selected from Kerala and its surroundings and their ages ranged from 17 to 23 years. Subjects were randomly assigned into two equal groups (n=15). All the subjects were divided into two groups with 15 subjects each as an experimental group and a control group. Group I underwent weight training exercises for a period of 6 weeks and Group II acted as a control that did not participate in any special training apart from the normal routine. Physical condition variables such as Muscular Endurance, Flexibility and Balance were selected as dependent variables. The dependent "t" test was applied to determine the difference between the means of two groups. To find out if there were any significant differences between the experimental and control groups. To test the level of significance of the difference between the means, a confidence level of 0.05 was set. The result of the study shows that there was a significant improvement in the muscular endurance, flexibility and balance of the college level handball players.

Alagudurai and Sivagnanam (2019), to determine how resistance training affects the players' explosive power and shoulder strength. Twenty male kabaddi players were randomly chosen as study subjects from Thiru Arul Senior Secondary School and S. Thomas Senior Secondary School in Tiruchendur Taluk, Thoothukudi District, Tamilnadu, India, for the academic year 2018-2019 in order to achieve the study's goals. They were between the ages of 15 and 17. The chosen individuals were separated into two groups at random, with group 'I' receiving resistance (weight) training (n = 10) and group 'II' serving as the control (n = 10) respectively. For six weeks, Group I engaged in resistance training on three different days of the week, with one session per day. Group II took part in routine activities but was not exposed to any particular training. Standardized test items like the Sargent vertical jump test and the push-up test were used to evaluate the data on the criteria variables of explosive power and shoulder strength. The dependent-'t' test and Analysis of Covariance (ANCOVA) were used to statistically examine the acquired data, with the level of confidence set at 0.05. The statistical tool SPSS-22 version was used to examine all the data. It was determined that the resistance training group greatly outperformed the control group in terms of shoulder strength and explosive power, and that there were also significant differences between the experimental and control groups.

Azeem et. al. (2019), study was to examine the effect of resistance training (RT) on selected physical and physiological variables among college men. This is an experimental investigation with a pre and post test design that includes resistance training and a control group. Sixty male participants were selected for this study who were randomized into two groups; group-A (N=30) experimental group and group –B (N=30), control group. The age of the participants was in the range between 18 and 22 years old. The duration of the RT program was 45 minutes, twice a week. All subjects were tested first and after the 12 week program. For the statistical analysis, ANCOVA and SPSS 16 were used. Descriptive statistics were applied observe the differences between the participants from the pre-test to the post-test. Based on the results, the effect of RT on selected physical variables was significant, eg, body composition, explosive power, muscle strength, muscular endurance and flexibility. There was also a significant difference with respect to physiological variables.

Lakshmanan and Jayakumar (2019), study was to determine how intercollegiate kabaddi players' physical fitness levels were affected by resistance training. From Bharathidasan University in Trichy district, forty kabaddi players were chosen at random. The chosen players were split into two groups, each of which contained 20 intercollegiate kabaddi players. There was no attempt to compare the groups. The subjects were between the ages of 18 and 21. Resistance training's impact on physical fitness was evaluated. The training load was raised above the subject's maximum allowable working capacity for the pilot research. The training phase could only last for eight weeks, and there could only be three sessions per week. The dependent 't' test was used to statistically evaluate the data from all the groups before and after the experimental period to determine whether there had been any appreciable improvements. A level of confidence of 0.05 was fixed to the level of significance between the pre and post-test averages of all the groups. The findings of this study suggested that weight training is more effective at producing desired improvements in male kabaddi players than agility and flexibility.

Vivekanth and Vallimurugan (2019), examined impact of strength training on the physical fitness metrics of intercollegiate volleyball players. Thirty intercollegiate volleyball players from three different college levels in Tamilnadu's Salem district were chosen as the subject. Age of subjects ranged from 18 to 24. A total of 30 intercollegiate volleyball players were divided into two equal groups by random selection. Strength training group and control group were the names of the groups. The post-tests were administered following the training session, which lasted eight weeks for the training group. After analyzing the post-test mean differences, it was necessary to take into account the difference between the two groups' pre-test means. Paired 't' was used to examine the impact of the variables on the outcomes, and a level of significance of 0.05 was determined to be adequate for the study. This strength training group demonstrated a noticeable difference in the intercollegiate volleyball players' upper extremity strength and lower extremity strength.

Vivekanth and Vallimurugan (2019), study was to determine the effect of strength training on the physical condition variables of intercollegiate volleyball players. The subject was selected thirty intercollegiate volleyball players from three different college level volleyball players from Salem district, Tamilnadu. The subject's age

ranged from 18 to 24 years. In total (N = 30) they were randomly assigned to two equal groups of intercollegiate volleyball players. The groups were called the resistance training group and the control group. Upper limb strength was measured with the bench press and lower limb strength was measured with the half squat. The training group had received training for a period of eight weeks and post-testing was performed after the training period. Therefore, the difference between the means of the two groups in the pretest had to be taken into account after the analysis of the differences between the means in the posttest. A paired "t" was applied, to contrast the results obtained on the variables, the significance level 0.05 was chosen and it was considered sufficient for the study. This strength training group had a significant difference in the upper extremity strength and the lower extremity strength of the intercollegiate volleyball players.

Bilal and Muthueleckuvan (2018), to determine the impact of weightlifting on specific physical fitness metrics among college men's kabaddi players. 24 male kabaddi players who were students at Annamalai University in Tamil Nadu's department of physical education and sports sciences were chosen as the study's subjects in order to fulfill its goals. The randomly chosen subjects were split into two groups, each of which has 12 participants. Group II served as the control group while Group I served as the experimental group. The subjects' ages, which ranged from 18 to 22, were verified by the university file. The control group received no training beyond their normal routines, while the experimental group participated in strength training for six weeks. To determine whether certain variables had significantly improved between the pre- and post-test, the basic t-test was performed. The significant difference between the groups was discovered using the analysis of covariance (ANCOVA). The confidence level was set at 0.05. It was concluded that there was a significant improvement on selected variables.

Moorthi et. al. (2018) study's was to ascertain how three different resistance circuit training modalities affected the collegiate male kabaddi players' speed, physical strength, endurance, and speed. Sixty male kabaddi players from Vellalar College of Engineering, who were between the ages of 17 and 21, volunteered to take part in the study. Four groups of subjects were formed, including Experimental Group-I (n=15, RTG group), which engaged in resistance training while receiving rest, and

Experimental Group-II (n=15, RCTG group), which engaged in resistance circuit training while receiving no rest. Resistance training and resistance circuit training were combined with and without rest for Experimental Group III (n=15, CRTRCTG Group), whereas no specific training programs were followed by the Control Group (n=15; CG). An eight-week training program's pre- and post-test results were used to evaluate the subjects. Using the t ratio, analysis of variance, analysis of covariance, and Scheffe's post hoc test were used to evaluate the individuals in order to determine the mean difference between each group's pre- and post-test results. Results showed that all experimental groups considerably improved in terms of speed ($p<0.05$), muscular strength ($p<0.05$), muscular strength and endurance ($p<0.01$), whereas there was no significant change in the control group.

Tandel (2018) how strength training affected a few key physical characteristics of kabaddi players. Thirty male intercollegiate kabaddi players from Shri Govind Guru University Godhra were chosen at random as the study's subjects in order to attain its goals. They varied in age from 17 to 21. The subjects were split into a control group (n = 15) and a strength training group (n = 15) at random. The participants then gave their informed consent to take part in the study. Both before and after the training session, all tests were conducted (pre-test and post-test). For a total of six weeks, members of the strength training group I were away performing strength training exercises on Monday, Wednesday, and Friday. II served as the control group. They did not take part in any particular training. Speed (50 yard run), agility (10 mts. 4 shuttle run test), and muscular endurance (sit-up test) are the chosen physical variables. ANOVA was used to determine the mean difference between before and post treatment. The findings of this study show that strength training has the ability to increase muscular endurance, speed, and agility, especially among male intercollegiate Kabaddi players.

Kumar and Sha (2016), study's goal was to find out how college-level kabaddi players responded to aerobic and resistance training on key physical fitness metrics. The 30 male intercollegiate level kabaddi players from Tamilnadu, India, who were chosen as subjects for the current study at random ranged in age from 18 to 25. Pre-test and post-test random group designs with control and experimental groups were used in the current study. The Subjects were divided into two equal groups of fifteen each, designated as Groups "A" and "B," and placed in them at random. Group 'A' engaged

in aerobic exercise, while Group 'B' engaged in resistance exercise. Speed was measured using the 50-meter dash and Through sit-ups, muscle endurance was evaluated. Data was gathered before and after a 12-week training period. Application of Analysis of Covariance (ANCOVA) was used to analyze the data. The significance threshold was set at 0.05. The college level kabaddi players' speed and muscle endurance improved because to the aerobic training. Resistance training had a positive effect on the college-level kabaddi players' speed and muscular endurance. The benefits of both training techniques on college-level kabaddi players' speed and muscular endurance were comparable.

Rathod (2015), examined the impact of a weight training regimen on a number of physical fitness indicators in male kabaddi players at the Swami Ramanand Tirth Marathwada University in Nanded. 200 participants between the ages of 18 and 23 were chosen at random from S.R.T.M.U. Nanded. Subjects were divided into two groups, with 100 in each of the experimental and control groups. Both the Experimental group and the Control Group's subjects received fundamental and related weight training. The mean, S.D., and "t" test were used to examine the data in accordance with McGeehan's advice regarding the significance of difference. The results of the study show that the subjects, who were between the ages of 18 and 23, had improved speed, endurance, and agility after participating in a weight training program for a year.

Sharma (2014), examines the impact of a nine-week resistance training regimen on specific basketball players' physical fitness metrics. Twenty female basketball players from Delhi University were chosen as study participants for this reason; their ages ranged from 17 to 21. Inter University was required for participation at the lowest level. The participants were then split into two groups: the experimental group (G-I) undertook resistance training, while the control group (G-II) maintained their usual level of physical activity. College kabaddi competitors. Three days each week for nine weeks served as the study's training period. Prior to the training session, data from both groups were collected, and the subjects underwent tests to determine their speed, back strength, and abdominal strength. As a statistical tool, the dependents 't' test and analysis of covariance were used. The significance level was set at 0.05 in each example. According to the study's findings, training groups' back strength had increased but their speed and abdominal strength had not changed significantly.

Sharma (2014), study was to know the effect of a nine-week resistance training program on Physical condition variables of basketball players. For this purpose twenty female basketball players from the University of Delhi were selected to serve as study subjects, the age of the subjects from 17 to 21 years old. The minimum level of participation It was intercollegiate. The subjects were divided into two groups, for example, control group and experimental group, group I underwent resistance training and group II acted as controls and continued with your regular physical activity. The training period of the study was three days a week for nine weeks. Previous data of both the groups were taken before the training period; subjects They were tested for speed, back strength, and abdominal strength. The dependent 't' test and the analysis of covariance were applied as statistical tool. In all cases, the level of 0.05 was set as significance. It was concluded from the results of the study that the training groups had improved back strength and had no significant results Improved speed and abdominal strength.

2.3 Reviews Related to Bodyweight Training

Dong et. al. (2023) study was to use a meta-analysis to examine the impact of players' core training on their performance in a particular sport. We chose pertinent studies on randomized controlled trials, and then we used the random effects model and standardized mean difference values to calculate the effect size. Results showed that agility training had a modest effect size but no statistically significant impact on athletes' power and speed. On the other hand, there was a significant impact on overall athletic performance, including balance and core endurance. As a result, core training had a significant impact on athletes' core stability and endurance but had minimal impact on their performance in certain sports. This finding suggests that more complex core training plans should be developed to enhance athletes' performance in their chosen activity.

Marwat et. al. (2021), study was to ascertain the effects of calisthenics training and physical fitness factors on the general playing ability level of male Pakistani Kabaddi players. The purpose of the study was to determine the effects of calisthenics training on kabaddi players' physical fitness (coordination, flexibility, and endurance). Seventy male kabaddi players—ten from each district—were chosen for the study in order to fulfill its objectives. The athletes' ages ranged from 18 to 28 years old. Before and

after the treatment, all of the subjects had tests on a number of different variables. The researcher gathered pre- and post-training data from the participants on the field during contests and training. Research has demonstrated that instructional training and traditional training groups greatly enhanced the physical fitness factors, including; agility, leg explosive power, muscular strength endurance, and overall playing ability of Pakistani Kabaddi players. The study's findings supported its goals, yet neither hypothesis was supported, hence both were disproved.

Rajkaran et. al. (2021), study was created to look at how intercollegiate male Kabaddi players' physical fitness levels were affected by ladder training. Thirty male Kabaddi players were chosen from National College in Tiruchirappalli, Tamil Nadu, India, to serve as the study's participants in order to accomplish its goals (N=30). The subjects were between the ages of 18 and 23. The chosen subjects (N=15) were split into two groups. Group I received ladder instruction. Group II served as the control group, only engaging in their regular daily activities and no special training. As dependent variables, the physical fitness traits of agility and leg balance were chosen. They were evaluated using the shuttle run and the stroke stand, respectively. For a period of six weeks, six days a week, the subjects focused on their specific training. ANOVA was used to statistically assess the data on selected criterion variables that were gathered from two groups before and just after the training program. To test the hypothesis, the degree of confidence was set for all cases at 0.05. The study's findings show that intercollegiate male Kabaddi players' agility and balance significantly improved in the ladder training group as compared to the control group.

Karikalan (2020), Twelve (12) Kabaddi players who competed in the intercollegiate tournament were chosen as the study's subjects. The subjects were between the ages of 18 and 25. The dependent variable chosen was muscular strength. The following standardized test items evaluated the study's chosen dependent variable. The strength was measured in numbers and evaluated by sit-ups. The data pertaining to the variable was investigated by utilizing a dependent 't' test for each variable to discover whether there was, if any, a difference between the ways to ascertain the muscular strength among Kabaddi players. For all situations, the level of significance was set at 0.05 level of confidence. According to the study's findings, the Turbulence Training group's strength level should have greatly increased compared to the control group.

Arumugam (2019), conducted research on twenty male Kabaddi players from Manonmaniam Sundaranar University in Tirunelveli District, Tamil Nadu, India, whose ages ranged from 18 to 25 years old and who competed in intercollegiate competition in the 2018–19 academic year. For flywheel training, the participants are randomly split into two groups: group I, which includes 10 players, and group II, which includes 10 players in the control group. While group II engaged in their regular activities, group I participants participated in a six-week training program that included one session per day for three alternate days. For pushups and wall sits, the athletes' shoulder and leg strength were quantified in terms of numbers and time. The dependent 't' test and ANCOVA are used to analyze the pre-test and post-test samples. The impact of flywheel training on male kabaddi players' shoulder and leg strength was concluded. However, the control group had not significantly improved on several of the factors, such as leg and shoulder strength.

Palanisamy (2019), was investigated the impact of plyometric training on players' physical characteristics. For the duration of the 12-week experiment, 30 male kabaddi players got plyometric training. Ages of the players ranged from 18 to 25. The study's findings showed that plyometric training for 12 weeks greatly increased the physical fitness traits of explosive strength, muscular endurance, and speed.

To assess the effects of a chosen program of core stability of body and jumping exercises on trunk strength and balance in female Kabaddi athletes, **Torbatinezhad et al. (2019)**. 24 female Kabaddi players served as the study's subjects. They were chosen at random and consciously divided into two groups. The experimental group participated in a 6-week training regimen that included three sessions per week. The data's normality was examined using the Shapiro-Wilk test. The paired t-test was employed to assess the variations in mean values in the case of normal data. According to the study's findings, there was a significant difference between the experimental and control groups' mean post-test scores for trunk strength and static and dynamic balance ($P < 0.001$), indicating that the experimental group's participants did better on these measures. The findings of the current study indicate that combining hopping with core-body balancing workouts can increase the athletes' balance and endurance, which may help them avoid injuries.

Torbatinezhad et. Al. (2019), study was to assess how a particular set of hopping and core stabilization exercises affected the balance and trunk strength of female Kabaddi players. 24 female Kabaddi players were arbitrarily chosen and consciously divided into the experimental group and the control group. The experimental group engaged in a 6-week training regimen that included three sessions each week and 40 minutes of hopping and core stability exercises. The paired t-test was employed to assess the variations in mean values in the case of normal data. The findings of the current study indicate that combining hopping with core-body balancing workouts can increase the athletes' balance and endurance, which may help them avoid injuries.

Singh and John (2018), examined the impact of body weight plyometric training on broad jump in kabaddi players. Forty samples from Jammu will be chosen at random for this study. participants would range in age from 16 to 24 years old, and the 20 participants were separated into 2 equal groups. While the Control group received no training at all but was allowed to enrol in regular classes, the Experimental group received plyometric training for nine weeks. The study concludes that there existed significant difference in pre-test and post-test of Experimental group and There existed significant difference in post-test of control groups. Experimental group and post-test of Control group.

Bovas and Pradeep (2014), used a 10-week training program and a circuit to assess the impact of a few physical characteristics on college-age male Kabaddi players in Kerala who are between the ages of 18 and 25. Forty college-aged male Kabaddi players from Kerala were chosen as the study's subjects. The subjects were between the ages of 18 and 25. Before involving them as study participants, the subjects were told about the purpose of the study and their agreement was also obtained. After that, the participants were divided into two groups at random: a control group-1 and an experimental group-2 (Body weight circuit training). After a 10-week training program, the study found that both experimental groups had improved in comparison to the control group in terms of physical traits like speed, speed endurance, agility, reaction time, abdominal strength, and explosive power. The circuit training group also demonstrated a statistically significant improvement in all of the above traits.

2.4 Reviews Related to Combination Training

Haq and Govindhan (2023), study was to determine the impact of plyometric exercise and a combination of plyometric and strength training on specific back and leg strength. For the study, 45 male kabaddi players between the ages of 18 and 25 were chosen. They were split into three equal groups, each with fifteen participants. Each group consisted of three experimental groups and one control group. Group I (n = 15) underwent plyometric training, Group II (n = 15) underwent a combination of plyometric and strength training for three days (alternate days) per week for twelve weeks, and Group III served as the control group, which did not engage in any training. The subjects had tests on a few criteria variables before and right after the training period, including back and leg strength. The dynamometer was used to measure the strength of the back and the legs. Finding any significant differences between the experimental groups and control group on particular criteria variables individually was done using the analysis of covariance (ANCOVA). The Scheffé S test was applied as a post-hoc test because the current study included three groups. When compared to the control group, all training groups showed a significant improvement in the chosen criteria variables, such as leg and back strength.

Kumar et. al. (2023), study was to determine how particular training affected the motor fitness of male kabaddi players. Subjects (N-30) from the Ramakrishna Mission Vidyalaya Arts and Science College in Coimbatore, Tamil Nadu, were chosen for this purpose. The subjects were between the ages of 18 and 24. Two equally sized groups of topics are created. They were divided into the experimental group (n-15) and the control group at random. There are (n- 15) people in each group. Strength and flexibility have been chosen as the dependent variables. Push-ups and the sit-and-reach test were used to measure flexibility and the criterion variables that were chosen. The training regimen was provided 8 weeks, including daily 45-minute sessions of focused instruction. Aside from their regular tasks, the control group was not allowed to take part in the training. The 't' test was used to analyze the collected data. The 0.05 level of significance was established. The study's findings demonstrated that men's kabaddi players' specialized training had a positive effect on their strength and flexibility. The chosen criterion variables were not improved by the control group.

Senthilkumar (2023), the influence of tabata training on a performance-related component of kabaddi players' agility is investigated in the current study. The researcher read through all of the published works on tabata training, including books, journals, magazines, periodicals, and research papers. Studies have demonstrated the beneficial impact of tabata training on a certain game performance-related aspect of the agility of school-level kabaddi players. the 15–18 age range and a particular area of Coimbatore Tamil Nadu, India school level kabaddi players. Comparable statistically significant gains in agility standard scores were seen in all three groups of kabaddi players. When compared to the control group, the tabata group's agility increased by 9.25. The role of tabata in traditional kabaddi players can be organized with the use of studies on short-term interventions in established players to help them maintain good alignment and posture while moving for training.

Kalpana (2021), The goal of the current study was to determine the impact of specialized training on particular physical fitness traits and intercollegiate Kabaddi player skill performance. In order to accomplish this goal, fifteen Kabaddi players from Thanjavur District who competed in intercollegiate competitions were chosen at random as study subjects. The subjects were between the ages of 20 and 25. The chosen physical fitness factors, namely flexibility and endurance, as well as the chosen skill variables, ankle hold and blocking, were all chosen. The statistical analysis of the data among the Kabaddi players used the student t-test. To test the significance, a predetermined level of confidence of 0.05 was used in each example. The "t" ratio, which demonstrated significance at 0.05 level of confidence, was used as a statistical tool to determine the proper study result. The performance of Kabaddi players on pre- and post-tests for endurance, flexibility, and skill showed a substantial difference.

Panbilnathan and Palanisamy (2021), Forty-five male native Kabaddi players were chosen as study participants in order to fulfill the study's objectives. The subjects were between the ages of 16 and 18, with a variety of height and weight. The chosen subjects were divided into three equal groups of fifteen each by random assignment. Group II (CPW) underwent plyometric training together with weight training, while group III (CG) served as the control group. Group I (P.T) underwent plyometric training. In addition to their normal daily routines, the experimental groups undertook their different training programs three days per week for a period of twelve weeks. The

three groups' pre- and post-experiment data on a few dependent variables were statistically examined using analysis of covariance (ANCOVA) to determine whether there was any evidence of a meaningful difference. Since there were three groups, the Scheffe's test was used as a post hoc test to identify paired mean differences whenever the derived 'F' ratio for adjusted post-test means was determined to be significant. The level of confidence for significance was set at 0.05 in each example. This study's key conclusion was that both plyometric training and plyometric training mixed with weight training regimens improved the specified dependent variable. However, plyometric training with weight training was superior to plyometric training alone. The Moving Toe touch skill performance could be developed with enough plyometric and weight training.

The impact of conventional Kabaddi training coupled with plyometric exercise was examined by **Dharod et al. (2020)**. They assessed the characteristics such as explosive power, agility, strength, balance, and aerobic performance on the 61 male sub-elite kabaddi players. A 12-week training program was required. When compared to the control group, players in the traditional kabaddi training with plyometric training group exhibit a significant improvement in their explosive power, flexibility, balance, agility, and aerobic capacity. By enhancing explosive power, flexibility, agility, and muscle strength in male Kabaddi players, plyometric training alone has a major impact on their specific physical fitness. This is thought to improve raiding and defines performance. As a result, the study's findings recommended combining traditional kabaddi training with plyometric exercise to improve players' performance.

Kumar (2019), study was to examine how a certain combined training regimen (Resistance Training and Plyometric Training) affected the development of leg and arm explosive power in Kabaddi players. The experiment involved 60 Kabaddi players (Junior players: 30, Senior players: 30), all of whom volunteered for the study. For the duration of the study, the experimental group underwent weight training followed by plyometric training four days per week. For the subjects' upper and lower extremity explosive strength, pre and post tests were conducted before and after 12 weeks of training. The study's findings showed that complicated training to raise players' levels of upper and lower body explosive strength had a favorable impact by raising their performance.

Pawar and Borkar (2018), investigated how training in ladder drills affected the agility of female semipro and professional kabaddi players. According to inclusion and exclusion criteria, 48 female semipro and sessional kabaddi players who were enrolled in high school or college were chosen to participate in the training. The age range for the group was 12 to 20 years. Each participant gave their blessing and written consent for the study. The players were then split into two groups: the experimental group and the control group. In the experimental group (n=24 players), who received ladder drill training for 4 days/weeks, 6 weeks, and the control group (n=24 players), who did not participate in any activity. The Agility T-test served as the outcome indicator for both groups. Both the group's outcome measurements were taken before and after the training session. Pair and unpaired t-tests were used to statistically analyze the acquired data. According to the statistical findings, the experimental group's agility performance had a p-value of 0.0001, which is deemed to be very significant. According to the study's findings, the experimental group's agility performance significantly improved when compared to the control group.

Karuppiah and Palanisamy (2017), examined the individual and combined effects of weight training and ladder training on a number of physical characteristics of male kabaddi players. Out of a total of 100 players, 45 male kabaddi players who were enrolled in different colleges at Madurai Kamaraj University were chosen at random to participate in the study. The individuals' ages ranged from 18 to 23 years old. The subjects were then divided into three 48-person groups of 15 each at random. Before and after the training period, the chosen criteria variables, such as agility and abdominal strength, were measured. Analysis of Covariance (ANCOVA) was used to statistically analyze the data that had been obtained. When the 'F' ratio of the adjusted post-test means was determined to be significant at the 0.05 level of confidence, the Scheffe's test was used as a post-hoc test. According to the study's findings, the standalone and combined influence weight and ladder training groups significantly improved their agility and abdominal strength compared to the control group.

Muniraju et al. (2017), investigated the combined effect of plyometric training and specialized training with traditional volleyball skill training. Eighty volleyball players were selected for this project from various Karnataka schools. Each set of 20 subjects was split into four equal groups. Group 1 refers to the integrated training (Plyo +

specialized + skill). Plyometric training and skill training were given to the second group, skill training was given to the third group, and no training was given to the fourth group, the control group. Through 12 weeks of training, the group 1 and group 2's explosive leg power, flexibility, and volleying skill all significantly improved.

Among college-level kabaddi players, **Jagathesan (2016)**, investigated the impact of concurrent strength and endurance training on Cardio-respiratory endurance and Resting pulse rate. Thirty students from Namakkal, Tamil Nadu, India's Selvam College of Physical Education were randomly chosen as subjects to accomplish this goal. They were between the ages of eighteen and twenty-two. The chosen participants were split into a concurrent strength and endurance training group and a control group, each of which had fifteen members. While the control group continued to go about their everyday routines and received no additional training, the experimental group underwent twelve weeks of concurrent strength and endurance training. Prior to and immediately after the training session, the subjects of the two groups had tests for a few different variables, including cardio-respiratory endurance and resting pulse rate. These tests included Cooper's 12-minute walk/run test and counting on radial artery/minute. To determine if there was a statistically significant difference between the groups, the obtained data were statistically evaluated using analysis of covariance (ANCOVA). To assess the level of significance that was deemed appropriate, the .05 level of confidence was fixed. The study's findings demonstrated that the concurrent strength and endurance training group and control group had notable differences from one another. Additionally, compared to the control group, the concurrent strength and endurance training group significantly improved their cardio-respiratory endurance and resting pulse rate.

Chaudhari (2014), evaluated the combined impact of strength and plyometric training on male kabaddi players' upper and lower body strength. Male kabaddi players from the Agricultural University of Navsari in Gujarat, India, number 48 in total. These athletes were divided into two groups: control group 24 and strength and plyometric training group 24. Upper body strength and lower body strength were chosen as the dependent variables for the current study. Three days a week of strength and plyometric training were given for ten weeks. The combined training program combines plyometric and strength training, with two plyometric and one strength training session

each week completed during even weeks, and one plyometric and two strength training sessions during odd weeks. Both the strength and plyometric training group and the control group provided pre and post data. The Analysis of Covariance (ANCOVA) was used to examine the acquired data. It can be concluded that ten weeks of plyometric and strength training improves the upper and lower body strength of male kabaddi players.

Rao and Kishore (2014), study sought to determine the combined impact of strength and plyometric training on specific motor fitness domains in male kabaddi players. From Acharya Nargarjuna University's associated colleges, 48 male intercollegiate kabaddi players were chosen. Both the strength and plyometric training group (SPTG: 24) and the control group (CG: 24) were divided up into these players. Speed, power, and agility were chosen as the dependent variables for the current study. Ten weeks of three days per week of mixed strength and plyometric training were conducted. Ten weeks of three days per week of mixed strength and plyometric training were conducted. The combined training program combines plyometric and strength training, with two plyometric and one strength training session each week completed during even weeks, and one plyometric and two strength training sessions during odd weeks. Both SPTG and CG provided the pre- and post-data. The Analysis of Covariance (ANCOVA) was used to examine the acquired data. The differences within a group before and after a nine-week training intervention were calculated using a paired t test. The study's findings conclusively demonstrate that there are substantial differences between groups in terms of speed ($F = 109.46$, $p = 0.000$) and power ($F = 11.57$, $p = 0.001$). However, agility ($F = 0.025$, $p = 0.875$) failed to distinguish between the groups significantly. Male intercollegiate kabaddi players' speed and power are said to have significantly improved after ten weeks of combined strength and plyometric training.

Taheri (2014), study aimed to compare the effects of combined versus strength and plyometric training on several physical fitness traits in Iranian national team kabaddi players. 48 male kabaddi players (aged 22.3–2.7) were divided into four groups at random: control ($n=12$), strength training ($n=12$), plyometric training ($n=12$), and combined training ($n=12$). Tests for agility (shuttle run), explosive power (Sargent

jump), and sprinting (60-m sprint) were conducted before and after an 8-week training intervention. Some physical fitness parameters were said to have significantly improved in the plyometric, strength, and combination groups. We come to the conclusion that plyometric, strength, and combination training that is correctly planned may benefit kabaddi players' physical performance.

The combined effects of strength and plyometric training on certain motor fitness components of male kabaddi players are evaluated by **Rao and Kishore (2014)**. From Acharya Nargarjuna University's associated colleges, 48 male intercollegiate kabaddi players were chosen. Both the strength and plyometric training group (SPTG: 24) and the control group (CG: 24) were divided up into these players. Speed, power, and agility were chosen as the dependent variables for the current study. Ten weeks of three days per week of mixed strength and plyometric training were conducted. Both SPTG and CG provided the pre- and post-data. The Analysis of Covariance (ANCOVA) was used to examine the acquired data. The differences within a group before and after a nine-week training intervention were calculated using a paired t test. The study's findings conclusively demonstrate that there are substantial differences between groups in terms of speed ($F = 109.46$, $p = 0.000$) and power ($F = 11.57$, $p = 0.001$). However, agility ($F = 0.025$, $p = 0.875$) failed to distinguish between the groups significantly. Male intercollegiate kabaddi players' speed and power are said to have significantly improved after ten weeks of combined strength and plyometric training.

Kagitha and Kumar (2013), determine the effects of careful preparation with yogic practices based on selected engine fitness parameters and the number of male Kabaddi players. In order to fulfill this study's purpose, sixty male Kabaddi players were randomly selected from the Guntur area of India. Pradesh, Andhra. The chosen subjects ranged in age from 18 to 25 years old, 165 to 225 pounds, and 170 cm, plus 55 to 65 kilograms each person. The selected individuals were divided into three groups: twenty each, randomly. Group "An" underwent complex preparation, Group "B"

underwent complex preparation with yogic practices for four sessions each week, and Group "C" served as the control group, not undergoing any special preparation outside of their regular educational module program. The entire subject displayed a calm steadiness, and no attempt was made to tune in the training program. The subjects were examined by a licensed medical professional who declared them to be physically and medically fit for the program. The complex training improves the motor fitness variables on speed, agility, flexibility, explosive power, muscular endurance and coordination of kabaddi men players.

CHAPTER – III

RESEARCH METHODOLOGY



This chapter discuss the methodology used in the selection of subjects, classification of group, experimental treatment, selection of variables, selection of tests, reliability of data, pilot study, experimental design, administration of tests collection of data and statistical techniques were presented.

3.1 Selection of Subjects

The purpose of the study was to investigate the relative effects of resistant training, bodyweight training and their combined training on selected physical fitness components among University men Kabaddi players. Hundred (n=100) men Kabaddi players, who participated in Veer Narmad South Gujarat University, Surat Intercollegiate Kabaddi tournaments during the year 2020-2023, were selected randomly as subjects. The age of the subjects ranged from 18 to 25 years respectively.

All subjects were told about the nature of the study, and their permission to participate was secured until the end of the experiment and testing periods.

3.2 Group classification

100 selected men kabaddi players were randomly divided into four equal groups. The groups and classification are briefly explained in table – 3.1.

Table 3.1 : Classification of Players by Group

Group	Name of the Groups	Total Numbers of players
Experimental Group – I	Bodyweight Training	25
Experimental Group – II	Resistance Training	25
Experimental Group – III	Combination (Combination of body weight training and resistance training)	25
Group – IV	Control Group	25

3.3 Selection of Variables

The investigator reviewed all the available scientific literatures pertaining to the problem under study from books, research papers, websites and also consideration of the feasibility and availability of instrument relevant to the present study the following physical fitness components were selected.

3.3.1 Dependent Variables

- Speed
- Endurance
- Agility
- Flexibility
- Muscular Endurance
- Upper body strength
- Lower body strength

3.3.2 Independent Variables

- Bodyweight Training
- Resistance Training
- Combination (resistance training and bodyweight) Training
- Control Group

The game of kabaddi is a fast body contact sport, which places great physical demands on the body. The success of a kabaddi player depends on physique and fitness. Modern kabaddi players require tremendous speed, agility, explosive power, maximum muscular strength of upper and lower body, endurance, flexibility and muscular endurance of abdominal muscles.

3.4 Experimental Design

The experimental design used in this study was random group design involving one hundred subjects who were divided at random into four groups of twenty five each ($n = 25$). This study consisted of four independent variables such as bodyweight training, resistance, combination training and control group, the four selected groups, experimental group-I underwent bodyweight training, experimental group-II underwent resistance training, experimental group-III combination training and the group - IV acted as control. All the subjects were tested prior to, and after the 12 weeks training period on selected physical fitness components.

3.5 Criterion Variables

The following tests were chosen for this study by the investigator after examining relevant literature for the study and consulting with specialists in sports science and

physical education. The characteristics of the selected test items were displayed in Table 3.2.

Table 3.2 : Selection of Tests

No	Variables	Test	Units of Measurement
1	Speed	50 m Run	1/100 th of a second
2	Endurance	Coopers 12 Minutes Run / Walk	Distance Covered / Meters
3	Agility	Shuttle Run (4 x 10 m)	Time was recorded to the nearest 1/100 th second
4	Flexibility	Sit and Reach Test	The measurement was recorded in Centimetre
5	Muscular Endurance	One Minute Bend Knee Sit-ups Test	Number of correctly Sit-ups in One minute.
6	Upper body strength	1RM Bench press	Maximum weight of one full repetition successfully completed is recorded in Kilogram.
7	Lower body strength	1 RM SQUAT	Maximum weight of one full repetition successfully completed is recorded in Kilogram.

3.6 Tester Competency

With the assistance of coaches, trainers, and professors of physical education employed by various colleges in south Gujarat, the physical fitness components connected to the investigator carried out this research. The investigator's assistants participated in numerous practice sessions to make sure they were proficient in the proper testing methodology. Test and retest techniques were used to determine the tester's reliability.

3.7 Instruments' Reliability

The necessary equipment was obtained from the M.K. College of Commerce, Bharuch, Department of Physical Education. In terms of functionality, they were

excellent. From reputable and standardized companies, the instruments were obtained. Their calibrations were examined, and it was discovered that they were precise enough to meet the needs of the investigation.

3.8 Reliability of Data

Ten subjects were used in a test-retest method to determine the reliability of the data. The same individuals examined all of the dependent variables selected in the current study twice on the participants under identical circumstances. The reliability of the data was investigated using the Pearson's correlation method; the results are shown in Table 3.3.

Table 3.3 : Scores of Tests and Retests Reliability Coefficient

Sr. No.	Variables	Correlation Coefficient R
1	Speed	83*
2	Endurance	79*
3	Agility	81*
4	Flexibility	82*
5	Muscular Endurance	80*
6	Upper body strength	83*
7	Lower body strength	81*

* $r - 0.05 (10) = 0.58$

The correlation on selected physical variables is shown in table 3.3. The data were considered as reliable in terms of subjects because the obtained "R" values were significantly greater than the necessary table value.

3.9 Orientation to the Subjects

A number of sessions were allowed prior to the start of the training so that the participants could become familiar with the methods used to carry out the training exercises. The researcher gave the subjects an explanation of the purpose of the program and their role in the investigation. The investigator provided directions regarding the method to be used by them for measuring while also explaining the process of training and testing on specific criterion variables. Throughout the training and testing period, the individuals had enough motivation to perform at their best.

During the trial period, the control group received no special training and was encouraged not to participate in any form of practice or training program. All of the willing volunteers were informed of the significance and value of the study.

3.10 Training Programme

The experimental groups experienced their different training programs during the training period in addition to their regular study schedules. Group - I underwent resistance training, Group - II underwent bodyweight training, and Group - III underwent a combination of bodyweight and resistance training on alternate days. Group - IV served as the control group.

The total duration of each training session throughout the course of the twelve weeks was roughly between 60 and 75 minutes, including warm-up and cool-down periods. The control group; they didn't take part in any particular equivalence training with the experimental group. All of the participants in this study were closely observed throughout the training regimen to prevent injuries. Throughout the training program, questions about their health status were asked of them. They all stated that they were uninjured. However, muscle soreness started to show up throughout the initial part of the workout regimen and eventually subsided.

3.10.1 Bodyweight Training

In body weight training; exercise were done using your own weight to provide resistance against gravity. While some exercises may require some type of equipment, the majority of bodyweight exercises require none. Group – II would undergoing training for bodyweight exercises for thrice in a week (Monday, Wednesday, and Friday) for total twelve (12) weeks.

- This training was designed to promote increasing strength and flexibility.
- Phase 1 (weeks 1 to 3) were consist of 1-minute sets with 30-second rest periods.
- Phase 2 (weeks 4 to 6) were consist of 1.5-minute sets with 45-second rest periods.
- Phase 3 (weeks 7 to 9) were consist of 2-minute sets with 1-minute rest periods.

- Finally, phase 4 (weeks 10 to 12) were consist of 2.5-minute sets with 90-second rest periods.

Table 3.4 : Bodyweight Training Programme

Days	Week 1-3	Week 4-6	Week 7-9	Week 10-12
Day 1 (Tuesday)	6 Round of UPPER BODY (Chest & Triceps) 1 min Tricep Dips 1 min Chin Ups 1 min Diamond Push-up 1 min Tricep Extension 1 min Decline Push-ups 1 min Push-Ups + Isometric Hold Rest 30 secs in between exercises	6 Round of UPPER BODY (Chest & Triceps) 1.5 min Tricep Dips 1.5 min Chin Ups 1.5 min Diamond Push-up 1.5 min Tricep Extension 1.5 min Decline Push-ups 1.5 min Push-Ups + Isometric Hold Rest 45 secs in between exercises	6 Round of UPPER BODY (Chest & Triceps) 2 min Tricep Dips 2 min Chin Ups 2 min Diamond Push-up 2 min Tricep Extension 2 min Decline Push-ups 2 min Push-Ups + Isometric Hold Rest 60 secs in between exercises	6 Round of UPPER BODY (Chest & Triceps) 2.5 min Tricep Dips 2.5 min Chin Ups 2.5 min Diamond Push-up 2.5 min Tricep Extension 2.5 min Decline Push-ups 2.5 min Push-Ups + Isometric Hold Rest 90 secs in between exercises
Day 2 (Thursday)	6 Round of LOWER BODY (Legs & Lower Back) 1 min Squats 1 min Split Lunges 1 min Froggers 1 min Front Lunges (Left) 1 min Front Lunges (Right) 1 min Side Lunge (Alternating) Rest 30 secs in between exercises	6 Round of LOWER BODY (Legs & Lower Back) 1.5 min Squats 1.5 min Split Lunges 1.5 min Froggers 1.5 min Front Lunges (Left) 1.5 min Front Lunges (Right) 1.5 min Side Lunge (Alternating) Rest 45 secs in between exercises	6 Round of LOWER BODY (Legs & Lower Back) 2 min Squats 2 min Split Lunges 2 min Froggers 2 min Front Lunges (Left) 2 min Front Lunges (Right) 2 min Side Lunge (Alternating) Rest 60 secs in between exercises	6 Round of LOWER BODY (Legs & Lower Back) 2.5 min Squats 2.5 min Split Lunges 2.5 min Froggers 2.5 min Front Lunges (Left) 2.5 min Front Lunges (Right) 2.5 min Side Lunge (Alternating) Rest 90 secs in between exercises
Day 3 (Saturday)	6 Round of CORE / ABS 1 min Elbow Plank 1 min Side Plank (Left) 1 min Side Plank (Right) 1 min Glute Bridge Swings 1 min Leg Raises Rest 30 secs in between exercises	6 Round of CORE / ABS 1.5 min Elbow Plank 1.5 min Side Plank (Left) 1.5 min Side Plank (Right) 1.5 min Glute Bridge Swings 1.5 min Leg Raises Rest 45 secs in between exercises	6 Round of CORE / ABS 2 min Elbow Plank 2 min Side Plank (Left) 2 min Side Plank (Right) 2 min Glute Bridge Swings 2 min Leg Raises Rest 60 secs in between exercises	6 Round of CORE / ABS 2.5 min Elbow Plank 2.5 min Side Plank (Left) 2.5 min Side Plank (Right) 2.5 min Glute Bridge Swings 2.5 min Leg Raises Rest 90 secs in between exercises

3.10.2 Resistance Training

In resistance training; any exercise of a muscle or muscle group were performed against external resistance. The external resistance can be dumbbells, barbells, rubber exercise tubing, bricks, medicine ball or any other object that causes the muscles to contract. Resistance training Group - I would go for resistance training exercises for three days in a week i.e. Tuesday, Thursday and Saturday for total twelve (12) weeks.

- The group performed 60% of 1 RM for the first three weeks (1-3) when doing the selected resistance exercises. The subjects completed one set of 8 repetitions for each exercise.
- The group performed 65% of their 1RM for the second three weeks (4-6) of the resistance workouts they had selected. The subjects completed two sets of 10 repetitions for each exercise. Each set was followed by a 2-minute recuperation period.
- The group performed in the selected resistance exercises for the third three weeks (6-9) at 70% of 1RM. The subjects completed two sets of each exercise with 10 repetitions each. Each set was followed by a 2-minute recuperation period.
- The group performed 75% of their 1RM for the final weeks (9-12) of resistance training. The subjects completed two sets of 12 repetitions for each exercise. Every set had a 2-minute recovery period in between.

Table 3.5 : Resistance Training Programme

Week	Intensity	Repetitions	Set	Recovery
1-3	60% 1RM	08	1	1 Min
4-6	65% 1RM	10	2	2 Min
7-9	70% 1RM	10	2	2 Min
9-12	75% 1RM	12	2	3 Min

- The warm up with barbells, clean and lift, clean and press and stretching exercises were done with the self-interest and capability or necessity of the subjects.
- Exercises involving the upper body, lower body, and trunk were performed during this training with a fixed load.

- Exercises including; barbell curls, military press, bench press, dumbbells exercise, deep squat, hamstring curl, leg press, leg extension, medicine ball etc.

3.10.3 Combination of resistance training and bodyweight training

Combination of bodyweight training and resistance training Group- III would go for bodyweight training for three days (Monday, Wednesday and Friday) in a week for first six (06) weeks for training along with bodyweight training Group- I. Remaining six (06) weeks Group- III would go for resistance training for three days (Tuesday, Thursday and Saturday) in a week along with resistance training Group- II.

3.11 Collection of the Data

The data were collected on the selected physical fitness components as per the methods described above. The pre-test data were collected prior before the training programme and post-test data were collected immediately after the twelve weeks of bodyweight, resistance and combination of bodyweight and resistance training from three experimental groups and a control group.

3.12 Administration of Test

➤ Speed

Test - 50 m Run

Purpose - The test was to determine the player's maximum speed and the ability to accelerate from a standing position.

Equipment - Stop watch, marking cones and measuring tape.

Procedure—The participants were instructed to begin standing behind the starting line. They were instructed to begin running by saying the words "Ready" and "Go" while clapping by the clapper. The stopwatch was activated simultaneously. The timer was stopped when the subject crossed the finish line after running as quickly as possible. Only one trial was permitted.

Scoring -The score was the duration of time, measured in 1/100th of a second, that passed between the start of the race and when the subject crossed the finish line.

➤ Endurance

Test - Coopers 12 Minutes Run / Walk

Purpose - The purpose of the test was to evaluate cardio-respiratory endurance of the each subjects.

Equipment -A track of 400 meters with inner and outer markings, cones, measuring tape, and a stopwatch.

Procedure – After the 400 m track had the requisite markings applied, cones were placed 20 mts apart on either side of the track to make estimating the distance easier. Individual or group running was required of the participants. They were instructed to cover as much ground as they could during the test while pacing was given first emphasis. The exam administrator should orally indicate the 3, 6, and 9 minute mark in order to encourage students. The test administrator meticulously counted the laps each participant completed during the 12 minute test time. The test administrator gave the participants the signal to halt running and wait on the spot by blowing a whistle at the conclusion of the testing time. Each subject's covered distance was noted by the administrator.

Scoring - The distance covered by the subjects in 12 minutes was recorded in meters.

➤ **Agility**

Test -4 x 10 m Shuttle Run

Purpose - The purpose of the test was to evaluate each subject's level of agility.

Equipment - Flat surface of 10 m with two parallel lines on both sides, wooden blocks, whistle and stop watch.

Procedure – The 10 m-long flat surface was marked with parallel lines on both sides. The wooden blocks should be put behind any one of the lines. The test subjects were instructed to take a position at the end of another line. When the whistle blew, the subjects sprinted as quickly as they could to the other side of the line to pick up one block, return to the starting line, and then keep the block on the ground behind the line. After placing the block, you immediately went back to get another one before sprinting across the starting line. The score was the amount of time between the first signal and when the subject crossed the starting line.

Scoring - The time was recorded as the score in 1/100th of a seconds.

➤ **Flexibility**

Test - Sit and Reach

Purpose - The purpose of this test is to monitor the development of the athlete's lower back and hamstring flexibility.

Equipment - A 'Sit and Reach Table'

Procedure – The subject sat in front of the box with both legs extended forward. The measuring stick was placed on the box in-between both the hands. The zero end of the measuring stick was placed as proximal end. The subject bent forward and extends both arms forward. The zero point of the measuring stick was placed to the tip of the middle finger. The subject slowly stretches forward the hip, back and the arm. The maximum distance reached was recorded with the help of measuring stick in centimetres. Three trials were given with adequate rest in between. The best of the three trials was treated as the final score.

Scoring -Maximum of reading taken by the students was recorded in centimetres.

➤ **Muscular Endurance**

Test –One Minute Bend Knee Sit-ups Test

Purpose - The purpose of the test was measures the strength and endurance of the abdominals and hip-flexor muscles.

Equipment - Exercise mat, stopwatch

Procedure – The subjects were asked to execute the sit-ups in supine position with knee were flexed at 90° with the feet held flat on the floor. The hands were placed behind the head. A helper will be used to hold the feet down. When the subject was ready, he performed sit-ups by rolling the trunk of the floor until the chin touches the knees. A subject was not allowed any rest in between sit-ups during his performance. The subjects were then returns to the supine position by uncurling. The subjects kept repetition continue until time has elapsed. Only one trail is given.

Scoring: One point was scored for each correctly performed sit-up. The maximum numbers of sit-ups completed in one minute time were recorded.

➤ **Upper Body Strength**

Test - 1RM Bench press

Purpose –The test was measure maximum strength of the arm, shoulder and chestmuscle groups.

Equipment -A barbell, weight plates, safety locks and bench press bench.

Procedure – Depending on the group being evaluated, the bar is set to the proper weight. The athlete starts out by lying on the bench in a supine position with their feet flat on the ground and their upper and lower backs constantly in touch with the bench. To ensure that the elbows are at right angles at the lowest position, the bar is grasped at a distance that is around 6 inches wider than shoulder width. A successful lift is considered complete when it moves the weight from its beginning position with the arms fully extended and immediately above the chest to its final position with the weight barely touching the chest before returning to the starting position. The weight should continue to be in line with the nipples, and the bar should move smoothly and at a controlled speed.

Scoring - The highest weight for a repetition that is successfully completed is recorded.

➤ **Lower Body Strength**

Test - 1RM Squat

Purpose –The test was measure maximum strength endurance of the leg muscle groups.

Equipment -A barbell, weight plates and squat rack

Procedure – The bar was set to the proper weight. Standing comfortably, the athlete spreads his legs to around shoulder width. Step under the bar with the feet parallel to the ground and grasp the bar with a closed, pronated grip. In either a low bar position or a high bar position, balance the bar on your upper back and shoulders. Once in this posture again, extend the hips and knees to elevate the bar by lifting the elbow, keeping the chest up, and tilting the head slightly upward. Take one or two steps backward after raising the bar, then squat while keeping your feet shoulder-widthapart and your toes pointing slightly outward.

Scoring - The maximum weight of one full repetition successfully completed isrecorded.

3.12 Statistical Technique

To estimate the effect of resistance training, bodyweight training and their combination on selected physical fitness components the following statistical techniques were used.

Analysis of covariance (ANCOVA) statistical technique was used to test the adjusted post-test mean differences among the experimental groups. If the adjusted posttest result was significant, the Scheffe's post-hoc test was used to determine the significance of the paired mean differences. The level of significance was set at $p < 0.05$ of all the cases.

CHAPTER – IV

ANALYSIS OF DATA AND FINDING OF THE STUDY



4.1 Overview

The analysis and interpretation of the data are presented in this chapter. Various statistical methods, including descriptive statistics, analysis of covariance (ANCOVA), and the post hoc pair-wise comparison utilizing the Scheffe's test analysis, were used to conduct the analysis.

This is the section of the thesis that is most important for drawing conclusions from the analysis of the hypothesis. For the study, it was deemed sufficient to follow a process of accepting or rejecting the hypothesis based on the findings in respect to the degree of significance. The significance level was set at ($p < 0.05$) levels.

SPSS 21st version, a statistical tool for social sciences, was used to assemble and analyze the data.

4.2 Analysis of Data

The influence of the independent variables on each criterion variables were analysed and presented below.

4.2.1 Speed

The statistical analyses of the initial and final means of the physical variable speed to determine the effect of resistance training, bodyweight training and their combination on kabaddi players are presented in Table 4.1.

Table 4.1 : Analysis of Covariance of Pre-Test, Post-Test and Adjusted Post-Test Mean on Speed of Resistance Training, Bodyweight Training and Their Combination Training Group and Control Group

Test		Resistance Training	Bodyweight Training	Combination Training	Control Group	Sources of Variance	Sum of Square	D F	Mean of Square	Obtain F ratio	Sig. (2-tailed)
Pre-Test	M	7.03	7.01	6.99	6.99	B	0.03	3	0.01	0.13	0.94
	SD	0.21	0.36	0.27	0.23	W	7.38	96	0.08		
Post Test	M	6.81	6.77	6.69	6.92	B	0.69	3	0.23	3.04*	0.03
	SD	0.21	0.36	0.26	0.25	W	7.26	96	0.08		
Adjusted Post Test	M	6.79	6.76	6.71	6.94	B	0.72	3	0.24	35.65*	0.00
						W	0.64	95	0.01		

*Significant at 0.05 level of significance if ($p < 0.05$).

Table 4.1 showed that the resistance training group had a pre-test mean and S.D value of 7.03 ± 0.21 , followed by the bodyweight training group with a value of 7.01 ± 0.36 , the combination training group with a value of 6.99 ± 0.27 , and the control group with a value of 6.99 ± 0.23 . Given that the obtained ($F = 0.13$, $p > 0.05$) was less than the required table value of 2.70 at $\alpha = 0.05$ for the DF of 3 and 96, ANCOVA clearly demonstrates that there is no significant difference in speed between the experimental group and control group prior to the start of training. It indicates that the random grouping of subjects was successful.

The post-test means and SD for speed for the resistance training group was 6.81 ± 0.21 , for bodyweight training it was 6.77 ± 0.36 , for combination training it was 6.69 ± 0.26 , and for the control group it was 6.92 ± 0.25 . There was a significant difference in speed during the post-test, as shown in Table 4.1. The obtained ($F = 3.04$, $p < 0.05$). value was higher than the required table value of 2.70 and the DF of 3 and 96. It concludes that a twelve-week training program must have had a significant effect on the speed that was found to have changed.

Additionally, the means of speed for the resistance training group ($M = 6.79$), bodyweight training group ($M = 6.76$), combination training group ($M = 6.71$), and control group ($M = 6.94$) after adjusting for post-test variance. The table clearly shows that there was a significant difference in adjusted post-test speed scores between the groups after for pre-test scores, as shown by the fact that the obtained value ($F = 35.65$, $p < 0.05$) was higher than the required table value of 2.70 at $\alpha = 0.05$ for the DF of 3 and 95. As a result, it may be said that the experimental group's speed improved after twelve weeks of training.

Scheffe's post hoc test was used to determine which of the four paired means had a significant difference, and the findings are shown in Table 4.2.

Table 4.2 : The Scheffe's Post Hoc Test for Difference between the Adjusted Post Test Paired Means on Speed

Resistance Training	Bodyweight Training	Combination Training	Control Group	Mean Difference	Sig.
6.79	6.76	-	-	0.03	0.21
6.79	-	6.71	-	0.08	0.00*
6.79	-	-	6.94	0.15	0.00*
-	6.76	6.71	-	0.05	0.03*
-	6.76	-	6.94	0.18	0.00*
-	-	6.71	6.94	0.23	0.00*

*Significant at 0.05 Level of Significance if $p < 0.05$.

The post-test adjusted mean difference in speed shown in table - 4.3 demonstrates that there are significant differences between resistance training and combination training (0.08, $p < 0.05$), resistance training and control group (0.15, $p < 0.05$), bodyweight training and combination training (0.05, $p < 0.05$), bodyweight training and control group (0.18, ($p < 0.05$) and combination training and control group (0.23, $p < 0.05$). The table also demonstrates that there is no difference between resistance training and bodyweight training (0.03, $p > 0.05$).

The study's findings suggest that after completing their respective twelve- week training regimens, the resistance training, bodyweight training, and combination training groups all had significant improvements in speed. The study's findings also revealed a significant difference in the training groups' rates of speed, in this respect, the combination training group having better speed than the resistance training, bodyweight training, and control groups.

The pre, post and adjusted means on speed are illustrated through bar chart in figure - 4.1.

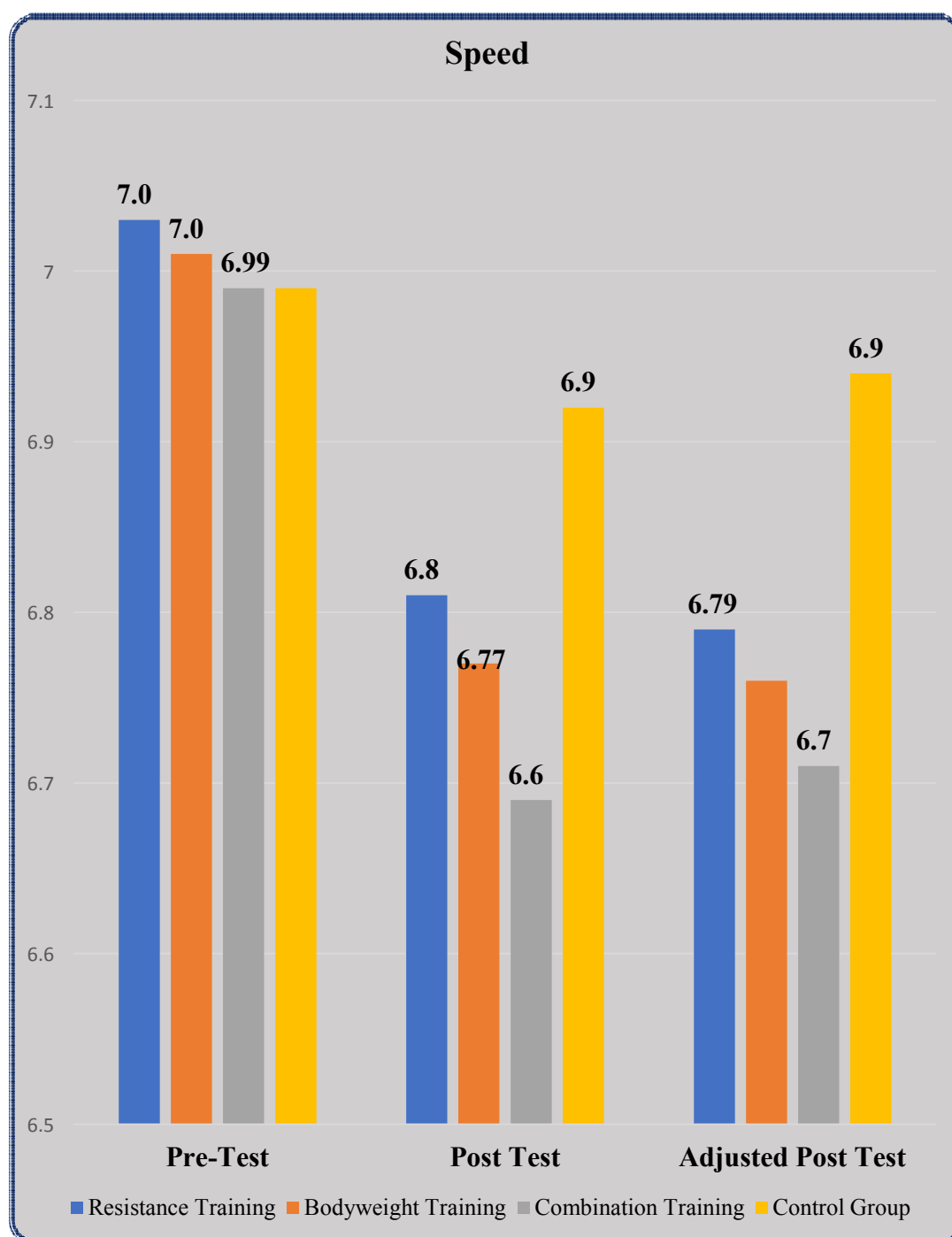


Fig. 4.1 : Pre, Post and Adjusted Post Test Differences of the Resistance Training, Bodyweight Training, Combination Training and Control Groups on Speed

4.2.2 Endurance

The statistical analyses of the initial and final means of the physical variable endurance to determine the effect of resistance training, bodyweight training and their combination on kabaddi players are presented in Table 4.3.

Table 4.3 : Analysis of Covariance of Pre-Test, Post-Test and Adjusted Post-Test Mean on Endurance of Resistance Training, Bodyweight Training and Their Combination Training Group and Control Group

Test		Resistance Training	Bodyweight Training	Combination Training	Control Group	Sources of Variance	Sum of Square	D F	Mean of Square	Obtain F ratio	Sig. (2-tailed)
Pre-Test	M	2164.40	2099.20	2092.00	2113.20	B	80072.00	3	26690.67	0.40	0.75
	SD	303.62	247.86	152.32	300.02	W	640399.44	96	66707.75		
Post Test	M	2286.00	2301.60	2330.80	2124.40	B	645115.00	3	215038.33	3.30*	0.02
	SD	301.61	218.62	131.30	323.70	W	625873.6	96	65195.17		
Adjusted Post Test	M	2241.85	2318.44	2354.37	2128.14	B	749531.33	3	249843.78	36.27*	0.00
						W	654463.85	95	6889.09		

*Significant at 0.05 level of significance if ($p < 0.05$).

Table 4.3 showed that the resistance training group had a pre-test mean and S.D value of 2164.40 ± 303.62 , followed by the bodyweight training group with a value of 2099.20 ± 247.56 , the combination training group with a value of 2092.00 ± 152.32 , and the control group with a value of 2113.20 ± 300.02 . Given that the obtained ($F = 0.40$, $p > 0.05$) was less than the required table value of 2.70 at $\alpha = 0.05$ for the DF of 3 and 96, ANCOVA clearly demonstrates that there is no significant difference in endurance between the experimental group and control group prior to the start of training. It indicates that the random grouping of subjects was successful.

The post-test means and SD for endurance for the resistance training group was 2286.00 ± 301.61 , for bodyweight training it was 2301.60 ± 218.60 , for combination training it was 2330.80 ± 131.30 , and for the control group it was 2124.40 ± 323.70 . There was a significant difference in endurance during the post-test, as shown in Table 4.3. The obtained ($F = 3.30$, $p < 0.05$). value was higher than the required table value of 2.70 and the DF of 3 and 96. It concludes that a twelve-week training program must have had a significant effect on the endurance that was found to have changed.

Additionally, the means of endurance for the resistance training group ($M = 2241.85$), bodyweight training group ($M = 2318.44$), combination training group ($M = 2354.37$), and control group ($M = 2128.14$) after adjusting for post-test variance. The table clearly shows that there was a significant difference in adjusted post-test endurance scores between the groups after for pre-test scores, as shown by the fact that the obtained value ($F = 36.27$, $p < 0.05$) was higher than the required table value of 2.70 at $\alpha = 0.05$ for the DF of 3 and 95. As a result, it may be said that the experimental group's endurance improved after twelve weeks of training.

Scheffe's post hoc test was used to determine which of the four paired means had a significant difference, and the findings are shown in Table 4.4.

Table 4.4 : The Scheffe's Post Hoc Test for Difference between the Adjusted Post Test Paired Means on Endurance

Resistance Training	Bodyweight Training	Combination Training	Control Group	Mean Difference	Sig.
2241.85	2318.44	-	-	76.59*	0.00
2241.85	-	2354.37	-	112.52*	0.00
2241.85	-	-	2128.14	113.71*	0.00
-	2318.44	2354.37	-	35.93	0.13
-	2318.44	-	2128.14	190.30*	0.00
-	-	2354.37	2128.14	226.23*	0.00

*Significant at 0.05 Level of Significance if $p < 0.05$.

The post-test adjusted mean difference in endurance shown in table - 4.4 demonstrates that there are significant differences between resistance training and bodyweight training (76.59, $p < 0.05$), resistance training and combination training (112.52, $p < 0.05$), resistance training and control group (113.71, $p < 0.05$), bodyweight training and control group (190.30, $p < 0.05$) and combination training and control group (226.23, $p < 0.05$). The table also demonstrates that there is no difference between bodyweight training and combination training (35.93, $p > 0.05$).

The study's findings suggest that after completing their respective twelve- week training regimens, the resistance training, bodyweight training, and combination training groups all had significant improvements in endurance. The study's findings

also revealed a significant difference in the training groups' rates of endurance, in this respect, the combination training group having better endurance than the resistance training, bodyweight training, and control groups.

The pre, post and adjusted means on endurance are illustrated through bar chart in figure - 4.2.

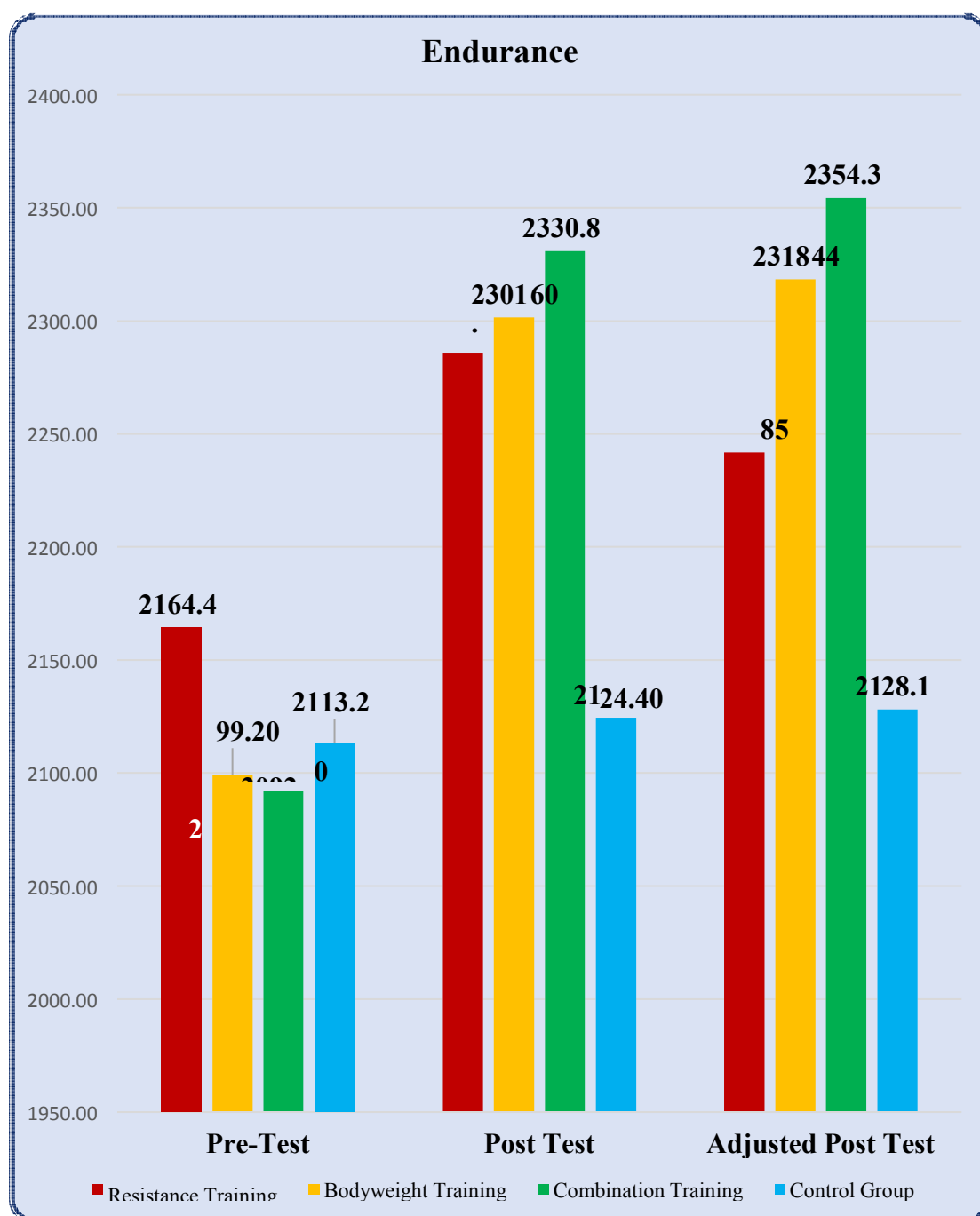


Fig. 4.2 : Pre, Post and Adjusted Post Test Differences of the Resistance Training, Bodyweight Training, Combination Training and Control Groupson Endurance

4.2.3 Agility

The statistical analyses of the initial and final means of the physical variable agility to determine the effect of resistance training, bodyweight training and their combination on kabaddi players are presented in Table 4.5.

Table 4.5 : Analysis of Covariance of Pre-Test, Post-Test and Adjusted Post-Test Mean on Agility of Resistance Training, Bodyweight Training and Their Combination Training Group and Control Group

Test		Resistance Training	Bodyweight Training	Combination Training	Control Group	Sources of Variance	Sum of Square	D F	Mean of Square	Obtain F ratio	Sig. (2-tailed)
Pre-Test	M	9.46	9.53	9.43	9.32	B	0.57	3	0.19	1.43	0.24
	SD	0.16	0.29	0.18	0.63	W	12.85	96	0.13		
Post Test	M	9.30	9.33	8.99	9.39	B	2.52	3	0.84	4.64*	0.00
	SD	0.18	0.30	0.76	0.15	W	17.35	96	0.18		
Adjusted Post Test	M	9.30	9.31	8.99	9.42	B	2.59	3	0.86	4.93*	0.00
						W	16.64	95	0.18		

*Significant at 0.05 level of significance if ($p < 0.05$).

Table 4.5 showed that the resistance training group had a pre-test mean and S.D value of 9.46 ± 0.16 , followed by the bodyweight training group with a value of 9.53 ± 0.29 , the combination training group with a value of 9.43 ± 0.18 , and the control group with a value of 9.32 ± 0.63 . Given that the obtained ($F = 1.43$, $p > 0.05$) was less than the required table value of 2.70 at $\alpha = 0.05$ for the DF of 3 and 96, ANCOVA clearly demonstrates that there is no significant difference in agility between the experimental group and control group prior to the start of training. It indicates that the random grouping of subjects was successful.

The post-test means and SD for agility for the resistance training group was 9.30 ± 0.18 , for bodyweight training it was 9.33 ± 0.30 , for combination training it was 8.99 ± 0.76 , and for the control group it was 9.39 ± 0.15 . There was a significant difference in agility during the post-test, as shown in Table 4.5. The obtained ($F = 4.64$, $p < 0.05$). value was higher than the required table value of 2.70 and the DF of 3 and 96. It concludes that a twelve-week training program must have had a significant effect on the agility that was found to have changed.

Additionally, the means of agility for the resistance training group ($M = 9.30$), bodyweight training group ($M = 9.31$), combination training group ($M = 8.99$), and control group ($M = 9.42$) after adjusting for post-test variance. The table clearly shows that there was a significant difference in adjusted post-test agility scores between the groups after for pre-test scores, as shown by the fact that the obtained value ($F = 4.93$, $p < 0.05$) was higher than the required table value of 2.70 at $\alpha = 0.05$ for the DF of 3 and 95. As a result, it may be said that the experimental group's agility improved after twelve weeks of training.

Scheffe's post hoc test was used to determine which of the four paired means had a significant difference, and the findings are shown in Table 4.6.

Table 4.6 : The Scheffe's Post Hoc Test for Difference between the Adjusted Post Test Paired Means on Agility

Resistance Training	Bodyweight Training	Combination Training	Control Group	Mean Difference	Sig.
9.30	9.31	-	-	0.01	0.90
9.30	-	8.99	-	0.31*	0.01
9.30	-	-	9.42	0.12	0.31
-	9.31	8.99	-	0.32*	0.01
-	9.31	-	9.42	0.11	0.37
-	-	8.99	9.42	0.43*	0.00

*Significant at 0.05 Level of Significance if $p < 0.05$.

The post-test adjusted mean difference in agility shown in table - 4.6 demonstrates that there are significant differences between resistance training and combination training (0.31, $p < 0.05$), bodyweight training and combination training (0.32, $p < 0.05$) and combination training and control group (0.43, $p < 0.05$). The table also demonstrates that there is no difference between resistance training and bodyweight training (0.01, $p > 0.05$), resistance training and control group (0.12, $p > 0.05$), bodyweight training and control group (0.11, $p > 0.05$).

The study's findings suggest that after completing their respective twelve- week training regimens, the resistance training, bodyweight training, and combination

training groups all had significant improvements in agility. The study's findings also revealed a significant difference in the training groups' rates of endurance, in this respect, the combination training group having better agility than the resistance training, bodyweight training, and control groups.

The pre, post and adjusted means on endurance are illustrated through bar chart in figure - 4.3.

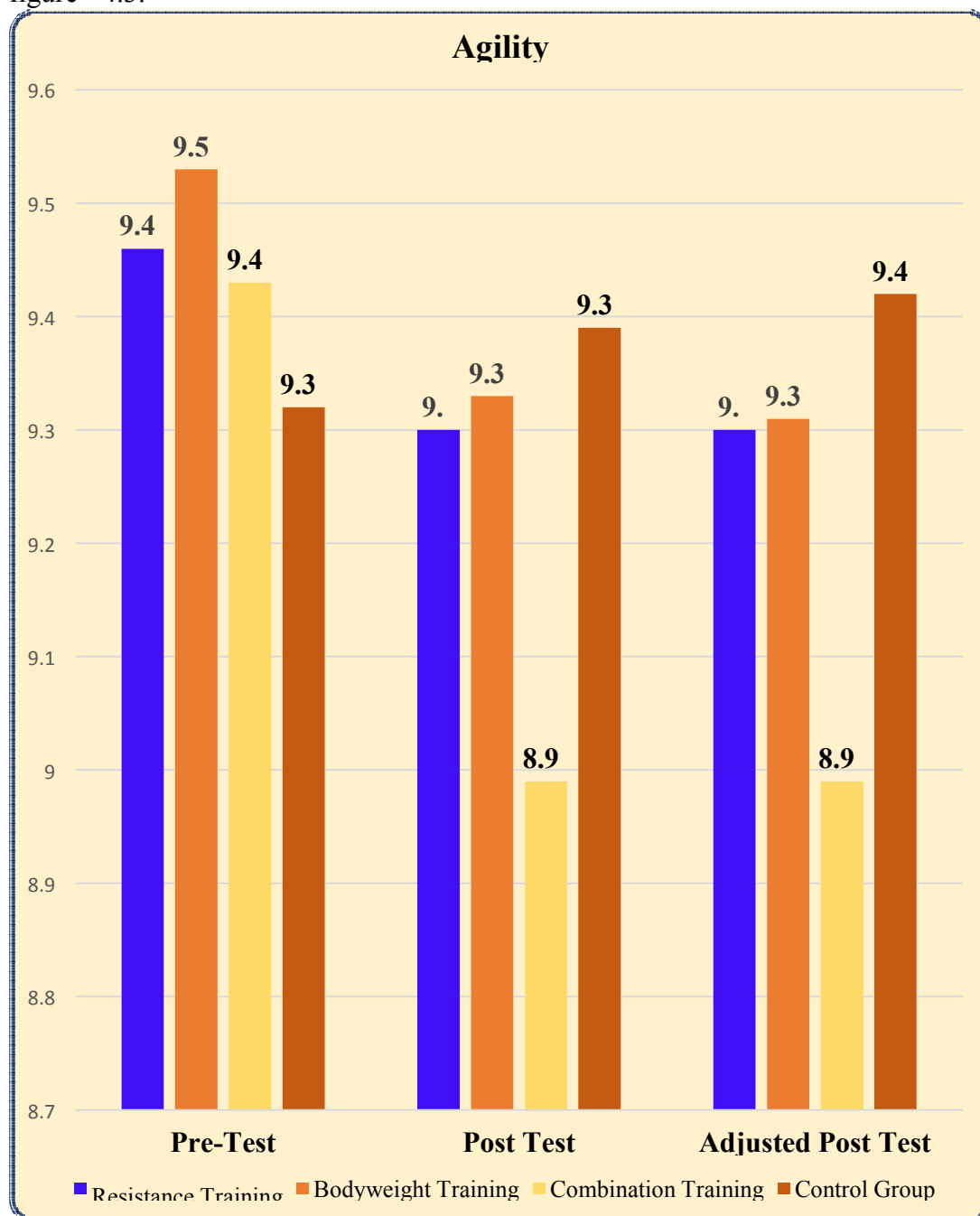


Fig 4.3 : Pre, Post and Adjusted Post Test Differences of the Resistance Training, Bodyweight Training, Combination Training and Control Groupson Agility

4.2.4 Flexibility

The statistical analyses of the initial and final means of the physical variable flexibility to determine the effect of resistance training, bodyweight training and their combination on kabaddi players are presented in Table 4.7.

Table 4.7 : Analysis of Covariance of Pre-Test, Post-Test and Adjusted Post-Test Mean on Flexibility of Resistance Training, Bodyweight Training and Their Combination Training Group and Control Group

Test		Resistance Training	Bodyweight Training	Combination Training	Control Group	Sources of Variance	Sum of Square	D F	Mean of Square	Obtained F ratio	Sig. (2-tailed)
Pre-Test	M	17.14	17.92	17.78	17.78	B	9.17	3	3.06	1.33	0.27
	SD	1.27	1.49	1.54	1.72	W	220.68	96	2.30		
Post Test	M	19.56	21.18	20.80	18.40	B	119.63	3	39.88	15.52*	0.00
	SD	1.36	1.35	1.39	2.17	W	246.60	96	2.57		
Adjusted Post Test	M	19.98	20.96	20.70	18.30	B	107.72	3	35.91	34.90*	0.00
						W	97.74	95	1.03		

*Significant at 0.05 level of significance if ($p < 0.05$).

Table 4.7 showed that the resistance training group had a pre-test mean and S.D value of 17.14 ± 1.27 , followed by the bodyweight training group with a value of 17.92 ± 1.49 , the combination training group with a value of 17.78 ± 1.54 , and the control group with a value of 17.78 ± 1.72 . Given that the obtained ($F = 1.33$, $p > 0.05$) was less than the required table value of 2.70 at $\alpha = 0.05$ for the DF of 3 and 96, ANCOVA clearly demonstrates that there is no significant difference in flexibility between the experimental group and control group prior to the start of training. It indicates that the random grouping of subjects was successful.

The post-test means and SD for flexibility for the resistance training group was 19.56 ± 1.36 , for bodyweight training it was 21.18 ± 1.35 , for combination training it was 20.80 ± 1.39 , and for the control group it was 18.40 ± 2.17 . There was a significant difference in flexibility during the post-test, as shown in Table 4.7. The obtained ($F = 15.52$, $p < 0.05$). value was higher than the required table value of 2.70 and the DF of 3 and 96. It concludes that a twelve-week training program must have had a significant effect on the flexibility that was found to have changed.

Additionally, the means of flexibility for the resistance training group ($M = 19.98$), bodyweight training group ($M = 20.96$), combination training group ($M = 20.70$), and control group ($M = 18.30$) after adjusting for post-test variance. The table clearly shows that there was a significant difference in adjusted post-test flexibility scores between the groups after for pre-test scores, as shown by the fact that the obtained value ($F = 34.90$, $p < 0.05$) was higher than the required table value of 2.70 at $\alpha = 0.05$ for the DF of 3 and 95. As a result, it may be said that the experimental group's flexibility improved after twelve weeks of training.

Scheffe's post hoc test was used to determine which of the four paired means had a significant difference, and the findings are shown in Table 4.8.

Table 4.8 : The Scheffe's Post Hoc Test for Difference between the Adjusted Post Test Paired Means on Flexibility

Resistance Training	Bodyweight Training	Combination Training	Control Group	Mean Difference	Sig.
19.98	20.96	-	-	0.98*	0.00
19.98	-	20.70	-	0.72*	0.02
19.98	-	-	18.30	1.68*	0.00
-	20.96	20.70	-	0.26	0.36
-	20.96	-	18.30	2.66*	0.00
-	-	20.70	18.30	2.40*	0.00

*Significant at 0.05 Level of Significance if $p < 0.05$.

The post-test adjusted mean difference in flexibility shown in table - 4.8 demonstrates that there are significant differences between resistance training and bodyweight training (0.98, $p < 0.05$), resistance training and combination training (0.72, $p < 0.05$), resistance training and control group (1.68, $p < 0.05$), bodyweight training and control group (2.66, $p < 0.05$) and combination training and control group (2.40, $p < 0.05$). The table also demonstrates that there is no difference between bodyweight training and combination training (0.26, $p > 0.05$).

The study's findings suggest that after completing their respective twelve- week training regimens, the resistance training, bodyweight training, and combination training groups all had significant improvements in flexibility. The study's findings also revealed a significant difference in the training groups' rates of flexibility, in this

respect, the bodyweight training group having better flexibility than the resistance training, combination training, and control groups.

The pre, post and adjusted means on flexibility are illustrated through bar chart in figure - 4.4

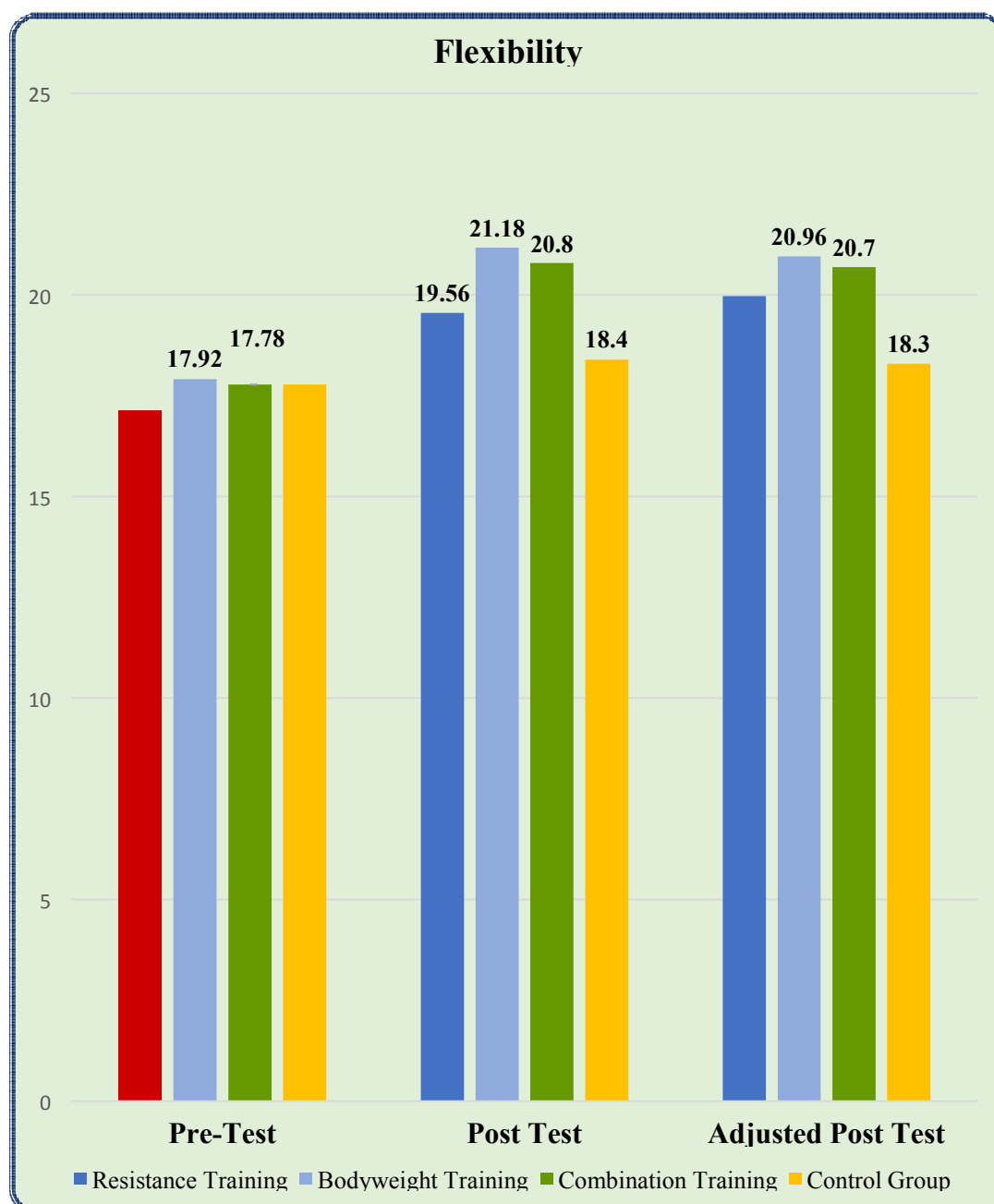


Figure 4.4 : Pre, Post and Adjusted Post Test Differences of the Resistance Training, Bodyweight Training, Combination Training and Control Groupson Flexibility

4.2.5 Muscular Endurance

The statistical analyses of the initial and final means of the physical variable muscular endurance to determine the effect of resistance training, bodyweight training and their combination on kabaddi players are presented in Table 4.9.

Table 4.9 : Analysis of Covariance of Pre-Test, Post-Test and Adjusted Post-Test Mean on Muscular Endurance of Resistance Training, Bodyweight Training and Their Combination Training Group and Control Group

Test		Resistance Training	Bodyweight Training	Combination Training	Control Group	Source of Variance	Sum of Square	D F	Mean of Square	Obtain F ratio	Sig. (2-tailed)
Pre-Test	M	29.92	30.68	30.72	30.52	B	10.28	3	3.43	0.24	0.87
	SD	3.24	3.50	4.70	3.61	W	1386.56	96	14.44		
Post Test	M	33.44	34.08	34.56	31.00	B	187.55	3	62.52	5.63*	0.00
	SD	2.68	3.04	4.10	3.34	W	1066.16	96	11.11		
Adjusted Post Test	M	33.87	33.90	34.35	30.95	B	182.70	3	60.90	31.85*	0.00
						W	181.65	95	1.91		

*Significant at 0.05 level of significance if ($p < 0.05$).

Table 4.9 showed that the resistance training group had a pre-test mean and S.D value of 29.92 ± 3.24 , followed by the bodyweight training group with a value of 30.68 ± 3.50 , the combination training group with a value of 30.72 ± 4.70 , and the control group with a value of 30.52 ± 3.61 . Given that the obtained ($F = 0.24$, $p > 0.05$) was less than the required table value of 2.70 at $\alpha = 0.05$ for the DF of 3 and 96, ANCOVA clearly demonstrates that there is no significant difference in muscular endurance between the experimental group and control group prior to the start of training. It indicates that the random grouping of subjects was successful.

The post-test means and SD for muscular endurance for the resistance training group was 33.44 ± 2.68 , for bodyweight training it was 34.08 ± 3.04 , for combination training it was 34.56 ± 4.10 , and for the control group it was 31.00 ± 3.34 . There was a significant difference in muscular endurance during the post-test, as shown in Table 4.9. The obtained ($F = 5.63$, $p < 0.05$). value was higher than the required table value of 2.70 and the DF of 3 and 96. It concludes that a twelve-week training program must have had a significant effect on the muscular endurance that was found to have changed.

Additionally, the means of muscular endurance for the resistance training group ($M = 33.87$), bodyweight training group ($M = 33.90$), combination training group ($M = 34.35$), and control group ($M = 30.95$) after adjusting for post-test variance. The table clearly shows that there was a significant difference in adjusted post-test muscular endurance scores between the groups after for pre-test scores, as shown by the fact that the obtained value ($F = 31.85$, $p < 0.05$) was higher than the required table value of 2.70 at $\alpha = 0.05$ for the DF of 3 and 95. As a result, it may be said that the experimental group's muscular endurance improved after twelve weeks of training.

Scheffe's post hoc test was used to determine which of the four paired means had a significant difference, and the findings are shown in Table 4.10.

Table 4.10 : The Scheffe's Post Hoc Test for Difference between the Adjusted Post Test Paired Means on Muscular Endurance

Resistance Training	Bodyweight Training	Combination Training	Control Group	Mean Difference	Sig.
33.87	33.90	-	-	0.03	0.93
33.87	-	34.35	-	0.48	0.22
33.87	-	-	30.95	2.92*	0.00
-	33.90	34.35	-	0.45	0.26
-	33.90	-	30.95	2.95*	0.00
-	-	34.35	30.95	3.40*	0.00

*Significant at 0.05 Level of Significance if $p < 0.05$.

The post-test adjusted mean difference in muscular endurance shown in table - 4.10 demonstrates that there are significant differences between resistance training and control group (2.92, $p < 0.05$), bodyweight training and control group (2.95, $p < 0.05$) and combination training and control group (3.40, $p < 0.05$). The table also demonstrates that there is no difference between resistance training and bodyweight training (0.03, $p > 0.05$), resistance training and combination training (0.48, $p > 0.05$) and bodyweight training and combination training (0.45, $p > 0.05$).

The study's findings suggest that after completing their respective twelve-week training regimens, the resistance training, bodyweight training, and combination training groups all had significant improvements in muscular endurance. The study's

findings also revealed a significant difference in the training groups' rates of muscular endurance, in this respect, the combination training group having better muscular endurance than the resistance training, bodyweight training, and control groups.

The pre, post and adjusted means on muscular endurance are illustrated through bar chart in figure - 4.5.

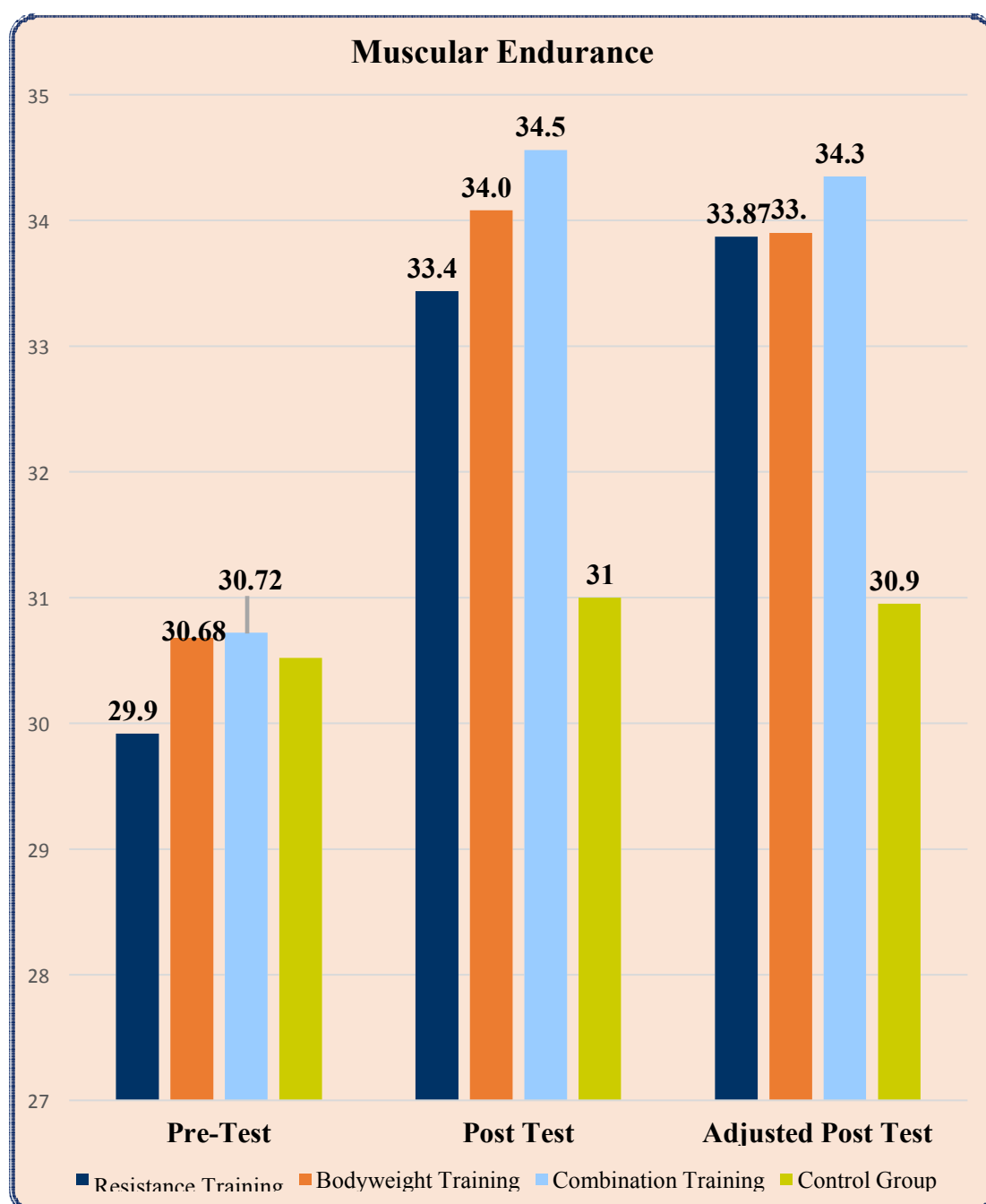


Fig. 4.5 : Pre, Post and Adjusted Post Test Differences of the Resistance Training, Bodyweight Training, Combination Training and Control Groupson Muscular Endurance

4.2.6 Upper Body Strength

The statistical analyses of the initial and final means of the physical variable Upper Body Strength to determine the effect of resistance training, bodyweight training and their combination on kabaddi players are presented in Table 4.11.

Table 4.11 : Analysis of Covariance of Pre-Test, Post-Test and Adjusted Post-Test Mean on Upper Body Strength of Resistance Training, Bodyweight Training and Their Combination Training Group and Control Group

Test		Resistance Training	Bodyweight Training	Combination Training	Control Group	Source of Variance	Sum of Square	D F	Mean of Square	Obtain F ratio	Sig. (2-tailed)
Pre-Test	M	34.60	33.10	32.30	32.20	B	92.25	3	30.75	0.99	0.40
	SD	6.91	3.97	5.35	5.70	W	2990.00	96	31.15		
Post Test	M	38.80	36.60	36.10	33.10	B	413.25	3	137.75	5.28*	0.00
	SD	5.91	3.30	5.31	5.51	W	2504.50	96	26.09		
Adjusted Post Test	M	37.46	36.56	36.75	33.83	B	187.68	3	62.56	21.39*	0.00
						W	277.85	95	2.93		

*Significant at 0.05 level of significance if ($p < 0.05$)

Table 4.11 showed that the resistance training group had a pre-test mean and S.D value of 34.60 ± 6.91 , followed by the bodyweight training group with a value of 33.10 ± 3.97 the combination training group with a value of 32.30 ± 5.35 , and the control group with a value of 32.20 ± 5.70 . Given that the obtained ($F = 0.99$, $p > 0.05$) was less than the required table value of 2.70 at $\alpha = 0.05$ for the DF of 3 and 96, ANCOVA clearly demonstrates that there is no significant difference in upper body strength between the experimental group and control group prior to the start of training. It indicates that the random grouping of subjects was successful.

The post-test means and SD for upper body strength for the resistance training group was 38.80 ± 5.91 , for bodyweight training it was 36.60 ± 3.30 , for combination training it was 36.10 ± 5.31 , and for the control group it was 33.10 ± 5.51 . There was a significant difference in upper body strength during the post-test, as shown in Table 4.11. The obtained ($F = 5.28$, $p < 0.05$). value was higher than the required table value of 2.70 and the DF of 3 and 96. It concludes that a twelve-week training program must have had a significant effect on the upper body strength that was found to have changed.

Additionally, the means of upper body strength for the resistance training group ($M = 37.42$), bodyweight training group ($M = 36.56$), combination training group ($M = 36.75$), and control group ($M = 33.83$) after adjusting for post-test variance. The table clearly shows that there was a significant difference in adjusted post-test upper body strength scores between the groups after for pre-test scores, as shown by the fact that the obtained value ($F = 21.39$, $p < 0.05$) was higher than the required table value of 2.70 at $\alpha = 0.05$ for the DF of 3 and 95. As a result, it may be said that the experimental group's upper body strength improved after twelve weeks of training.

Scheffe's post hoc test was used to determine which of the four paired means had a significant difference, and the findings are shown in Table 4.12.

Table 4.12 : The Scheffe's Post Hoc Test for Difference between the Adjusted Post Test Paired Means on Upper Body Strength

Resistance Training	Bodyweight Training	Combination Training	Control Group	Mean Difference	Sig.
37.46	36.56	-	-	0.90	0.06
37.46	-	36.75	-	0.71	0.15
37.46	-	-	33.83	3.63*	0.00
-	36.56	36.75	-	0.19	0.70
-	36.56	-	33.83	2.73*	0.00
-	-	36.75	33.83	2.92*	0.00

*Significant at 0.05 Level of Significance if $p < 0.05$.

The post-test adjusted mean difference in upper body strength shown in table - 4.12 demonstrates that there are significant differences between resistance training and control group (3.63, $p < 0.05$), bodyweight training and control group (2.73, $p < 0.05$) and combination training and control group (2.92, $p < 0.05$). The table also demonstrates that there is no difference between resistance training and bodyweight training (0.90, $p > 0.05$), resistance training and combination training (0.71, $p > 0.05$) and bodyweight training and combination training (0.19, $p > 0.05$).

The study's findings suggest that after completing their respective twelve-week training regimens, the resistance training, bodyweight training, and combination

training groups all had significant improvements in upper body strength. The study's findings also revealed a significant difference in the training groups' rates of upper body strength, in this respect, the resistance training group having better upper body strength than the bodyweight training, combination training and control groups.

The pre, post and adjusted means on upper body strength are illustrated through bar chart in figure - 4.6.

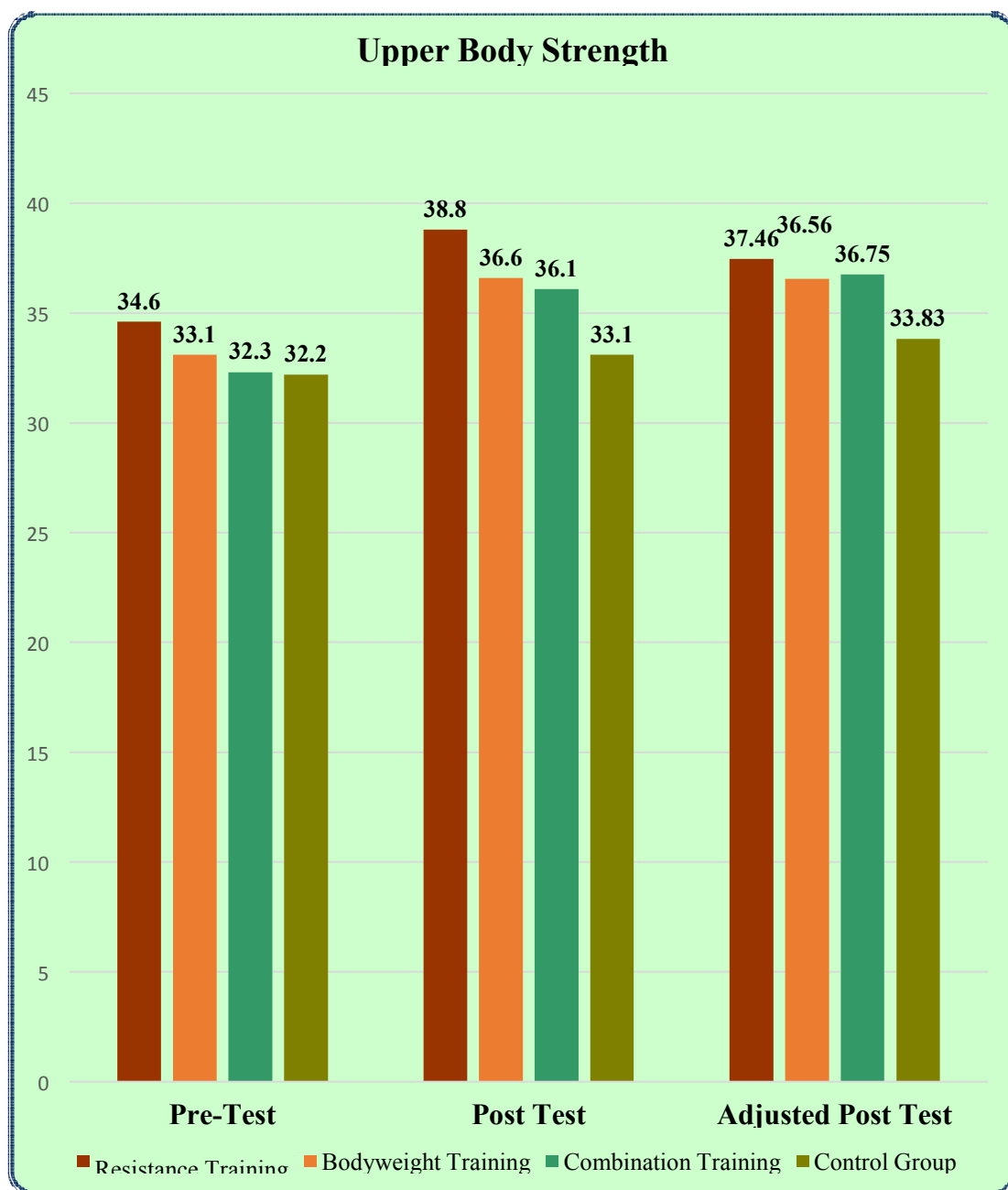


Fig. 4.6 : Pre, Post and Adjusted Post Test Differences of the Resistance Training, Bodyweight Training, Combination Training and Control Groupson Upper Body Strength

4.2.7 Lower Body Strength

The statistical analyses of the initial and final means of the physical variable Lower Body Strength to determine the effect of resistance training, bodyweight training and their combination on kabaddi players are presented in Table 4.13.

Table 4.13 : Analysis of Covariance of Pre-Test, Post-Test and Adjusted Post-Test Mean on Lower Body Strength of Resistance Training, Bodyweight Training and Their Combination Training Group and Control Group

Test		Resistance Training	Bodyweight Training	Combination Training	Control Group	Source of Variance	Sum of Square	D F	Mean of Square	Obtain F ratio	Sig. (2-tailed)
Pre-Test	M	70.80	70.40	69.80	69.60	B	22.75	3	7.58	0.08	0.97
	SD	10.28	9.34	9.94	9.67	W	9250.00	96	96.35		
Post Test	M	78.60	76.80	78.00	70.40	B	1068.75	3	356.25	4.74*	0.00
	SD	9.07	7.48	8.16	9.78	W	7216.00	96	75.17		
Adjusted Post Test	M	78.07	76.60	78.29	70.85	B	909.21	3	303.07	26.47*	0.00
						W	1.87.80	95	11.45		

*Significant at 0.05 level of significance if ($p < 0.05$)

Table 4.13 showed that the resistance training group had a pre-test mean and S.D value of 70.80 ± 10.28 , followed by the bodyweight training group with a value of 70.40 ± 9.34 the combination training group with a value of 69.80 ± 9.94 , and the control group with a value of 69.60 ± 9.67 . Given that the obtained ($F = 0.08$, $p > 0.05$) was less than the required table value of 2.70 at $\alpha = 0.05$ for the DF of 3 and 96, ANCOVA clearly demonstrates that there is no significant difference in lower body strength between the experimental group and control group prior to the start of training. It indicates that the random grouping of subjects was successful.

The post-test means and SD for lower body strength for the resistance training group was 78.60 ± 9.07 , for bodyweight training it was 76.80 ± 7.48 , for combination training it was 78.00 ± 8.16 , and for the control group it was 70.40 ± 9.78 . There was a significant difference in lower body strength during the post-test, as shown in Table 4.13. The obtained ($F = 4.74$, $p < 0.05$). value was higher than the required table value of 2.70 and the DF of 3 and 96. It concludes that a twelve-week training program must

have had a significant effect on the lower body strength that was found to have changed.

Additionally, the means of lower body strength for the resistance training group ($M = 78.07$), bodyweight training group ($M = 76.60$), combination training group ($M = 78.29$), and control group ($M = 70.85$) after adjusting for post-test variance. The table clearly shows that there was a significant difference in adjusted post-test lower body strength scores between the groups after for pre-test scores, as shown by the fact that the obtained value ($F = 26.47$, $p < 0.05$) was higher than the required table value of 2.70 at $\alpha = 0.05$ for the DF of 3 and 95. As a result, it may be said that the experimental group's lower body strength improved after twelve weeks of training.

Scheffe's post hoc test was used to determine which of the four paired means had a significant difference, and the findings are shown in Table 4.14.

Table 4.12 : The Scheffe's Post Hoc Test for Difference between the Adjusted Post Test Paired Means on Lower Body Strength

Resistance Training	Bodyweight Training	Combination Training	Control Group	Mean Difference	Sig.
78.07	76.60	-	-	1.47	0.13
78.07	-	78.29	-	0.22	0.82
78.07	-	-	70.85	7.22*	0.00
-	76.60	78.29	-	1.69	0.08
-	76.60	-	70.85	5.75*	0.00
-	-	78.29	70.85	7.44*	0.00

*Significant at 0.05 Level of Significance if $p < 0.05$.

The post-test adjusted mean difference in lower body strength shown in table - 4.14 demonstrates that there are significant differences between resistance training and control group (7.22, $p < 0.05$), bodyweight training and control group (5.75, $p < 0.05$) and combination training and control group (7.44, $p < 0.05$). The table also demonstrates that there is no difference between resistance training and bodyweight training (1.47, $p > 0.05$), resistance training and combination training (0.22, $p > 0.05$) and bodyweight training and combination training (1.69, $p > 0.05$).

The study's findings suggest that after completing their respective twelve- week training regimens, the resistance training, bodyweight training, and combination training groups all had significant improvements in lower body strength. The study's findings also revealed a significant difference in the training groups' rates of lower body strength, in this respect, the resistance training group having better lower body strength than the bodyweight training, combination training and control groups.

The pre, post and adjusted means on lower body strength are illustrated through bar chart in figure - 4.7.

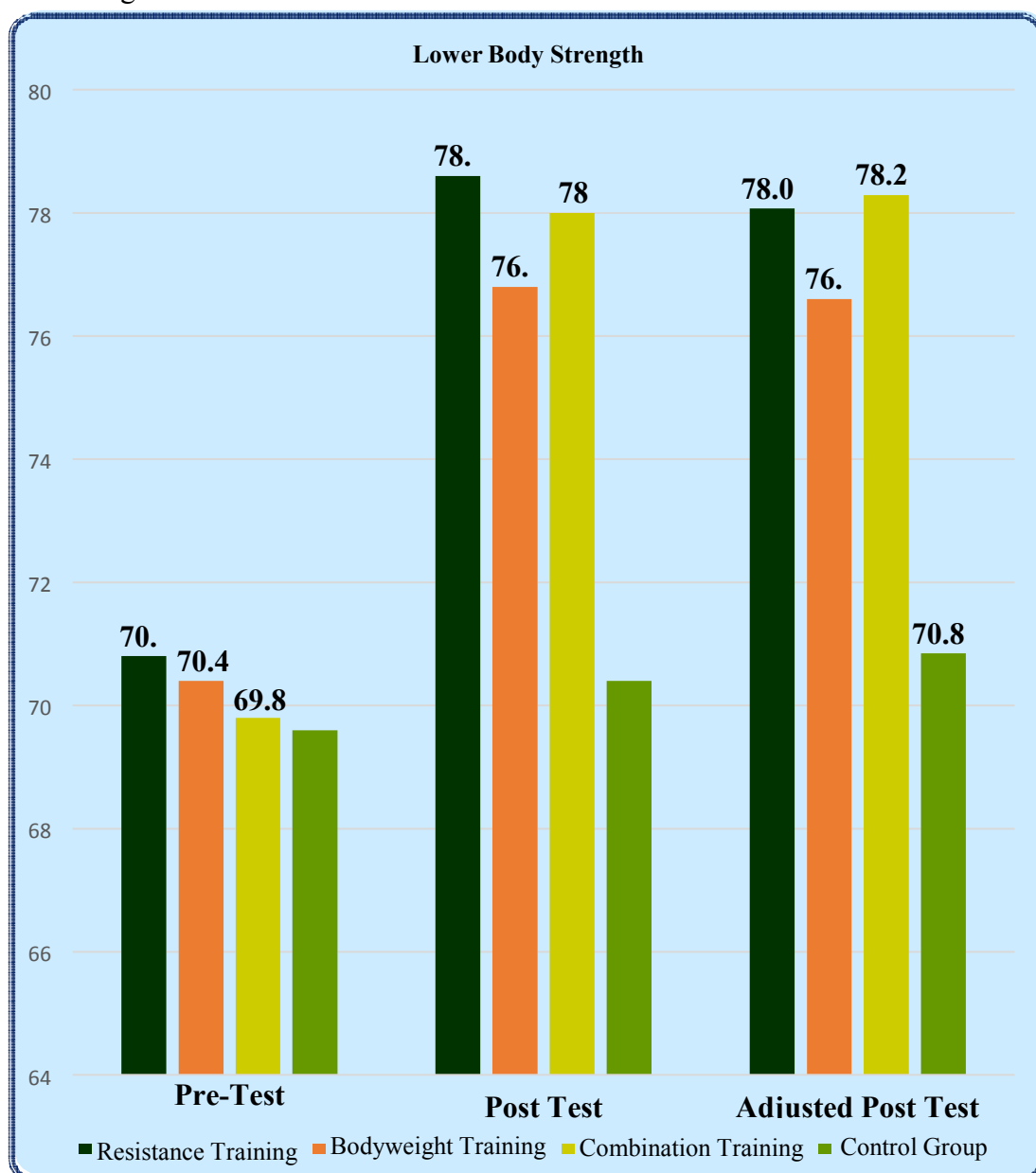


Fig. 4.7 : Pre, Post and Adjusted Post Test Differences of the Resistance Training, Bodyweight Training, Combination Training and Control Groupson Lower Body Strength

4.3 Results of the Study

The study's findings showed that all the experimental groups namely resistance training group, bodyweight Training group and their combination (Bodyweight and resistance) training group have significantly improved in the selected physical fitness components namely speed, endurance, agility, flexibility, muscular endurance, upper body strength and lower body strength. The study's findings also indicated that the control group did not significantly improve on the above-mentioned variables.

It was also found that the improvement effected on speed, endurance, agility, muscular endurance and lower body strength by the combination training group was superior when compared to the effects of resistance training group, bodyweight training group and control group. Additionally, bodyweight training. However, the bodyweight training group improved flexibility and the resistance training group improved upper body strength compared to the other training groups. The research findings supported the conclusions of the current investigation.

The goal of the **Chanderasear (2021)** study was to determine whether college-level handball players' muscular endurance, flexibility, and balance had significantly improved.

According to **Marwat et al. (2021)**, traditional training regimens and instructional training significantly improved the physical fitness traits of Pakistani Kabaddi players, such as agility, leg explosive power, muscular strength endurance, and overall playing ability. The study's results confirmed its objectives, but neither hypothesis was confirmed, hence both were found to be false.

The participants in the traditional kabaddi training with plyometric training group showed a considerable improvement in their explosive power, flexibility, balance, agility, and aerobic capacity, according to **Dharod et al.** study (2020).

In terms of shoulder strength and explosive power, it was found that the resistance training group did significantly better than the control group, and that there were also notable variations between the experimental and control groups. In **Alagudurai and Sivagnanam (2019)**.

Arumugam (2019), the study's findings showed that flywheel training has a positive impact on kabaddi players' shoulder and leg strength. However, none of the selected

characteristics had significantly improved for the control group. As a result, it is advised that, depending on the situation, physical educators and coaches apply the best pranav pranayama techniques to improve the performance of kabaddi players.

In their 2019 study, **Lakshmanan and Jayakumar** explored the effects of eight weeks of resistance training on the chosen metrics for intercollegiate men's kabaddi players. The findings of this study suggested that weight training is more effective at producing desired improvements in male kabaddi players than agility and flexibility.

After participating in the Strength training group for a total of eight training sessions, the intercollegiate volleyball players in **Vivekanth and Vallimurugan's (2019)** study showed a substantial improvement in all the chosen physical fitness metrics.

When plyometric exercise and specialized training were combined, **Muniraju et al. (2017)** found that flexibility, and explosive leg power all considerably increased.

Karuppiyah and Palanisamy (2017), the influence weight and ladder training groups both performed much better than the control group in terms of agility and abdominal strength.

Chaudhari (2014) can be inferred that ten weeks of strength training enhances male kabaddi players' upper and lower body strength.

The combined strength and plyometric training, the male intercollegiate kabaddi players' speed and power are said to have significantly increased, according to **Rao and Kishore's (2014)** study, which sought to determine the combined impact of strength and plyometric training on specific motor fitness domains in male kabaddi players.

According to **Kagitha and Kumar (2013)**, complex training increases the players' motor fitness in terms of speed, agility, flexibility, explosive power, muscular endurance, and coordination.

4.4 Discussion on Hypothesis

- In the first hypothesis, it was hypothesized that there would be a significant improvement on selected physical fitness components such as speed, endurance, agility, flexibility, muscular endurance, upper body strength and lower body strength due to the effect of resistance training programme. The finding of the

study showed significant improvement. Hence the researcher first hypothesis was accepted.

- In the second hypothesis, it was hypothesized that there would be a significant improvement on selected physical fitness components such as speed, endurance, agility, flexibility, muscular endurance, upper body strength and lower body strength due to the effect of bodyweight training programme. The finding of the study showed significant improvement. Hence the researcher second hypothesis was accepted.
- In the third hypothesis, it was hypothesized that there would be a significant improvement on selected physical fitness components such as speed, endurance, agility, flexibility, muscular endurance, upper body strength and lower body strength due to the effect of combined effect of resistance and bodyweight training programme. The finding of the study showed significant improvement. Hence the researcher third hypothesis was accepted.
- In the fourth hypothesis, it was hypothesized that there would be significant difference on selected physical fitness components such as speed, endurance, agility, flexibility, muscular endurance, upper body strength and lower body strength among resistance training, bodyweight training and combined training (resistance and bodyweight training) groups and control group. The finding of the study were similar to this hypothesis. Hence the research fourth hypothesis was also accepted.

CHAPTER – V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS



5.1 Summary

The development of a player's motor skills can be aided by a variety of training techniques. For any coach or player, it might be difficult to comprehend these training techniques and determine whether they are helpful for a given event. In an effort to maximize physical performance, this aids coaches and athletes in preventing injury and overtraining as well as analyzing the benefits and drawbacks of their individual training plans. Unfortunately, it goes way back if one neglected to build the proper training regimens for kabaddi players. The researcher was so curious to learn the effect of resistance training, bodyweight training and their combination on selected physical fitness components of kabaddi players.

To achieve the purpose, one hundred (n=100) male Kabaddi players who competed in Veer Narmad South Gujarat University, Surat Intercollegiate Kabaddi tournaments from 2020 to 2023 were chosen at random to serve as the study's subjects. The subjects were between the ages of 18 and 25, respectively. The experimental design used in this study was random group design involving one hundred subjects who were divided at random into four groups of twenty-five each (n = 25).

This study consisted of four independent variables such as bodyweight training, resistance, combination training and control group, the four selected groups, experimental group - I underwent bodyweight training, experimental group - II underwent resistance training, experimental group - III combination training and the group - IV acted as control. Pre-tests were conducted for all the subjects on selected physical fitness components namely, speed, endurance, agility, flexibility, muscular endurance, upper body strength and lower body strength. The experimental groups participated in their respective training protocols for a period of twelve weeks. The post-tests were conducted on the above said dependent variables after the experimental period of twelve weeks for all the four groups. Analysis of covariance (ANCOVA) statistical technique was used to test the adjusted post-test mean differences among the experimental groups. If the adjusted post test result was significant, the Scheffe's post-hoc test was used to determine the significance of the paired mean differences. The level of significance was set at $p < 0.05$ of all the cases.

5.2 Conclusions

The following conclusions were determined based on the interpretation of the data.

1. There was a significant improvement on selected physical fitness components such as speed, endurance, agility, flexibility, muscular endurance, upper body strength and lower body strength due to the effect of bodyweight training, resistance training and combination training programme.
2. There was a significant difference existed on selected physical fitness components among bodyweight training, resistance training, combination training and control group.
3. The combination training group performed significantly better in terms of improving all the selected dependent variables, such as speed, endurance, agility, muscular endurance and lower body strength; When compared to bodyweight and resistance training groups among kabaddi players.
4. Bodyweight training group had significantly better improvement on flexibility when compared with resistance training group and combination training groups among kabaddi players.
5. Resistance training group had significantly outperformed on upper body strength when compared with bodyweight training group and combination training groups among kabaddi players.
6. The control group did not show any significant improvement on any of the selected physical fitness components among kabaddi players.

5.3 Recommendations

1. According to the findings of the current study, the aforementioned training enhanced all of the physical fitness components that were chosen. In order to increase the physical fitness components for their students, it is advised that coaches, trainers, and physical educators implement these findings.
2. By selecting physiological, biochemical and hematological characteristics as criteria variables, a comparable study may be carried out.

3. Similar research could be done over longer periods of time or at different training intensities from those in the current study.
4. By including players from the state or national levels as participants, a similar study may be undertaken.
5. The sample size might be enlarged, enabling the researchers to get more precise findings from their study.
6. Similar study may be conducted among women players.

APPENDIX



APPENDIX – I

Score of Physical Fitness Variables of Resistance Training Group

No	Speed		Endurance		Agility		Flexibility		Muscular Endurance		Upper Body Strength		Lower Body Strength	
	Pre Test	Post Test	Pre Test	Post Test	Pre Test	Post Test	Pre Test	Post Test	Pre Test	Post Test	Pre Test	Post Test	Pre Test	Post Test
1	7.06	6.87	1930	2050	9.63	9.51	15.5	16.5	26	29	32.50	37.50	75	85
2	6.86	6.62	2350	2630	9.46	9.38	17.5	19	27	32	37.50	42.50	80	85
3	6.89	6.57	2700	2940	9.57	9.37	18	19.5	28	32	40.00	45.00	65	70
4	7.15	6.89	1900	2130	9.46	9.32	14.5	17	30	34	45.00	47.50	60	75
5	7.16	7.03	2250	2340	9.22	8.95	15	19	31	35	27.50	35.00	65	75
6	6.89	6.63	2710	2860	9.55	9.31	18	21.5	31	33	30.00	32.50	75	80
7	7.14	6.80	2010	2050	9.19	8.98	16.5	19	26	31	37.50	40.00	80	85
8	6.84	6.63	1810	2070	9.75	9.54	19	21	34	36	45.00	47.50	85	85
9	6.73	6.59	2430	2610	9.41	9.34	19.5	22.5	35	38	47.50	47.50	60	70
10	7.26	7.09	1870	1940	9.64	9.6	18	20.5	26	30	32.50	37.50	85	95
11	7.18	7.03	2640	2310	9.41	9.35	16	20	28	31	35.00	40.00	75	85
12	6.98	6.77	1870	1930	9.34	9.19	17	19.5	29	33	25.00	32.50	70	80

No	Speed		Endurance		Agility		Flexibility		Muscular Endurance		Upper Body Strength		Lower Body Strength	
	Pre Test	Post Test	Pre Test	Post Test	Pre Test	Post Test	Pre Test	Post Test	Pre Test	Post Test	Pre Test	Post Test	Pre Test	Post Test
13	6.68	6.47	1900	2090	9.5	9.34	18	19.5	32	36	20.00	27.50	75	80
14	7.22	7.06	2220	2270	9.41	9.32	16.5	20	30	33	30.00	35.00	80	90
15	6.78	6.63	2430	2510	9.45	9.22	16	18.5	27	32	35.00	40.00	90	90
16	7.22	7.11	2310	2490	9.56	9.3	17	20	36	38	37.50	40.00	75	85
17	6.82	6.58	1840	1950	9.55	9.46	16.5	18.5	28	32	27.50	32.50	55	70
18	6.93	6.71	1950	1990	9.42	9.29	18	19.5	32	36	40.00	45.00	65	70
19	7.08	6.81	1800	1910	9.34	8.9	19	21	33	36	42.50	45.00	60	80
20	7.34	7.11	2590	2630	9.41	9.2	17	18	26	30	40.00	45.00	50	55
21	7.48	7.13	1950	2170	9.47	9.37	16	18.5	35	37	35.00	40.00	65	70
22	6.94	6.73	1990	2020	9.25	9.2	18.5	20	28	31	37.50	40.00	60	65
23	7.20	6.97	1930	2260	9.35	9.18	17	21	34	37	27.50	32.50	65	75
24	6.74	6.49	2360	2540	9.41	9.32	16.50	19.00	26	31	30.00	32.50	75	80
25	7.19	6.93	2370	2460	9.87	9.67	18.00	20.50	30	33	27.50	30.00	80	85

APPENDIX – II

Score of Physical Fitness Variables of Body Weight Training Group

No	Speed		Endurance		Agility		Flexibility		Muscular Endurance		Upper Body Strength		Lower Body Strength	
	Pre Test	Post Test	Pre Test	Post Test	Pre Test	Post Test	Pre Test	Post Test	Pre Test	Post Test	Pre Test	Post Test	Pre Test	Post Test
1	6.98	6.76	2430	2590	9.41	9.31	19.5	21.5	28	30	35.00	37.50	65	70
2	6.48	6.41	1830	2220	9.37	9.28	18.5	22	30	33	32.50	37.50	70	80
3	7.56	7.19	1890	1970	9.22	9.05	20	23	29	34	27.50	32.50	75	75
4	7.21	7.06	2230	2420	9.01	8.71	18	23	31	34	40.00	42.50	80	85
5	7.19	6.91	2530	2630	9.73	9.6	20	21.5	34	37	37.50	42.50	50	60
6	6.59	6.37	2460	2630	9.41	9.27	17	20.5	35	37	30.00	35.00	60	70
7	7.15	6.94	2370	2560	9.73	9.51	17.5	20	29	32	25.00	32.50	70	75
8	7.45	7.08	1810	2070	8.76	8.51	16	20.5	33	36	30.00	35.00	75	75
9	6.48	6.20	1940	2190	9.34	9.2	19	23.5	34	38	35.00	35.00	80	85
10	7.11	6.79	1860	2080	9.8	9.67	20	22	26	30	37.50	42.50	85	90
11	6.89	6.38	1870	2190	9.76	9.52	19	22	37	38	27.50	30.00	90	90
12	6.78	6.49	1940	2080	9.4	9.21	19.5	22	38	41	30.00	35.00	75	80

No	Speed		Endurance		Agility		Flexibility		Muscular Endurance		Upper Body Strength		Lower Body Strength	
	Pre Test	Post Test	Pre Test	Post Test	Pre Test	Post Test	Pre Test	Post Test	Pre Test	Post Test	Pre Test	Post Test	Pre Test	Post Test
13	7.16	7.06	2360	2570	9.79	9.57	16.5	21.5	26	30	32.50	35.00	70	75
14	6.78	6.59	1950	2160	9.41	9.19	19	22.5	30	33	35.00	40.00	60	65
15	6.48	6.34	1900	2210	9.37	9.17	19	22	30	34	35.00	37.50	65	75
16	7.18	6.89	2340	2550	9.88	9.53	16	19.5	26	31	30.00	35.00	65	70
17	7.68	7.48	1910	2100	9.91	9.73	16	21.5	24	29	32.50	37.50	60	70
18	6.84	6.52	2070	2220	9.37	9.21	16.5	19	28	32	30.00	35.00	75	80
19	6.79	6.49	2470	2510	9.41	9.17	18.5	22	29	32	35.00	32.50	80	85
20	7.16	7.08	2260	2430	9.81	9.68	17	20.5	31	34	37.50	37.50	75	85
21	7.02	6.94	1930	2110	9.83	9.63	15.5	18.5	30	34	40.00	40.00	70	80
22	7.51	7.18	2370	2580	9.77	9.47	16.5	19	34	37	32.50	37.50	75	80
23	6.37	6.11	1970	2180	9.29	9.11	18.5	21.5	32	36	37.50	40.00	70	75
24	7.16	6.79	1830	2030	9.67	9.41	19.00	21.00	30	33	30.00	35.00	65	75
25	7.40	7.14	1960	2260	9.84	9.66	16.00	19.50	33	37	32.50	35.00	55	70

APPENDIX – III

Score of Physical Fitness Variables of Combination Group

No	Speed		Endurance		Agility		Flexibility		Muscular Endurance		Upper Body Strength		Lower Body Strength	
	Pre Test	Post Test	Pre Test	Post Test	Pre Test	Post Test	Pre Test	Post Test	Pre Test	Post Test	Pre Test	Post Test	Pre Test	Post Test
1	6.87	6.57	2010	2370	9.23	9.11	16.5 0	18.0 0	26	29	37.5 0	45.0 0	75	85
2	6.98	6.66	2130	2340	9.13	9.07	18.0 0	20.5 0	30	34	40.0 0	42.5 0	65	70
3	7.18	6.78	1890	2190	9.68	6.48	19.5 0	21.0 0	35	28	27.5 0	32.5 0	60	70
4	7.28	7.01	1920	2180	9.29	9.18	15.5 0	18.5 0	28	33	35.0 0	37.5 0	55	65
5	6.84	6.57	1870	2160	9.48	9.21	16.5 0	20.0 0	29	32	32.5 0	35.0 0	80	85
6	6.79	6.40	2340	2460	9.45	9.16	18.0 0	21.0 0	30	34	35.0 0	37.5 0	65	70
7	7.19	6.87	1930	2340	9.56	9.22	17.5 0	21.5 0	35	38	37.5 0	42.5 0	55	70
8	7.48	7.18	2130	2330	9.72	9.5	20.0 0	23.0 0	20	26	42.5 0	45.0 0	70	80
9	7.45	7.04	1890	2190	9.42	9.21	16.5	20.0	28	33	40.0	45.0	75	80

No	Speed		Endurance		Agility		Flexibility		Muscular Endurance		Upper Body Strength		Lower Body Strength	
	Pre Test	Post Test	Pre Test	Post Test	Pre Test	Post Test	Pre Test	Post Test	Pre Test	Post Test	Pre Test	Post Test	Pre Test	Post Test
							0	0			0	0		
10	6.48	6.31	2060	2240	9.34	8.9	18.5 0	21.5 0	29	34	25.0 0	32.5 0	75	85
11	6.87	6.57	2330	2670	9.44	9.2	19.0 0	20.0 0	34	37	27.5 0	32.5 0	80	85
12	7.03	6.78	2160	2340	9.47	9.15	16.5 0	20.5 0	29	34	40.0 0	42.5 0	65	75
13	6.49	6.30	2040	2280	9.37	9.2	18.0 0	21.5 0	35	38	32.5 0	37.5 0	90	95
14	7.16	6.79	2070	2350	9.35	9.1	17.5 0	21.5 0	34	37	25.0 0	30.0 0	75	80
15	6.75	6.41	2130	2340	9.46	9.21	16.5 0	20.0 0	38	41	27.5 0	30.0 0	80	90
16	7.32	7.03	2340	2580	9.22	8.9	19.0 0	23.0 0	39	43	32.5 0	35.0 0	65	75
17	7.08	6.81	2280	2430	9.55	9.31	18.5 0	21.5 0	34	38	30.0 0	30.0 0	55	65
18	6.74	6.48	2160	2410	9.09	8.9	16.5 0	21.0 0	29	34	37.5 0	40.0 0	70	75
19	6.89	6.37	1860	2110	9.19	9.31	20.0 0	23.0 0	35	38	27.5 0	30.0 0	65	75

No	Speed		Endurance		Agility		Flexibility		Muscular Endurance		Upper Body Strength		Lower Body Strength	
	Pre Test	Post Test	Pre Test	Post Test	Pre Test	Post Test	Pre Test	Post Test	Pre Test	Post Test	Pre Test	Post Test	Pre Test	Post Test
20	7.21	6.93	1930	2160	9.41	9.22	15.50	19.00	34	37	25.00	27.50	75	80
21	7.00	6.78	2180	2270	9.64	9.56	21.00	23.00	30	35	27.50	32.50	80	85
22	6.78	6.49	2280	2450	9.41	9.26	18.50	21.50	32	37	32.50	35.00	85	90
23	6.59	6.37	2160	2360	9.34	9.19	16.00	19.00	21	27	30.00	35.00	70	80
24	7.21	7.02	2140	2380	9.63	6.57	19.50	21.00	28	34	32.50	37.50	60	70
25	7.06	6.73	2070	2340	9.78	9.52	16.00	19.50	26	33	27.50	32.50	55	70

APPENDIX – IV

Score of Physical Fitness Variables of Control Group

No	Speed		Endurance		Agility		Flexibility		Muscular Endurance		Upper Body Strength		Lower Body Strength	
	Pre Test	Post Test	Pre Test	Post Test	Pre Test	Post Test	Pre Test	Post Test	Pre Test	Post Test	Pre Test	Post Test	Pre Test	Post Test
1	6.97	6.90	2360	2390	9.31	9.28	18.50	19.00	23	24	32.50	32.50	65	70
2	7.16	7.14	1850	1860	9.78	9.71	22.00	23.00	27	29	40.00	42.50	75	75
3	7.45	7.41	1840	1830	9.67	9.59	20.50	22.50	29	30	45.00	45.00	80	80
4	6.84	6.98	1860	1880	9.42	9.37	19.5	21	32	30	47.50	47.50	85	85
5	6.79	6.71	2430	2510	9.49	9.48	17.5	18	34	33	32.50	35.00	60	65
6	7.13	7.07	1820	1830	9.72	9.71	19	19.5	35	36	25.00	27.50	55	55
7	7.16	7.06	2450	2480	9.29	9.24	20	20.5	29	30	35.00	35.00	60	55
8	7.34	7.31	2620	2640	9.28	9.25	17	18	28	29	30.00	32.50	65	60
9	6.84	6.89	1740	1720	9.31	9.26	16.5	17	30	31	25.00	25.00	55	60
10	6.76	6.83	1890	1890	9.6	9.57	17.5	17.5	31	32	27.50	27.50	60	60
11	6.79	6.64	2410	2430	9.41	9.37	16	16.5	34	35	32.50	32.50	65	70
12	7.09	7.01	2370	2410	9.31	9.26	18	18	32	33	30.00	30.00	75	75

No	Speed		Endurance		Agility		Flexibility		Muscular Endurance		Upper Body Strength		Lower Body Strength	
	Pre Test	Post Test	Pre Test	Post Test	Pre Test	Post Test	Pre Test	Post Test	Pre Test	Post Test	Pre Test	Post Test	Pre Test	Post Test
13	7.12	7.02	1830	1810	9.34	9.31	17	17.5	35	36	30.00	32.50	70	75
14	7.22	7.18	1900	1890	9.39	9.32	16	16.5	28	30	27.50	30.00	70	75
15	6.87	6.73	1870	1780	9.54	9.51	18.5	15	26	28	35.00	37.50	85	80
16	6.49	6.44	1960	1950	9.62	9.58	18	18.5	24	26	37.50	37.50	90	90
17	6.86	6.63	2260	2280	9.37	9.34	19	21.5	35	35	32.50	32.50	80	85
18	7.09	6.99	2450	2490	9.42	9.39	17.5	18	29	27	30.00	32.50	70	70
19	7.18	7.06	2460	2510	9.55	9.53	16	16.5	30	30	25.00	25.00	55	55
20	6.84	6.77	2390	2430	9.34	9.31	19	17	34	32	27.50	30.00	65	60
21	6.78	6.63	1760	1760	9.26	9.24	16.5	17.5	26	26	32.50	32.50	70	75
22	7.30	7.21	1820	1810	9.4	9.35	18	21.5	30	30	27.50	30.00	75	70
23	7.19	7.08	2460	2470	9.47	9.42	14	15	34	33	30.00	30.00	70	70
24	6.84	6.78	2240	2290	9.37	9.25	16.00	17.50	35	36	32.50	32.50	75	75
25	6.66	6.53	1790	1770	6.4	9.21	17.0	17.5	33	34	35.0	32.50	65	70

BIBLIOGRAPHY



Book

1. Barrow, H.M. and Gee, R. (1979), A Practical Approach to Measurement in Physical Education, US: Lea and Febiger.
2. Consul, D.K. (1997), Test and Measurement, New Delhi: DVS Publication, 1997, P. 221
3. Harrison, CH (1976). Application of Measurement of Health and Physical Education, 5th Ed., Englewood Cliffs, New Jersey: Prentice Hall, Inc.,
4. Hockey, R.V. (1989), Physical Fitness-The Pathway to Healthful Living, 7th Ed.; Mosby: St. Louis Baltimore, p.102.
5. Howell, M. (1994), Foundations of Physical Education, Delhi: Friends Publications.
6. Johnson and Nelson, (1982), Practical Measurements for Evaluation in Physical Education, 1982, p.119.
7. Johnson, B. and Nelson, JK (1982), Practice Measurement for Evaluation in Physical Education, Edina: Burgess Publication.
8. Kerr, R. (1982), Psychomotor Learning, Philadelphia, Pa.: Saunders Publishing.
9. Matveyev, L. (1977). Fundamental of Sports Training, Moscow: Progress Publishers.
10. Michalsik, L., and Bangsbo, J. (2002). Aerobic and Anaerobic Training. Danmarks Idrats Forbund.
11. Millar, D.I. and Nelson, R.C. (1973), Bio-mechanics of Sports, Philadelphia: Lea and Fibiger, p.5.
12. Seidal, B. and Reick, M. (1974), Physical Education, an Overview, Addison Wesley Publishing Co., Ontario, p. 45.
13. Singh, A. (2004), Essential of physical education, Kalyani publisher, Chandigarh, p. 38.
14. Singh, H. (1984), Sports Training and Coaching, Patiala: Nethaji Subash National Institute of Sports Publications, p.3.
15. Singh, H. (1984), Sports Training, General Theory and Methods, Patiala: N.I.S. Publications.

16. Singh, H. (1991), Science of Sports Training, D.V.S Publications, New Delhi, p. 14.
17. Sundarrajan, G.S. (1979), Sports Medicine Lecturers, Madras: Rashan Publications, p.158- 163.
18. Thompson Peter J L, (2009). Introduction to Coaching, the Official IAAF Guide to Coaching Athletics.
19. Uppal, A.K. (2009), Principles of Sports Trainings, New Delhi: Friends Publication, p.71.
20. William, J.C.P. and Sperry, P.N. (1976), Sports Medicine, London: Edward Arnold Publishers Ltd., p.8.

Journals

1. Alagudurai, T. and Sivagnanam, P. (2019), Effect of Resistance Training on Explosive Power and Shoulder Strength among Kabaddi Players, Journal of Information and Computation Science, 9(11): 603-607.
2. Alcaraz, P. E. et. al. (2008). Physical performance and cardiovascular responses to an acute bout of heavy resistance circuit training versus traditional strength training. The Journal of Strength and Conditioning Research. 22(3): 667-671.
3. Arumugam, S. (2019). Effect of flywheel training on shoulder and leg strength among Kabaddi players, Journal of emerging technologies and innovative research. 6(3): 114-117.
4. Azeem, K. and Hamdan, (2019), The effect of Resistance Training on the Selected Physical and Physiological Variables of the Male Students, International Journal of Pharmaceutical Research and Allied Science, 8(2): 198-205.
5. Bhisaji, S. et. al. (2018), Effect of Ladder Drills Training in Female Kabaddi Players, International Journal of Physical Education, Sports and Health, 5(2): 180-184.
6. Bilal, A. and Muthueleckuvan, R. (2018), Effect of Strength Training on Selected Physical Fitness Variables among University Men Kabaddi Players, Asian Journal of Multidimensional Research, 7(2): 26-33.

7. Bovas, J. and Pradeep, C.S. (2023), Impact of Circuit Training on Selected Physical Fitness among College Level Kabaddi Players in Kerala, Academic Sports science.
8. Chandrasear, S.J.A. (2021), Effect of Weight Training on Selected Physical Fitness Variables among College level Handball Players, Llkogretim Online – Elementary Education Online, 20:5 (2021): 6349-53.
9. Chaudhari, N. (2014), Combined Effect of Strength and Plyometric Training Programme on Upper and Lower Body Strength of Male Kabaddi Players, Towards Excellence: An Indexed, Refereed & Peer Reviewed Journal of Higher Education, 6(2): 14-17.
10. Dharod, R. et. al. (2020), Effect of Plyometric Training on Explosive Power, Agility, Balance, and Aerobic Performance of Young Adult Male Kabaddi Players, Critical Reviews in Physical and Rehabilitation Medicine, 32(3).
11. Dong, K. et. al. (2023), Effects of Core Training on Sports-Specific Performance of Athletes: A Meta-Analysis of Randomized Controlled Trials, Behavioral Sciences, 13(2): 148.
12. Haq, G.I. and Govindhan, C.T. (2023), Influence of Plyometric Training and Combination of Plyometric and Strength Training on Leg and Back, International Journal of Innovative Research in Technology, 9(9): 486-489.
13. Jagathesan, R. (2016), Effect of Concurrent Strength and Endurance Training on Selected Physiological variables among College Level Kabaddi Players, International Journal of Recent Research and Applied Studies, 3(6): 97-99.
14. Jayakumar, S. and Lakshmanan, C. (2019), Effect of resistance training on selected physical fitness variables among inter collegiate men kabaddi players, International Journal of Physiology, Nutrition and Physical Education, 4(2): 607-609.
15. Kagitha, VP and Kumar, PPS (2013), Effect of Complex Training with Yogic Practices on Selected Motor Fitness Variables and Playing Ability Among Kabaddi Men Players, International Journal of Humanities and Social Science Invention, 2(10): 10-14.

16. Kalpana, G. (2021), Effect of specific training on selected physical fitness components and skill performance of inter-collegiate Kabaddi players, *International Journal of Physical Education, Sports and Health*, 8(5): 243-245.
17. Karikala, I. (2020), Effect of Turbulence Training on Strength among College Men Kabaddi Players, *Journal of Emerging Technologies and Innovative Research*, 7(2): 476-481.
18. Karuppiah, L. and Palanisamy, A. (2017), Isoalted and Combined Influence of Weight Training and Ladder Training on Selected Physical variable among Men Kabaddi Players, *International Journal of Recent Research and Applied Studied*, 4(2): 612.
19. Kraemer, W.J. (2003), Strength training basics: Designing workoutstomeet patients' goals, *Physician and sports medicine*. 31:8 (2003): 39–45.
20. Kumar, RR and Sha, BSS (2016), Effect of Aerobic and Resistance training on needful physical fitness components among college level kabaddi players, *Journal of Recent Research and Applied Studies*, 9(9): 88-91.
21. Kumar, SR., et. al. (2023), Impact of Specific Training on Selected Motor Fitness Variables of Men Kabaddi Players, *Journal of Childhood Obesity*, 8:1 (2023): 13.
22. Kumar, T. (2019), A study on effect of resistance training and plyometric on arm and leg explosive strength in Kabaddi players of Karnataka, *International Journal of Physiology, Nutrition and Physical Education*, 4(2): 223-226.
23. Marwat, NM. Et. al. (2021), Calisthenics Training: Effects on Physical Fitness (Coordination, Flexibility and Endurance) of Kabaddi Players, *Palarch's Journal of Archaeology of Egypt/Egyptology*, 18(1): 5212-5220.
24. Moorthi S.K.V. et. al. (2000), The Effects of Three Modalities of Resistance Circuit Training on Speed, Muscular Strength, Muscular Strength and Endurance of Collegiate Male Kabaddi Players, *International Journal of Innovative Research and Development*, 5(5): 282-287.
25. Muniraju M.G. et. al. (2017), Effects of the Combination of Plyometric and Specific Training with Skill Training on the Development of Performance Related.

26. Parameters and Skill Performance Variables of the School Level Volleyball Players, *International Journal of Physical Education & Sports Sciences*, 18 :11.
27. Mustafa, G. et. al. (2022), Effect of Strength Training on the Physical Fitness and Obesity of College Girls, *Pakistan Social Sciences Review*, 6(2): 511-24.
28. Palanisamy, A. (2019) Effect of plyometric training on selected physical variables among Kabaddi Players, *The International Journal of Analytical and Experimental Modal Analysis*, 11(9).
29. Panbilnathan, A. and Palanisamy, K. (2021), Effect of plyometric training and plyometric combined with weight training on selected skill performance variables of kabaddi players, *Indian Journal of Physical Education, Sports and Applied Science*, 11(4): 27-32.
30. Rajasekaran, E. and Majaboobjan, A. (2021), Effect of Iadder Training on Selected Physical Fitness Variables among Inter College Men Kabaddi Players, *International Journal of Physical Education, Sports and Health*, 9(6): 188-190.
31. Rao, C.V. and Kishore, Y. (2014) Combined Effect of Strength and Plyometric Training Programme on Selected Motor Fitness Components of Male Kabaddi Players”, *International Journal of Recent Research and Applied study*, 2(11): 43-45.
32. Senthilkumar, N. (2023), Effect of Tabata Training on Performance Related Component in Agility of Kabaddi Players, *International Journal of Rsearch Publication and Reviews*, 4(3): 2262-2265.
33. Sharma, D. (2014), The Effect of Resistance Training Program on the selected Physical Fitness Variables of female basketball Players”, *International Journal of Scientific and Research Publications*, 4(12)” 1-4.
34. Sharma, K. (2014), The Effect of Resistance Training Programme on the Selected Physical Fitness Variables of Female Basketball Players, *International Journal of Scientific and Research Publications*, 4(12): 1-5.
35. Singh, S. and John, B. (2018). Effect of plyometric exercises on broad jump of Kabaddi players. *International Journal of Physiology, Nutrition and Physical Education*, 3(1): 1506-1508. Tandel, BS (2018), Effect of strength training on

- selected physical variables of kabaddi players, *International Journal of Physiology, Nutrition and Physical Education*, 3(1): 39-41.
36. Torbatinezhad, Z. et. al. (2019), The Effect of Selected Core stability and Hopping Exercise on Trunk Endurance and balance of Female Kabaddi athletes, *Specific Physical Therapy Journal*, 9(2): 125-136.
37. Vivekanth, B. and Vallimurugan, V. (2019), Effect of Strength Training on Physical Fitness Variables of Intercollegiate Volleyball Players, *International Journal of Applied Research*, 5(6): 442-44.
38. Vivekanth, B., and Vallimurugan, V., (2019). Effect of strength Training on physical fitness variables of intercollegiate volleyball players. *International Journal of Applied Research*. 5(6): 442-444.

Thesis

1. Rathod, MM (2015), Effect of Weight Training Programme on Selected Physical Fitness Variables, Raiding and Blocking Skills of Male Kabaddi Players of Swami Ramanand Tirth Marathwada University Nanded, Online Published Ph.D. Thesis, Marathwada University Nanded, Maharashtra.
2. Taheri, (20104), M. Effects of 8-week plyometric and strength training programs on selected physical fitness factors of elite kabaddi players, Published Ph.D. Thesis, Department of Physical Education, Qazvin, Iran.

Website

1. https://en.wikipedia.org/wiki/Bodyweight_exercise
2. <https://www.health.harvard.edu/exercise-and-fitness>
3. http://en.wikipedia.org/wiki/Weight_Training
4. <https://www.healthline.com/health/exercise-fitness/endurance>

PUBLICATIONS





Effect of Hurdle Running Training on Agility of Kabaddi Players

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Abstract: The purpose of this research study was to investigate the effect of hurdle running training on the agility of kabaddi players. In this research study brothers who played kabaddi game at university level were selected as subjects. Players in the age group of 18 to 25 years were selected for this research study. A total of 40 players were selected in this research study. Standard of measurement Agility was measured by shuttle run test. One way analysis of covariance (One Way Analysis of Covariance) test was applied to find out the effects on obstacle running training group. Differences between means were tested at 0.05 level by Least Significant Difference Post Hoc test. The conclusion of which was seen as follows. An eight-week inhibitory training program of the method showed a significant improvement in the shuttlerun of selected subjects.

Introduction:

Kabaddi is a team sport, mainly played in the Indian subcontinent and also in the country of India in particular. The name Kabaddi is mostly used in North India, while the game is also known as Chedugudu in South India and Hu Tu Tu in East India. The game is equally popular in India's neighboring countries Nepal, Bangladesh, Sri Lanka, and Pakistan.

Kabaddi is a sport played in South Asia, which is purely a sport of physical ability. The word Kabaddi is derived from a Tamil word meaning 'holding hands'. The game has its origins in India. The game is known by different names in different regions of India due to its popularity and the fact that it has been played for many years. This game is three to four thousand years old.

Today's life is not as simple as it used to be. Today's age is the age of machinery. Where man has to learn various kinds of actions to maintain his existence and identity. Sometimes such a question comes to mind. How does a person learn these new actions? The simple answer to this question is that man has intelligence. Using which these skills and actions are learned. But this is not the right answer! Now man does not only take help of intellect to learn any skill but different muscles and organs of his body help him. Thus, to learn any action, a person needs to have certain elements. Taken together, these components constitute a dynamic element or set of components essential to learning. Which helps people to learn new actions.

Where there is life there is movement. Walking and running are the best known forms of movement that can be developed over a period of time through repetition of training. Running is one of the oldest forms of sport for humans. It is a simple test of ability to measure how fast a person can get from one place to another. The Olympic goals Cytes, Altius and Fortius theoretically mean swift, lofty and daring. From ancient Greece to modern times, fast and long running has become popular.

Running has been ingrained with us since human existence. It is natural for humans to run in one form or another to satisfy their physical, psychological and physiological needs.

In all sports competitions, including the Olympics, the level of performance is increasing and more and more excellence is beginning to take place. The appearance is beyond our imagination and the research related improvements in the running surface and equipment materials are responsible for achieving this high level.

The author Whitehead gives an example of runners in track athletics who consider hurdle running as an important part of training and strongly believe in it. Many commentators, such as New Zealand's Arthur Leakyard, Australia's Pearly Safety, Sweden's Gunder Hague and Wales' Jim Alfred, are all of the same opinion. All of these jumpers' training involves continuous obstacle running, where the jumper is provided with surfaces such as hills, mud, snow, sand to run on and the sprint is repeated several times.

Agility is the ability of a person to change position. E.g. Agility in football also includes the ability to change direction, which is important in sports such as football, basketball, hockey, softball, etc. Speed is an important requirement in agile work. A person who can transition from one position to another with maximum speed and consistency has a high degree of agility. Agility also requires strength and endurance.

Purpose of the Study

The purpose of this research study was to investigate the effect of hurdle running training on the agility of kabaddi players.

Selection of the Study

In this research study brothers who played kabaddi game at university level were selected as subjects. Players in the age group of 18 to 25 years were selected for this research study. A total of 40 players were selected in this research study.

Criterion Measurement

Sl.	Variable	Test	Measurement
1	Agility	Shuttle Run	Time

Statistical Procedure

Statistical analysis was done by applying Analysis of Variance to quantify the physical ability and psychological aspects of hockey players from obstacle training. In which the confidence level was kept at 0.05 level.

Result of the Study

Table-1 Covariance analysis of variance of an experimental and a control group of shuttle run test performance

Test	Group		Sum of square (SS)		Degree freedom (df)	Mean sum of square (MSS)	F
	Group-A	Group-B					
Per test Mean	13.023	13.198	B	0.308	1	0.308	2.152
			W	9.346	38	0.246	
Post test Mean	11.311	12.586	B	16.244	1	16.244	142.343*
			W	4.692	38	0.123	
Adjusted Mean	11.327	12.570	B	14.957	1	14.957	129.123*
			W	4.391	37	0.119	

*Sig.Level at 0.05 ' $F' = 0.05 (1,38) = 4.098$ & $(1,37) = 4.105$

Above Table-1 shows all the statistical data of pre-test and post-test means and co-variance analysis 'F'. Accordingly, the 'F' ratio of pre-test medians of shuttlerun test performance (Group-A "Intervention Training Group" = 13.023, Group-B "Control Group" = 13.198) was found to be 2.152. Which compared to the table value (4.098) was not found to be significant at 0.05 level.

The 'F' ratio of the medians of the final test of the two groups (Group-A "Intervention Training Group" = 11.311, Group-B "Control Group" = 12.586) was found to be 142.343. Which compared to the table value (4.098) was found to be significant at 0.05 level. Hence, the training provided has been shown to significantly improve the performance of the subjects. Also the 'F' ratio of corrected medians (Group-A "Intervention Training Group" = 11.327, Group-B "Control Group" = 12.570) was found to be 129.123, Comparing it with the table value (4.105) was found to be significant at 0.05 level. The difference between the two groups observed between the corrected medians by the 'F' ratio is significant. Hence the effect of experimental training on the experimental group was observed as compared to the control group.

Conclusion:

- An eight-week inhibitory training program of the method showed a significant improvement in the shuttlerun of selected subjects.

Reference:

- Ambubhai Purani Smarak Granthshreni, Vyayam Vignan Kosh-Granth Panchmo, Rajpipla : Gujarat Vyayam Pracharak Mandal, Rajpipla, District-Bharuch-1982.
- Balayan, Sunil, Sharirik Shiksha Me Parikshan Avam Mapan, Khel Sahitya Kendra, 2009.
- Hed, Nick White, Track Athletics, West Yorkshayer, E. P. Publishing Ltd., 1976.
- Sarvaiya, G. T. and Other, Sharirik Shikshanna Siddhanto ane Pravaho, 1st Edition; Patan : Hemchandracharya North Gujarat University, 2006.
- Varma, Prakash J., A Textbook on Sports Statistics, Gwalior : Vinus Publication, 2000.



Effect of Hurdle Running Training on Explosive Power of Kabaddi Players

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Abstract :

The purpose of this research study was to investigate the effect of hurdle running training on the explosive power of Kabaddi sports players. In this research study brothers who played kabaddi game at university level were selected as subjects. Players in the age group of 18 to 25 years were selected for this research study. A total of 40 players were selected in this research study. The standard of measurement was explosive force measured by the standing broad jump test. Analysis of Variance was applied to find out the effects of hurdle training group and significance of differences between means was tested at 0.05 level. The conclusion of which was seen as follows. An eight-week resistance training program of the method showed a significant improvement in the explosive strength of the subjects selected.

Introduction :

The All India Kabaddi Committee has prepared a framework of policy rules for the game. Kabaddi reached the international level for the first time in 1936 in Berlin Olympics. The Amateur Kabaddi Federation of India (AKFI) is credited with modernizing the game. Along with this, the Asian Kabaddi Federation also decided that this legendary game should be popularized in the region. They always organize different competitions which are popular in Asian sports. In the 1998 Bangkok Asian Games, the Indian team managed to win the gold medal in this sport (Kabaddi).

Kabaddi was first exhibited internationally in Japan in 1979 where it quickly gained popularity. In England, this game started by combining Indians and Pakistanis. The game also became interesting to other nations and thus the game became a part of their culture. Today, different countries have prepared a separate structure for this game known as England Kabaddi Committee.

Different parts of the world have seen the latest changes and cultural influences in Kabaddi that are its changing form. The game is played today in different forms but its essence: the forum is still intact.

Sprint stands for fast running. Which depends on the strength of muscle tension in the player. This is a natural endowment. That is why it has been said that runners are born. Since then they have very high reaction power. These natural forces affect the intensity of a runner's stride. The length of a player's stride at high speed is to some extent a function of the player's body structure. But training plays a very important part in increasing it. Stride length requires drive, and drive requires a great deal of endurance to power up to 100, 200 meters at speed.

Aspects like high speed, endurance, muscle strength, agility, flexibility etc. are considered important in sports. A high level of physical fitness is considered more important than anything else among athletes. It is difficult to succeed in sports activities like handball, basketball, volleyball, hockey, athletics etc. without the necessary aspects of physical fitness. Hence, speed and agility are important in any sport.

In today's fast-paced competitive era, preparations for games are made to players with the goal of "win only play". Trainings are given to keep the mental strength of the players very high. In today's competitive era, new records or world records are being set within a short span of time. Speed is an important attribute of today's game. Earlier records were created in games. He would be associated with one player's name for years. But that is not the case today as training is conducted in a scientific manner and the equipment used in the game is manufactured using modern methods. That being said, diet is equally important to a nutritious diet. Due to these reasons, there is a stark difference in today's sports and sports performance and physical activities.

Explosive power is the ability to exert maximum force in minimum time.

Power – Force x Velocity Both speed and force must be combined for effective action. Sprinting, weight throw, high jump, shot put, long jump, etc. require this type of ability. In the above Shakti formula, force represents muscular force in human effort and velocity represents speed. Thus a powerful man has the following.

- (a) High muscle strength
- (b) High speed
- (c) A high degree of skill combining speed and muscularity

Purpose of the Study

The purpose of this research study was to determine the effect of hurdle running training on the explosive power of Kabaddi sports players.

Selection of the Subject :

In this research study brothers who played kabaddi game at university level were selected as subjects. Players in the age group of 18 to 25 years were selected for this research study. A total of 40 players were selected in this research study.

Criterion Measurement

Sl.	Variable	Test	Measurement
1	Explosive Force	Standing Broad Jump	Distance

Statistical Process

Statistical analysis was done by applying analysis of variance to determine the amount of explosive force of hockey players after obstacle training. In which the confidence level was kept at 0.05 level.

Result of the Study

Table-1 Covariance analysis of variance of an experimental and a control group of standing broad jump test performance

Test	Group		Sum of square (SS)		Degree freedom (df)	Mean sum of square (MSS)	F
	Group-A	Group-B					
Per test Mean	169.550	168.400	B	0.225	1	0.225	0.311
			W	799.750	38	21.046	
Post test Mean	210.200	169.700	B	9922.500	1	9922.500	315.004*
			W	917.400	38	24.142	
Adjusted Mean	212.200	170.700	B	9920.276	1	9920.276	439.111*
			W	917.371	37	24.794	

*Sig.Level at 0.05 'F' = 0.05 (1,38) = 4.098 & (1,37) = 4.105

Above Table-1 shows all the statistical data of pre-test and post-test means and co-variance analysis 'F'. Accordingly, the 'F' ratio of pre-test medians of standing broad jump test performance (Group-A "Constraint Training Group" = 169.550, Group-B "Control Group" = 168.400) was found to be 0.311. Which compared to the table value (4.098) was not found to be significant at 0.05 level.

The 'F' ratio of the medians of the final test of the two groups (Group-A "Intervention Training Group" = 210.200, Group-B "Control Group" = 169.700) was found to be 315.004. Which compared to the table value (4.098) was found to be significant at 0.05 level. Hence, the training provided has been shown to significantly improve the performance of the subjects. Also the 'F' ratio of corrected medians (Group-A "Intervention Training Group" = 212.200, Group-B "Control Group" = 170.700) was found to be 439.111. Comparing it with the table value (4.105) was found to be significant at 0.05 level. The difference between the two groups observed between the corrected medians by the 'F' ratio is significant. Hence the effect of experimental training on the experimental group was observed as compared to the control group.

Conclusion :

- An eight-week resistance training program of the method showed a significant improvement in the explosive strength of the subjects selected.

Reference

1. Ambubhai Purani Smarak Granthshreni, **Vyayam Vignan Kosh-Granth Panchmo**, Rajpipla : Gujarat Vyayam Pracharak Mandal, Rajpipla, District-Bharuch-1982.
2. Balayan, Sunil, **Sharirik Shiksha Me Parikshan Avam Mapan**, Khel Sahitya Kendra, 2009.
3. Hed, Nick White, **Track Athletics**, West Yorkshayer, E. P. Publishing Ltd., 1976.
4. Oza, Gunvantray, **Health Club**, Ahmedabad : Gujarat Samachar, 1-15, June-1999.
5. Ray, V. K. **Dodna Sprint Se Marathon Tak**, Bhopal : Hindi Granth Academy, 2000.
6. Sarvaiya, G. T. and Other, **Sharirik Shikshanna Siddhanto ane Pravaho**, 1st Edition; Patan : Hemchandracharya North Gujarat University, 2006.
7. Varma, Prakash J., **A Textbook on Sports Statistics**, Gwalior : Vinus Publication, 2000.

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Hurdle Running Training, Body Weight Training
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