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Effectiveness of Plyometric Training to the Skill Related Fitness of High School Volleyball Athletes

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Abstract

This experimental study aimed to determine the effectiveness of an eight-week plyometric training program on the skill-related fitness of high school female volleyball athletes from Antonio A. Maceda Integrated School. Sixteen (16) athletes were randomly assigned to either an experimental group (n=8), which underwent a structured plyometric training program, or a control group (n=8), which continued with regular training. Skill-related fitness components—agility (L-drill), balance (one-leg stand), coordination (hand-eye wall ball test), and power (standing long jump)—were assessed through pre-test and post-test measurements. Results indicated that while both groups showed improvements from pre-test to post-test, the experimental group demonstrated greater mean gains in all four components. Statistical analysis using t-tests revealed a significant difference between the two groups in agility ($p = 0.04$), leading to the rejection of the null hypothesis for that component. However, no significant differences were found for balance ($p = 0.838$), coordination ($p = 0.072$), and power ($p = 0.059$), leading to a failure to reject the null hypothesis for these components. The study concludes that the plyometric training program was particularly effective in enhancing agility. It is recommended that such programs be incorporated into athletes' training regimens, with further investigation needed to optimize protocols for improving balance, coordination, and power.

Keywords: *plyometric training, skill-related fitness, volleyball athletes, agility, high school sports*

INTRODUCTION

An athlete's overall performance is determined by his physiological and psychological makeup, as well as the support he receives from his environment, which includes his parents, teammates, friends, relatives, coach, and the school he represents, as well as a good training program. In sports, the athlete is the focal point of development because his or her performance has an impact not only on themselves and their team, but also on the school, institution, or country that he or she represents. Each athlete has a distinct physiological, biological, and psychological make-up that influences how the athlete responds to achieving the desired goal; thus, the proper use of various training programs must be researched before implementation. Participation in elite sport training at a young age, as Zhao, K., et al. (2019) stated, is associated with the selection of athletes with specific pre-requisites and the development of the specific anthropometric, motor, and physiological characteristics of a particular sport.

Most coaches' secret weapon is their training program, which can make or break an athlete's athletic career. According to Davies et al. (2015), knowledge in training programs is increasing, and exercise programs following musculoskeletal injury are evolving. Rehabilitation programs have evolved dramatically, particularly in the final stages of rehabilitation, which include performance enhancement, power development, and a safe return to activity. As the patient nears a return to activity, plyometric exercise has become an essential component of late-phase rehabilitation. Among the various types of exercises available, plyometrics aid in the development of power, which serves as a foundation for the athlete to refine their sport skills.

According to Michailidis, F., et al. (2013), plyometric training is an exercise for jumping, hopping, and bounding that is distinguished by the use of the stretch-shortening cycle that develops during the transition from a rapid eccentric muscle contraction (deceleration or negative phase) to a rapid concentric muscle contraction (acceleration or positive phase). The stretch-shortening cycle exercise uses the elastic properties of connective tissue and muscle fibers to enhance muscle force and power output by allowing the muscle to store elastic energy during the deceleration-negative phase and release it later during the acceleration-positive phase. Lower-limb plyometric training has consistently been shown to improve various muscle power measures and components such as vertical jumping ability, speed and acceleration, maximal and explosive strength, agility, and sport specific performance.

As a result, Plyometric training provides total maximum strength of performance of athletes by repeatedly executing the theory of stretch-shortening cycle in terms of developing the jump cycle into rapid contraction of the muscle fibers that produce elastic energy stored during the series of jump training, and releasing it later during the acceleration or positive phase to enhance and develop maximum muscle force or explosiveness in jumping. Directly stressing the legs in training exercises helps to maintain and develop lower extremity muscle. Jump training is stressed and quick in order to achieve explosiveness in performance, which gives athletes an advantage in jumping execution. As a result, incorporating plyometric exercise (alternate-leg plyometric bounding with or without a weight vest) into an athlete warm-up is a far more practical approach, and one that we show is effective in improving sprint acceleration performance in training participants (Turner, et al. 2015).

Student training practices are usually held after school hours in the Philippines, particularly in the Department of Education (DepEd). This training session is designed to meet both the athletic and academic requirements of the student-athlete. In their commitment to producing quality athletes, the Department of Education, Philippines hosted a yearly sports competition (Division or Manila Meet) to assess the athletic prowess of young Filipino athletes while also recruiting potential players who will represent the Philippines in various sports competitions abroad.

As a proponent of the plyometric training program, the researcher was motivated to investigate the significant effect of the plyometric training program on the skill related fitness of the selected volleyball student-athletes of Antonio A. Maceda High School using an experimental method to test its significance. The researcher has personally observed problems with the plyometric training program, particularly numerous injuries. Plyometric training, like all exercises and sports, is a continuous process in which beginners begin with light exercise and low volume and gradually progress with gained strength.

Repetitive jumping and bounding can strain the leg joints. The purpose of a plyometric training program is to improve the jumping ability and explosive movement of power in the upper and lower extremities, as well as the total development of muscle, tendon, and nerves, which are all important in sports competition. Plyometric exercises improve athletes' performance in areas other than jumping ability. However, every specific sport development requires total body movement in explosive and powerful execution.

Theoretical Framework

This research study is based on training specificity principles, functional training principles, and plyometric principles. The following principles provide a clear understanding of the impact of sports training programs on athlete performance improvement:

The Training Specificity principle. Specificity Principles are derived from the observation that body adaptation or change in physical fitness is specific to the type of training undertaken. Simply put, if the goal of fitness is to increase flexibility, flexibility training must be used. Resistance or strengthening exercises must be used if one wishes to develop strength. Hawley (2008) proposes some indicators in order to validate the specificity of the training in his study, such as volume, intensity, and frequency of exercise sessions.

The magnitude of the adaptive response that either increased or decreased exercise capacity was determined by the training impulses. According to the principles of specificity, the closer the training routine is to the requirements of the desired outcome, the better. Similarly, previous research indicates that appropriate functional outcome measures of exercise capacity are critical in defining the precise variations in physical activity that produce the most desired effect or target in the development of the physiological aspect.

Another theory that supports this study is that functional training principles emphasize core strength and stability by using whole-body coordination movements involving multiple muscles. The muscles work together to prepare them for daily tasks by simulating common sports movements. Conditioning programs, according to Chmielewski, Myer, Kauffman, and Tillman (2006), are frequently performed at a submaximal level and are aimed at achieving proper biomechanical technique.

Furthermore, the plyometric theory is used in this study. Plyometric training principles involve specific sports exercises. According to Davies, Reimann, and Maske (2015), plyometric exercises can increase average power to velocity, peak force and velocity acceleration, time for force and development, energy storage in a series of elastic components, increase levels of muscle activation, and evolve stretch reflexes.

It demonstrates that Plyometric training improves performance and force production. It also improves movement speed and velocity. It tones the muscles of the lower and upper legs, which indicates strength and explosive power. It primarily improves leg strength and power in jumping, giving athletes more speed and velocity in every execution. Endurance and power aid in reaching peak performance in a

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plyometric training program. The program uses an 8-week training method that is gradually increased, and the level of repetition is monitored to prevent injuries.

The benefit of plyometric training is that it produces a rapid cyclical muscle action known as a stretch-shortening cycle (SSC) in which the muscle undergoes an eccentric contraction followed immediately by a transition period to a concentric contraction that shortens contraction and stores elastic energy that is used to increase force of performance. The eccentric phase prepares the muscle tendon for a counter force movement in which the muscle tendon stretches to a series of elastic components. This stimulates the neurophysiological biomechanical response component of muscle. The amortization phase is essential for more powerful and effective plyometric movement. This is used to efficiently store the energy produced in order to accelerate muscle contraction and elastic recoil in the directions of the plyometric movement pattern. The concentric or shortening contraction of the muscle improves performance activity in jumping.

Conceptual Framework

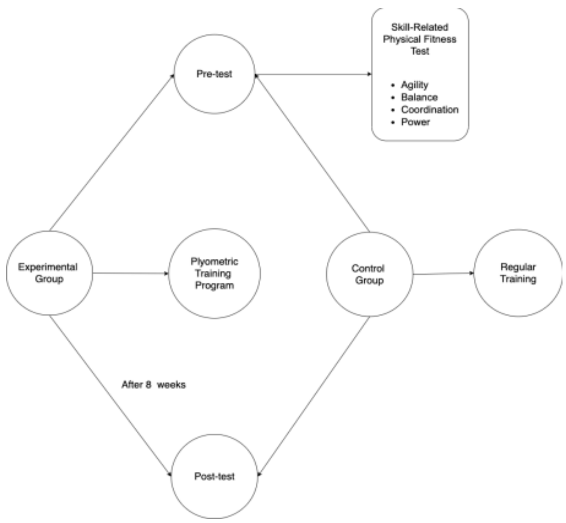

Figure 1. Paradigm of the Study

Figure 1 depicts the study's concept, using a Venn diagram to show the relationship of each component of the study. The Experimental group's plyometric training program applies the stretch-shortening cycle of eccentric to concentric phase of training. To employ the rapid cycle of muscle contraction, a step-by-step procedure or gradual training was used. The participants underwent pre-test and post-test examinations to assess their physical fitness skill-related fitness such as agility, balance, coordination, and power using an experimental method. The experimental group received an eight (8) week plyometric training program, while the control group continued with their regular training program designed by their coach. L-drill cone to test the participant's agility; one leg standing test to measure balance; hand-eyes object coordination; and double leg and jumping forward to measure power are all part of the physical fitness skill related fitness test. The eight-week plyometric acceleration training program, on the other hand, included no barriers, barriers, and the use of the jump box training method.

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Statement of the Problem

This study aimed to determine the effectiveness of plyometric training program to the skill related fitness level of the participants. Specifically, it sought to answer the following questions:

1. What is the anthropometric profile of the participants in terms of:
   1.1 Height
   1.2 Weight
   1.3 Hips Circumference
   1.4 Waist line
2. Which of the two groups has better performance training program during the pre-test and post-test in terms of:
   2.1 Agility
   2.2 Balance
   2.3 Coordinating
   2.4 Power
3. Is there a significant difference between the pre-test and post-test in terms of:
   3.1 Agility
   3.2 Balance
   3.3 Coordination
   3.4 Power
4. Is there a significant difference between the experimental group and the control group in terms of:
   4.1 Agility
   4.2 Balance
   4.3 Coordination
   4.4 Power?

Hypothesis

The hypotheses were tested at .05 probability level:

HO: That there is no significant difference in skill-related fitness performance of the participants when they are grouped according to their training program.

Significance of the Study

The result of this study is deemed significant to the following group of individuals: **Athletes**. The findings of this study will provide confirmation of the effect of a plyometric program on an athlete's athletic prowess. This realization will pave the way for the inclusion of plyometric exercises in the strength training program, allowing the athlete to further develop his strength and power, resulting in an overall improvement of his athletic performance and achievement of the desired goal.

Team Captain. The findings of this study will serve as a challenge to improve their volleyball skills and capabilities.

Trainers. This research will assess athletes' ability to compete in sports. Athletes' abilities can be identified by trainers, and their weaknesses can be improved. Providing strategies for high school athletes to use in order to have a more effective training program.

Coaches. The findings of this study can be used as a guide in developing their strength training program. Coaches can also link the benefits of plyometric exercises to their existing training program, resulting in a more responsive training program for their athletes.

Teachers. The findings of this study will provide an indication of student athletes' academic performance. This will increase the responsibility of being an athlete and a student. Dedicated to all aspects of athletic and academic development.

Sports Directors and Administrators. This study is a good source of baseline data in the development of a well-responsive sports development program in their school, allowing them to easily achieve their targeted goal.

Future Researches. The findings of this study can be used as a reference in their future research. This study's variables can be expanded in future studies.

Scope and Limitation of the Study

The purpose of this study is to determine the effectiveness of a Plyometric Training Program on the participants' Skill-related Fitness components such as agility of the L-drill routine, balance in a one-leg stand, coordination of the eyes and hand body movement, and power in jumping forward to cover distance.

To assess the effectiveness of the Plyometric training program, the true-experimental method was used in a random sequence to group the experimental and control groups. The experimental group's enhanced training program includes an eight (8) week plyometric training program, whereas the control group is advised to retain and use only the regular training program designed by their coach. Sixteen (16) female volleyball players from Antonio A. Maceda High School participated in the study.

REVIEW OF LITERATURE AND STUDIES

This chapter presents a review of literature and studies that support both foreign and local literatures and studies that the researcher has read and cited in order to enrich the discussion of the research findings.

Plyometric Nature and Scope

Ozbar, Ates, and Agopyan (2014) found that safe, effective, and alternative Plyometric Training can be useful to strength and conditioning coaches, especially during competition season when less time is available for training. The implementation of a Plyometric Training program will increase physical capacity in competitions.

This equipment is used not only to develop the upper extremities of the body, but also to provide a total body workout in order to improve one's performance in competitive sports.

According to Dewar (2017), the jump squat is an excellent exercise for increasing power, harnessing and transferring energy during ballistic athletic movements, and increasing motor unit firing rates. Backload and pair dumbbells should be used when performing weighted jump squats.

In their study, Beardsley and Contreras (2014) claim that the kettlebell can be used to develop strength and power, as well as to improve aerobic fitness.

This equipment is used not only to develop the upper extremities of the body, but also to provide a total body workout in order to improve one's performance in competitive sports.

The box jump is an excellent tool for protecting our athletes or simply for training purposes. If our athletes have mastered the mechanics of jumping and landing, we can employ the box jump, which focuses solely on jumping without the mechanical stress of landing. The box jump eliminates the eccentric forces of landing, while the box depth drop eliminates the additional work of jumping for athletes (Green, 2017).

Jumping rope is a classic McCall (2017) movement that increases the elasticity and resiliency of lower leg muscles, resulting in a lower risk of lower-leg injuries. It can help to strengthen the calf muscle, improve body coordination, and cognitive function while learning new motor patterns. This workout will target various muscle groups, increasing heart rate and cardiorespiratory benefit.

Taheri et al. (2014) demonstrate in a study of training exercises that include stopping, starting, and changing direction that have an explosive nature that they can help athletes improve agility. Specific resistance training exercises are required to obtain maximum muscle strength from the major muscle group of the lower limb for explosive power. Jumping intervention during childhood and adolescence improves bone mineral content, density, and structural properties without having any negative consequences. This increases bone mass early in life, which may have a direct preventive effect on bone diseases such as osteoporosis later in life (Bruton, et al., 2017).

Depth jump exercises are a type of plyometric training exercise. In depth jumping, athletes stand on a shelf that is typically 20 cm above the ground, and when they step off the shelf, they immediately perform a maximal effort vertical and horizontal jump after landing on the ground (Mishra, 2016).

Introducing specialized neuromuscular training at the start of puberty can influence neuromuscular response in girls. According to Verma et al. research (2014). The training program for a trained group consisted of upper body plyometrics such as press-ups, chest passes, and power drops, as well as lower body plyometrics such as two-legged hops, bunny hops, depth jumps, short sprints, and bounds. This resulted in a significant improvement in student vertical jumping.

This resulted in a significant improvement in student vertical jumping. For a long time, Papa and Pagaduan (2014) have studied and used complex training in the strength and conditioning and rehabilitation circles. It is a training method that combines a heavy load exercise with a biomechanically similar plyometric workout. This training method is said to increase muscular power output, causing the athlete to move more explosively. Despite the individual increase in vertical jump for resisted and non-resisted jumps, no significant improvements were observed.

It is recommended that plyometric exercises be used to enhance the lower extremities, thereby improving sports performance in athletes. These exercises strengthen the leg muscles in various angular movements and help prevent injuries during training and competitive sports (Mavkovic et. al 2012).

Souhaeil et. al (2015) effects of in-season plyometric training over a short period of time should be demonstrated. This training aims to produce outstanding results in track and field athletes' performance. The significance of the outcomes depends on the methods and duration of training employed by both the athlete and coach.

In the study by Prieshe et al (2015) it was found that the development of athletes' performance can progressively enhance the stability of the body, allowing better control over movement and angular motion.

According to Jefferys et al. (2016), facilitating both speed and agility can work synergistically. Speed and agility are inseparable concepts; speed requires less time to complete tasks, while agility training demands more control over momentum. This coordination is essential for moving in specific directions to achieve training goals.

Plyometric Training for Sports / Volleyball

There are various exercises that can be used to improve performance in a plyometric training program that is being implemented. The specifics of each training project for a specific sport training and volleyball exercise to improve athletes' performance for more consistent output in team performance and to improve basic fundamental movement to a dynamic and explosive jumping performance vary.

According to Villareal et al. (2009), in terms of variable performance training volumes, more than 10 weeks and more than 20 sessions of a high-intensity program (with more than 50 jumps per session) were the strategies that seemed to maximize the probability of achieving a significantly greater improvement in performance. It is preferable to combine different types of plyometric exercises such as squat jump, countermovement jump, and drop jump rather than using only one.

Vlada et al. (2008) investigated the effect of plyometric training on the explosive strength of volleyball players' leg muscles during single and two-foot takeoff jumps. During the second half of the preliminary period, this is a six-week plyometric training program cycle. The testing instruments included eight tests of explosive leg strength: the two-foot takeoff block jump, the right foot takeoff block jump, the left foot takeoff block jump, the two foots takeoff spike jump, the right foot takeoff spike jump, the left foot takeoff spike jump, the standing depth, and the standing triple jump.

Vassil and Bazanov (2012) used a plyometric training program on twenty-one 12– 19-year-old youth volleyball players over a 16-week period. There were twelve female volleyball players and nine male volleyball players. Subjects who participated in the following tests completed three controlling test exercises: standing long jump, depth leap long jump, medicine ball thrown up in 10 seconds, medicine ball overhead thrown forward against the wall in 10 seconds, maximal vertical jumps to the maximum height in 10 seconds, maximal vertical jump height. Testing results show consistent improvements; however, only the legs' explosive power has not shown a significant consistent difference.

Turgut et al. (2017) investigated the effects of a 12-week plyometric training program on dynamic stability in female prepubertal volleyball players versus a control group. This study's findings backed up the idea that plyometric training improves dynamic balance and neuromuscular control in female prepubertal volleyball players. When compared to control training, twelve weeks of plyometric training resulted in greater improvements in dynamic balance scores.

Stojanovic et al. investigated jumping agility (2012). A six-week training program based on the plyometric method has been experimentally proven to have a statistically significant effect on the increase of explosive leg strength, and thus on the increase in jumping agility. Individually tailored plyometric programs as a more effective tool for developing jumping agility in cadets.

Slimani et al. (2016) claimed that the following training exercises had a positive effect on power performance: vertical jump, sprint performance, and agility exercise. Laffaye et al. (2008) investigated the effect of shorter stature on male and female performance. The study sought to ascertain the effects of the drop jump technique on gender. Nine skilled volleyball players, nine male and nine female, were instructed to jump as high as they could. According to this study, women and men have different jump techniques when dropping from a higher position but without increasing vertical performance. This finding suggests that players should have the necessary or optimal height for plyometric training dropping height.

According to Baggett (2008), you can apply force in a short period of time. The right movement pattern is produced by the qualities of good performance control and stable body weight. The correct jumping technique is emphasized in loading. Jumping into training requires the proper method of execution. Maximum performance strength, particularly in loading, must be developed. The combination of force and velocity results in balance and power when training with your body weight.

Strength training in basic form includes speed and timing. A jump force absorber is an eccentric or negative force used to control the drop of the feet or a quick countermovement. The forces gathered or stored in tendons and muscles function similarly to a rubber band. Muscle control is required to absorb enough energy to the body. Reactive training is the force of releasing a large amount of muscle energy. Quickness and stressing are ongoing processes in vertical jumping.

Karadenizli (2016) conducted a study on the effect of ten weeks of Plyometric Training on the static balance (SB-unipedal), dynamic balance (DB-bipedal slalom), anaerobic power (AP), and physical fitness parameters (PFP) of a 30-meter sprint, agility test (Illinois agility test), vertical jump (VJ), and horizontal jump. The plyometric program's outcomes improved the performance of young handball athletes.

Inovero and Pagaduan (2014) used the Sargent Jump Test to determine leg power in their study. The difference between the reach height and the jump height, which represented the participant's vertical jump value, was recorded.

Shah (2012) attest that a plyometric training program for pubescent athletes should begin with low-intensity gross motor activities. It should be included in warm-ups and sport specific skills. Plyometric training should begin with simple exercises and progress to more difficult ones. Recovery is a critical factor in determining whether plyometrics will be successful in developing muscular endurance power.

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According to Ramirez et al. (2014), high-intensity plyometric exercises such as drop jump can be used safely and effectively in the young population from the start. They take less time to complete than other plyometric modes while inducing training adaptation comparable to slow intensity exercises.

According to Lidor et al. (2010) volleyball players with high-caliber training skills can outperform others, even under inconvenient physical conditions. Pre-season conditioning training, aimed at increasing the vertical jump of highly skilled players, showed that experienced athletes could still deliver performance despite being unfit.

Plyometric and Skill-Related Fitness Components

The goal of using plyometric and skill-related fitness tests after a plyometric training program for athletes is to determine the difference in their skilled performance. Many field sports, such as soccer, handball, hockey, cricket, and tennis, necessitate a quick change in direction while maintaining agility and improving balance and coordination (Sailor, et al, 2019). Exercise is repetitive bodily movements done to improve or maintain one or more of the components of fitness. Skill-related health concepts are the underlying skills that are needed in sports competition includes body balance, speed, agility, power, coordination, and reaction time. Plyometric exercises, calisthenics, and HIIT can be safely performed by athletes of all ages and skill levels. Plyometrics, previously associated primarily with box jumping, now encompass a wide array of movements. The success observed with plyometric training has led to creative and complex strength and conditioning programs incorporating this training aspect.

According to J. Jaran et.al 2015, Comparing to games-based PE, exercise-based PE showed more positive changes in some gross motor coordination skills outcomes, coordination skills outcomes and cardiorespiratory fitness. The results from this study show that exercise-and games-based PE represents a useful strategy for improving health-and skill-related physical fitness in Albanian elementary school children. In addition, the study shows that exercise-based PE was more effective than games-based PE in improving gross motor function and cardiorespiratory fitness.

Sintara and Sonchan (2015) conducted a study in which the fitness level of 22 subjects (11 men and 11 women) was assessed using six battery tests based on motor skills. The findings revealed that data from post-test data for male and female athlete performance indicated improvement across all tested components. The coordination, balance, and agility components were moderate, and the run test demonstrated significant improvement.

According to Yahaya (2012), badminton consists of several skilled-related movements such as footwork in the playing center using split jump, pre-tension jump, footwork, scissors jump, two-feet landing, and two-legged jumps, and movement back toward the placing center using a variety of movement patterns.

Mcleod and Tamara (2008) investigated whether clinicians implementing injury prevention programs, which included a supervised pre-season phase that progressed from basic balance exercises (eyes open, firm surface) to more challenging exercises, should be considered (eyes closed uneven support surface, sport-specific drills). Athletes should be educated on the importance of attending each training session and how their compliance with the training program benefits them more.

Terrell (2010) defined physical fitness as the ability to perform daily tasks with vigor and alertness, without undue fatigue, and with enough energy to engage in leisure activities and respond to emergencies. Physical fitness includes a variety of components such as cardiorespiratory endurance or aerobic power, selected muscle endurance, skeletal muscle strength, skeletal muscle power, flexibility, and balance, speed of movement reaction time, and body composition. These are required in order to improve military training and physical fitness.

Brown and Ferrigino classified preventing further pain and injury (2015). The only way to prevent or postpone the onset of muscle soreness is to adapt to exercise stress. This necessitates repetition of the exercise, but over a period of several weeks with adequate rest between sessions. This allows the muscle to recover and heal simultaneously. To Dawes and Roozen (2012), performing multi-directional cone-agility drills requires strengthening the muscle involved in stabilizing the muscle and joint of the lower extremities. If athletes are unable to decelerate lateral forces when performing a cutting motion due to insufficient core stability, he or she will take much longer to change direction. Muscle balance requires the development of strength that optimizes stabilization. In their study on aerobic fitness, Murphy et al. (2014) state that it appears reasonable that the level of aerobic fitness would be a risk factor for injury, because once fatigued, most athletes alter their muscle recruitment patterns. This altered recruitment pattern may, in turn, change the distribution of forces acting on articular, ligamentous, and muscular structures. The geometry of the articular surfaces, as well as muscle, tendon, ligament, and joint capsule laxity, determine the flexibility of a joint.

Fayaz (2009) investigated the human upward stance as a constant battle against gravity to avoid falling, because this posture is unstable in most situations. "Because of this constant instability, there is a need in sports medicine for static and dynamic static balance tests to qualify balance ability."

Rimando et al. (2015) propose that plyometric training, in addition to traditional physical therapy training, be used as part of a ligamental knee re-injury prevention program and for the improvement of leg power, strength, balance, and agility in female soccer players. This will boost the athletes' confidence and trust in their plyometric training.

Simonek et al. (2016) conducted a study to find a difference in the performance of players based on sports specifications, as well as to assess the relationship between the performance of players in two agility tests that measure the ability of a simple reaction, acceleration, deceleration, and changes in movement direction, as well as to process one's perception and decision-making skill.

Myers et. al (2006) attest that training exercises improve biomechanical movement, increase muscle development, and enhance vertical jumping ability, thereby preventing the risk of injury in female athletes.

Kevin et al. (2009) utilized both drop jump and counter jump plyometric training methods, which increased the agility and jumping skills of the players. According to Kibele et al. (2009) the integration of instability resistance training with traditional stable training systems provides a far more effective training method. This dynamic approach enables athletes to perform better in various skills.

Kayatas et al. (2020) claim that there is a medium to moderate effect on the speed skills component, with a slight impact on the speed performance of athletes. Maintaining these slight changes can benefit youth athletes, leading to more effective performance in speed tests.

Souhaeil et al. (2010) attest that applying plyometric training twice a week improves athletes' performance. Training different types of plyometric exercises in standard form execution ensures the improvement of young athletes throughout an annual training program.

This results in continuous shooting training and vertical jump improvement in basketball. A combined training program takes time to have a positive impact on skill tests. The explosiveness and strength gained from plyometric training can benefit athletes in various sports (Radenkovic et al. 2022).

Importance of Developing Skill-Related Fitness Skills

The significance of training skill-related fitness is an indication of improvement in terms of agility in running in multiple directions and balancing the body's stability to control the center of mass. Sailor et al. (2019) Present the Illinois test, the 505 test, the T-test, the L run test, and the zigzag test, all of which are agility tests. Dynamic balance refers to an individual's ability to maintain total body stability of the center of mass while moving. The ability to keep the center of mass stable while moving is referred to as dynamic balance. Lower Quarter Y Balance Test, a modification of the star excursion balance scale, assesses dynamic balance in athletes. The Y Balance test was created to standardize test performance and improve measured repeatability. This is an important test for guiding and monitoring the athletes' abilities.

The essential softball skills of movement performance and male players taking advantage of competitions can be improved. The softball player's health and skill-related fitness profile may be well-developed in order to achieve high performance and compete (Sintara and Sonchan, 2015). The concept of FIT was based on earlier reports on resistance training for school-age youth and was refined based on process evaluation from previous investigations (10,11,30). The aim of this study was to evaluate the effects of FIT on health- and skill-related fitness measures in primary school children during PE.

According to the concept, "fitness is a collection of physical skills that include endurance, stamina, strength, flexibility, power, speed, coordination, agility, balance, and accuracy." It continued, "functional fitness is most accurately measured by one's capacity to perform well the various tasks a Marine faceson a daily basis in training and combat" (Terrell, 2010). Static balance in young athletes is an important ability that has a relevant influence on their present and future sport performances, as well as on the reduction in risk of injury. The present study reports data collected on three homogeneous groups of 9 years-old athletes (n = 10 for each group), whose static balance was monitored every two months during an overall period of six months.

Vairavasundaram et al., (2014) showed that significant improvement in all the selected physical variables namely agility, explosive power, muscular strength endurance and flexibility among handball players. (Mathewos et al.,2013) evaluated that aerobic exercise has positive effect on improvement of cardiovascular endurance, muscular strength, muscular strength and flexibility.

According to Cagas and Hassandra (2014), the most frequently cited reason for exercising and participating was weight loss. The next most frequently mentioned reasons for exercising were improved health, strength and endurance, and appearance. Exercise for social recognition and competition, on the other hand, were the least mentioned reasons for exercising. Espeso et al. (2016), stated that increasing fitness benefits muscles and bones. Strong muscles and bones are required to improve performance and reduce the risk of injury, particularly for those whose jobs require physical exertion.

Cagas et al. (2016) proposed that physical activity leaders and program directors consider strengthening physical activity programs that emphasize sport for health rather than just exercise in order to address the program of physical inactivity among Filipinos. The program that offers a broader range of activities, such as exercises for appearance and health motivation, enjoyment, and long-term adherence to activities that promote health and overall well-being. Given the importance of motor skill related fitness for children's future physical activity, an international group of academics developed a standardized test battery, the PERF-FIT, to assess motor skill related fitness worldwide in low resourced areas (Smits-Engelsman et al., 2018). In this tool, the most developmentally appropriate and natural ways for children to test motor skill related fitness were selected.

Inovero and Pagaduan (2014) acknowledges that post-activation potentiates the coexistence of fitness and fatigue with mechanical stimulus. Post-activation potentiation occurs when fitness exceeds fatigue, and vice versa. While athletes training may experience fitness gains, the recovery time allowed to demonstrate transference in passing accuracy may be insufficient. Athletes must rest in order to overcome the fatigue factor.

Billot et al. (2010) investigated maximal voluntary contraction in vertical jump height, sprint running, and other sports activities using different contraction modes (eccentric, concentric, isometric). It noticed an increase in isometric and eccentric maximal knee extensive torques, as well as increased speed. Combining the three training modes would improve performance significantly.

According to Borbajo et al. (2017), previous research has shown that high-frequency muscle stimulation increases muscle activation time. The level of stimulation for a healthy subject in a fatigued state would typically range from 16-30 Hz. Because of the spread of the stimulation, lower frequencies tended to penetrate deeper into muscle groups, and stimulation pulses produced a much larger action potential. Training, according to Mendoza (2012), can improve your strength, core, endurance, and body composition—but make sure it's safe and appropriate for your needs. If you can only devote thirty (30) - sixty (60) minutes to your exercise program three days a week, you might want something that will help you lose fat faster, build muscle, and improve your endurance, core, strength, and flexibility. Training for a race may meet the majority of your cardiovascular and leg strength requirements, but it does not provide muscle-building or core benefits. A popular dance workout that incorporates dumbbells can help you burn more calories and tone your body, but an instructor may not always be available at your preferred time. Boot camp training may be suitable for you. This fitness workout will remain popular because it incorporates the most recent exercise types, fitness equipment, and research.

Souhaeil et al. (2014) found that the increase in leg and thigh muscles did not differ from the arm performance test, showing improvement in both the lower and upper extremities. Plyometric training exercises boost athletes' confidence in playing their chosen sports.

Miyama et al. (2004) found that using a soft surface provides more preventive measures, protecting the legs during jumping. This approach improves the strength and power of the leg muscles, countering any potential injuries during testing.

Fernandez et al. (2018) investigated and found that female youth athletes can easily adapt to resistance training, thereby increasing their strength and power. Resistance training is a significant contributor to muscle strength in female youth athletes.

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According to Souhaeil et al. (2009), improving jumping performance through the use of back half squat plyometric exercises is highly recommended for a year-long training program for athletes.

Synthesis of Review Literature and Studies

The summary of reviewed literature and studies was compiled to increase knowledge and understanding of this study, as well as the researcher's justified rationale for general ideas of the problem, concept, and treatment of the study, which was integrated into the early studies and literature.

Ozbar, Ates, and Agopyan (2014), Beardsley and Contreras (2014), Green (2017), Papa and Pagaduan (2014), Dewar (2017), Bruton, Llorente, Aguero, Casajus, and Rodriguez (2017), Mishra (2016), Verma, Subramanium, and Krishman (2014), Villareal, Kellis, Kramer, and Izquierdo (2009), Stojanovic, Javanovic, and Stijanovic (2012), Laffaye, Wagner, and Tombleson (2008), Baggett (2008), Inovero and Pagaduan and Ramirez, Henriquez, Andragle and Alvarez (2014) noted that plyometric training exercises increase competitiveness of the athletes. The loading system of training develop the strength and power of explosiveness through series of exercises. With gradual intervention of fitness training to maximum loading will enhance the vertical and horizontal jumping ability of athletes in significant improvement.

McCall (2017), Taheri, Nikseresht, and Khoshman (2014), Slimani, Miarka, Chamari, and Del Vecchio (2016), Shah (2012), Sailor, Valodwala, and Bhalani (2019), Yahaya (2012), Terrell (2010), Murphy, Connolly, and Beynnon (2014), Rimando, Divora, Viray, Canlas, Ferrer, Galvez, Ilagan, Meria, and Refuerzo (2015), Simonek, Horicka, and Hianik (2016), Sintara and Sonchan (2015), Inovero and Pagaduan (2014), Billot, Martin, Paizis Cormetti, Babault (2010), Borbajo, Casil, Cruz, Penaflor, and Musgi (2017), and Mendoza (2012) mentioned in theirs studies and literature that combining different types of training can lead to improvements in high intensity or maximum level of performance. To improve the more dynamic skill of training, they can be controlled or adapted to the changing pattern of movement. Athletes can improve their explosive strength and leg power to compete at a higher level.

Sailor, Valodwala, and Bhalani (2019), McLeod, and Tamara (2008), Terrell (2010), Fayaz (2009), Simonek, Horicka, and Hianik (2016), Sintara and Sonchan (2015), Yahaya (2012), Dawes and Roozen (2012), Murphy, Connolly, and Beynnon (2014), and Rimando, Divora, Viray, Canlas, Ferrer, Galvez, Ilagan, Meria, and Refuerzo (2015) mentioned and discussed using skills tests as a guide and indicator of athletes' good and poor performance Physical fitness can also improve multi-directional agility skills, balance, firm hold or body control, coordinated move with simultaneous response of the extremities, and power to improve leg strength in jumping skills.

Sailor, Valodvala, Bhalani (2019), Sintara and Sonchan (2015), Mendoza (2015), Terrell (2010), Billot, Martin, Paizis, Cormetti, and Babault (2010), Borbajo, Casil, Cruz, Penaflor, and Musgi (2017), Inovero and Pagaduan (2014), Cagas and Hassandra (2014), Cagas, Manalastas, and Torre (2016), and Espeso, Dimapilis, and Muli (2016) discussed the importance of sports agility skills that can create a multi-direction pattern of movement, balance center, and firm hold of the body movement that improve performance Skills training improves fitness or the capacity and capability of athletes. Combination training of skills provides

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more high and low frequencies, allowing athletes to adapt and recover for a short period of time. Even at a young age, fitness is recognized for competitive purposes. Children can engage in physical activity for bone development, health promotion, and overall wellness.

Agility test

Purpose: The purpose of this test is to know the speed, quickness, flexibility, change of direction and body control

Procedure: The athlete must run down forward while altering his running direction, as opposed to strictly stopping and starting in opposite directions. Each time they perform the 3-cone drill for a different side.

Scoring: The time to complete the test in seconds is recorded. The score is the best time of three trials.

Balance test

Purpose: To assess the ability to balance on the ball of the foot. Procedure: Position the non-supporting foot against the inside knee of the supporting leg. The subject is given one minute to practice the balance. The subject raises the heel to balance on the ball of the foot.

Scoring: The total time in seconds is recorded. The score is the best of three attempts. **Coordination test**

Purpose: To measure hand-eye coordination.

Procedure: A mark is placed a certain distance from the wall with 3 feet distance. The person stands behind the line and facing the wall. The ball is thrown from one hand in an underarm action against the wall, and attempted to be caught with the opposite hand. The ball is then thrown back against the wall and caught with the initial hand.

Scoring: Based on the score of the number of successful catches.

Power test

Purpose: To measure the explosive of the legs.

Procedure: The athlete stands behind a line marked on the ground with feet slightly apart. A two foot take-off and landing is used, with swinging of the arms and bending of the knees to provide forwards drive. The subject attempts to jump as far as possible, landing on both feet without falling backwards. Three attempts are allowed.

Scoring: The measurement is taken from take-off line to the nearest point of contact on the landing (back on the heels). Record the longest distance jumped, the best of three attempts.

METHODOLOGY

This chapter describes the methods, research design, population, sample size, sample technique, respondent description, research instrument, data collection procedure, and statistical analysis of data used in this study.

Research Design

The quantitative true experimental research design was used by the researcher. True experimental research entails randomly assigning participants to conditions in a systematic manner. The true experimental description (Prayas Gautan 2017) in which subjects are randomly assigned to program and comparison groups is one in which the researcher manipulates the cause-effect relationship on the respondents while using random assignment of participants to groups to control external factors from influencing the results. In this study, the researcher used statistics to collect and analyze data from respondents during training sessions for eight (8) weeks in order to determine the effectiveness of plyometric training in student-athlete skill-related fitness.

Population, Sample Size, Sample Technique

This research included sixteen (16) female volleyball players from Antonio A. Maceda High School. The volleyball team is divided into two groups: the experimental group, which consists of eight (8) participants who receive treatment, and the control group, which consists of eight (8) participants who continue with their regular training session of exercises. The population of high school volleyball players is divided into two groups. In order to comply with the study, participants are matched based on their skill performance.

Description of Respondent

The study's respondent-participants are sixteen (16) volleyball girls from Antonio A. Maceda High School. The respondent-participant is the school's official representative in all sports competitions in which the school competes. They are made up of both freshmen and seniors. The girls volleyball team is made up of freshmen and veteran players who were chosen to represent Antonio A. Maceda Integrated School during an annual Manila and NCR meet in August 2018. The positions on the team are as follows: open spiker and quicker, setter, utility, and libero. The respondents are between the ages of 13 and 16.

Table 1

Frequency and Percentage Distribution of the

Respondents in According to Age

Frequency	Age Percentage (%)
5	13 years old 31.3

3	14 years old 18.8
1	15 years old 6.3
3	16 years old 18.8
4	17 years old 25.0
16	**Total 100.0**

Table 1 displays the frequency and percentage distribution of respondents by age. According to the above table, the majority of the 16 respondents are 13 years old with a percentage of 31.1%, followed by 17 years old with a percentage of 25%, 16 and 14 years old with a percentage of 18.8%, and 15 years old with a percentage of 6.3%. Volleyball has been a part of the respondents' lives for at least four years.

Table 2. Frequency and Percentage Distribution of the Respondents in According to Number of Years as a Player

Frequency	**No. of Years as a Player**	**Percentage (%)**
1	Below 1 year	6.3
7	1 year	43.8
3	2 years	18.8
3	3 years	18.8
2	4 years	12.5
16		**100.0**

Table 2 shows the frequency and percentage of respondents by number of playing years. 7 or 43.8% of respondents have been playing for a year or more, followed by respondents with 2 or 3 years of experience, both of whom have three frequencies (18.8%). Respondents who have been playing for four years (12.5%) are followed by those who have been playing for less than one year (6.3%). Respondents have been playing for an average of 1.90 years.

Research Instrument

This study used and adopted the Physical Fitness Test Standard to determine the respondent-participants' Skil-Related Fitness. The American Association of Health, Physical Education, and Recreation (AAHPRD) skill-related component cited by Glencore and Graw (2004) was used in this study. The following tests were evaluated using the following purpose, procedure, and scoring: agility, balance, coordination, and power. Ensure the validity, eliminate bias, and use appropriate protocol with high school students only. The Physical Fitness Test Standard was used in the study to determine the participant's Skill related fitness level.

The equipment must begin with a basic training exercise. This exercise is labeled as follows: no barrier, barrier, and boxes. The purpose of the plyometric training no barrier exercises is to acquaint the participant with the training program. Barrier objects are used in biomechanical movements to improve jumping performance, and boxes are used in multiple jumping to improve explosiveness and power in jump training. These equipment training principles begin with low frequency repetition sets and gradually increase the athletes' treatment. To achieve a specific goal of higher frequency training and a well adjusted routine of the participant free from injury and safe in performing plyometric training program.

The first section of the instrument is the Respondent Profile, which includes age, height, weight, hip circumference, waist line, and playing years.

The second component of the instrument compares training performance in terms of agility, balance, coordination, and power between experimental and control groups during the Pre-test and Post-test. The third component is the significant difference in training performance between experimental and control groups in terms of agility, balance, coordination, and power between the Pre-test and Post-test. The final section focuses on the difference in skill-test scores between experimental and control groups during the Pre-test and Post-test.

To obtain a reliable sample from the respondents, a four-skill test was used. Athletes fill out the form as part of their participation in the plyometric training, and parental consent is required for their daughters to participate in the experiment. To evaluate the skill-related fitness test of the girls volleyball athletes, a skill test was conducted and data were collected from each individual athlete who was purposefully chosen for the control group that received regular training and the experimental group that received plyometric training treatment.

The skill-related fitness test was evaluated, and statistical data was analyzed to provide insight into the level of training performance of respondents.

Agility, Balance, Coordination, and Power skill tests comprise the four skill tests. The following instruments will be used to assess performance in three trial tests. The study of Hoffman (2020), that agility

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of the L-drill skill-test to measure athlete which is subjected in ranking athlete performance, that agility of the L-drill skill-test to measure athlete which is subjected in ranking athlete performance. Muehlbauer, Roth, Mueller, and Granacher (2011) investigated young adults' performance in a one-leg stand balance test with a reliability calculation. Handayani, Anton, and Yohandri (2020) conducted a study that measured hand and eye coordination while catching and bouncing a ball on the wall. In the study of Ferrera, Izzo, Cecilliani, and Di Tore (2019), power is calculated and evaluated by carrying out and evaluating the performance of a skill-test in jumping forward to determine explosive strength and power.

To evaluate the skill-related fitness test of the girls volleyball athletes, a skill test was conducted and data were collected from each individual athlete randomly selected for the control group that received regular training and the experimental group that received plyometric training treatment.

Data Gathering Procedure

Before beginning the study, permission to conduct it was obtained. A pilot test was also conducted within the study area, and the respondents who participated in the pilot testing were not included in the actual data collection. If a revision is required, it was made after the pilot testing. Respondents were informed that the purpose of the study was to evaluate the effectiveness of plyometric training on their skill-related fitness.

The plyometric training began by purposefully dividing the respondents into two groups: experimental and control. Plyometric training was administered to the experimental groups three times per week. Beginning after class hour on Mondays, Wednesdays, and Fridays. There are three kinds of plyometric training: no barrier, barriers, and boxes for box jump.

Individual respondent statistical data from plyometric exercise training were analyzed using the results of skill-related fitness test performance. The researcher measured data on improvements made during the 8 weeks of plyometric training using average means and standard deviation. The researcher tested all of the volleyball athletes after 8 weeks of training. The pre-test indicates a reliable candidate for the study, and the post-test results of both groups were compared to determine whether there was a significant difference. The research concentrated on specific scientific techniques related to methodology.

Statistical Treatment of Data

Treatment of data were tabulated and analyzed using the following statistical tools • Means – the average that is used to derive the central tendency of the data in question. It is determined by adding all data points in a population and then dividing the total by the number of points.

Formula:

$X = \Sigma "$

where x (read as ‘x bar’) is the mean of the set of x values

□□ is the sum of all the x values, and

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n is the number of x values.

• Standard Deviation – is a measure of the amount of variation or dispersion of a set of values.

Formula:

O = standard deviation

∑ = sum of

Xi = each value from the data set

x = the mean of all values in the data set

N = number of data points in the set

• Z-score – is to measure the significant difference of the value.

Formula:

□ = X − μ

□

□ = standard score

□ = observed value

μ = mean of the sample

x = standard deviation of the sample

RESULT AND DISCUSSION

This chapter discusses the study's findings on the effectiveness of a plyometric training program on the participants' skill-related fitness level.

1. Distribution of Respondents According to Height, Weight, Waistline Hip Circumference.

Table 3. **Frequency and Percentage Distribution of the Respondents in According to Height**

Frequency	Height	Percentage (%)
2	Below 5'0"	12.50
5	5'0" to 5'1"	31.30
5	5'2" to 5'3"	31.30
3	5'4 to 5'5"	18.80
1	5'6"	6.30
16		**Total 100.00**

Girls' volleyball athletes have an average height of 5'1" feet inches. The requirement of 5'4" feet inches in height is to make the team competitive in game performance. In volleyball, proper height proportion of the player stand can yield effective results. The study by Bones et al. (2022) does not agree with the study. The height difference profiling does not indicate weak athletes, but muscle development through training is of primary importance.

Table 3 displays the frequency and percentage distribution of respondents by height. It demonstrates an equal distribution of respondents with heights ranging from 5'0" to 5'1" and 5'2" to 5'3", equating to 5 (31.3%). This is followed by respondents with heights ranging from 5'4" to 5'5" (18.8%), then those with heights less than 5'0" (12.5%), and only one (6.3%) measured 5'6".

Table 4. Frequency and Percentage Distribution of the Respondents in According to Weight

Frequency	Weight Percentage (%)
4	35 to 40 kg 25.00
4	41 to 50 kg 25.00
6	51 to 60 kg 37.50
2	61 to 70 kg 12.50

16	**Total 100.00**

The weight range of 35 kilograms to 50 kilograms indicates that the participants' weight is thin or lighter. Adding weight to the athlete forces the team to adhere to stability and control movement. According to Pavlovic et al. (2022), gaining weight or mass does not indicate a lower performance result when jumping, but rather the stability of the leg muscle and joint. The study does not agree with the current study.

The frequency and percentage distribution of respondents in terms of weight is shown in Table 4. According to the table, the majority of the 16 respondents (37.5%) weigh between 51 kilograms and 60 kilograms, followed by 35 kilograms to 40 kilograms and 41 kilograms to 50 kilograms, each with four frequencies or 25%, and the remaining respondents weigh between 61 kilograms and 70 kilograms.

Table 5. Frequency and Percentage Distribution of the Respondents in According to Waistline

Frequency	**Waistline Percentage (%)**
4	24 to 26 inches 25.00
7	27 to 29 inches 43.80
3	30 to 32 inches 18.80
1	33 to 35 inches 6.30
1	36 inches and above_ 6.30
16	**Total 100.00**

The respondent's waistline circumference is 24 to 29 inches in diameter and has an effect on muscle build-up in the core area of the upper extremities, reducing the effectiveness of the loading system. According to Shiwei Wang (2022), a slim portion of the core does not indicate small muscle build-up, but athletes who exert maximum effort can show improvement. The study does not agree with the current study.

Table 5 shows the frequency and percentage distribution of respondents' waistlines. The majority (43.8%) have waistlines measuring 27 to 29 inches, followed by respondents with waistlines measuring 24 to 26 inches. Those with a waistline of 30 to 32 inches (18.8) are followed by those with a waistline of 33 to 35 inches (18.8) and those with a waistline of 36 inches or greater (6.3%).

Table 6. Frequency and Percentage Distribution of the Respondents in According to Hip Circumference

Frequency	Hip Circumference Percentage (%)
3	27 to 29 inches 18.80
8	30 to 32 inches 50.00
3	33 to 35 inches 18.80
2	36 to 38 inches 12.50
16	**Total 100.00**

The average hip circumference of the respondent was 31.69 inches, which is considered slim in the hip portion of the lower extremities. Shiwei Wang's (2022) research focuses on muscle development structure and training performance. This means that the respondent feature is not a barrier to success in the sport of volleyball. This study does not agree with the current study.

The frequency and percentage distribution of respondents in terms of hip circumference is shown in Table 6. 50% of respondents have hip circumferences measuring 30 to 32 inches, followed by a tied distribution of those with hip circumferences measuring 27 to 29 inches and 33 to 35 inches, which comprised 18.8% of respondents. The majority of respondents (12.5%) have hip circumferences ranging from 36 to 38 inches.

2. Performance During Pre-test and Post-test in Agility Test

Table 7. Agility Test Result in the Pre-test and Post-test Agility Test Experimental Group

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Pre-test (Second)	Post-test (Second)	Control Group	Pre-test (Second)	Post-test (Second)
10	8	Participant 1	10	
9	7	Participant 2	9	
9	7	Participant 3	9	
9	7	Participant 4	9	
9	7	Participant 5	9	
9	7	Participant 6	9	
11	8	Participant 7	10	
9	7	Participant 8	9	
9.25	7.125		9.25	

Post-test (Second) Participant 1 9 Participant 2 8 Participant 3 8 Participant 4 8 Participant 5 8 Participant 6 8 Participant 7 9 Participant 8 7 **MEAN SCORE** 8

Table 7 revealed that the experimental group finished the L-drill routine in a shorter time average, with a pre-test and post-test mean average of 9.25 seconds to 7.125 seconds decrease of 2.125 seconds. The eccentric muscle improved, allowing for more speed, and the concentric muscle released energy to burst in velocity in multi-directional changes to complete the task in agility skill-test. While the control group had a pre-test and post-test mean average score of 9.25 seconds to 8 seconds, a 1.25 second decrease that slightly improved the movement in multi-direction changes to every cone is slower in speed and consumes more time.

This means that the experimental group performed better in the Plyometrics training program. The current study's findings back up Dawes and Roozen's (2012) claim that agility training necessitates strengthening the muscles involved in stabilizing the muscles and joints of the lower extremities in order to perform multi-direction cone-agility drills. Athletes cannot easily accelerate and decelerate lateral forces in performing cutting motions without core stability; this takes a long time to make a directional change. This study agrees with the current study.

Table 8

Balance Test Result in the Pre-test and Post-test

Balance Test Experimental Group

Pre-test (Second)	**Post-test (Second)**	**Control Group**	**Pre-test (Second)**
10	7	Participant 1	4
3	7	Participant 2	12
4	6	Participant 3	10
7	12	Participant 4	14
14	18	Participant 5	7
6	14	Participant 6	12
12	12	Participant 7	4
14	20	Participant 8	9
8.75	12		9

Table 8 shows that the experimental group improved in balance by 3.25 seconds, foot stability, and body control to remain firmly in one leg for a long period of time with a pre-test and post-test mean average of 8.75 seconds to 12 seconds. The eccentric muscle group allows the body to remain in an elongated position for an extended period of time. It performs the body's concentric muscle contraction to ensure stability. While the control group improves their balance by 2.125 seconds with a pre-test and post-test mean average score of 9 seconds to 11.125 seconds. In a short period of time, this gradually improves. This means that the experimental group performed better in the Plyometrics training program. Turgut, Colakoglu, Serbes, Akarcesme, and Baltic (2017) found that a 12-week plyometric training program improved dynamic stability in female prepubertal volleyball players more than a control group. Supported the concept of plyometric training on dynamic balance and neuromuscular control in female prepubertal volleyball players, which resulted in higher dynamic balance scores. The previous study agrees with the current study.

Table 9

Coordination Test Result in the Pre-test and Post-test Coordination Test Experimental Group

Pre-test (catch)	**Post-test (catch)**	**Control Group**	**Pre-test (catch)**
56	60	Participant 1	37
9	34	Participant 2	17
12	20	Participant 3	23
29	40	Participant 4	26
48	68	Participant 5	21
18	36	Participant 6	15
28	21	Participant 7	5
15	32	Participant 8	21
26.875	38.875		20.625

Post-test (catch) Participant 1 41 Participant 2 23 Participant 3 20 Participant 4 33 Participant 5 35 Participant 6 30 Participant 7 12 Participant 8 24 **MEAN SCORE** 27.25

The study's findings in an alternating recruitment pattern show which participants are more likely to catch more balls. Participants with lower results in the controlled group's pre-test and post-test will most likely struggle to maintain the drill test of bouncing on the wall while catching the ball. While the experimental group with the best results will have more balls to catch.

Table 9 shows that the experimental group improved by 12 catches, with a pre-test and post-test mean average of 26.875 catches to 38.875 catches, and the eyes and hand coordination movement improved in catching more balls. While the control group with a pre test and post-test mean average score of 20.625 seconds to 27.25 seconds, the eyes and hand improve in a less incline in catching and bouncing the ball on the wall.

This means that the experimental group performed better in the Plyometrics training program. The current study's findings are consistent with the current study's findings on altered recruitment patterns, which may alter the distribution of forces acting on articular, ligamentous, and muscular structures. The participant is not inclined to coordinate pattern movement from the start of the study. (Murphy, Connolly, & Beynon, 2014).

Table 10

Power Test Result in the Pre-test and Post-test Power Test Experimental Group

Pre-test (inches)	Post-test (inches)	Control Group	Pre-test (inches)
55	62	Participant 1	61
60	65	Participant 2	66
62	69	Participant 3	63
59	65	Participant 4	63
60	64	Participant 5	53
67	72	Participant 6	57

61	60	Participant 7	55
57	66	Participant 8	66
60.125	66.00		60.5

Table 10 shows that the experimental group improved their leg power and covered more distance with a pre-test and post-test mean average of 60.125 inches to 66 inches. The eccentric muscle of the leg improves and the concentric muscle increases explosive output to gain momentum in jumping, whereas the control group improves only 1.75 inches of covered distance in jumping forward with a pre-test and post-test mean average score of 60.50 inches to 62.25 inches. This means that the experimental group performed better in the Plyometrics training program.

The current study's findings support the findings of a previous study by Shah (2012), which claimed that testing should begin with gross motor low intensity and progress to higher intensity. Every session of workout training, the participant receives the same treatment. The workout session and time for developing power for muscular endurance are then gradually increased. As a result, this finding is consistent with the current study's findings.

3. Significant Difference between the Pre-Test and Post-Test

Table 11

Comparison on the Skill-Related Fitness Test in the Pre-Test and Post-Test of Control Group Skill-Related Fitness

Agility skill test

Balance skill test Coordinating skill test Power skill test

Pre-Test		**Post-Test**	
Average	**SD**	**Average**	**SD**
9.63	0.49	8.5	0.85

7.29	3.21	9.75	3.88
8.42	3.25	12.58	3.62
57.96	4.44	60.67	3.85

Agility of the average result of the Control group:

1.0 Agility score in the pre-test drill test shows an average score of 9.63 seconds, which is considered slow in performance when finishing the L-drill test. 2.0 Post-test agility score of 1.0 has decreased over time. The difference in performance can be seen in the respondent's improved directional movement control after completing the drill test. To compensate for the time adjustment, the cone must be properly in control motion movement.

Balance of the average result of the control group:

1.0 Balance of the control group in the pre-test drill performance has a score of 7.29 second on standing in one leg which has a shorter time in spending in one leg stand

2.0 The average balance score of the post-test drill has increased to 9.75 seconds. The average difference of 2.46 seconds is insufficient time to devote to one leg stand performance. The participant's muscle endurance is expected to allow him or her to stand on one leg for a longer period of time.

Coordinating of the average result of the control group:

1.0 Coordinating skill test score in the pre-test drill has an average of 8.42 number of ball catches. The number of balls acquired by participants falls short of the average number of ball catches.

2.0 Coordinating skill test score in the post-test drill performance has an average score of 12.58 average numbers of catches. The difference of 3.86 average on ball catch is insufficient in the average of the numbers of catches in the performance test.

Power of the average result of the control group:

1.0 Power score in the pre-test drill performance has an average score of 57.96 in inches of the jumping forward performance drill test. In the jumping performance test, which has a short distance covered

2.0 Power score in the post-test drill performance has an average score of 60.67 in inches of jumping forward performance drill test. The difference in average inches covered of 3.13 is insufficient to cover the distance of jumping forward. In the jumping forward test, the lower extremities legs are not well established to cover more distance.

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Table 11 compares the pre-test and post-test results of a skill-related fitness test between control groups. The average score of skill-related tests increased from pre-test to post-test, with the exception of the Agility test, which has a lower average score on post-test. Except for the power skill test, standard deviations are also higher during their post-test, indicating a larger spread of data or distance from the average score. The data show that, while the Agility score is lower on the post-test, the scores of respondents are clustered closer to the average score than they were on the pre-test. Power skill test, which has average scores of 57.96 and 60.67, and standard deviations of 4.44 and 3.85 during pre-test and post-test, respectively, means that on their post-test, respondents got a higher average score, and their scores are clustered closer around the average score, compared to their pre-test, which has a lower average score, and their scores are clustered farther around the average score.

Mendoza (2012) claims in his study that training can improve your strength, core, endurance, and body composition—but make sure it's safe and appropriate for your needs. If you can only devote thirty (30) - sixty (60) minutes to your exercise program three days a week, you might want something that will help you lose fat faster, build muscle, and improve your endurance, core, strength, and flexibility. Training for a race may meet the majority of your cardiovascular and leg strength requirements, but it does not provide muscle-building or core benefits. A popular dance workout that incorporates dumbbells can help you burn more calories and tone your body, but an instructor may not always be available at your preferred time. Boot camp training may be suitable for you. This fitness workout will remain popular because it incorporates the most recent exercise types, fitness equipment, and research.

Table 12

Comparison on the Skill-Related Fitness Test in the Pre-Test and Post-Test of Experimental Group Skill-Related Fitness

Pre-Test		Post-Test	
Average	**SD**	**Average**	**SD**
9.54	0.83	7.63	0.68
6.5	3.96	10.29	4.84
12.04	10.26	18.38	7.54
57.83	3.7	64.54	3.69

Agility of the average result of the Experimental group:

1.0 The experimental group's agility score in the pre-test drill test shows an average score of 9.54 seconds, which is considered slow in performance when finishing the L drill test

2.0 The experimental group's agility score in the post-test drill has decreased over time. With a score of 7.63 seconds, the average performance difference is 1.91 seconds. This demonstrates that the participant improved on directional movement control after completing the L-drill test.

Balance of the average result of the Experimental group:

1.0 Balance score of the experimental group in the post-test drill performance has a score of 6.50 second average on standing in one leg which has a shorter time in spending in one leg stand

2.0 The post-test drill's balance score has increased with an average time of 10.29 seconds. The difference is 3.71 seconds spent on average in one leg stand performance. The participant's muscle endurance improved, allowing him to stand on one leg for extended periods of time.

Coordinating of the average result of the Experimental group:

1.0 Coordinating score in the pre-test drill has an average score of 12.04 average number of ball catches. The number of balls caught by participants is minimal on average.

2.0 Coordinating score of the experimental group in the post-test drill performance has an average score of 18.38 average numbers of catches. The difference in average ball catch time of 3.86 seconds indicates that more balls were caught in the performance test. Numbers of ball are caught in the performance test.

Power of the average result of the Experimental group:

1.0 The experimental group's pre-test drill performance has an average score of 57.96 in inches of the jumping forward performance drill test, which is considered an average result in the jumping forward performance test.

2.0 Power score in the post-test drill performance has an average score of 64.54 in inches of jumping forward performance drill test. This demonstrates a 6.71 average difference in inches covered distance when jumping forward. The lower extremities legs have improved, allowing them to cover greater distances in the jumping forward test.

Table 12 compares the pre- and post-test results of a skill-related fitness test between experimental groups. The average score of skill-related tests increased from pre test to post-test, with the exception of the Agility test, which has a lower average score on post-test. Except for the balance skill test, standard deviations are lower during their post-test, indicating a larger spread of data or distance from the average score. Power skill is calculated with average scores of 57.83 and 64.54 and standard deviations of 3.70 and 3.69 in pre-test and post-test, respectively, indicating that on their post-test, respondents received a higher average score and their scores were clustered closer around the average score compared to their pre-test, which had a lower average score and respondents' scores were clustered farther around the average score. Furthermore, respondents' Agility test results showed a lower post-test average score and standard deviation.

The goal of using plyometric and skill-related fitness tests after a plyometric training program for athletes is to determine the difference in their skilled performance. requiring a faster change of direction while maintaining agility control and improving balance and coordination (Sailor, Valodwala, and Bhalani, 2019).

4. Significant Difference Between the Experimental Group and Control Group

Table 13

Comparison of Agility test in the Significant Difference between

the Experimental Group and Control Group

Groups	**Mean**	**t - value**	**P - value**	**Decision**
Experimental	8.5	2.269	0.04	Reject Ho

Indicator Remarks Agility Significant

Note: *If p value is less than or equal to the level of significance which is 0.05 reject the null hypothesis otherwise failed to reject Ho.*

This implies that the experimental group improved its performance in the L-drill test by taking less time. With significant comments, the participant demonstrates the ability to control multi-direction pattern movement in completing the drill test in less time. The significant difference found indicates that the experimental group outperformed the control group in terms of performance scores.

Table 13 compares the agility of the respondents in experimental and controlled groups. According to the findings, there is a significant difference between the experimental and control groups in terms of respondent agility, and because the computed p-value is less than the level of significance, which is 0.05, the researcher rejects the null hypothesis. Also, the experimental group completed the L-drill routine in a shorter time on average due to a decrease in second running faster in multi-direction changes from one cone to another. The eccentric muscle improved, allowing for more speed, and the concentric muscle released energy to burst in velocity in multi-directional changes to complete the task in agility skill-test. While the control group had a pre-test and post-test mean average score decrease in seconds, which slightly improved its movement in multi-direction changes to every cone, it was slower in speed and took longer. The experimental group's agility level is higher than the controlled group's respondents.

Jaromir Simonek et al. (2016), this study is to find the difference between the players performance based on sports specification and enable to assess the relationship players performance into agility test. (The Illinois Agility Test assesses the ability of a simple reaction, acceleration, deceleration, and changes in the

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movement direction, while the Fitro Agility Check assesses the above process of the individual perception and decision-making. Their findings are consistent with the present study..

Table 14

Comparison of Balance test in the Significant Difference between

the Experimental Group and Control Group

Groups	Mean	t - value	P - value	Decision
Experimental	10.21	0.208	0.838	Failed to Reject Ho

Indicator Remarks $_{\text{Balance}}$ Not Significant

Note: *If p value is less than or equal to the level of significance which is 0.05 reject the null hypothesis otherwise failed to reject Ho.*

Based on the experimental group's performance on the balance skill test, the group spent more time balancing on one leg. Despite the fact that the participants improved on the skill performance test, the P-value is not less than the significance value. Failure to reject the hypothesis indicates that the remark result is not significant. Even though the experimental group's score is higher than the control group's, it is not high enough to withstand the longer time spent in the one leg stand performance test.

Table 14 compares the experimental and controlled groups in terms of respondent balance. According to the results, there is a significant difference in the balance of the respondents between the experimental and controlled groups because the computed p-value is greater than the level of significance, which is 0.05, and thus the researcher failed to reject the null hypothesis.

Furthermore, on average, the experimental group improved balance in seconds, foot stability, and body control to remain firmly in one leg for an extended period of time. The eccentric muscle group allows the body to withstand being in an elongated position for an extended period of time. It performs the body's concentric muscle contraction to ensure stability. While the control group improves in seconds with a pre-test and post-test mean average score. For a short time, the balance gradually improves. This means that the experimental group performed better in the Plyometrics training program. The experimental group has a higher level of balance than the control group respondents.

Similar to this study, Karadenizli (2016) conducted a study on the effect of 10 weeks of Plyometric Training on the static balance (SB-unipedal), dynamic balance (DB-bipedal slalom), anaerobic power (AP), and physical fitness parameters (PFP) of 30 meter sprint, agility test (Illinois agility test), vertical Jump (VJ), and horizontal jump. The results show that a 10-week plyometric program improves the performance of young handball athletes. This is consistent with the findings of the current study.

Table 15

Comparison of Coordination test in the Significant Difference between the Experimental Group and Control Group

Indicator Remarks

Groups	Mean	t - value	P - value	Decision
Experimental	28.5	1.944	0.072	Failed to Reject Ho

Coordination Not Significant

Note: *If p value is less than or equal to the level of significance which is 0.05 reject the null hypothesis otherwise failed to reject Ho.*

This data shows that the experimental group's coordination skill test result in catching more balls is not significant, even though its control group catches fewer balls than the treated participants. The experimental group is more likely to perform the drill test, which improves hand and body coordination. The remark based on the failure to reject the hypothesis is that there is no significant difference.

Table 15 compares the coordination of the respondents in experimental and controlled groups. According to the findings, there is no significant difference between the experimental and control groups in terms of respondent coordination because the computed p-value is greater than the level of significance, which is 0.05, and thus the researcher failed to reject the null hypothesis. Furthermore, catches improved the eyes and hand coordination movement in catching a greater number of balls on average.

The eccentric muscle eyes and hand coordination movement precisely catches the ball and concentric contraction in throwing the ball on the wall returns to the original place of eyes and hand position, whereas the control group with a pre-test and post-test mean average catches improved the eyes and hand coordination, which is less inclined in catching and bouncing the ball on the wall. This means that the experimental group performed better in the Plyometrics training program.

The experimental group has better coordination than the respondents in the control group. According to Sintara and Sonchan (2015), data from the post-test for male and female athlete performance indicated

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improvement across the board. The coordination, agility, and balance components of male athletes improved, but only moderately. Speed, reaction time, and power all improved to a satisfactory level. Female athletes improved their speed, but it was still at a low level of norm, and their power component was still below the moderate level. The coordination, balance, and agility components were moderate, and the run test showed significant improvement. This study agrees with the current study.

Table 16

Comparison of Power test in the Significant Difference between

the Experimental Group and Control Group

Groups	Mean	t - value	P - value	Decision
Experimental	64.54	2.054	0.059	Failed to Reject Ho

Indicator Remarks Power Not Significant

Note: *If p value is less than or equal to the level of significance which is 0.05 reject the null hypothesis otherwise failed to reject Ho.*

This implies that the experimental group outperformed the control group in terms of covering distance in the forward jump test. In terms of higher figures, however, the average number of p-values is insufficient to cover the significant result and fails to reject the hypothesis.

Table 16 compares the power of the respondents in experimental and controlled groups. According to the results, there is a significant difference in the power of the respondents between the experimental and controlled groups because the computed p value is greater than the level of significance, which is 0.05, and thus the researcher failed to reject the null hypothesis. Furthermore, the experimental group improved in inches, leg power, and distance covered. The eccentric muscle of the leg improves and the concentric muscle increases explosive output to gain momentum in jumping, whereas the control group improves for a couple of inches to covered distance in jumping forward with a pre-test and post-test mean average score. This means that the experimental group performed better in the Plyometrics training program. The experimental group has a higher power level than the control group respondents.

This finding supported the notion that plyometric training is required for skill development. A statistical analysis of the testing results revealed that athletes' legs and arms speed and force improved consistently. The results of the standing long jump, depth leap long jump, and maximal vertical jump height tests, which demonstrated legs explosive power, did not show a significant reliable difference ($p>0.05$). Medicine ball throws and maximal vertical jumps to the maximum height in 10 seconds, which demonstrate speed force improvement, demonstrated a consistent difference (Vassil and Bazanov, 2012). This study agrees with the current study.

Chapter 5

SUMMARY OF FINDING, CONCLUSION AND RECOMMENDATION

This chapter 5 presents the study summary of findings, conclusions, and recommendations, all of which were based on the data gathered and interpreted in the previous chapter 4. All are validated and gathered to provide pertinent answers for the development of this study and for a much clearer view of the result, which is stated in accordance with the questions stated previously in this chapters.

Summary of Findings

The purpose of this study is to determine the effectiveness of a Plyometric training program for high school girls volleyball athletes from Antonio A. Maceda Integrated School who participate in the Palarong Maynila Annual Meet. The following is the findings of the study:

In terms of height, the majority of the volleyball athletes are with an equal distribution of respondents who are between 5'0" to 5'1" and 5'2" to 5'3", which is equivalent to 5 (31.3%), followed by respondents who are between 5'4" to 5'5" with a percentage of 18.8% or 3, then below 5'0" with a percentage of 12.5%, and only 1 (6.3%) of the respondents measured 5'6".

In terms of weight, the majority of the 16 respondents weigh between 51 and 60 kg. with a percentage of 37.5% or 6, followed by respondents weighing between 35 and 40 kg. with the same distribution equivalent to 4 frequencies each or 25%, and the remaining respondents weigh between 61 and 70 kg. with a percentage of 12.5% or 2 frequencies.

In terms of waistline, the majority of respondents measure between 27 and 29 inches, with a percentage of 43.8% or 7, followed by those measuring between 24 and 26 inches, with a percentage of 25% or 4, and those measuring 30 to 32 inches, with a percentage of 18.8% or 3, while the rest of the respondents with 33 to 35 inches and 36 inches have the same distribution equivalent of 1 with a percentage of 6.3%.

In terms of hip circumference, the majority of respondents measure 30 to 32 inches with a percentage of 50% or 8, followed by respondents measuring 27 to 29 and 33 to 35 inches with a percentage of 18.8% or 3, and the remainder measure 36 to 38 inches with a percentage of 12.5% or 2.

In Agility, the experimental group completes the L-drill in the quickest possible time of 7.125 seconds, while the control group takes 8 seconds to complete the skill-test. The experimental group decreased by 2.125 seconds on average, while the control group decreased by 1.25 seconds. This means that the experimental group's performance training method is superior to the control group's regular training exercise.

In Balance, the experimental group spent more time standing on one leg for 12 seconds than the control group with 11.125 seconds. The experimental group gained 3.25 seconds on average, while the control group gained 2.125 seconds. This means that the experimental group's performance training method is superior to the control group's regular training exercise.

In coordination, the experimental group catches more balls (38.875 catches) than the control group (27.25 catches). The experimental group increased their catch rate by 12 percent on average, while the control group increased their catch rate by 6.625 percent. This means that the experimental group's performance training method is superior to the control group's regular training exercise.

In Power, the experimental group increased their jump distance by 66.00 inches, while the control group increased by only 62.25 inches. The experimental group increased by 5.875 inches on average, while the control group increased by 1.75 inches. This means that the experimental group's training method is superior to the control group's regular training exercise.

In terms of the difference between the pre-test and post-test, the experimental group has a lower output average score of the post-test that decreases in seconds running to finish L-drill faster and gain more speed at multi-direction changes in velocity, whereas the control group slightly decreases in seconds in running for speed movement.

In general, the experimental group spent more time producing average post-test scores that increased in seconds leg stability and retention in standing on one leg, whereas the control group score average increased in seconds in a gradual phase.

The experimental group catches more balls in the average score of the post-test that eyes, hand movement, and body control in bouncing the ball on the wall, whereas the control group catches fewer balls with less incline in catching and bouncing the ball.

The experimental group covered more distance in inches in the average score of the post-test that increased leg power and explosiveness output in jumping forward, whereas the control group covered less distance in the average score output.

In terms of the significant difference between the experimental and control groups: The agility skill-test produces a significant difference between the experimental and control groups with a lower p-value; thus, the null hypothesis is rejected. The experimental group runs faster in developing leg and core muscle to gain more speed in finishing the L-drill agility test, while the control group runs slightly slower.

The null hypothesis is accepted because there is no significant difference between the experimental and control groups that is greater than the p-value output on the balance skill-test. The experimental group's leg stability control of the body allowed it to stand for a longer period of time, whereas the control group's increase in seconds was minimal.

The null hypothesis is accepted because there is no significant difference between the experimental and control groups, which is greater than the p-value output. The experimental group catches more balls with their eyes and hand coordination while bouncing a ball on the wall, whereas the control group only catches a few balls.

The power of the experimental group is greater than the p-value output because there is no significant difference between the experimental group and the control group; thus, the null hypothesis is accepted. The experimental group covers more ground in terms of leg power and explosiveness when jumping forward.

Conclusion

Result of the research study arrived to a conclusion that:

1. The majority of 13-year-old respondents are too young to be considered for recruitment. The medium height profile range of 5'0" to 5'1" is too small for recruitment, so taller players must be prioritized. A weight range of 35 to 50 kilograms is considered thin. For the team, half of the players must be physically fit. In terms of waistline, most players range from 24 to 29 inches, which is slim and requires muscle mass and core development, and hip circumference ranges from 30 to 32 inches, which requires more power in training and loading workouts. In terms of playing years, almost one year, or the first year of playing volleyball, is required for beginners in training and playing volleyball to mature and become a well-rounded player.Both groups have improved, but the experimental group has a better training method than the control group.

2. The experimental group's average agility test time was 7.125 seconds, which was faster than the control group's time of 8 seconds. The experimental group performed better in Plyometric training and had a lower average output in agility test performance.

2.1 The experimental group’s mean average time is 12 seconds, which is longer than the control group’s time of 11.125 seconds. The experimental group outperformed the control group in Plyometric training, with a higher average output and improved balance test performance.

2.2 Coordination test results show that the experimental group averaged 38.875 catches, which is more than the control group’s 27.25 catches a few balls. The experimental group performed better in Plyometric training and had a higher average output in the coordination test. Power test result of the experimental group mean average of 66.00 inches which cover more distance than the control group of 62.25 inches forward jump. The experimental group has a better performance in training Plyometric an increase output average of the improve in the power test performance.

3. Both group has a difference between the pre-test and post-test, but the experimental group has a higher skills development.

3.1 Agility skill-test both groups have a difference. The experimental group has a difference in terms of lower seconds result than the control group. Therefore, the experimental group with higher level of agility in finishing the test a quick possible time.

3.2 Balance skill-test both groups have a significant difference. In the aspect of time spent in one leg stand the experimental group has a significant change in longer seconds result than the control group. Therefore, the null hypothesis is rejected the experimental group longer time in balancing in one leg.

3.3 Coordination skill-test both groups have a significant difference. In term of catches the experimental group has a significant change in catches more number of ball result than the control group few ball is catch. Therefore, the null hypothesis is rejected the experimental group with more number ball catches in bouncing the ball on the wall.

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3.4 Power skill-test both groups have a significant difference. In jumping forward the experimental group has a significant change in more distance covered than the control group performance. Therefore, the null hypothesis is rejected the experimental group more distance covered in jumping forward.

4 There is a significant difference between the experimental group and control group in terms. 4.1 Agility skill-test that there is a significant difference between experimental group and control group in lower p-value output; thus, the null hypothesis is rejected. The experimental group run faster in developing the leg and core muscle to gain more speed in finishing the L-drill agility test while the control group with slight decrease in seconds.

4.2 Balance skill-test that there was no significant difference between experimental group and control group which is more than the p-value output; thus, the null hypothesis is accepted. The experimental group leg stability control of the body to stand for a longer period of time while the control group with minimal increase in seconds.

4.3 Coordination skill-test that there was no significant difference between experimental group and control group which is higher than the p-value output; thus, the null hypothesis is accepted. The experimental group catches more numbers of ball the eyes and hand control coordination improve in bouncing ball on the wall while the control group few balls is catch

4.4 Power of the experimental group that there was no significant difference between the experimental group and control group which is higher than the p-value output; thus, the null hypothesis is accepted. The experimental group more distance is covered in leg power and explosiveness in jumping forward while the control group lesser distance is covered in jumping forward.

Recommendations

In the light of the findings, based on conclusion, the following recommendations are presented to know the effectiveness of plyometric training program for athletes, coaches, and administrations for better development of athletes in the field of sports.

1. It is highly suggested in order to have a great output in playing volleyball a player should be at the level age of 15 years old.

2. Training plyometric exercise is recommended to the participant of the controlled group and experimental group to continuously adapt the system of loading training program of plyometric exercises.

3. Both group can have a Plyometric training for trice a week consisting of squat in incline and decline position (standard and closed form), plyometric push-up, lateral box push-up, medicine ball throw, split jump, lateral depth jumps, lateral hurdle jump, single-leg lateral hops. However each session should have six exercises repeated twice (two to three sets) with varying the repetitions between 8 to 15.

4. Introduce new training method to help develop high school girl volleyball athletes to reach their full potential. Plyometric training program develop the multi-directional movement, stabilize the leg muscle, synchronize coordination body movement and jumping skill exercise will develop with a higher level performance.

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5. The researcher suggests an extensive recruitment in scouting better player that has a potential traits, right physique and maturity in playing for the school. Additionally, there should plyometric training program seminars and orientation to introduce the technical importance and scientific method in training Plyometric Training Program to the girls volleyball team of AAMIS. Primary develop and improve in playing volleyball for sport competition. Faculty members and including coaches, trainers,

teachers, and those who are involved in school sports to train in a boot camp using scientific exercises such as plyometric exercises. There should be also support provided to athletes in term of supplemental budget for sport equipment and proper area in holding to intensified training for sports development.

6. Further study in terms of effectiveness of plyometric training to other schools must be undertaken.

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