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Review Article

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Research Article

Mobile games and applications for high school level students as physical education E learning platform

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Received: 21-11-2020 **Acceptance:** 29-12-2020

ABSTRACT

This paper discusses the features of Virtual Reality technology and the roles of VR technology in physical education teaching and training. To prove the current health issues facing the children among the primary class conducted a data collection body mass index (BMI) of among the 5th standard 35 male and female students of Sree Sarada Vidyalaya, Kalady, Kerala Senior Secondary School Kalady, the result was shocking most of them are obese and overweight. I aim to improve the health making much interested to involve and participate in physical activities through virtual reality game application because this age children's are more familiar and much enjoying the mobile games they are not recommended to play the old minor games this generation young children are very much the consumers of mobile application we must understood the desire. Based on the nature of PE teaching and training, the application model of VR technology in this field is constructed. For the features of VR technology are including perception, presence, interactivity, and autonomy, it will be widely applied in PE teaching and training and play a significant role. Health-care experts are arguing that there is a need for an all-inclusive and result oriented fitness for children in India. Children's health is becoming a matter of concern in globally. Being the second most populated country of the world, the situation is even more alarming in India. Statistics provided by Indian journal of Endocrinology and metabolism shows that 5.74–8.82% school children in India are obese. In the Pandemic situation, virtual cycling has key role providing physical fitness and mental health. The truth is that although nearly everyone knows they should workout and eat right, most students do not do it. They do their best for a few weeks or a month, and then give up and are back to square one. The frustration continues. The biggest and most amazing benefit of VR fitness are that by creating an immersive, emotional, social experience, you can make working out as addictive as your favorite sport, or video game. Virtual reality is a revolutionary concept for experiencing the virtual world which does not have any physical existence using Head Mounted Display device. It is the factor to feel the environment with our own customization. VR is completely safe and can give mesmerizing experience to the user. VR has a wide scope starting from small object to the entire world which depends on the creativity of the environment designer. It can be used in many fields such as medical practices, healthcare, driving simulation, nd gaming. In this paper, the product is meant for people who want to maintain their fitness experiencing different environment of their own choice. Nowadays, cycling in gym has become too generic, also in stationary cycle along with just paddling the intended product will provide them a thrilling environment in which they will exercise more frequently and help them to maintain their health. VR provides completely new level of human-computer interaction. Combination of physical exercise and digital games. Developed to transform monotonous practice into a more enjoyable activity, these systems are being successfully used in different settings, including rehabilitation and sports training. Fun and fitness are now combined with various digital gaming products. We believe virtual reality platform can change the ordinary physical education activities to extra-ordinary this ultimately the impact of VR can improve the physical and mental health school children's among our nation.

Keywords: E-lerning, Obesity, Physical education, PlankPad, Virtual reality

INTRODUCTION

Meanwhile, a study published in pediatric obesity predicts that India will have about 17 million obese children by 2025. Another study shows that about 97,000 children India suffer from type I diabetes. Poor eating habit and sedentary lifestyle among children are two of the major reasons for the declining levels of physical fitness in children, leading to childhood obesity, diabetes, and other lifestyle diseases. "It is estimated that child 20 years from now is likely to suffer from diabetes and heart diseases which become unpreventable during adulthood. They can be controlled" opines Dr. Arbinder

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Singal, CEO and Co Founder, Fitterfly. While health and fitness education provided in schools is seen as an important tool in dealing with this health issue, experts have noticed that the physical education programs being pursued by the schools in India are either obsolete or inadequate in addressing the emerging health challenges since they mostly revolve around theoretical aspects or random sports. Education and health-care experts point out that in India no more than 10% school going children are into active and competitive sports.

This is because the schools tend to focus only on the diet of the kids who are expected to represent the school at local, regional, state and national level events, excluding a majority of children who end up as faience – sitters in the PE periods.

Commenting on this Dr. Singal said, "It is a tragedy that still many people continue to see physical fitness as something that is required only for athletes or sportsmen. However, they do not realize that physical health is equally important academic results too also an objective assessment of fitness is a must as that is the only way to know where the child is and where the child ideally should be for his or her age and a gender." According to Dr. Bakul Parekh, Senior Paediatrician, "Fitness in children can power them for a healthy future. Schools should focus physical education and school health check-up's around physical literacy. It means that children should understand the importance of exercises, fitness, and sports. Hence, there is a need for our PE to move beyond the romantic landscape of sports t general fitness for every child." Home to the world's largest youth population, experts believe that India needs to introduce a mass child fitness program – a program that is scientific, workable, accurate, and verifiable aided by data and technology.

To prove the current health issues facing the children's among the primary class, we conducted a data collection among the 5th standard 35 male and female students of Sree Sarada Vidyalaya, Kalady, Kerala, Senior Secondary School Kalady the result was shocking.

PlankPad

PlankPad comes with a fitting app with many games and workouts. The app is synchronized with the PlankPad. The movements you perform control the games. The app and the gyroscope of your mobile device are in perfect sync with the PlankPad. There is a game for everyone such as Candy Monster, Duck Shoot, Pong Goal, Meteor Madness, Wave Rider, and Snow Cruisin'. And in the future, there will be even more. The games will challenge you to collect more and more points and you will forget about the time. By playing a game, your focus is more into the game than on counting every second. This makes you plank much longer, reaching your goals faster while the time flies by having fun. To play the game you have to balance the PlankPad left and right. The app and the gyroscope of your mobile device are in perfect sync with the PlankPad. There is a game for everyone such as: Candy Monster, Circles, Asteroids, Wave Rider, and Snow Cruisin'. And in the future, there will be even more. The games will challenge you to last much longer, collect points, save your score, and compete with your family or friends.

The Plank Workouts

The PlankPad app includes a special workout section with various exercises. Videos are showing many different variations of the plank exercise that need to be followed. The workouts support more dynamic plank training for more advanced users. You just need to follow the exercises on the screen and try to keep a correct posture. If you lose the plank position, the app will notice and give you as hint on keeping a better balance. It is a good idea to start with the games because the workouts are way more intense and are aimed primarily for more advanced users.

PlankPad App with Different Games and Workouts

This is a perfect fitting app that synchronizes the PlankPad between your smartphone. You can install it on your IOS and Android smartphone or tablet. It comes with many different workout challenges and games. To start an exercise, you just need to download the app, place it on the straight aligned PlankPad to synchronize and choose a game or a workout. The app also teaches you to do the perfect plank. To play the game you have to balance the PlankPad left and right. The app and the gyroscope of your mobile device are in perfect sync with the PlankPad. There is a game for everyone such as: Candy Monster, Circles, Asteroids, Wave Rider, and Snow Cruisin'. And in the future, there will be even more. The games will challenge you to last much longer, collect points, save your score, and compete with your family or friends.

ISOMETRIC PLANK EXERCISE

Iso-metric exercise or iso metrics are a type of strength training, in which the angle and muscle length do not change during contradiction. Iso-metrics are done in static position rather than being dynamic through a range of motion.

STATEMENT OF THE PROBLEM

The purpose of the study is to find the comparative effect of 6 week ISO-metric exercise and plank gaming on the core strength of students in the age group of 13–19 years

DELIMITATIONS

The study is delimited to the following aspects,

- The study is defined to 40 male and 40 female students in the age group of 13–19 years.
- The study is further delimited to the students of M.V.M Residentional HSS Valayamkulam, Malappuram.
- The study is delimited to PlankPad gaming and iso-metric training.

Limitations

The followings are the limitation of the study:

- Individual differences among the subjects such as lifestyle, daily routine, and other factor that may have influence the subject will remain as limitation of the study.
- The response of the subjects to 6-week plank gaming and isometric training has been recognized as limitation of the study.

Hypothesis

- It is hypothesized that there will be significant increase in the core strength of teenage school students undergoing PlankPad gaming than iso-metric training.

Definition and Explanation of Terms

PlankPad

PlankPad combines a fitness device with games and workouts on your smartphone or tablet. It is the perfect solution if you want to train your whole body. Planking is one of the most effective workouts. It will get you in shape, make you lose fat and gain muscles, even prevent back pain and can also relieve it. PlankPad makes the plank workout more dynamic and way more fun. The very effective plank exercise strengthens the entire body. Arms, shoulders, back, abs, glutes, and legs are trained simultaneously and highly efficient. PlankPad comes with a fitting app with many games and workouts. Your training is much more fun. The app is synchronized with the PlankPad. The movements you perform control the games and workouts. The playful training distracts you and makes you last much longer during the exercises.

PlankPad Gaming

PlankPad comes with a fitting app with many games and workouts. The app is synchronized with the PlankPad. The movements you perform control the games. The app and the gyroscope of your mobile device are in perfect sync with the PlankPad. There is a game for everyone such as Candy Monster, Duck Shoot, Pong Goal, Meteor Madness, Wave Rider, and Snow Cruisin'. And in the future, there will be even more. The games will challenge you to collect more and more points and you will forget about the time. By playing a game, your focus is more into the game than on counting every second. This makes you plank much longer, reaching your goals faster while the time flies by having fun.

ISO-metric Exercise

Iso-metric exercise or iso-metrics are a type of strength training, in which the angle and muscle length do not change during contradiction. Iso-metrics are done in static position rather than being dynamic through a range of motion.

Significance of the Study

- The study will help in highlighting the role of mobile application for training students.
- The findings of the study will be great significance for coaches and trainers to enhance the fitness level of school students.
- The study will be helpful for physical education teachers and coaches to evaluate their students.
- The result will definitely contribute to development of the core strength.

Selection of Subjects

A total of forty ($n = 80$) male and female high school students will be selected from the M.V.M Residentional HSS, Valayamkulam Malappuram. The selected subject will be randomly divided into two groups of twenty ($n = 40$) each. Group I will be administered with Plank pad gaming and Group II will be administered with iso-metric training. The age will range from 13 to 19 years.

Selection of Variable

Core strength will be tested appropriately,

The Plank Fitness Test

The plank test, also known as the Prone Bridge Test, is a simple fitness test of core muscle strength, and can also be used as a fitness exercise for improving core strength.

Purpose: The plank test measures the control and endurance of the back/core stabilizing muscles.

Equipment required: Flat and clean surface, stopwatch, recording sheets, and pen.

Pre-test: Explain the test procedures to the subject. Perform screening of health risks and obtain informed consent. Prepare forms and record basic information such as age, height, body weight, gender, and test conditions. Perform a standard warm-up.

Procedure: The aim of this test is to hold an elevated position for as long as possible. Start with the upper body supported off the ground by the elbows and forearms, and the legs straight with the weight taken by the toes. The hip is lifted off the floor creating a straight line from head to toe. As soon as the subject is in the correct position, the stopwatch is started. The head should be facing toward the ground and not looking forward. The test is over when the subject is unable to hold the back straight and the hip is lowered.

Scoring: The score is the total time completed.

EXPERIMENTAL DESIGN

The students will be divided into two groups. Group I will be administered with PlankPad gaming and Group II will be administered with ISO metric training.

Reliability of the Data

The reliability of data will be measured by ensuring instrument reliability and tester reliability.

Reliability of Instrument

The required instruments such as stopwatch, PlankPad, mobile application use for the study will be standard ones and high quality and of good working condition .their calibration were tested and founded to be accurate enough to serve the purpose of this study

Tester Reliability

To ensure that the investigator is well versed with the techniques of conducting the test, the investigator will have a number of practice sessions in testing the procedure under the guidance of an expert. All measurement will be taken by the investigator under the supervision of an expert.

Orientation of the Subjects

Before administrating the test, the investigator will explain the nature and purpose of the study to the subjects. The investigator will demonstrate the test in a detailed manner. Each subject will demonstrate the test in a detailed manner. Each subject will be asked to perform as many trials and will be asked to familiarize themselves with the rest.

STATISTICAL TECHNIQUE

The researcher wishes to use *t*-test to compare the difference between the initial and final scores of the experimental group.

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Research Article

The effect of HRVB training on young soccer players' skill performance

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ABSTRACT

The present study aimed to evaluate the influence of heart rate variability biofeedback (HRVB) training on selected soccer skills performance. The objective of this study was to evaluate the effect of HRVB on soccer players' reactive motor skill test (RMST), sprint time, reactive agility, passing time, and passing accuracy. Participants of this study were Malaysian high school soccer players (n = 32), with mean age of 15.21 ± 1.85, who were assigned randomly into two groups: Experimental groups and control group. Each group had 16 players who were assigned randomly through the fishbowl method. A pre-test and post-test design was used in this study to evaluate the effect of training on the players' skill performance. The experimental group received HRVB training for 8 weeks in addition to their regular soccer training, while the control group only attended their regular soccer training. The experiments developed in this study consisted of a 10-min breathing exercise using the Elite HRVB app to feedback players' breathing to 5.5–6 BPM resonant breathing. After the 8 weeks of training were completed, the RMST was administered to all participants to measure the changes in their RMST, sprint time, reactive agility, passing time, and passing accuracy. The data were analyzed with a factorial MANOVA test to evaluate the differences within and between groups. Research questions of the study were supported, and statistically significant effects of experimental training on players' performance were demonstrated. The multivariate results were statistically significant differences between and within groups, $F(5, 26) = 60.665$, $P \leq 0.001$, Wilks' $\Lambda = 0.079$. Furthermore, the univariate interaction effects result showed that all the dependent variables have statistically significant differences individually between experimental and control group as well as within experimental group. There was a statistically significant interaction effect between tests and type of intervention for RMST, $F(1, 30) = 119.692$, $P = 0.001$, sprint time, $F(1, 30) = 47.686$, $P = 0.001$, reactive agility, $F(1, 30) = 218.332$, $P = 0.001$, passing time, $F(1.30) = 42.354$, $P = 0.001$, and passing accuracy, $F(1, 30) = 21.544$, $P = 0.001$. The pre-test-post-test results showed that RMST, sprint time, reactive agility, passing time, and passing accuracy were statistically difference within experimental group. The findings of this study provide evidence that 8 weeks of HRVB training significantly improved soccer players' RMST, sprint time, reactive agility, passing time, and passing accuracy test results.

Keywords: Heart rate variability biofeedback, Soccer skills

INTRODUCTION

HRV is the most important marker of the autonomic nervous system (ANS) and also is a noninvasive way to identify ANS imbalances. HRV dynamics are sensitive to changes in one's physiological and emotional state as positive and negative emotions are distinguished by smooth or erratic heart rhythm patterns, respectively, (McCraty and Tomasino, 2004). It has been studied as an important marker of autonomic nervous system (ANS) modulation (Achten and Jeukendrup, 2003; Park *et al*., 2007; Sandercock, 2007). The ANS comprises two finely balanced opposing systems: The sympathetic nervous system (SNS), associated with the "fight or flight" response, and the parasympathetic nervous system (PNS), associated with rest and digestive activity (Lane *et al*., 2009; Thayer and Brosschot, 2005). Efficient functioning in a complex environment requires a dynamic interplay between SNS and PNS, and this interplay requires adequate prefrontal cortex (PFC) functioning, which

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is thought to be involved in the inhibition of SNS activation (Friedman, 2007; Thayer and Lane, 2009). Attenuated SNS and increased PNS influence are associated with a high HRV, particularly the high-frequency component (HF), and are associated with higher PFC activity (Lane *et al*., 2009). Associations between ANS and PFC activity, using HRV and cognitive performance, have previously been reported by some researchers (Hansen *et al*., 2009; Thayer and Brosschot, 2005).

If an athlete's ANS system is in fight-or-flight mode, the variation between heart beats is low and if an athlete is in a more relaxed state, the variation between their heart beats is high. In fact, the healthier the ANS, the faster athletes are able to switch gears to show more resilience and reaction. A previous researches have shown a strong relationship between low HRV and poor reactive agility and attention (Drozd *et al*., 2010; Sutarto *et al*., 2010). Athletes who have a high HRV, have better cardiovascular fitness and are more resilient and flexible when facing stress (Drozd *et al*., 2010; Sutarto *et al*., 2010). HRV provides personal feedback about athletes' lifestyle and helps to motivate those who are considering taking steps to have a healthier life.

HRV is literally the variance in time between the beats of the heart. Hence, if an athlete's heart rate is 60 beats/min, it is not actually beating once every second. Within that minute there may be 0.9 s between two beats and, for example, 1.15 s between two others. The greater heart rate variability is a sign that an athlete's body is ready to execute at a high level of performance (Sutarto *et al*., 2010). Therefore, if an athlete's body be under stressed, then there is very little variability in their beat-to-beat heart rate but if their body is relaxed and aerobically fit and healthy, and then they will get a lot of variability from their heart rate. In other words, the heart's ability to vary the duration of time between beats is symptomatic of its ability to reflect changes in the rest of the athletes' body. When athletes begin using a heart rate variability monitor, they notice that their HRV varies greatly from day to day. Rather than comparing athletes' HRV to others, a more practical use of HRV is to follow their own trends. For example, if they are taking steps to improve their HRV, over time they should see a gradual increase in their average heart rate variability.

Sports match analyses have shown that more soccer goals are scored towards the end of a game (Nekooei *et al*., 2019; Pooya *et al*., 2016; Reilly and Gilbourne, 2003; Reilly and Thomas, 1976; Reilly and Williams, 2003). This is largely due to the detrimental effects of fatigue, which cause a decrease in HRV which is highly associated with playing errors, and also a debilitating effect from "mental fatigue" leading to lapses in concentration, associated with poor decision making and reactive agility (Reilly and Gilbourne, 2003; Reilly and Thomas, 1976; Reilly and Williams, 2003). Players have to decide quickly to pass, shoot, and change direction in a short time. Good reactive agility to pass, shoot, and change direction can help players decrease their playing errors. In addition to their physical ability and physical training, the soccer players' ANS plays an effective role. HRV biofeedback training (HRVB) with an effect on ANS response may help players improve their reactive agility and skill performance.

Biofeedback modalities are created to help athletes modulate their autonomic responses such as HRV, skin temperature, blood pressure, brain activity, and muscle contraction (Perry *et al*., 2011). HRV training with biofeedback devices (HRVB) are associated with improving sports performance with effects on ANS (Björkstrand and Jern, 2013; Hedelin *et al*., 2001). Therefore, it may help soccer players to reach autonomic modulation, which leads to performance improvements. Soccer players' skill performance and reactive agility may improve as a result of physiological balance in their ANS. Furthermore, concurrent training of HRVB and PETTLEP video imagery (mind and heart connection) can be a good invention to achieve better reactive agility and skill improvement in the game.

In biofeedback training, the clinician assists the client in identifying incoherent, or unhealthy biological responses, and implements adaptive practices such as paced breathing, positive self-talk, and emotional regulation (McCraty *et al*., 2001). The goal of biofeedback training is to develop strategies to gain voluntary control, or self-regulation of biological responses, and to transfer this ability to everyday situations without any instrumentation (Blumenstein *et al*., 2002). Biofeedback training conducted with athletes has demonstrated a variety of results, including the enhancement of self-control, the prevention, and treatment of overtraining and athletic injuries, the reduction of competition anxiety, and the encouragement of perceived control (Sime, 2003). As a mental skills training technique, an improvement in performance is the result of many biofeedback treatment interventions (Sime, 2003; Werthner *et al*., 2013).

Study literatures showed that biofeedback training is advantageous in reducing anxiety in athletes. However, increasing self-confidence should be the primary focus of biofeedback training, as this ultimately enhances performance (Davis and Sime, 2005). One of the most common techniques for self-regulation is HRV biofeedback training (HRVB). Heart rate variability (HRV) refers to an organism's ability to continuously adapt the interval between heartbeats to situational requirements (Aubert *et al*., 2003). Physical strain or mental stress results in a quickening of the heart rate, which falls again during relaxation and recovery. HRV can be a good sign of health status, stress tolerance, resilience, and biological age. Restricted heart rate variability is a sign of liable health, burnout, depressiveness, and a biological age that is higher than the actual age (Drozd *et al*., 2010). Biofeedback is used to assist one in developing an awareness of internal physiological processes

that are not consciously controlled (Perry *et al*., 2011). Through a variety of feedback modalities, heart rhythm variability is considered as a good indicator of the client's psychological state and physiological response (Sutarto *et al*., 2010).

The scientific study of the variability in heart rate is fairly recent, and only in the past 10 years did it become possible to train human beings to change the variability in heart rhythms. Biofeedback practitioners have found that HRVB training can increase HRV through several parallel training pathways. The practitioner initially guides the subject to acquire three basic skills: (1) Relax physically and emotionally, (2) reduce anxious thoughts and negative emotions, and (3) engage in smooth full diaphragmatic breathing. Although researchers contend that HRVB training are effective means of enhancing performance (Hedelin *et al*., 2001), there has not been a clear consensus among them due to the limitations of psychological treatment precluded, and still, there is a disagreement among researchers as to whether HRVB training can be effective in improving players' skill performance. Thus, the present study attempted to determine whether HRVB training improves young soccer players' skill performance in terms of reactive motor skill, reactive agility, sprint time, passing time, and passing accuracy.

METHODS

Participants

The participants of the study were 32 young male Malaysian high school soccer players (age mean: 15.21 ± 1.85) from an international school, who played in the school team at the time of the study. They were assigned randomly into two groups, with 16 participants in each group, using the Fishbowl technique. The participants had minimum 2 years of experience in playing soccer at the school level. They did not have any health and psychological issues and participated in the school's soccer training three sessions a week for approximately 2 h per session. All participants and their guardians were informed about the test procedure, and consent letters were provided for all participants before conducting the study.

Equipment and Measurements

The equipment and material used in this study included reactive motor skills test (RMST) designed to test the players' passing time, passing accuracy, speed, and reactive agility. Elite HRV application (version 4.7) validated by Perrotta *et al*. (2017), Polar H7 heart rate sensor validated by Electro (2016), timing gates (Brower Timing System Speed Trap Ii) validated by Shalfawi *et al*. (2010), soccer balls (Adidas Brazuca size 5), headphones (Original Beats EP on-ear headphone), NEC projectors, and an Apple iPad. A soccer field and futsal court were also used for practice and experimental measurements. The equipment was internationally standard and calibrated before the intended testing according to the manufacturers' standardized procedures.

Data Collection

This study examined the effects of HRV biofeedback training on soccer players' skill performance. After gaining permission from the high school authorities to conduct the study using their facilities, and before the pre-test, the researcher explained the importance of this research, different training objectives, training length and procedure, of the RMST to the participants. On the 1st day, all participants were gathered in a sports hall and tested after doing specific soccer warm-up compiled by the researcher.

RMST was performed to test the players' sprint, passing time, passing accuracy, and reactive agility at the pretest. Each participant was performed the test for three times with 10 min rest between, the best timing was recorded for each participant for analysis. They were instructed to complete the test quickly and accurately. The performance outcome was assessed through the time spent on each section (sprint, passing, and reactive agility) and also the total timing of the RMST. After the pre-test, the participants were assigned to two groups and the HRV biofeedback training was implemented before players' usual soccer practice for 8 weeks in the experimental group twice a week. All players had their usual soccer practice after school three times a week.

In the first training session, the researcher explained HRV, HRVB training, and why HRVB training might help the players improve their performance through a PowerPoint presentation. The participants were instructed about their first session of HRVB training with the Elite HRV app, installed on iPads. Then, before their usual soccer practice, they had a session of HRVB training twice a week using the Elite HRV app connected to a polar belt (model: H7) to capture accurate R-R interval with Elite HRV. The training involved 10 min of breathing exercise using Elite HRV as it showed a blue and green circle to feedback players' breathing by decreasing and increasing the size and using audio feedback according to 5.5-6 BPM resonant breathing exercises. The training duration was calculated based on the literature (Lehrer *et al*., 1997; Lehrer *et al*., 2000; Moss, 2004). After HRVB training, players were sent to have their usual soccer training on the field. Participants in the control group had their usual soccer training organized and supervised by their school soccer coach and researcher. In the post-test phase of the study, the researcher implemented the exact procedure of the pre-test evaluation with the participants who had participated in all training sessions. Finally, the collected data during pre-test and post-test phases of the study were analyzed to determine the effectiveness of the HRVB training on the participants' performance of selected soccer skills.

RESULTS

Descriptive Statistics

Before the inferential analysis of the data, the descriptive statistics including normality test, homogeneity of variance

test, and equality of groups at pre-test, were computed using exploratory data analysis. This analysis aimed to test the normal distribution of the variables and homogeneity of variance between groups before conducting inferential analyses. Then, inferential analysis of the data including paired and independent samples *t*-test was conducted to answer the research questions of this study [Table 1].

A normality test was run to evaluate the normal distribution of players in groups. To this end, the Shapiro–Wilk test was interpreted. As it is shown in Table 2, the assumption of normality for all dependent variables was satisfied for both groups, as assessed by Shapiro-Wilk's test ($P > 0.05$).

Homogeneity of Variables

The Levene's test was used for determining equality of variance in the groups. It tests whether the variances of two samples are approximately equal, so it tests our assumption of homogeneity of variance. As it is shown in Table 3, the groups' variances are not significantly different, so equal variances are assumed, and in this case, the probability is even >0.01. The assumption of homogeneity of variance has been met for both groups at pre-test.

Table 1: Descriptive analysis of dependent variables

	Group H		Group C	
	Mean	SD	Mean	SD
RMST time pre-test	7.71	0.17	7.75	0.17
RMST time post-test	6.94	0.28	7.67	0.18
Sprint time pre-test	1.36	0.03	1.37	0.04
Sprint time post-test	1.26	0.03	1.35	0.06
Reactive agility pre-test	1.92	0.11	1.94	0.08
Reactive agility post-test	1.67	0.11	1.93	0.09
Passing time pre-test	4.44	0.03	4.44	0.04
Passing time post-test	4	0.24	4.4	0.05
Passing accuracy pre-test	4.13	1.12	4.16	1.21
Passing accuracy post-test	5.44	1.03	4.25	1.39

Table 2: Shapiro–Wilk's normality test

Group	Group H		Group C	
	Statistic	*P* value	Statistic	*P* value
RMST time pre	0.979	0.957	0.974	0.892
RMST time post	0.972	0.863	0.951	0.511
Sprint time pre	0.895	0.067	0.953	0.539
Sprint time post	0.951	0.505	0.973	0.885
Reactive agility pre	0.97	0.837	0.964	0.726
Reactive agility post	0.892	0.06	0.946	0.435
Passing time pre	0.954	0.562	0.945	0.414
Passing time post	0.956	0.59	0.947	0.446
Passing accuracy pre	0.915	0.142	0.923	0.191
Passing accuracy post	0.859	0.019	0.819	0.005

Inferential Analysis

A factorial MANOVA was conducted. Due to having a repeated-measures variable that has only two levels, the sphericity assumption is met in this study. As presented in Table 4, the results of the multivariate test show that there were statistically significant differences between and within groups and also there was a statistically significant interaction effect between tests and groups of intervention, $F(5, 26) = 60.665$, $P \leq 0.001$, Wilks' $\Lambda = 0.079$.

As the univariate interaction effects in Nekooei, 2019. Show all the dependent variables have statistically significant differences individually between and within groups. There was a statistically significant interaction effect between tests and type of intervention for total time score, $F(1, 30) = 119.692$, $P = 0.001$, sprint time, $F(1, 30) = 47.686$, $P = 0.001$, Reactive Agility, $F(1, 30) = 218.332$, $P = 0.001$, passing time, $F(1.30) = 42.354$, $P = 0.001$, and passing accuracy, $F(1,30) = 21.544$, $P = 0.001$ [Table 5].

Effect of HRVB Training on Soccer Skill Performance

As presented in Table 6, the results of within-group comparison in all reactive agility skill parameters showed statistically significant differences. According to Table 6, the players' total time value is MD = 0.771, $P < 0.001$, sprint time MD = 0.091, $P < 0.001$, reactive agility time MD = 0.244, $P < 0.001$, passing time MD = 0.436, $P < 0.001$, and passing accuracy MD = 0.186, $P < 0.001$ for group HRVB that shows there was a statistically significant difference between pre-test and post-test in all of the RMST parameters including total time in the experimental group, while the value for control group was total time value is MD = 0074, $P < 0.109$, sprint time MD = 0.013, $P < 0.111$, reactive agility time MD = 0.014, $P < 0.221$, passing time MD = 0.047, $P < 0.277$, and passing accuracy MD = 0.094, $P < 0.617$, which was not statistically significant. The mean of HRVB group at pre- and post-test shows that the players' reactive motor skill performance in all of the parameters including total time were improved after 8 weeks of experimental training in the treatment group.

Table 3: Test of homogeneity of variances

Test of homogeneity of variances		
	Levene's statistic	*P* value
RMST time	1.505	0.222
Sprint time	2.308	0.086
Reactive agility	1.752	0.155
Passing time	2.318	0.085
Passing accuracy	0.174	0.913

Table 4: Multivariate test

Effect		Value	F	df	Error df	Sig.
Between subjects						
Intercept	Wilks' Lambda	0.000	32223.549b	5.000	26.000	0.000
Group	Wilks' Lambda	0.098	48.059b	5.000	26.000	0.000
Within subjects						
Tests	Wilks' Lambda	0.059	82.560b	5.000	26.000	0.000
Tests*Group	Wilks' Lambda	0.079	60.665b	5.000	26.000	0.000

Table 5: Univariate tests

Source	Type III sum of squares	df	Mean square	F	Sig.
Tests					
Total time	2.860	1	2.860	176.243	0.000
Sprint time	0.044	1	0.044	85.114	0.000
Reactive agility time	0.265	1	0.265	273.663	0.000
Passing time	0.934	1	0.934	65.204	0.000
Passing accuracy	7.910	1	7.910	28.683	0.000
Tests * Group					
Total time	1.943	1	1.943	119.692	0.000
Sprint time	0.024	1	0.024	47.686	0.000
Reactive agility time	0.212	1	0.212	218.332	0.000
Passing time	0.606	1	0.606	42.354	0.000
Passing accuracy	5.941	1	5.941	21.544	0.000
Error (tests)					
Total time	0.487	30	0.016		
Sprint time	0.015	30	0.001		
Reactive agility time	0.029	30	0.001		
Passing time	0.430	30	0.014		
Passing accuracy	8.273	30	0.276		

Furthermore, as shown in Table 7, a comparison between groups shows that there is a statistically significant difference between groups in all four component of reactive motor skill performance including total time after 8 weeks of experimental training. As it showed in Table 7, there were no any significant differences between groups in the pretest. The posttest value for group H versus Group C of the players' total time was MD = −0.738, $P < 0.001$, sprint time MD = −0.89, $P < 0.001$, reactive agility time MD = −0.254, $P < 0.001$, passing time MD = −0.398, $P < 0.001$, and passing accuracy MD = 1.188, $P < 0.01$. Hence, there was a statistically significant difference between the experimental group and the control group after 8 weeks HRVB training. This suggests that HRVB training had a significant effect on players' reactive motor skill component including total time.

The results presented above show that there were significant differences in all of the RMST component scores within and between groups, suggesting that HRVB intervention was positively effective on soccer players skill performance within the treatment group and also between the treatment and control groups.

DISCUSSION

This study examined the effect of HRVB training on soccer players' skill performance using RMST that measured sprint time, reactive agility, passing time, and passing accuracy. The research results showed that RMST component time including total time significantly improved within the experimental group after 8 weeks of HRVB training. Therefore, reactive agility time, sprint time, passing time, and passing accuracy improved in the experimental group, and these improvements affected total RMST time positively. The findings of this study are in line with the evidence from the previous research that shows HRVB training can improve sprint, passing time, passing accuracy, and reactive agility (Grillo *et al*., 2020; Kiviniemi

Table 6: Reactive motor skill within group comparisons

Pairwise comparisons within group							
Measure			**Mean difference (I-J)**	**Std. Error**	**Sig.[b]**	**95% Confidence interval for difference[b]**	
						Lower bound	**Upper bound**
Total time							
HRVB	Pre	Post	.771*	0.045	0.000	0.679	0.863
Control	Pre	Post	0.074	0.045	0.109	-0.018	0.166
Sprint time							
HRVB	Pre	Post	.091*	0.008	0.000	0.075	0.108
Control	Pre	Post	0.013	0.008	0.111	-0.003	0.029
Reactive agility time							
HRVB	Pre	Post	.244*	0.011	0.000	0.221	0.266
Control	Pre	Post	0.014	0.011	0.221	-0.009	0.036
Passing time							
HRVB	Pre	Post	.436*	0.042	0.000	0.350	0.523
Control	Pre	Post	0.047	0.042	0.277	-0.040	0.133
Passing accuracy							
HRVB	Pre	Post	-1.313*	0.186	0.000	-1.692	-0.933
Control	Pre	Post	-0.094	0.186	0.617	-0.473	0.285

Table 7: Reactive motor skill between group comparisons

Pairwise comparisons between group							
Measure			**Mean difference (I-J)**	**Std. Error**	**Sig.[b]**	**95% Confidence interval for difference[b]**	
						Lower bound	**Upper bound**
Total time							
Pre-test	HR	Control	−0.041	0.060	0.499	−0.164	0.082
Post-test	HR	Control	−0.738*	0.083	0.000	−0.907	−0.569
Sprint time							
Pre-test	HR	Control	−0.011	0.013	0.429	−0.038	0.016
Post-test	HR	Control	−0.089*	0.017	0.000	−0.123	−0.055
Reactive agility time							
Pre-test	HR	Control	−0.024	0.035	0.501	−0.095	0.047
Post-test	HR	Control	−0.254*	0.034	0.000	−0.324	−0.184
Passing time							
Pre-test	HR	Control	−0.009	0.013	0.517	−0.036	0.019
Post-test	HR	Control	−0.398*	0.061	0.000	−0.523	−0.273
Passing accuracy							
Pre-test	HR	Control	−0.031	0.411	0.940	−0.871	0.809
Post-test	HR	Control	1.188*	0.433	0.010	0.304	2.071

et al., 2007; Saha *et al*., 2013). This study confirmed the finding that improvement in each skill of the RMST will lead to an overall improvement in RMST (Bullock *et al*., 2012).

The results of this study showed significant sprint time improvement in HRVB group. It means that HRVB intervention improved players' sprint after 8 weeks, so it is an effective training method to be used by the coaches to improve soccer players' sprint time. In a study by Kiviniemi *et al*. (2007), 30 club runners were divided into three groups, one group was given a coach-designed training program, one group served as the control, and the third one had their training intensity

guided by daily HRV readings. Although both coached and HRV groups showed improvements in maximum running speed (and speed at aerobic threshold), the improvements were significantly larger in the HRV group, which was also the only group to show an increase in VO2 peak. The findings of the present study support the findings of the above-mentioned research related to sprint time improvement. In addition, Oliveira *et al*. (2013) investigated the changes in physical performance in high-level futsal players and showed significant improvement in players' speed after they received HRVB training. Furthermore, Benítez-Flores *et al*. (2019) reported that HRVB training had a significant effect on sprint time. Although the findings of the present study show less speed improvement compared to other skills, they still support previous research findings on HRVB training and speed improvement. The results of the current study, which showed improvement in players' sprint after HRVB training, are in line with the findings of (Benítez-Flores *et al*., 2019; Kiviniemi *et al*., 2007; Oliveira *et al*., 2013). However, most of the previous researchers emphasized the need for further research on HRVB training regarding its impact on athletic performance (Goessl *et al*., 2017).

This study also investigated the effects of HRVB intervention on reactive agility and whether reacting to unpredictable stimuli could be improved using this intervention. The results showed significant improvements in players' reactive agility as a result of HRVB training in the experimental group of the study. The HRVB group showed significant improvements in players' reactive agility after receiving HRVB training for 8 weeks. HRVB training can reduce stress which may result in better decision making and reactive agility during the competition (Goessl *et al*., 2017). Therefore, it can be recommended for soccer players and athletes to use HRVB training along with their physical practice. One goal of this study was to apply HRVB training using Elite HRV application to improve players' reactive agility as the past researchers did not examine the effects of HRVB on soccer players' reactive agility. In fact, the current study reports new findings about the effect of HRVB training on soccer players' reactive agility. However, some previous studies on HRVB training and reactive agility in other sports are supported by the findings of this study (Goessl *et al*., 2017; Iftikhar *et al*., 2018; McNeil *et al*., 2019).

The Heart Math Institute's research has shown that HRVB training helps athletes reach the state of coherence and generating sustained positive emotions facilitates a body-wide shift to a specific, scientifically measurable state (Edwards *et al*., 2015). This state is termed psychophysiological coherence because it is characterized by increased order and harmony in both our psychological (mental and emotional) and physiological (bodily) processes. Psychophysiological coherence is the state of optimal functioning. Research shows that when we activate this state, our physiological systems function more efficiently, we experience greater emotional stability, and we also have increased reaction, mental clarity and improved cognitive function. Physiologically, the coherence state is marked by the development of a smooth, sine-wave-like pattern in the heart rate variability trace. This characteristic pattern of heart rhythm coherence is what the Elite HRV application measures and quantifies and is an indicator of psychophysiological coherence and important physiological changes occur in this state of coherence. It also shows that a number of important physiological changes occur during coherence. The two branches of the ANS synchronize with one another, and there is an overall shift in autonomic balance toward increased parasympathetic activity. There is also increased physiological entrainment as a number of different bodily systems are synchronized to the rhythm generated by the heart. Finally, there is increased synchronization between the activity of the heart and brain (Edwards *et al*., 2015). Therefore, athletes' heart and brain are synchronized as a result of HRVB training, which increases their coherence before receiving other types of training.

The findings of this study also showed that HRVB training improved the players' passing accuracy and passing time in the experimental group. This finding is in accord with the findings of the previous studies that revealed significant improvements in athletes' passing performance and accuracy after receiving HRVB training. The previous research findings on HRVB training showed increase in players' concentration, thus better concentration helps players enhance their passing time and passing accuracy in the game (Kiss *et al*., 2016). The goal of HRVB training is for athletes to gain control and awareness over their breathing during the training and they should be able to apply this knowledge without using any application or device after the training. The findings of the present study support some studies which have investigated the effect of HRVB training on athletes' performance. In fact, considerable evidence links the findings of this study regarding HRVB training and performance improvements to the findings of previous studies. A study conducted by Saha *et al*. (2013) examined the effect of different biofeedback training on soccer skill performance. The findings showed significant improvement in soccer juggling and passing performance in the heart rate biofeedback training group. Moreover, Morgan and Mora (2017) published a review of the studies on the effect of heart rate variability biofeedback training (HRVB) on sports performance. They reported that all previous studies had small sample sizes. In almost 85% of the studies, even with six participants, HRVB training helped athletes to improve their psychophysiological variables. Therefore, 16 participants were recruited in the current study to fill the research gap. However, this review concluded that despite the limited amount of experimental studies, HRVB is an effective, easy-to-learn, easy-to-apply, and safe method for both coaches and athletes to improve sport performance (Morgan and Mora, 2017).

CONCLUSION

The findings of the current study show that 8 weeks of HRVB training had a significant within- and between-group effect on the soccer players' RMST, passing time, passing accuracy, and reactive agility. The use of biofeedback devices in sport is limited because they are not easy to use and most of modalities need an expert to run the training or test. The other reason is that most of the biofeedback devices are expensive and not easy to carry everywhere. This study used Elite HRV biofeedback application which is easy to install on the computer or smartphone and there is no need to run the test by an expert. The application is connectable to Polar belt H7 to receive a reliable and valid heartbeat. Coaches and athletes can benefit from this application which is very convenient to use with a reasonable price. After HRVB training athletes learn how to gain control over their heartbeat by following the application's breathing feedback which helps the athlete to become ready to receive other types of training. HRVB training has been reported to lead to stress reduction and improvement in players' decision-making skill which leads to performance improvement, but this improvement may vary depending on the skill and sport.

This study proved the effectiveness of 8 weeks of HRVB training on young soccer players' skill performance. However, more longitudinal studies of physiological and psychological aspects of athletes' performance are needed to inform future interventions about the most effective constructs on which to focus for each level of performance. It is also recommended to conduct interventional studies with higher number of elite players to extend the findings of longitudinal studies and provide a deeper understanding of the psychological effects of training on athletes' performance. Finally, regarding the findings of this study, coaches and players are encouraged to include HRVB training in their training protocols to further improve athletic performance in different fields of sport.

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Research Article

Correlations of anthropometric, body composition, somatotype variables, and performance of elite male junior weightlifters

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ABSTRACT

The aim of this study was to evaluate the correlations of anthropometric, body composition, and somatotype variables with the lifting performance of six national male junior weightlifters *(*mean ± SD: age 15.67 ± 1.97 years, height 161.7° 2.1 cm, and weight 60.77° 3.1 kg). The subject volunteered for and gave written informed consent to participate in this study, which was approved by Ho Chi Minh city Sports University and Ho Chi Minh city National Sports Training Center. Results showed that the snatch and clean and jerk record significantly correlated with thumb length, shoulder width, hip width, and chest circumference ($P < 0.05$). The results also revealed that the clean and jerk records and snatch records significantly correlated with fat-free mass (r= 0.840 and r = 0.374; $P < 0.05$) as well as muscle mass (r = 0.871 and r = 0.838; $P < 0.05$). There were strong correlations significantly existing between performance (snatch, and clean and jerk record) and Mesomorphs (r = from 0.984 to 0.965) and strong correlations between performance (snatch, and clean and jerk record) and Endomorphs but that were not statistical significant (r = −0.677–−0.741); there were no correlations significantly different ($P > 0.05$) between performance (snatch, and clean and jerk record) and Ectomorphs (r = −0.22–−0.27). These findings indicate that these variables should be used to evaluate the effects of training and to predict performance for Viet Nam elite male junior weightlifters.

Keywords: Anthropometric, Body composition, Correlation, Ectomorphs, Elite weightlifter, Endomorphs, Heath – carter, Mesomorphs

INTRODUCTION

Humans show variability in the kinds of characteristics, including body morphology that predisposes to sporting success (Olds, 2009). The transmission of successful sporting adaptations, including body size and shape characteristics, which have been labeled "morphologic optimization" (Norton *et al*., 1996), has both cultural and genetic facets. Anthropometric success characteristics are not fixed within the athlete group; they are constantly evolving as a response to changes in the sporting and external environment (Olds, 2009). Talent identification usually monitors several parameters, one of which is anthropometry. There are a variety of anthropometric techniques that are used in talent identification (Khaled, 2013). The data on the three components of somatotype, endomorphs, mesomorphs, and ectomorphs originate from Sheldon (Sheldon *et al*., 1940) and were approved and modified by American Scientists, Heath and Carter. The above authors, on the basis of certain anthropometric parameters, determined somatotype using formulas, tables, and nomograms. The endomorphic component is associated with the amount of body fat, muscle mass (MM) with mesomorphic, ectomorphic, and the ratio of height and weight. If one of the components is dominant, then it is a "pure type" (endomorph 7-1-1, 1-7-1, and 1-1-7 mesomorphic ectomorphic). Success in many different sporting activities would most likely be dependent in part on body type and composition. According to Carter and Ackland (1994), in strength-speed sports, the body fat values are lower when compared to sports, in which the training is focused on kinetic abilities. A distinctive combination of muscle strength, explosive power, endurance, and weightlifting technique needed for successful performance in the profile of somatotype (Kraemer and Koziris, 1994; Andrew *et al*., 2006). Mesomorphs may be more appropriated in sports that require strength for each individual sports requirement anthropometric and physical skill.

As a consequence, those responsible for talent identification for other sports might also be interested in these characteristics

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(Fry, 2006). Weightlifting is one of the most powerful athletic activities, performance consisting of snatch and clean and jerk lifting. The relationship between lifting performance and body mass is not linear. This relationship has been frequently studied in Olympic Games (Cleather, 2006). Sánchez-Muñoz (2012) suggested that the measurement of anthropometry and somatotype is a crucial tool in the search for information to assist coaches and athletes in the quest for success at the highest level in weightlifting. According to these results, the purpose of this study was to evaluate the correlations of anthropometric and body composition variables with performance (snatch and clean and jerk) of Viet Nam elite male junior weightlifters.

METHODS

Experimental Design and Subjects

Six national junior male weightlifters *(*mean ± SD: age 15.67 ± 1.97 years, height 161.7° 2.1 cm, weight 60.8° 3.2 kg) volunteered for and gave written informed consent to participate in this study, which was approved by Ho Chi Minh city Sports University and Ho Chi Minh City National Sport Training Center. These athletes were professional weight lifters with average 3 years lifting experience.

Tools and devices used are as follows: Body Composition including BMI, Body fat%, fat mass, fat-free mass (FFM), and MM analyzer by in body MC780MA – 2013. Anthropometric variables including Height, Weight, Sitting height, Arm length, Thumb length, Middle-finger length, Leg length, Foot length, Shoulder width, Hip width, and Chest circumference. Basic ten anthropometric dimensions are needed to calculate the anthropometric somatotype: Body height (cm), body weight (kg), four skinfolds (triceps, subscapular, supraspinale, and medial calf), two bone breadths (epicondyle arhumerus and femur), and two limb girths (arm flexed and tensed, calf). The following descriptions are adapted from Carter *et al*. (1990). Further details are given by Ross and Marfell-Jones (1991), Carter (1996), Ross *et al*. (1999), Duquet and Carter (2001), and the ISAK Manual (2001). To gain the data, we used a standard Martin anthropometric set, consisting of a scale, a little adjustable caliper, a skinfold caliper measuring and a rolling meter. The Snatch and clean and jerk records, anthropometric, body composition, and somatotype variables were measured in the pre-competition phase.

Statistical Analysis

The data were analyzed using descriptive statistics for anthropometric, body composition, somatotype, and performance variables. Pearson correlation coefficient (r) was analyzed for finding the correlation of anthropometric, body composition, somatotype variables with the lifting performance. SPSS was used to apply formulas statistical by calculating: Average, standard deviation, and correlation.

RESULTS

Table 1 list the variables (mean ± SD) describing 11 anthropometric variables, five body composition variables and lifting performance (Snatch and Clean and Jerk) of subjects.

Table 2 list the variables (mean ± SD) describing somatotype variables of subjects.

Results showed that the clean and jerk and snatch records significantly correlated ($P < 0.05$) with thumb length ($r = 0.880$ and $r = 0.845$), shoulder width ($r = 0.866$ and $r = 0.825$), hip width ($r = 0.869$ and $r = 0.900$), and chest circumference ($r = 0.825$ and $r = 0.873$). The results also revealed that the clean and jerk records and snatch records significantly correlated with fat-free mass ($r = 0.840$, and $r = 0.374$; $P < 0.05$) as well as MM ($r = 0.871$ and $r = 0.838$; $P < 0.05$) [Tables 3 and 4].

The result showed that: There were high correlations between performance (snatch, clean and jerk record) and Meso ($r = 0.984–0.965$) and were significant different $P < 0.05$; there were not correlations significant different $P > 0.05$ between

Table 1: Descriptive Statistics for Anthropometric, body composition variables and lifting performance

Variables	Means±SD
Height (cm)	161.7±2.1
Weight (kg)	60.77±3.1
Sitting height (cm)	88.1±1.1
Arm length (cm)	66.73±1.09
Thumb length(cm)	6.30±0.21
Middle finger length (cm)	7.70±0.27
Leg length (cm)	87.77±1.10
Foot length (cm)	24.43±0.86
Shoulder width (cm)	37.55±1.39
Hip width (cm)	27.18±1.37
Chest circumference (cm)	84.83±2.02
BMI (kg/m2)	23.4± 1.5
Body fat (%)	12.0± 3.8
Fat Mass (kg)	7.3±2.5
Fat-free mass (kg)	52.3±1.9
Muscle mass (kg)	50.4±1.29
Snatch (kg)	90.5±20.1
Clean and Jerk (kg)	111.7±23.5

Table 2: Descriptive statistics for somatotype variables

Variables	Means±SD
Endo	3.4±1.6
Meso	4.7±1
Ecto	1.5±0.8

performance (snatch, clean and jerk record) and Endomorphs (r = −0.677–−0.741); Ectomorphs (r=−0.22–−0.27).

DISCUSSION

The results revealed there was a strong positive correlation between weightlifters' performance and shoulder width, hip width, and chest circumferences. The result of this study consistent with Siahkouhian (2010) findings who showed that significant positive correlations of shoulder circumference and chest circumference with the snatch, clean and jerk, indicate that these variables are important predictors to predict performance for a weightlifter. Strong correlations of Thumb length with the performance of the subjects is notable, it may be related to hand grip ability, which is rather important for lifting technique. It should be continued with future studies before coming to an exact conclusion.

Table 3: The correlation coefficient between anthropometric, body composition variables and performance (clean and jerk and snatch records)

Variables	Clean and Jerk record (kg)	Snatch record (kg)
Anthropometric		
Height (cm)	0.492	0.483
Weight (kg)	0.471	0.558
Sitting height (cm)	0.525	0.51
Arm length (cm)	−0.574	−0.552
Thumb length(cm)	0.880*	0.845*
Middle finger length (cm)	0.47	0.409
Leg length (cm)	−0.599	−0.582
Foot length(cm)	−0.766	−0.717
Shoulder width(cm)	0.866*	0.825*
Hip width(cm)	0.869*	0.900*
Chest circumference (cm)	0.825*	0.873*
Body composition		
BMI (kg/m^2)	0.157	0.231
Body fat (%)	−0.377	−0.348
Fat mass (kg)	−0.302	−0.265
Fat-free mass (kg)	0.840*	0.870*
Muscle mass (kg)	0.871*	0.838*

*Correlation is significant at the level of P<0.05

Table 4: The correlation coefficient between Somatotype variables and performance (clean and jerk and snatch record)

Variables	Clean and Jerk record (kg)	Snatch record (kg)
Endo	−0.741	−0.677
Meso	0.984*	0.965*
Ecto	−0.22	−0.27

*Correlation is significant at the level of P<0.05

The present study showed negative correlations of % body fat and fat mass with the performance of weightlifters. This result was in contrast with findings of Stone *et al*. (2005), but consistence with the result of Siahkouhian (2010). Negative correlations of % body fat and fat mass, as well as other anthropometric variables, with the performance of the subjects which may be due to the small number of the subject.

The results showed that the clean and jerk and snatch performance strong significantly correlated with FFM and MM consistent with the result of Siahkouhian (2010), appropriate with the statement of Heyward and Stolarczyk (1996) a large MM is important during strength and power records.

This study found a correlations coefficient between somatotype variables and the snatch, clean and jerk record performance. Smerecká (2014, cited in Urban, 2010) "Based on the anthropometric indicators, we gain the quantitative data about the individual body segments and on the basis of the morphological state of an individual, so-called merfo-phenotype, we can, to some extent, predict his/her performance." Orvanova (1984; 1986) showed that somatotype components to discriminant analyses of differences between the best and worst performers by weight classes, the author noted that mesomorphs had the highest rating throughout the series. The somatochart in Carter (1990, cited in Boennec, 1980) shows that ten out of 12 French weight lifters were endo-mesomorphs or extreme endo-mesomorphs. The approximate mean was 2.5-6.5-1.5. The young Cubans were endo-mesomorphic and their 5.6 in mesomorphs is the highest of all the 12-year-old sports groups. Orvanova (1990) studied on the body shape of weightlifters, her studied showed that weightlifter in the lighter weight classes are found to be ectomorph or balanced mesomorphs, while those in the heavier weight classes tend to be mesomorph endomorphs.

According to Carter (1990) mean somatotype of Word Elite Weightlifter, he combined the data from the 1960, 1968, and 1976 Olympics into four weight categories, he found the higher the weight class the higher the endomorphs and mesomorphs and the lower the ectomorphs. This trend is seen in the data for each Olympics and for data from Venezuela, Cuba, and CSSR. Mesomorphs averages about 6–7 in the lighter weight classes and 8–9 in the heaviest classes. The top-class lifters are balanced mesomorphs at the lighter weights and extreme endomorphs in the heaviest weights [Figure 1].

According to Carter (1990), the under 60 kg class had mesomorphs averages 6.9, this class is similar to Vietnam junior male weightlifters.

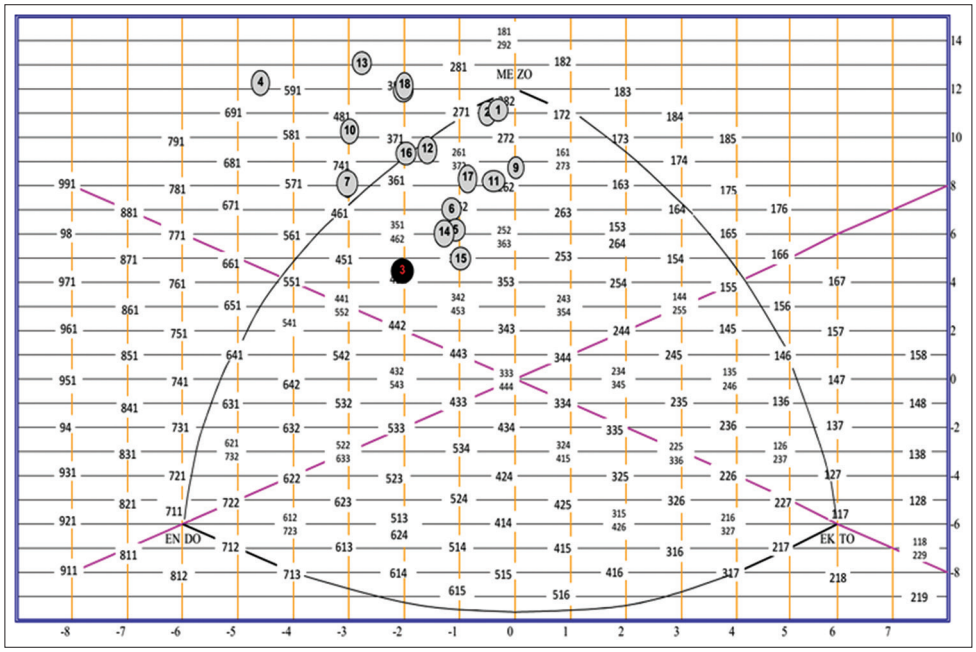

Figure 1: Mean somatotype chart of world elite weightlifter were counted by Carter (1990 - gray point) and Vietnam junior male weightlifter (2017 – black point). Olympics, (1960–1976) 1: <60 kg (1968); 2: 60–79,9 kg; 3: 80–99,9 kg; 4: 100+ kg (Carter, 1984b); 5: Czechoslovakia, 1969 (Stepnicka, 1974a; 1986); Czechoslovakia (1981); 6: Younger (adolescents); 7: Older (adolescents); Chovanova (1983a); 8: USSR (Heath, in Carter, 1970); 9: Venezucla 55–67 kg; 10: 69–122 kg (Pérez, 1981); Cuba (1976–1980); 11: Lightweight, (1978); 12: Middleweight; 13: Heavyweight (Rodrigucz et al., 1986; 14: Cuba, youths (Alonso, 1986); 15: India (Sodhi and Sidhu, 1984); 16: China, 1984 (Zeng, 1985); 17: Brighton Polytechnic (Bale, 1986); 18: South Australia Power lifters (Withers et al., 1986)

The result of this study showed that most of the athletes are on the Mesomorph-Endomorph category of the somatochart, the mean somatotype variables of post-season were 3.4-4.7-1.5. This data recorded the high correlation between performance (snatch, clean and jerk event) and Meso (r = 0.984–0.965) were significantly different $P < 0.05$; therefore, mesomorphs variable should be used to evaluate the effects of training and to predict performance for junior male weightlifters. This finding is consistent with previous studied. However, the somatotype of Vietnam junior male weightlifters needs to increase more mesomorphs.

CONCLUSION

Thumb length (cm), shoulder width (cm), hip width (cm), chest circumference (cm), FFM (kg), MM (kg), and mesomorphs significantly correlated with the snatch and clean and jerk records ($P < 0.05$). These variables should be used to evaluate the effects of training and to identification for Viet Nam male junior weightlifter.

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Research Article

Effect of SAQ training and own body resistance training on selected physical fitness parameters of intercollege male football players

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ABSTRACT

The aim of the study was to find out the Effect of SAQ Training and Own Body Resistance Training on Selected physical fitness Parameters of Intercollege Male Football Players. For this purpose of the study, the 19 intercollege Male football players from affiliated college of Osmania University, Hyderabad, Telangana. The age of the subjects was 18–22 years. The selected sixty Intercollege male football players were randomly assigned to one or four groups: SAQ training ($n = 30$, ISAQT), Isolated Own Body Resistance training ($n = 30$, IOBRT), and Combined and a control group ($n = 30$, CG). The performance parameters such as speed and agility were delimited as dependent variables. All the performance parameters were tested with standardized testing tools. The duration of the training intervention was delimited to 3 days per week for 6 weeks. The selected performance parameters were tested with standardizes test items. The collected pre- and post-test data were statistically analyzed using the analysis of covariance (ANCOVA) to determine the differences, if any among the groups on selected dependent variables separately. Whenever they obtained "F" ratio for adjusted post-test was found to be significant, the Scheff's *post hoc* test was applied as a *post hoc* test to find out the paired mean differences, if any the 0.05 level of confidence was fixed as the level of significance to test the "F" ratio obtained by the ANCOVA, which was considered appropriate. The results clearly proved that the selected trainings significantly shown the improvement on selected performance parameters owing to 6 weeks of training purpose.

Keywords: SAQ, Own body resistance

INTRODUCTION

Football is one of the most popular ball games in the world, involving a number of individuals and audiences. At the turn of the 21st century, the Union of International Football Associations announced that there were around 250 million members and more than 1.3 billion people interested in football. This is a most competitive sport in the world that needs a high level of physical, physiological and psychological fitness. Psychological traits play an important role in ensuring that athletes produce excellent outcomes in competitive athletics, aside from naturally gifted physical qualities. Literature on physical fitness and sports has shown this in recent years. Physical, psychological, and environmental influences – in addition to fitness, physics, and movement skills, there are also a variety of psychological factors, such as intelligence, attitude, determination, stress, anxiety, and violence, which have a critical effect on the performance of sportsmen in high-level competitions.

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MATERIALS AND METHODS

To facilitate the study, 19 Intercollegiate Male Football Players were selected as subjects who Participating Osmania University intercollege Football Tournament, Hyderabad, Telangana. The study would be confined to Intercollege Male Football Players between the age group of 18–22 years.

Dependent Variables

1. Speed
2. Agility.

Independent Variables

1. Isolated SAQ training
2. Isolated Own Body Resistance training.

Experimental Design

The selected subjects were divided into four groups, experimental Group 1, experimental Group 2, and control group. Each group consisting of 30 Male Football Players: Experimental Group 1 was assigned as isolated SAQ training (n = 30, ISAQT), Experimental Group 2 was assigned as isolated own body resistance training (n = 130, IOBRT), and Group 3 control group (n = 30, CG). were not given any special treatment and were under strict supervision of the investigator. Before experimental treatment, all the subjects were measured of their selected Performance Parameters such as speed and agility. This formed pre-test scores. After 6 weeks experiments to the experimental groups on respective training, all the four groups were tested on criterion variables selected, which formed post-test scores. The difference between pre- and post-test scores was considered as the effect of varied respective experimental treatments. Analysis of covariance (ANCOVA) was used to find out the significant differences if any, among the groups for each variable separately. The Scheffe's test was applied as *post hoc* test whenever the "F" ratios of the adjusted post-test means were found to be significant at 0.05 level of confidence.

Results on Speed

As shown in Table 1, the obtained pre-test means on speed on SAQ Training group was 7.04, isolated own body resistance training group was 7.01, and control group was 7.00. The obtained pre-test F value was 0.11 and the required table F value was 3.16, which proved that there was no significant difference among initial scores of the subjects.

The obtained post-test means on speed on SAQ training group was 6.63, isolated own body resistance training group was 6.76, and control group was 7.43. The obtained post-test F value was 23.41* and the required table F value was 3.16, which proved that there was significant difference among post-test scores of the subjects.

Taking into consideration of the pre-test means and post-test means adjusted post-test means were determined and ANCOVA was performed and the obtained F value 43.64* was greater than the required value of 3.16 and hence it was accepted that there was significant differences among the treated groups.

Since significant differences were recorded, the results were subjected to *post hoc* analysis using Scheffe's Confidence Interval test. The results are presented in Table 2.

The *post hoc* analysis of obtained ordered adjusted means proved that there was significant differences existed between SAQ Training group and control group (MD: 0.84). There was significant difference between Own Body Resistance Training group and control group (MD: 0.68*). There was no significant difference between treatment groups, namely, SAQ Training group and Own Body Resistance Training group. (MD: 0.15).

The ordered adjusted means were presented through bar diagram for better understanding of the results of this study in Figure 1.

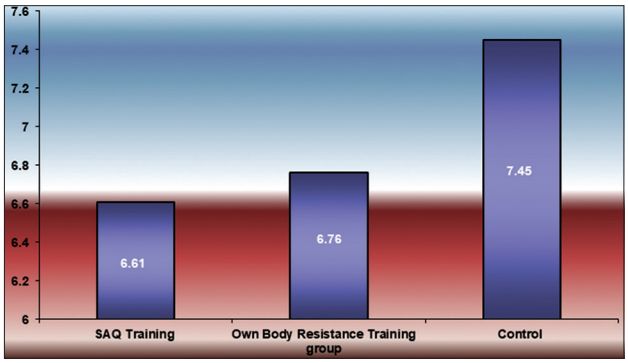

Figure 1: Bar diagram on ordered adjusted means on speed

Table 1: Computation of analysis of covariance of pre-test and post-test on speed scores of SAQ training and isolated own body resistance training and control groups

	SAQ training	Own body resistance training	Control group	Source of variance	Sum of squares	df	Mean squares	Obtained F
Pre test mean	7.04	7.01	7.00	Between	0.03	2	0.01	0.11
				Within	11.54	87	0.13	
Post test mean	6.63	6.76	7.43	Between	11.22	2	5.61003	23.41*
				Within	20.85	87	0.24	
Adjusted post test mean	6.61	6.76	7.45	Between	12.01	2	6.00	43.64*
				Within	11.83	86	0.14	
Mean diff	0.42	0.25	0.43					

Table F-ratio at 0.05 level of confidence for 2 and 87 (df) = 3.10, 2 and 86 (df) 3.10. *Significant

Results on Agility

As shown in Table 1, the obtained pre-test means on Agility on SAQ Training group was 9.73, Isolated Own Body Resistance Training group was 9.71, and control group was 9.92. The obtained pre-test F value was 1.52 and the required table F value was 3.16, which proved that there was no significant difference among initial scores of the subjects.

The obtained post-test means on Agility on SAQ Training group was 9.16, Isolated Own Body Resistance Training group was 9.17, and control group was 10.09. The obtained post-test F value was 34.26* and the required table F value was 3.16, which proved that there was significant difference among post-test scores of the subjects [Table 3].

Taking into consideration of the pre-test means and post-test means adjusted post-test means were determined and ANCOVA was performed and the obtained F value 36.31* was greater than the required value of 3.16 and hence it was accepted that there were significant differences among the treated groups.

Since significant differences were recorded, the results were subjected to *post hoc* analysis using Scheffe's Confidence Interval test. The results are presented in Table 4.

The *post hoc* analysis of obtained ordered adjusted means proved that there was significant differences existed between SAQ training group and control group (MD: 0.83*). There was significant difference between Own Body Resistance Training group and control group (MD: 0.81*). There was no significant difference between treatment groups, namely, SAQ Training group, and own body resistance training group. (MD: 0.02).

The ordered adjusted means were presented through bar diagram for better understanding of the results of this study in Figure 2.

Table 2: Scheffe's confidence interval test scores on speed

Means				Required CI
SAQ training	Isolated own body resistance training	Control group	Mean difference	
6.61	6.76		0.15	0.24
6.61		7.45	0.84*	0.24
	6.76	7.45	0.68*	0.24

*Significant

Table 3: Computation of analysis of covariance of pre-test and post-test on agility scores of SAQ training and isolated own body resistance training and control groups

	SAQ training	Isolated own body resistance training	Control group	Source of variance	Sum of squares	df	Mean squares	Obtained F
Pre test mean	9.73	9.71	9.92	Between	0.79	2	0.39	1.52
				Within	22.51	87	0.26	
Post test mean	9.16	9.17	10.09	Between	17.12	2	8.55985	34.26*
				Within	21.74	87	0.25	
Adjusted post test mean	9.19	9.21	10.02	Between	13.01	2	6.51	36.31*
				Within	15.41	86	0.18	
Mean diff	0.57	0.55	0.17					

Table F-ratio at 0.05 level of confidence for 2 and 87 (df)=3.10, 2 and 86 (df) 3.10. *Significant

Table 4: Scheffe's confidence interval test scores on agility

Means				Required C I
SAQ training	Isolated own body resistance training	Control group	Mean difference	
9.19	9.21		0.02	0.27
9.19		10.02	0.83*	0.27
	9.21	10.02	0.81*	0.27

*Significant

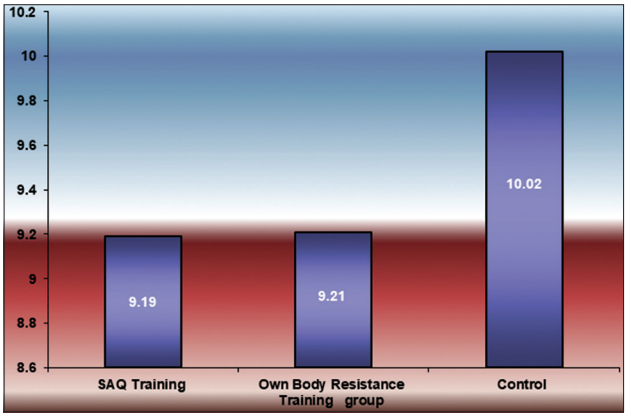

Figure 2: Bar diagram on ordered adjusted means on agility

DISCUSSION

The results of this study revealed that there was a significant difference in speed and agility due to 6 weeks of SAQ training and own body resistance training group. From the results of the present study and literature, it is concluded that dependent variable such as speed and agility was significantly improved due to the SAQ training and own body resistance training.

CONCLUSIONS

Within the limitations and delimitations of the study, the following conclusions were drawn. It was concluded that SAQ training and own body resistance training significantly altered such as, speed and agility of the college level male football players. Comparing between the treatment groups and it was found that SAQ training was better than own body resistance training group. The results of the present study show that it is possible to develop speed and agility by means of a 6-week SAQ training and own body resistance training program.

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Research Article

During COVID-19 the effect of Yoga training on vital capacity, body composition, and flexibility on selected sports person of VNSGU, Surat

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ABSTRACT

The present study is to find out the effect of selected Asana and Pranayam on vital capacity, body composition, and flexibility of selected sports person of VNSGU, Surat. The sample of 30 sportspersons ranged between the age of 18 and 26 years. The selected subjects were divided into two groups that are 15 as the experimental group and 15 as a control group. In the present study, purposive – random sampling technique was used to select the sample. After assessment of pre-test on both groups, then-experimental treatment was given. Asana and Pranayam were conducted for 6 weeks. After the completion of 6 weeks of training, the post-test (major test) was conducted to know the significant difference between both groups (experimental and control). The "t"-test was applied to analyze the data. The statistically significant effect of Asanas and Pranayam conditioning training was tremendous improvement found on body composition, vital capacity, and flexibility on selected sports persons of VNSGU Surat as compared to control group, at 0.5 level of significance.

Keywords: Asanas, Pranayam, conditioning.

INTRODUCTION

Yoga originated in India. It has a very old history, can be said farmly about the origin of Yoga. It can be said that yoga originated in India. On the basis of secondary sources, it can allude that yoga originated approximately 3000 BC in India. The first book on yoga was written by Maharshi Patanjali in 147 BC. In fact, yoga is derived from the Sanskrit word Yuj which means Union and join. So most of the people have not been leading a happy and peaceful life. It has significance in the life of human beings.

Today's life is full of stress and strain and tension and nervous irritability of hunger and excitement. Anyone who puts into practice a few of the elementary principles of yoga will be far better equipped to cope with his Complex existence.

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Yoga comes from the Sanskrit word Yuj which means to join together Unify and to unite. Yoga has existed from ancient times but was integrated and simplified by Patanjali in the 15th AD century. With the help of yogic exercise, the flexibility or elasticity of our body and makes the body more active and supple. The concentration will be the greater the advantage to the body and mind. Increase the practice, the body will become more and more elastic and flexible day by day. Swami Vivekananda (1887–1963) points out that after doing the yogic exercise the human body is more powerful as the human "AURA" is more. They found that human "AURA" is clearer and gain flexibility after yogic exercises or activities. In modern civilization, Asanas are generally practiced in form of exercise. Through the practice of Asana, one can achieve the organic and functional promotion of health fitness (Vinekar 1975).

METHODOLOGY

To achieve the purpose of the study, 15 men are selected in experimental groups to practice the selected Asana and

Pranayam. A purposive sample technique was used to select the subjects in a group, age between 18 and 26 years.

Variable and Instrument

For measuring body composition, the body composition analyzer and BMI norms table were used. The BMI was calculated easily from the following formula BMI = (weight in kg/square off height in meters), Vital capacity measuring peak flow meter and flexibility measuring sit and reach bench test as far as experimental training is concern the 6-week Asana and Pranayam training was conducted in a systematic manner.

6 weeks training program of selected Asanas and Pranayama on body composition, vital capacity, and flexibility following

SURYA NAMASKAR

Asana

1. Chakrasan,
2. Paschimottanasana,
3. Sarbhanga Asana,
4. Ardha matsyendrasana,
5. Halason,
6. Pawanmuktasana,
7. Salabhashan,
8. Bhujangasan,
9. Utthan padasana
10. Dhanurasana

Pranayam

(1) Anulom vilom, (2) Kapalbhati, (3) Bbhastrika, (4) Bhramri

Note:

Warm-ups, stretching exercise, daily works were selected as a limitation.

As training program had been continuous we would increase load.

Each Asana Teken only 1 min and total number of Asana was 10.

Each session had been 60 min time duration.

Procedure

For the measurement of body fat percentage as a pre-test, these subjects were divided into two equal groups that are 15 as the experimental group and 15 as the control group. Body fat percentage was measured by body composition analyzer and WHO's BMI norms table. The BMI was calculated easily from the following formula BMI = (weight in kg/square of height in meters).

The "*t*" test to analyze the data. The *t*-test was used to determine the effects of selected Asanas and Pranayam training on BMI, vital capacity, and flexibility. Further, the level of significance was set at 0.05 levels.

Significance of Difference

Groups	Pre-test	Post-test	Mean	"*t*"
Control	16.23	16.28	0.05	2.59*
Experimental	19.70	21.03	1.33	

Significant at 0.05 level. t 0.05(28) = 2.048

It is observed that the calculated "*t*" (2.59) is more than the tabulated "*t*" (2.048). Hence, it may be considered that there was a significant difference found in body mass index percentage between pre-test and post-test of the experimental group at 0.05 level of confidence.

Significance of Difference (Fat)

Groups	Pre-test	Post-test	Mean	T
Control	8.66	8.56	0.08	1.18
Experimental	10.48	10.90	0.42	

Significant at 0.05 level t 0.05(28) = 2.048

It is observed from the calculated "*t*" (1.18) is less than the tabulated "*t*" (2.048). Hence, it may be considered that there was no significant difference found in fat percentage between pre-test and post-test of the experimental group at 0.05 level of significance.

Significance of Difference (Water)

Groups	Pre-test	Post-test	Mean	"*t*"
Control	29.37	29.42	0.05	3.99*
Experimental	33.22	34.32	1.1	

Significant at 0.05 level t 0.05 (28) = 2.048

It is observed from that the calculated "*t*" (3.99) is more than the tabulated "*t*" (2.048). Hence, it may be considered that there was a significant difference found in total body water between pre-test and post-test of experiment group at 0.05 level of significance.

Significance of Difference (Vital Capacity)

Group	Pre-test	Post-test	Mean	"*t*"
Control	373.06	374.33	1.27	6.07*
Experimental	433.33	470.2	36.87	

Significant at 0.05 level t 0.05 (28) = 2.048

It is observed from that the calculated "*t*" (6.07) is more than the tabulated "*t*" (2.048). Hence, it may be considered that there was significant difference found vital capacity percentage between pre-test and post-test of experimental group at 0.05 level of significance.

Significance of Difference (Flexibility)

Group	Pre-test	Post-test	Mean	"*t*"
Control	18.26	18.53	0.27	13.24*
Experimental	22.6	25.8	3.2	

Significant at 0.05 level t 0.05 (28) = 2.04

It is observed that the calculated "*t*" (13.24) is more than the tabulated "*t*" (2.048).

Hence, it may be considered that there was a significant difference found in flexibility percentage between pre-test and post-test of the experimental group at 0.05 level of significance.

DISCUSSION

On the basis of the obtained results, it has been observed that there was no significant difference found in the results of the pre-test. Results also revealed that there was no significant difference found in fat percentage scores between pre-test of the experimental and control group and Asana and Pranayam is effective on body mass index, total body water, Vital capacity, and flexibility relieved by post-test score.

CONCLUSIONS

Within the limitation of the study, it was concluded that there were significant similarities found between the control group and experimental group in body mass index, water, vital capacity, and flexibility. However, no significant difference found in selected variables of the control group. After long practice asana and Pranayama are very important for reducing fat in the body and very useful for other selected variables of this study. During COVID-19 also it is effective on sports person of VNSGU, SURAT, as well as for others.

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Research Article

Promoting physical literacy in India

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ABSTRACT

"Physical Literacy" word has many definitions across the world. However, as per holistic definition by International Physical Literacy Association, it is motivation, confidence, knowledge, and understanding to value and engage in physical activities throughout the life. Physical literacy is not just the development of fundamental movement and sport skills, but it is much more than that. It is holistic concept for everyone and throughout the life. In school environment, concept propagates holistic, enriched, and meaningful experiences for each child to help them progress in their physical literacy journeys. Physical literacy also includes the ability to "read" what is going on in particular situations/environments and interacting appropriately as a whole being. The need to promote physical literacy is largely due to the increase in lifestyle diseases, decreasing physical activity levels, lack of focus on individual experiences in physical activity settings, and elitist tone in physical activity settings. While concept has been promoted at global level for past one decade, it got promoted in past 5 years through Pullela Gopichand and his team. From 2016 to 2017, team worked on various initiatives to promote physical literacy. A lot of other entities are also promoting the cause. Physical Literacy Movement is beneficial for all Indians for life-long health and good quality of life.

Keywords: Motivation, Physical activity, Physical literacy

INTRODUCTION

The term "physical literacy" describes the motivation, confidence, physical competence, knowledge, and understanding that individuals progress, all through their existence. Physical literacy encloses long way greater than physical training in schools or sports coaching. It presents a holistic and a broader understanding of lifelong engagement in physical activities. It looks at holistic development for each individual through their unique lifelong journeys. The current understanding of physical literacy in lot of current literature is around physical competency and fundamental movements more. However, physical literacy is much more than these understandings. It is lifelong concept for each individual to flourish themselves.

Physical literacy develops the individual through variety, diversity, and experiences in various environments. There is no fixed outcome state as "physically literate." Rather it is a journey which is from birth till death. There are different experiences and milestones in the journey. However, individual journey is considered as precious as individual lives. It is not about reaching a defined goal/end state. It is more about lifelong exploration and engagement in physical activities.

For developing physical literacy, childhood is the best time. Meaningful and enriched experience during early years has a strong impact on connection of physical activities with an individual. During physical education classes, students have a golden period to develop physical literacy components. Experience in each class and for each student, contributes immensely to the individual physical literacy journeys of all students. There is a critical opportunity and responsibility for key stakeholders to create an environment for fostering physical literacy journeys of all students.

Physical literacy in the current years has not been given its due importance to more focus on academics. Furthermore, within physical education, elitism, and champion-making are

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getting more and more prominence. Thus, while the number of champions is increasing, numbers of children, being left out of physical activities, is also increasing. Unhappy experiences in physical education and sports are leading lot of lifelong health issues in the society at large.

In this post, we are going to look at a clear understanding of physical literacy and why it is so important for children today. We also look at the physical literacy situation in India.

PHYSICAL LITERACY IN INDIA

Physical literacy, as a concept, is not new in India. India's rich cultural heritage and ancient literature on body, mind, and soul is a testimony to "monism" (oneness) concept, pillar of physical literacy. As Indians, we always had movements in our culture. Whether going to religious places, bending to elders, celebrations in families; all had physical movements an integral part.

However, in current times, culture of physical literacy is losing its prevalence. While there can be many factors (industrialization, nature of jobs, lifestyle, etc.), the future for our children on current trends looks worrisome.

- According to the World Happiness Report published by the UN Sustainable Development Solutions Network, India is ranked 140 out of 156 countries. Various factors that determine the happiness levels of a country include life expectancy, social support, income, freedom, trust, health, and generosity, among others.
- India is ranked 130 among 189 countries in the latest Human Development Index (HDI) released by the United Nations Development Programme. The HDI is a summary measure for assessing long-term progress in three basic dimensions of human development: a long and healthy life, access to knowledge, and a decent standard of living.
- The burden of non-communicable diseases (NCDs) is rising in India due to the change in lifestyle of the country's population. As per one research, NCDs account for 53% of all deaths in India. A major portion of NCDs includes cardiovascular diseases (24%), followed by respiratory diseases (11%), other NCDs (10%), and injuries (10%). As a result, out-of-pocket expenditure associated with the acute and long-term effects of NCDs is high, resulting in catastrophic health expenditure for the household. A national survey conducted in India found that spending on NCDs accounts for 5.17% of the total household expenditure. According to a macroeconomic analysis, it is estimated that every 10% increase in NCDs is associated with a 0.5% decline in the annual economic growth. The income loss due to hypertension is the highest, followed by diabetes and cardiovascular diseases. The macroeconomic impact of NCDs is profound as they cause loss of productivity and decrease in the gross domestic product.
- The increase in NCDs is leading to genetic dispositions of the future generations. One study in Canada showed that this generation of children may live 5 years lesser than the current adults. With the shift in human lifestyle, health issues are on the rise (malnutrition, underweight, lack of sanitation and quality healthcare, immunization, etc.), and children are at a very high risk of leading an unhealthy life.
- Moreover, mental health issues among the youth are on the rise, and drug/alcohol abuse has also increased among this group.

Furthermore, learning outcomes of education are not very desirable. A lot of focus in today's education system is on memorization and rote learning. This education system is, by design, ensuring long-term inactivity in children. Elitism (physical activity is for top layer only) is getting more popular. Body image is also adding to this issue. There are many training and fitness centers these days. However, it is not sure whether these are impacting lifelong physical literacy journeys of all the participants enrolling there. Physical literacy is not about a short-term goal of 3 kg weight loss. While, this may be initial motivation for an individual; however, the experience of fitness classes needs to provide such an experience that each individual is internally motivated to keep active for life.

Before beginning a particular exercise, one needs to understand individual capabilities and interests; and most important past perceptions/experiences in various physical activity settings. With consideration of above, every physical activity (along with experiences doing it) accounts in the physical literacy journeys.

Similarly, in schools and communities, play areas and playing habits are shrinking every day. At the same time, physical activity interest is seen growing in older population due to health issues. Thus, reaction is definitely happening but pro-active actions from younger ages are the most critical step to address.

Current habits (technology, nutrition, socialization, physical activities, etc.) is a good reflection on what is considered important and for what "time is not available." It may be due to lack of understanding on "what is valuable for a full-filling and quality of life." Thus, while symptoms are available to us through various data points, only prescriptive solutions such as 30 min/day activities, fitness benchmarks, and others are being shared.

However, there lies a deep question "why people are not active" when research has proven that it makes us happy and healthy, which is goal of everyone. There lies the answers and cross-questions provided by physical literacy concept: "Are physical activities sessions enjoyful and engaging?", "do my past experiences drive me to look forward for engagement in

physical activities?", "do I value physical activities for a good quality of life?", "am I motivated to do physical activities every day?", "do I feel confident performing various physical activities?". In these questions, there are answers hidden that why people are not active.

Physical literacy as a holistic concept is defined as by International Physical Literacy Association (IPLA).

"Physical literacy can be described as the motivation, confidence, physical competence, knowledge and understanding to value and take responsibility for engagement in physical activities for life."

Physical Literacy in India

As per book by Margaret Whitehead "physical literacy across in the world", Pullela Gopichand *et al*. had reached out to IPLA in 2016. IPLA reported this event**.** Afterward, Gopichand *et al*. has been advocating and implementing physical literacy across India through various programs. Their main focus is on including physical literacy as a key component within education system. Team also utilized physical literacy concept in Andhra Pradesh sports policy. Furthermore, Gopichand academy physical literacy days in Hyderabad. Gopichand also advises ELMS Sports foundation to promote vision of physical literacy. Gopichand's work on physical literacy has been covered by Olympic channel as well.

At the same time, there are a number of organizations advocating physical literacy. As per internet search, mainly these are Tata trusts, Indian Physical Literacy Foundation, Sportz village and zoomer.

Out Come and Recommendations

For a lifelong happy, healthy and flourishing population, there is a strong need to adopt physical literacy in the country. Current issues and future aspirations have to be aligned to physical literacy. As a concept, its for everyone and they can start their physical literacy journey anytime during their life time. We need to create a positive environment where physical activity participation by each individual is valued and promoted.

For our grassroots and youth sports, we need to look beyond medals and talent; and focus on amazing potential of each individual for a good quality of life. To promote physical literacy is a considerably important goal of physical education in current situation.

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Research Article

Coaching competency, commitment, and social-emotional competency as determinants of collegiate sports coaching performance in the Philippines

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ABSTRACT

Sports coaches play a central role in guiding the sport participation, performance, and the development of athletes. Coaching promotes values and character formation among athletes during training and actual competition. This study determined the effect of coaching competency, social-emotional competency, and commitment to sports coaching performance. The researcher utilized a descriptive multiple correlational research design. Respondents are 100 coaches from the University Athletics Association of the Philippines. Data were analyzed using multiple regressions through a pathway analysis. The results of the study revealed that Coaching Competency has no positive direct effect on Sports Coaching Performance. However, Social Emotional Competency and Commitment has a positive direct effect on Sports Coaching Performance (β =0.220; β = 0.386). The results further reveal that Coaching Competency and Social Emotional Competency has a positive direct effect on Commitment (β = 0.513; β = 0.038, $P > 0.001$). A positive direct effect of Coaching Competency to Social Emotional Competency was indicated as well. The constructs of the study revealed the huge role of Commitment in Sport Coaching Performance. Hence, it is recommended to institutionalize the creation of a National Competency Standards for Sports Coaching as well as Code of Ethics for Sports Coaches to dignify the sport coaching discipline in the Philippines.

Keywords: Coaching competency, Commitment, Social-emotional competency, Sport coaching, Sport coaching performance

INTRODUCTION

Sports coaches play a central role in guiding the sport participation, performance, and the development of athletes as part of the sport programs of clubs, schools, national sports associations, and other government and non-government organizations. Sports coaches help athletes develop their full potential. They are responsible for training in a particular sport by analyzing their performance, instructing them in relevant skills, and providing encouragement (France, 2009).

Coaching can also contribute to social aims by promoting active participation among individuals to engage in healthy lifestyle; uniting citizens behind a common entity; and generating economic activity through employment, education, purchase of equipment, use of facilities, and attendance at events (International Sport Coaching Framework, 2012). This shows that sports coaching role is diverse which demands them to fulfill a variety of roles such as educator, guidance counselor, sport psychologies, business manager, public relation officer, and other significant roles that contribute to the holistic development of an athlete.

Coaching is a very complex and demanding profession. It requires much technical and personal skill and a sound sports philosophy. Most good coaches discover that their philosophy, beliefs, and principles serve as a guide for many decisions that have to be made in the training and supervision of athletes (Elmer, 2001). Many sports organizations globally recognize

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that sports coaches have a responsibility to improve and expand their own capabilities on an ongoing process. Indeed, to fully meet the needs of the athletes and increase their knowledge and competence in a broad range of areas, coupled with the increasing demands and requirements, the sports coaching profession worldwide needs to be viewed empirically to set higher value for the profession which has seen its importance in its overall participation in the sports industry (France, 2009).

Sports coaching competency is considered as a leading issue in the field of management and psychology (Liu and Xiaoshu, 2009). It pertains to skills, knowledge, and behaviors that lead to successful performance (Senior Civil Service Competency Framework). Competency theory (Gross, 2005) can be applied in seeking coaching competency. Sport coaching may be highly regarded as skill competency but not so much of metacognitive ability. However, aside from the knowledge of the sport, a coach competency in terms of strategy and decision making skills is very important and this require metacognitive ability. Consequently, metacognitive ability of the coach will initiate self-recognition of his or her inadequacies and therefore will likely to always seek personal development through training or additional skill acquisitions.

Self-Efficacy Theory (Bandura, 1994), on the other hand, emphasizes human capacity, pathology of optimism and positive psychology perspectives as a whole. According to Bandura, self-efficacy can be developed through mastery experiences, social modeling, social persuasion, and states of physiology. Coaching competency can likewise be anchored on this theory because it emphasizes on human capacity, mastery experiences, self-enhancing, and decisional function where one always choose environments that are best suited for growth and development. A competent coach can be positive role-models, resourceful social-networks, and providers of nurturing environments.

Hence, enhancing one's competency to improve productivity does not always equate to skill or mastery acquisition. It is also a balance of other psychological factors. According to Kajtna and Baric (2009), successful coaches are also focused on their athletes' emotions and needs, inclined to democratic leadership and are ready to talk about professional problems. These elements largely pertain to social emotional competency which is also defined as a learned capacity, based on emotional intelligence, which contributes to effective performance at work (Boyatzis, 2013).

Another psychological construct related to sport coaching is commitment (Scanlan, 1993, O'Reilly and Chatman, 1986) Lyle (2002) established key criteria of commitment in the coaching process. Among these are: Stability, intensity of engagement, goal orientation, control of variables, planned progression, and personal development. Though considered as a psychological construct, commitment can be associated with high-performance coaching since full engagement of the coaching process is achieved through the criteria mentioned (Larson and Richburg, 2003).

Thus, sports performance is generally considered to be governed by a range of interacting physiological, biomechanical, and psychological variables, among others (Glazier, 2015).

Thus, this study determined the effect of coaching competency, social-emotional competency, and commitment to sports coaching performance. It is the researcher desires to extend his contribution to the sports coaching career in the Philippines and in the world.

Today, sports participation and performance have a great impact in different sectors in the society. This impact could be considered as factors affecting the sports coaching performance. This includes coaching competency, social-emotional competency, and commitment.

RESEARCH METHODS

The researcher used a descriptive multiple correlational research design. According to Glass & Hopkins (1984), descriptive research involves gathering data that describes pertinent variables of the study; multiple correlational research, on the other hand, is defined as a type of non-experimental research in which the researcher measures the relationship between three or more dependent variables and further determine their effects on a dependent variable (Price, Jhangiani and Chiang, 2013). The constellation of the research is shown in Figure 1.

Using the multiple correlational designs, the researcher aims to determine a positive association between the independent variables of the study such as: Coaching competency, social-emotional competency, and commitment. Further, the research aims to predict a direct positive effect of the independent variables to the dependent variable which is sport coaching performance measured based on team standing in Season 79 of the University Athletic Association of the Philippines (UAAP).

The population that the researcher studied includes the collegiate coaches of the UAAP. The researcher utilized the Non-Probability Sampling Technique. In non-probability sampling, there is no random selection of cases from the population. The samples or subjects that are needed are merely taken or selected for a certain purpose of the study (Gravetter, 2008). A total of 100 coaches participated in the study. Each of the UAAP participating school was represented in the study.

The variables of the study – Coaching Competency, Commitment and Social Emotional Competency – were measured using a 43-item questionnaire. There are 25 items

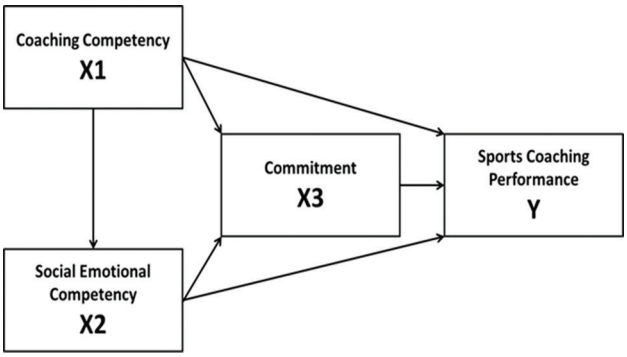

Figure 1: Research Model

on Coaching Competency which was divided into four domains: (1) Knowledge of the Sport; (2) Leadership Personal and Professional Qualities; (3) Coaching Performance and Experience; and (4) Communication Skill. There are ten items on commitment which was also divided into two domains: (1) Motivation and (2) Involvement Opportunities. Finally, there are eight items on compassion with two domains: (1) Interpersonal and Intrapersonal Skills and (2) Character Building.

Content validation of the instrument was done by panel of evaluators namely: one (1) sports psychologist, three (3) National coaches, and two (2) sports directors. The main purpose of this stage is to determine the validity of the items of the questionnaire. Further, the construct validity and reliability of the instrument was established using Cronbach alpha reliability coefficients and by factor analysis using principal component measures. All variables showed high Cronbach alpha coefficients. Principal component analysis yielded eight indicators with Eigenvalues greater than 1.0. Table 1 shows the results of the analysis.

Table 1: Cronbach alpha coefficients of the variables

Variables	Alpha	Standardized Item Alpha
Coaching Competence	0.950	0.953
Commitment	0.934	0.942
Social-Emotional Competence	0.921	0.925

Table 2: Standardized regression weights of variables

Path	Estimate	SE	CR	*P*
Commitment – Coaching Competence	0.275	0.094	3.441	***
Commitment – Social Emotional Competence	0.529	0.077	6.619	***
Sports Coaching Performance – Social Emotional Competence	0.024	1.045	0.210	0.834
Sports Coaching Performance – Coaching Competence	0.151	1.112	1.489	0.136
Sports Coaching Performance – Commitment	0.386	1.129	3.209	0.001*
Social Emotional Competence – Coaching Competence	0.407	0.010	3.749	***

RESULTS AND DISCUSSION

Result of path analysis is shown in Table 2 where regression weights are obtained. It is evident from the result that Coaching Competence and Social Emotional Competence has an influence on Commitment ($\beta = 0.275$, $P < 0.001$; $\beta = 0.529$, $P < 0.001$). Commitment, on the other hand, influences Sports Coaching Performance ($\beta = 0.386$, $P < 0.05$). Moreover, a relationship exists between Coaching Competence and Social Emotional Competence ($\beta = 0.407$, $P < 0.001$).

Hypothesis 1: Coaching Competency has no Positive Direct Effect on Sports Coaching Performance

Based on the result presented it does not support H1; therefore, coaching competency has no direct positive effect on sports coaching performance ($\beta = 1.656$, $P > 0.05$). Coaching competency is defined as coach ability to affect athletes' learning and performance (Myers, Feltz, Maier, Wolfe and Reckase, 2006a). Coach has an ability to influence athletes on their learning sports skills which could lead to a better performance. According to Glazier (2015), sports performance is considered to be governed by a range of interacting physiological, biomechanical, and psychological variables, among others. The UAAP Coaches do not just focus on their coaching competency but rather integrate it to other areas on sports coaching. This validates the result of this study which coaching competency has no effect and not solely predicts sports coaching performance.

Sports performance has different predictors such as coach-athlete relationship (Riemer and Chelladurai 1998; Jowett 2008), Commitment (Scanlan, 1993), and many others. According to Douge and Hastie (1993), the coaching effectiveness depends on what the athlete desires to get out of the program which may be associated with the sports competency of a coach. This only shows that coaching competency is not the only factor that predicts sports coaching performance but rather contributory and to be unified in different areas to have better individual or team sports performance.

Hypothesis 2: Social Emotional Competency has an Effect on Sports Coaching Performance

Result of regression weights does not support H2; hence, social emotional competency has no positive direct effect on sports coaching performance ($\beta = 0.220$, $P > 0.05$). According

to Tomlinson and Strachan (1996), coaches are not familiar with the concept of emotional and social intelligence and their leadership style was to maintain unilateral control or power over the athletes. This seems to be one of the indicators that UAAP coaches do not depend on social-emotional competency but rather consider multidimensional perspective in training athletes. Manning (2008) also mentioned that a team's performance in any sport can be predicted by many factors that include collective efficacy, team cohesiveness, and coaching competency. Indeed, positive coach-athlete relationships can deepen the motivation of athletes, foster positive emotions which could all contribute to the success or performance of a team. Consequently, studies show that less successful athletes' coaches were less focused on relationships, task oriented, did not show a tendency to include anyone in decision-making which may lead to affect the sports performance of the team (Kajtna & Baric, 2009). This only shows that caring attitude among coaches is a valuable indicator of coaching competency. Coaches therefore must respect, involve, listen, support their players and be sensitive to their needs. Coaches must realize that competency and hard work must coexist with compassion and empathy for them to bring out the best in their athletes.

Hypothesis 3: Commitment has an Effect on Sports Coaching Performance

The data analysis confirms the H3; therefore, commitment has an effect on sports coaching performance ($\beta = 0.386$, $P < 0.05$). The result coincides with the study conducted by Nikbin *et al*. (2014) that perceived justice for coaches – which is based on athletes' commitment, trust, and perceived performance – were positively and significantly related to coach commitment and trust. Moreover, commitment was significantly related to individual performance and team performance. The study of Turner and Chelladurai (2005) measured coaches' commitment to their university, coaching occupation, intention to leave the organization, team standings, and perceptions of performance. The results suggest that athletic departments should focus on enhancing their coaches' commitment to the organization to retain them. Commitment among collegiate coaches should be nurtured to reduce turnover rates in universities. Switching and swapping of coaches are common among universities and ethics is not an issue among administrators or coaches themselves. According to Jiménez, Borrásand Gómez (2009), competition, success, and social gratification causes work valuing among coaches, thus, increasing their commitment to their work. University administrators should not only appraise the roles of academic personnel in the community but also give value to the contributions made by coaches in molding athletes who give pride and strategic identity to the institution.

Hypothesis 4: Coaching Competency has an Effect on Commitment

Analysis of results on the variables coaching competency and commitment, proves H4, that coaching competency has an effect on commitment ($\beta = 0.275$, $P < 0.001$). This corroborates with the result of Tsai, Tsai, Chen and Lee (2014) among professionals that competency, self-efficacy, and commitment are significantly positively correlated. The study of Kent and Sullivan (2003) further confirm that there is a link between coaching competency and commitment; their study revealed that coaching efficacy significantly predicts both affective and normative commitment of intercollegiate coaches. Achieving high level sports performance usually depends on a driving force for coaches to excel. Sports psychologists state that this driving force is associated on how committed a person or motivated to achieve a certain goal. Certainly, for one to achieve a particular competency in a profession, one should devote effort to enhance his skills through training, certifications, or continuing professional education; consequently, all of these are translated on how committed an individual is to enrich or develop his profession be it for personal gains or career advantage. This result highly builds on Deci's and Ryan (1985) self-determination theory as well as the sportive behavioral correlates of the model of Commitment (Scanlan *et al*., 1993). It is also noteworthy that according to Scanlan's model (1993), extrinsic motivation has a higher contribution to enjoyment whereas intrinsic motivation has a higher contribution to commitment. Undoubtedly, a coaches' personal mission of developing his competency is an intrinsic motivation that stemmed

Hypothesis 5: Social-Emotional Competency has a Positive Direct Effect on Commitment

Outcome of analysis of the investigated variables social emotional competency and commitment infer an effect of social emotional competency on commitment ($\beta = 0.513$, $P > 0.001$). In a similar study by Masrek *et al*. (2015) revealed that there are correlational associations between social emotional capacity and professional commitment. This further signifies the importance of emotional intelligence in ensuring organizational commitment in the context of professionals. In the field of sports coaching, Fry and Gano-Overway (2010), study, similarly, revealed that athletes who perceived a caring climate were significantly more likely to report higher enjoyment, more positive attitudes toward their coaches/teammates, greater commitment and engage in more caring behaviors toward their coaches/teammates.

According to Boyatzis (2013), social emotional competency is a learned capacity, based on emotional intelligence, which contributes to effective work performance at work. In the field of sports coaching, this refers to a compassionate and caring attitude of the coach toward the athletes. Beck and Wilson (2000) mentioned that members of organization who are committed on an affective level stay with the organization because they view their personal employment relationship as congruent to the goals and values of the organization. The study further mentioned that affective commitment

Table 3: Summary and decisions on hypotheses results on coaching competency, commitment and social-emotional competency to sports coaching performance

No.	Hypotheses	ß	*P*	Decision	Interpretation
1.	Ho: ßX1Y = 0 Ha: ßX1Y > 0 X1→Y	ß = 1.656	>0.05	Ho is rejected. Ha is accepted	Have no positive direct effect
2.	Ho:ßX2Y = 0 Ha:ßX2Y > 0 X2→Y	ß = 0.220	>0.05	Ho is rejected. Ha is accepted	Have no positive direct effect
3.	Ho:ßX3Y = 0 Ha:ßX3Y > 0 X3→Y	ß = 0.386	<0.05	Ho is accepted. Ha is Rejected	Have positive direct effect
4.	Ho:ßX1X3 = 0 Ha:ßX1X3 > 0 X1→X3	ß = 0.275	<0.001	Ho is accepted. Ha is Rejected	Have positive direct effect
5.	Ho:ßX2X3 = 0 Ha:ßX2X3 > 0 X2→X3	ß = 0.513	<0.001	Ho is accepted. Ha is Rejected	Have positive direct effect
6.	Ho:ßX1X2 = 0 Ha:ßX1X2 > 0 X1→X2	ß = 0.038	<0.001	Ho is accepted. Ha is Rejected	Have positive direct effect

development involves identification and internalization. Identification refers with the desire to establish a rewarding relationship with an organization; while internalization refers to doing work congruent to the goals and values of the organization. The affective domain of the coaching profession is an important aspect to consider. Collegiate coaches should not only focus on athletic development but also on academic and moral development of student athletes. Mission vision of the school should likewise be translated in the training programs for coaches. Falcão, Bloom and Gilbert (2012) made an investigation regarding the impact of a coach training program designed to promote youth developmental outcomes. The results reported coaches' increase in knowledge and a better understanding of their players. Coaches' also perceived that it promoted cohesion and communication, contributing to the development of athlete competence, confidence, connection, and character/caring. The results provide guidance for creating and delivering coach training programs designed to promote youth developmental outcomes. This result is also evidence that coach training program should not only focus on coaching skills but also on the soft skills of coaches as well.

Hypothesis 6: Coaching Competency has a Positive Direct Effect on Social Emotional Competency

On testing the sixth hypothesis on whether coaching competency has an effect on social emotional competency, results indicate that coaching competency has an effect on social emotional competency ($\beta = 0.038$, $P > 0.001$). Kaur (2014) made a similar study among teachers and reveal a significant positive relationship between competence and emotional intelligence. Mustaffa *et al*. (2013) likewise found a significant relationship between emotional intelligence (self-awareness, self- control, self-motivation, empathy, and social skills) and skills competency.

Inevitably, coaching competency is a principal component in sports coaching performance. Traditionally, coaching competency is at par with championship titles. However, Allen and Hodge (2009) revealed that quality coaches also understand, support, and care for athletes as people – providing a motivational climate beyond competence-focused goals. Anchoring on the emotional and social intelligence competency model (2013), model shows that concepts such as self-awareness, social-awareness, self-management, and relationship management are predictors of performance. This also coincides with Boyatzis (2013) claim that social emotional competency contributes to effective work performance at work. Effectiveness and efficiency in coaching performance are easily measured by certain key performance indicators set by athletic administrators. However, social emotional competency is quite challenging to gauge. Evaluation of coaches should, therefore, be a practice in universities and items pertaining to social emotional competency apart from coaching competency should be regarded.

Table 3 shows the summary and decisions on the hypotheses testing results on the Coaching Competency, Commitment, and Social Emotional Competency to Sports Coaching Performance.

CONCLUSION

The result of the study highly regarded the role of Commitment in Sports Coaching Performance. The path analysis showed full mediation of the variables, showing Commitment as a mediating variable of Coaching Competency and Social Emotional Competency, toward better coaching performance. Thus, factors pertaining to an increase in the commitment of sport coaches must be examined by universities, institutions, and the national government to create a different perspective in the field of sport coaching. Consequently, results of the study can provide as a guiding principle that could be valuable not only in sport coaching practice but also in sports education and administration. The model could also be utilized as a framework in crafting a National Competency Standards for Sport Coaches and Code of Ethics for Sport Coaches in the Philippines.

A better understanding of the effect of coaching competency, social emotional competency and commitment to sports performance may bring optimum athletic performance essential for an athlete's development and progress. Sports participation and performance should not only focus on the tangible outcome such as rewards, medals, and other things associated in winning but also rather it should explore on other areas to improve and develop individuals holistically. It is high time to dignify sport coaching as a discipline and as a profession.

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Research Article

Impact of athletic training on selected motor variables

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ABSTRACT

Athletic performance has dramatically progressed over the past few years. Performance levels unimaginable before are now commonplace, and the number of athletes levels of outstanding result is increasing. All athletic programs should incorporate the fundamental factors of training, namely, physical, technical, tactical, psychological, and theoretical training. They are an essential part of any training program regardless of the athlete's age individual potential, training level or training phase, and the relative emphasis placed on each factor varies; however, according to these features and the characteristics of the sport or event. In the frame of training, exercise is a motor act repeated systematically. Exercise represents the main training method to increase performance. Exercises vary in effect from narrow to complex. Performing an exercise develops an athlete to physically, aesthetically and psychologically (Bucher 1972).

INTRODUCTION

Participation in an athletic training program along with other types of physical activity give children yet another opportunity to improve their health and quality of life. Science evidence indicates that youth athletic training programs are no more risky than other sports and activities in which children regularly participating. Medical and fitness organizations now support participation in well designed and properly instructed youth athletic training programs.

Regular participation in youth athletic training program can favorable influence selected motor abilities measures for all PU College girls and can improve the preparedness of aspiring young athletes for the demands of sports practice and competition. Parents, teachers and coaches should realize that athletic training is a specialized method of condition that can offer many benefits, but at the same time can result in injury if age appropriate training guidelines are not followed, when conducted by competent instructors who possess a found understanding of athletic training principles and development needs of girls, athletic training can have many benefits and lead to a lifelong interest in physical activity, it helps to improve skill and performance. In such a scenario athletic training ensure overall development of women sports persons.

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METHODOLOGY

To achieve the purpose of the study, fifty PU College girls were selected randomly as subjects. Their age ranged from 16 to 18 years. They were assigned to experiment group (Group 1) and control group (Group II) of 25 each. The experimental groups were subjected to their respective training programs during evening hours, namely, athletic training over the period of 5 days in a week in addition to their regular activities, the control group did not participate any specific training but they participated in the regular schedule.

All the subjects of five groups were tested on selected dependent variables before and after the treatment. The data pertaining to the variables in the study were examined using mean and "*t*" test to find out significant improvement and analysis of covariance (ANCOVA) for each variable separately in order to determine the difference if any among the pre- and post-test mean. The level of significance was fixed at 0.05 level of confidence for all the cases.

According to More House and Miller define "Cardio respiratory endurance is the ability to carry a work load for a relatively

Table 1: Summary of mean and "*t*" test for the pre- and post-tests on criterion variables of athletic training and control groups

Criterion variables	Mean and "*t*" test	Athletic training group	Control group
Speed	Pre-test	8.9	9.10
	Post-test	7.87	9.14
Endurance	"*t*" test	8.17*	1.02*
	Pre-test	2150	2222 B
	Post-test	2606	2207 B
Respective strength	Pre-test	21.41	22.24
	Post-test	27.2	21.04
	"*t*" test	31.1*	1.8*
Static strength	Pre-test	29.01	26.32
	Post-test	46.02	26.02
	"*t*" test	16.03*	1.89*

prolonged period. The endurance is that enables the heart, blood, vessels, and lungs to receive oxygen and take it to the muscular and to do it as often and effortless as possible.

RESULTS

For cardiorespiratory endurance the calculated F-value for pre-test (0.002) is ≤4.03 at 0.05 levels and hence it is not significant. Therefore, there is no significant difference among pre-test scores of endurance on control group and experimental group before the training period. The calculated F-value for post-test (2.528) is higher than the value of 4.03 at 0.05 levels and hence it is significant. Therefore, there is a significant difference among post-test scores of endurance on control group and experimental group after the training period. The results of one-way ANOVA for pre- and post-test score of cardiorespiratory endurance. It can be see that "F" = 33.138 for the post-test among control, and experimental group found to be significant at 0.05 level. Thus, the significant "F" value indicates that the training have a positive influence on the endurance of the subjects.

CONCLUSIONS

It was concluded that potential opportunity for the importance of Fartlek training on cardio respiratory endurance among the basketball players. Basketball players' aim is to achieve highest goal as much as possible stipulated period for that one has to run here and there with full effort. Fartlek training makes the basketball player to run up and down and sideward with the full effort according to situation. Fartlek is a speed play. Fartlek vastly reduce boredom, increases post-exercise energy expenditure, and stimulates the respiratory system, Fartlek training gives cardiovascular system and nervous system to a greater degree. Hence, the Fartlek training may be included as one of the important training in the basketball training.

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Research Article

The impact of COVID-19 on running events in Vietnam

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ABSTRACT

In the face of increasingly complicated and dangerous developments in the COVID-19 pandemic, a series of sporting events in the world were canceled or rescheduled; particularly in August and September 2020, 10 large sporting events with thousands of runners were canceled because COVID-19 came. On this situation, running events must to face a lot of problems. Inside, the most affecting factors are internal finance, contract with 3rd party, or sponsors. However, let's look at new opportunities and use energy to develop it.

Keyword: COVID-19, Event, Running

INTRODUCTION

According to statistics of the World Health Organization, as of September 1, 2020, the world had recorded 25,298,875 COVID-19 cases, including 847,602 deaths. In the face of increasingly complicated and dangerous developments in the COVID-19 pandemic, a series of sporting events around the world were canceled to ensure safety and limit the spread of disease in the community (Bruno *et al*., 2020).

Statistical results of Statista decided to postpone the Tokyo Olympics, the International Olympic Committee has significant influence 11,000 Olympic athletes and 4400 Paralympic athletes compete in this event. Many other professional tournaments around the globe have halted their seasons, which leads to sponsorship deals, TV rights, and ticket… being destroyed. According to Johan Cruyff Institute, this is the main income of professional sporting events. Faced with this situation, hundreds of thousands of people face the risk of unemployment and some event companies have been facing the brink of bankruptcy.

In Vietnam, by the end of the third quarter of 2020, an estimated 50 major sporting events have been canceled or rescheduled.

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In the face of successive difficulties, the organizers have constantly searched for appropriate legal events to ensure social aspects, benefits for participants, and balance benefits with the sports ecosystem (Dobson, 2000).Virtual race is a solution of choice for this type of race event. This is not only an alternative solution but also opens up new trends in the sporting event industry. Although there is a flexible solution to respond promptly, like all other areas, there is still no denying the difficulties faced by running events organizers. Within the scope of the article, the authors have made every effort to bring a complete and accurate result, providing readers with an overview of the impacts of the COVID-19 pandemic on running events in Vietnam.

METHODS

Sample

Eight organizers of running events canceled at the time of translation include: Vietnam MTB Series, Pulse Active, Race Vietnam, Race Jungle, VnExpress Marathon, Nexus Communications, EPM Sports Joint Stock Company, and Sunrise Events Vietnam. However, only four of them responded, the rest refused for their own reasons.

Scale

The survey was built using the theoretical synthesis method from the published documents Dobson (2000) and Lina (2008) and preliminary survey with open questions, direct interviews.

Then, the questionnaire was transferred to Google s to send to the sample, conducting the official interview.

RESULTS

The Running Events Cannot Timely Organize due to the COVID-19 (in August and September 2020)

Just 2 months of second season of COVID-19 in Vietnam (August and September 2020), there are 10 large running event canceled or moved. Some have decided move the event at a different time of the year, others have canceled the event altogether and plan to hold it next year, especially Danang International Marathon 2020 and Wow Marathon Hội An 2020 Switch to virtual run (VR) [Table 1].

The Following Factors Affected When the Event is Canceled or Moved

The effects of the event have been published on previous studies which can be divided into three categories: Social – "The social part for a community to arrange an event is the benefit of improving the social ties and an opportunity for the community to demonstrate that they can pull it together for the greater good" (Bryn Parry, 2004). Economic – "Tourist town has long understood that the benefits of running events can during the tourist season bring more people to the town and thus encourage further spending in local shops and businesses or it can extend the season in some way" (Parry *et al*., 2004). Political – "Sporting events play a political role in addition to the social and economic roles. This is because of the perceived economic effects but, on the other hand, it is also positive political impacts, such as improving the international image of the country or in the case of some events as a means of gaining other political benefits such as public exposure" (Parry *et al.*, 2004). This has the same effect when an event is canceled. This is effect on organizer.

According to the survey, there are 12 factors affected to organizer when the event is canceled or moved, include internal finance, revenue from tickets, sponsorship contracts, the contract on the venues, contract with 3rd party (suppliers of equipment, installation expo …), media, event insurance, athletes, products for event (gifts, publications …), event restart costs (for postponed events), and customer service. Inside, the most affecting factors are internal finance, contract with 3rd party (suppliers of equipment, installation expo …), and media with mean = 4.5.

DISCUSSION

Part of the above research results is similar to those of Johan Cruyff Institute. The authors said, the main elements in the organization of a major sporting event are the athletes, television, and the sponsors who get the financial resources to make it possible. In addition to the above impact aspects, analyzing in a deeper aspect through direct communication with some economic experts, the author recognizes the dangers from destructive impacts to the local economy (loss of sports economy resources combined with tourism), threatening the existence of the event organizer.

The transition to the Virtual Race, essentially only meets a small part of the athlete's need compared to traditional running. Objectivity in the match results, atmosphere of the event, sound, color, interaction…. That is one of a lot of factors that make people spend time, money… to get a ticket to run.

However, when looking from another angle, sometimes, there are positive things in the difficulty. Evidence is that the organizer of Mekong Delta Marathon 2020 – Mr. Feedy Pham said optimistic that "Event delays can increase ticket sales to reach more audiences; the organizers have more time to prepare for better solutions." This is evidenced when the official organization after postponing because of COVID-19, the number of people registered to attend the Mekong Delta Marathon 2020 increased to 7000 participants, an increase of 1000 people compared to the previous plan.

Table 1: The running events cannot timely organize due to the COVID-19 (in August and September 2020)

No	Name events	Expected time	Location	Organizer
1	Tri-Factor Vietnam 2020	August 02, 2020	Ba Ria – Vung Tau	Vietnam MTB Series
2	Danang International Marathon 2020	August 09, 2020	Da Nang	Pulse Active
3	Wow Marathon Hội An 2020	August 09, 2020	Hoi An	Race Vietnam WOWHOLIDAY
4	Quang Binh Discovery Marathon 2020	August 16, 2020	Quang Binh	Race Jungle
5	VnExpress Marathon Hanoi Midnight 2020	August 22, 2020	Ha Noi	VnExpress
6	Mekong Delta Marathon 2020	August 29, 2020	Hau Giang	Nexus Communications
7	Loop Ultra Trail	August 28, 2020	Ha Giang	Race Jungle
8	Ecopark City Trail Marathon 2020	September 02, 2020	Hung Yen	Công ty cổ phần thể thao EPM
9	Hue VnExpress Marathon 2020	September 06, 2020	Hue	VnExpress
10	IRONMAN 70.3 Vietnam 2020	September 06, 2020	Dan Nang	Sunrise Events Vietnam

CONCLUSION

The most affecting factors are internal finance and contract with 3rd party (suppliers of equipment, installation expo …). We should not focus solely on the negative things that COVID-19 brings us. Take a more optimistic view and use your energy to develop better things. The author also predicts that after the shock of the COVID wave not only in Vietnamese but also in the world will open up new development opportunities for the organizers. The mix between sport and technology is promoted. Technology products are developed to ensure increasing objectivity, virtual reality enhancement: Virtual glasses, automatic routes…. Those are not entirely bad scenarios.

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Research Article

Assessment of physical literacy of primary grade pupils

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ABSTRACT

This study aims to determine the physical literacy of primary grade pupils in Pangil Central Elementary School in the province of Laguna, Philippines. This study utilized the descriptive evaluative research design where the facts regard of the current issue of the phenomena is attain to collect data and performance of the 185 pupils from Grades 1–3 in terms of physical literacy. Walking got the highest mean and has mostly moderate score and interpret as moderate in terms of physical literacy, while jumping and running have a low scores and interpreted as low level of physical literacy. Therefore, the level of physical literacy of the primary grade pupils is at low level. The physical literacy shows a low score and there is a need of attention to bridge the gap base from the performance.

Keywords: Physical activity, Physical literacy, Primary grade pupils

INTRODUCTION

Physical literacy is a broad term to understand as an individual in the nature for a healthy and active lifestyle. However to understand the meaning of this deep terminology, various researches are presented that give a definition of this study. According to Whitehead (2006), physical literacy defined as a motivation, confidence, physical competence, and knowledge that carry an obligation and give value in physical activity in the life of human. It forms a basis for qualifications, characteristics, awareness, behaviors, understanding, and knowledge in development for healthy and active living in physical recreation opportunities Gabbani (2001).

One of the problems that will be encounter of primary grade pupils nowadays is a low given of time in terms of physical activity and in education. Not all of the primary grade pupils are interested to participate in physical activity program, and the fact that half of the teachers in physical education are teaching physical education inside the classroom rather than a practical physical activity out of the field. The World Health Organization (2002) calculates that around 1.9 million of people are die every year as of result in physical inactivity.

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According to Lloyd *et al*. (2012), physical literacy has four inter-related core domains which are (a) physical fitness which pertain to (cardiorespiratory, muscular strength, and flexibility), (b) motor behavior that pertains to (fundamental motor skill proficiency), (c) physical activity behaviors that directly measured daily activity), and (d) psychosocial/cognitive factors connecting in attitudes, feelings, and knowledge of an individuals. In this manner, Corbin (2016), physical literacy provides a good foundation for elite sports, recreation of public health, and physical education instead of being term use to improve the public perception.

Move to learn is the context of physical activity as a means for learning. Learn to move is the embodies learning of skills, and techniques and acquisition of understanding that are requisites to participation in a variety of physical activities which include exercise, games, sports, dance, and recreation Curriculum Guide Physical Education CGPE (2016). Moreover, the physical literate active child will have a chance to interact with a sensitiveness and release to others group situation that will appreciate the expressive quality of movement among herself and in others. In other words, an individual who is physically

literate can embody the physical nature of movement and can use take the benefit of his/her experiences and knowledge to interact with the environment Haydn and Davies (2005). Quality motor development in early life has a significant effect on quality of life in later years Aspen Institute (2015). Developing a proper understanding of motor patterns and teaching age appropriate skills, therefore, becomes imperative for a full understanding of the benefits of physical literacy

METHODOLOGY

The researcher used a stratified random sampling technique for collecting of data. A stratified sampling technique is a kind of sampling approach where the total number of population of the subject is divided into smaller part of group. It is also called a cluster; cluster sampling is similar to stratified random sampling on which group of individuals is identified from the population and subjects are drawn from these group. A sampling that involves from a large group of subjects is called cluster and the individual member of cluster is selected in the final stage of sampling process.

The respondents of this study consisted of primary grade pupils from Grades 1–3 of Pangil Central Elementary School, Grade 1 a total of 66 respondents, Grade 2 a total of 60, and Grade 3 a total of 59 with the sum of 185 total respondents.

The researcher used a model for physical literacy movement skills [Figure 1]. Moreover, analytic rubric known as criteria for assessment for the performance of the primary grade pupils in terms of walking, running, and jumping skills including of their age, sex, grade level, and health status.

Findings

A total of 185 primary grade pupil respondents were assessed, based on the analysis and interpretation of data gathered regarding of the profile, level of physical literacy, and effects of age and sex on physical literacy movements skill, (a) walking, (b) running, and (c) jumping.

Table 1 shows the profile of the respondents includes age, sex, and grade level. The table shows the range of the ages of the respondents is from 6 to 9 years old by which 17% is 6 years old, 26% is 7 years old, 37% is 8 years old, and 20% of it is 9 years old. Female dominant the group with more than a half of the respondents which is 51% while male is 49% of the group. The respondents composed of Grades 1–3 by which Grade 1 dominants the number of respondents with 35.7% follows by Grade 2 with 32.4% and the least is Grade 3 with 31.9% of the respondents.

Table 2 shows the level of physical literacy of the primary grade pupils in terms of (a) walking, (b) running, and (c) jumping. Walking got the highest mean and has mostly moderate scores and verbally interpreted as moderate on the level of physical literacy of the primary grade pupils while running and jumping mostly have a low score and a lower means and both verbally interpreted as low on the level of physical literacy of the primary grade pupils. Since then, the computed weighted mean is 1.37 and verbally interpreted as low, therefore, the physical literacy of the primary grade pupils shows a low level. This result implies that the ability of the

Table 1: The profile of the respondents includes age, sex, and grade level

Profile	Frequency	Percentage	Rank
Age			
6	31	17	4
7	48	26	2
8	69	37	1
9	37	20	3
Total	185	100	
Sex			
Male	90	49	2
Female	95	51	1
Total	185	100	
Grade			
1	66	35.7	1
2	60	32.4	2
3	59	31.9	3
Total	185	100	

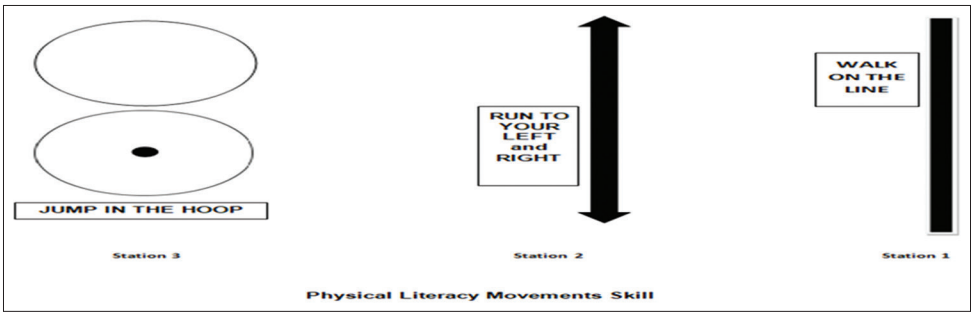

Figure 1: Physical literacy model

Table 2: Level of physical literacy of the primary grade pupils in terms of (a) walking, (b) running, and (c) jumping

Physical literacy	Frequency			Percentage			Mean	Verbal interpretation
	1	2	3	1	2	3		
Walking	47	138	0	25	75	0	1.75	Moderate
Running	149	36	0	81	19	0	1.19	Low
Jumping	155	30	0	84	16	0	1.16	Low
Weighted mean							1.37	Low

child to perform basic locomotor skills has a lack of attention which needs to teach and practice at this kind of level. In one study, it was found that the relationship between appropriate practice and achievement was significantly higher for low skilled students than for medium or high skilled students. In addition, there was a significant negative correlation between the number of inappropriate practice trials and achievement for low skilled students, but not for medium and high skilled students, Silverman and Mercier (2015).

Table 3 shows the significant effects of age and sex on the physical literacy of the primary grade pupils in terms of walking. There is not enough evidence that the physical literacy of the primary grade pupils depends on their sex since the Chi-square test is 0.521 with $P = 0.471$ which is greater than its alpha level of 0.05 which implies to accept the null hypothesis and to conclude that there is no significant effect but otherwise, age shows enough evidence that the physical literacy of the primary grade pupils depends on it in walking. The Chi-square test is 11.54 while $P = 0.009$ which is less than to its alpha level which is 0.05 that implies to reject the null hypothesis, therefore, there is a significant effect between age and physical literacy of the primary grade pupils in terms of walking. Meaning the body posture of the respondents in walking skill is not yet fully developed and still adjusting. According to Shkuratova *et al*. (2004), postural adjustments are defined as changes in walking speed, cadence, stride length, and double-limb support duration that occur in response to perturbations during walking. The ability to adapt walking speed, cadence stepping rate, and stride length might be equally as important in maintaining dynamic balance for other tasks and contexts.

Table 4 shows the significant effects of age and sex on the physical literacy of the primary grade pupils in terms of running. There is not enough evidence that the physical literacy of the primary grade pupils depends on their age since the Chi-square test is 4.015 with $P = 0.26$ which is greater than its alpha level of 0.05 which implies to accept the null hypothesis and to conclude that there is no significant effect but otherwise, sex shows enough evidence that the physical literacy of the primary grade pupils depends on it in running.

The Chi-square test is 9.943 while $P = 0.002$ which is less than to its alpha level which is 0.05 that implies to reject the

Table 3: Significant effects of age and sex on the physical literacy of the primary grade pupils in terms of (a) walking, (b) running, (c) jumping

Walking	X^2	*P*-value	Decision	Interpretation
Age	11.54	0.009	Reject	Significant
Sex	0.521	0.471	Accept	Not significant

Table 4: The significant effects of age and sex on the physical literacy of the primary grade pupils in terms of running

Running	X^2	*P*-value	Decision	Interpretation
Age	4.015	0.26	Accept	Not significant
Sex	9.943	0.002	Reject	Significant

null hypothesis, therefore, there is a significant effect between sex and physical literacy of the primary grade pupils which shows that the capacity of balance, posture, and speed to perform running skill are seeking attention to achieve a good performance in running skill. The ability to run is the key to many games, sports and everyday activities it is essential that children are taught the correct technique for running and provided with plenty of opportunities to practice. In the study of Hespanhol Junior *et al*. (2015), they stated that the high popularity and accessibility of running are seen as a strong contributor toward promoting and enhancing a physically active lifestyle within the population. To ensure effective running programs that promote physical activity and consequently to reduce the risk of lifestyle-related diseases, it is essential to quantify the extent to which running improves health.

Table 5 shows the significant effects of age and sex on the physical literacy of the primary grade pupils in terms of jumping.

There is not enough evidence that the physical literacy of the primary grade pupils depends on their age since the Chi-square test is 4.125 with $P = 0.248$ which is greater than its alpha level of 0.05 which implies to accept the null hypothesis and to conclude that there is no significant effect but otherwise, sex shows enough evidence that the physical literacy of the primary grade pupils depends on it in jumping. The Chi-square test is 8.734 while $P = 0.003$ which is less than to its alpha level which is 0.05 that implies to reject the null hypothesis, therefore, there

Table 5: The significant effects of age and sex on the physical literacy of the primary grade pupils in terms of jumping

Jumping	X^2	*P*-value	Decision	Interpretation
Age	4.125	0.248	Accept	Not significant
Sex	8.734	0.003	Reject	Significant

is a significant effect between sex and physical literacy of the primary grade pupils. This result showed and give an impact on the performance that signify between sex and physical literacy base from the accuracy given by the respondents which is low in jumping skills. It is essential to teach and practice landing safely by bending ankles, knees, and hips, this helps to absorb impact on landing body weight should be evenly distributed between both feet, landing at the same time. The k to 12 curriculum guide physical education (2016) set a grade level standard, where grades 1–3 learners should demonstrate understanding body awareness, space awareness, qualities of effort, and movement relationship through participation in enjoyable physical activity which might be one possible solution to achieve the physical literacy in different types of physical activity.

CONCLUSION

Through the statistical treatments applied, the researcher concluded that after the assessment and evaluation, the scores of the subjects of the study are decreasing which means that the physical literacy of the respondents is getting low and need some attention to upgrade rather improve their physical literacy outcome and skills.

Recommendations

It is suggested that to achieve a good physical literacy outcome, pupils should engage in physical activity that will align to this study which start at primary level where the body is tend to be developed and make physically fit engaging for many physical activities. Primary grade pupils P.E teachers must have enough knowledge to teach on what is physical literacy and how this helps to their pupils to enhance their physical literacy skills.

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Research Article

An analytical study of self-confidence and stress level among boxers and judokas of Himachal Pradesh

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ABSTRACT

The objective of the study was to compare the boxers with judokas with respect to their self-confidence and stress level traits. To accomplish the study a purposive sampling device was used and a sample of 120 male intercollegiate sportsmen comprising 70 Boxers and 50 Judokas who had represented their respective colleges in the inter college Boxing and Judo championship of Himachal Pradesh University, during academic session 2018–19, were selected. It was hypothesized that there would be a significant difference between boxers and judokas w.r.t. their self-confidence and stress levels. To assess the self-confidence and stress levels of boxers and judokas, Hindi Version of Agnihotri's Self-Confidence Inventory was used as a tool. Mean, standard deviation, and *t*-test were used as statistical tools to analyze the data statistically. The level of significance was set at 0.05 levels. The results of the study exhibited that the boxers differed significantly from the judokas on the self-confidence component and judokas possessed higher level of self-confidence characteristic. Moreover, boxers and judokas experienced more or less similar levels of stress. Thus, the alternate hypothesis was partially accepted and partially rejected.

Keywords: Boxers and judokas, Self-confidence, Stress

INTRODUCTION

Physical education and sports have emerged from a long historical background. It is a process that has taken place and is still taking place in various informal and formal ways in every culture, from the times of primitive man to the present modern eras either directly or indirectly, physical activities have played a key role in the lives of all people. The participation in physical education activities contributes to building up of physical, emotional, social, and temperamental make-up of the individual. The success in sports activities in childhood and adolescence, enhance self-esteem. The process of acquiring motor skill, and using them in sports, helps to acquire academic proficiency.

Sports psychology is a healthy field with a bright future within physical education. The field continues to grow. Psychologists and psychology department's serenity have shown increased interest in the field. Certainly, the sports fan and the amateur sports competitor are keenly interested in the psychological aspects of performance stories about sports performance which have improved substantially after consultations with a sport psychologist. Sports psychologists have fueled interest and have given the field credibility among laypersons and among those who write about and comment on sport in the popular media.

There is no doubt that the sports field is currently divided between the people who study the psychological aspects of sports performance and people who work with athletes in the capacity of sports psychologists. The former are academic sport psychologists and the latter are practicing sports psychologists. A person does not have to be exclusively one or the other. Many sports psychologists work directly with athletes and still contribute to the emerging knowledge base through their research and scholarship.

Sports psychology stresses on the psychological study of the problems which arise in any sports situation, that is, sports

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competitions, players participating in sports, spectators involved in sports events, and others who are deeply concerned or associated with sports. Sports psychology deals with the behavior of all participants during various conditions and circumstances in sports.

Comparing with exercise physiology and kinesiology, which are as old as sport science, sport psychology is just emerging as a sub-discipline. The international society of sport psychology founded in the early 1960s is the oldest organization in this field. The early history of sport psychology is closely related to that of motor learning, because people with a background in psychology could understand and work in both fields. A large portion in the field of sports psychology is academic. The broader goal of this part of the field is to identify factors that are particularly important in sports, especially those related to sports performance. Neuro-psychological, bio-physical, psychological, and inter-personal variables are some that influence the performance of athletes and teams.

The sport psychologist is a scientist who employs the concepts, theories, and tools of the larger field of psychology in seeking to describe, control, and predict the behavior of those involved in sports. As a sports discipline, sports psychology which is presently constituted, is primarily an applied science. By this, we mean that sports psychologist seeks to use knowledge for the ultimate improvement of performance in sport and satisfaction with sport.

Self-confidence is an attitude which allows individuals to have positive yet realistic view of themselves and their situations. Self-confident people trust their own abilities have a general sense of control on their lives and believe that they would be able to do what they wish, plan and expect. Having self-confidence does not mean that individuals would be able to do everything. Self-confident people have expectations that are realistic. Even when some of their expectations are not met, they continue to be optimistic and accept the reality. People, who are not self-confident; depend excessively on the approval of others, to feel good about them.

The word "stress" has a long history and is possibly derived from the Latin word Stringere "to draw tight." The concise dictionary defines, "stress" in different ways. The first definition is that it is a constraining or maligning force and one example used is "under the stress of poverty." The second definition treats it as an effort or demand on energy, as subjected to great stress. The third definition offered talks of a force exerted on the body. Stress is a "mentally or emotionally disruptive or upsetting condition occurring in responses to adverse external influences and capable of affecting physical health, usually characterized by increased heart rate, rise in blood pressure, muscle tension, inability, and depression."

Moreover, both the games, that is, Boxing and Judo are highly competitive and need a wider variety of fitness components, that is, speed, strength, endurance, coordination, reaction time, nd power. Apart from that as we know they are also combat sports and require greater quality of psychological characteristics to excel in the present era of high extreme competition. Thus, keeping in mind all above assertions, assumptions, and preoccupations researcher undertook the present research for the assessment and comparison of self-confidence and stress levels of boxers and judokas.

Objective of the Study

The objective of the study was to assess and compare the self-confidence and stress levels of boxers and judokas and it was hypothesized that there would be a significant difference between boxers and judokas w.r.t. their self-confidence and stress levels.

MATERIALS AND METHODS

A survey type of research study had been designed to investigate the self-confidence and stress levels of inter college level boxers and judokas of Himachal Pradesh University. A purposive sampling method was employed and the sample of study comprised 120 sportsmen having 70 Boxers and 50 Judokas who had represented their respective colleges in the inter college Boxing and Judo championship of Himachal Pradesh University, during academic session 2018–19. Hindi Version of Agnihotri's Self-Confidence Inventory was used as an assessment tool. The collected data were statistically analyzed using Mean, Standard Deviation, and *t*-test and the level of significance was set at 0.05 levels.

RESULTS

The findings of the research on the investigated psychological variables are presented in Tables 1 and 2 and their analysis and interpretation follows them along with their discussion.

Interpretation

It is evident from Table 1 that mean value of self-confidence level of boxers and judokas came out to be 24.30 and 27.96 and the mean difference is 3.66 which indicates that boxers and judokas differ highly from each other on the variable self-confidence. The standard deviation for the boxers and judokas is 8.627 and 6.612. The calculated "*t*-value" for boxers and judokas with regard to self-confidence came out to be 2.517 at 118 df which is higher than the table value at 0.05 level of significance. Hence, it is interpreted that the two groups differ significantly.

Thus, as per the result of the statement the formulated hypothesis for the present investigation, that is, "*There would be a significant difference in the self-confidence level of boxers and judokas*" is accepted.

Table 1: Comparison of self-confidence level among boxers and judokas

Variable	Group	N	Mean	SD	SEM	M.D.	Df	*t*-value
Self-Confidence	Boxers	70	24.30	8.627	1.031	3.66	118	2.517
	Judokas	50	27.96	6.612	.935			

Significant at 0.05 levels

Table 2: Comparison of stress level among boxers and judokas

Variable	Group	N	Mean	SD	SEM	M.D.	Df	*t*-value
Stress	Boxers	70	149.73	26.57	3.176	4.869	118	1.006
	Judokas	50	144.86	25.523	3.61			

Not significant at 0.05 Level

Interpretation

It is evident from Table 2 that mean value of stress level of boxers and judokas came out to be 149.73 and 144.86 and the mean difference is 4.869 which indicates that boxers and judokas differ highly from each other on the variable stress. The standard deviation for the boxers and judokas is 26.57 and 25.523. The calculated "*t*-value" for boxers and judokas with regard to stress came out to be 1.006 at 118 df which is lesser than the table value at 0.05 level of significance. Hence, it is interpreted that the two groups have no significant difference.

Thus, as per the result of the statement the formulated hypothesis for the present investigation, that is, "*There would be a significant difference in the stress level of boxers and judokas*" is rejected.

Discussion on Findings

1. After going through the findings, result of the study indicates that judokas possess higher level of self-confidence as compared to boxers.
2. Moreover, it was also observed that boxers and judokas were having near about similar stress levels.

CONCLUSION

Based on the present study, it can be concluded that:

1. There is a significant difference in the self-confidence level among boxers and judokas.
2. There is no significant difference in the stress level among boxers and judokas.

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Research Article

Effect of yogic practices and interval training on selected physiological variables among high school boys

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ABSTRACT

The purpose of the study was to find out whether there is any significant improvement on the efficiency of the physiological and biochemical variables through selected asanas and interval training. To execute this investigation, the research scholar employed random sampling method. The study was conducted on a total sample of ninety boys drawn randomly from 150 students of APSWR School, Jangaon, Warangal District, age was ranged from 12 to 15 years. The pre- and post-tests design employing analysis of covariance technique was adopted. Yogic practices and interval training had significantly improved the pulse rate, breath holding time, and vital capacity. When the experimental Group-I (yogic practices) was compared with control group, there was a significant improvement in pulse rate, vital capacity, and breath holding time. When the experimental Group-II (interval training) was compared with control group, there was a significant improvement in pulse rate, vital capacity, and breath holding time. When the experimental Group-I was compared with experimental Group-II, experimental Group-I had no significant difference in physiological variables where experimental Group-II had a significant difference in physiological variables. It is recommended that similar studies may be conducted separately for men of different age groups.

Keywords: Biochemical, Interval training, Physiological, Yogic practices

INTRODUCTION

In today's world, sport plays an important role in our lives. Not so long ago, it was the hobby of the idle rich. Today, millions of people under modern conditions participate in it, and sport has got woven into the fabric of modern life, providing a counter weight to the excessive comforts and indulgences of today.

Yoga

"Yoga has a complete message for humanity. It has a message for the human body, it has a message for the human mind, and it has also a message for the human soul. Intelligent and capable youth must come forth to carry this message to every individual not only in India but also in every other part of the world."

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Interval Training

Interval training is to subject the body to repeat but short intermittent periods of reduced intensity. Interval training is advocated by many of the top coaches, trainers, and performers who have used it to advantage.

1. A specific distance that is repeated at given number of times.
2. A recovery period during which the athlete jogs slowly and relaxes.

Statement of the Problem

The purpose of the study was to find out whether there is any significant improvement on the efficiency of the physiological and biochemical variables through selected asanas and interval training.

Hypothesis

1. There may be significant differences in the way the selected physiological variables respond to yogasanas.
2. There may be significant differences in the way the selected physiological variables respond to interval training.

3. There may be significant differences on the responses of selected physiological variables among yogic practices and interval training groups.

Significance of the Problem

1. The study might throw light on whether selected yogasanas and interval training might cause desirable changes on selected physiological variables.
2. It would also be possible to find out whether any one-exercise program might have a marked difference over the other in bringing out changes in the selected physiological variables.

Delimitations

1. The subjects were selected randomly from APSW Residential School (Boys), Jangaon, Warangal District.
2. The study was delimited to the age group ranging from 12 to 15 years.
3. The study was conducted on 90 boys only.

The following physiological variables only were selected.

Physiological Variables

I. Vital capacity
II. Pulse rate
III. Breath holding time.

Limitations

The study was limited in the following aspects and these limitations would be taken into consideration in the interpretation of the results. The possible variables such as air, temperature, atmospheric pressure, and relative humidity etcetera during the testing periods, could not be controlled and their possible influence on the result of the study was not taken into consideration while interpreting the result.

METHODOLOGY

Sample and Design

To execute this investigation, the research scholar employed random sampling method. The study was conducted on a total sample of 90 boys drawn randomly from 150 students of APSWR School, Jangaon, Warangal District, age was ranged from 12 to 15 years. The pre- and post-tests design employing analysis of covariance technique was adopted.

PROCEDURE

Experimentation–I

The selected 10 asanas training was given in 6 days a week except Sunday. The duration of the exercises was 20 min during the 1st month, 30 min during the next month, and 40 min during the 3rd month in the morning from 6:30 a.m. to 7.10 a.m.

Experimental–II

The interval training was practiced by the subjects 3 days/week over a period of 3 months. Before giving the interval training, the subjects were asked to warm up. The duration training schedule was 20 min during the 1st month, 30 min during the 2nd month, and 40 min during the 3rd month in the morning from 6:30 a.m. to 7:10 a.m.

Criterion Measures

The following criterion measures were chosen for testing the hypothesis.

1. Vital capacity was recorded in liters/minute.
2. Pulse rate was measured in beats/min.
3. Breath holding time was recorded in seconds.

Statistical Procedure

In this study, the analysis of covariance was used to analyze the results. The Scheff's *post hoc* test was used to analyze the means and differences between the means of the various groups.

CONCLUSIONS

1. Yogic practices and interval training had significantly improved the pulse rate, breath holding time, and vital capacity.
2. When the experimental Group-I (yogic practices) was compared with control group, there was a significant improvement in pulse rate, vital capacity, and breath holding time.
3. When the experimental Group-II (interval training) was compared with control group, there was a significant improvement in pulse rate, vital capacity, and breath holding time.
4. When the experimental Group-I was compared with experimental Group-II, experimental Group-I had no significant difference in physiological variables where experimental Group-II had a significant difference in physiological variables.

Recommendations

1. Similar study can be conducted using other physiological and biochemical variables.
2. The study may also be conducted in asthmatic patients.
3. Similar study can be conducted separately for girls of different age groups.
4. It is recommended that yoga shall be made a compulsory part in the physical education program in schools and colleges.

5. Comparative studies on the effects of yogasanas and other training schedules on the variables used in the studies shall be conducted.
6. Studies to see the effect of yogasanas on psychophysiological and psychomotor variables shall also be conducted.
7. Similar studies may be conducted for other stages of yoga.
8. Similar studies may be conducted on state and national level players and athletes to find the effects.
9. It is recommended that similar studies may be conducted separately for men of different age groups.

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Research Article

Cognitive ability and sports participation: An analytical study of female intercollegiate hockey players

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ABSTRACT

The aim of the study was to compare the female intercollegiate hockey players with respect to their cognitive ability (systematic and intuitive) level at different participation levels. To accomplish the study, a selective sampling device was used and a sample of 55 female intercollegiate hockey players comprising 41 quarter final losers and 14 final winners who had represented their respective colleges in the intercollege hockey championship of Himachal Pradesh University, during academic session 2017–18 was selected. It was hypothesized that there would be no significant difference in the cognitive ability (systematic and intuitive) level of female intercollegiate hockey players at different levels of participation. To assess the cognitive ability (systematic and intuitive) level of hockey players, Hindi Version of Jha's Cognitive Style Inventory (CSI) was used as a tool. Mean, standard deviation, and t-test were used as statistical tools to analyze the data statistically. The level of significance was set at 0.05 level. The results of the study revealed that the final winners exhibited higher level of cognitive ability (systematic score) level as compared to quarter final losers whereas quarter final losers and final winners possessed more or less similar level of cognitive ability (intuitive score) level. Thus, the null hypothesis was partially accepted and partially rejected.

Keywords: Cognitive ability, Intuitive, Sports participation and hockey, Systematic

INTRODUCTION

Physical education and sports have emerged from a long historical background. A physical education program provides each student with an opportunity to develop into a physically educated person; one who learns skills necessary to perform a variety of physical activities, is physically fit, participates regularly in physical activity, and knows the benefits from involvement in physical activity and its contribution to a healthy lifestyle.

For all students to become physically educated, instruction is designed for all students with special consideration for students who need help the most, less skilled students, and students with disabilities. Students who are skilled and blessed with invite ability have many opportunities to learn. All students must feel successful if they are expected to enjoy and value physical activity. Activity is the basis of the program and offers opportunities for repetition and refinement of physical skills activities which are success oriented, so students are motivated to continue.

Psychology is a very wide subject. It can be applied to many branches of human knowledge and activities. It can serve as a media for the fitness of human mind and body. It lays stress on the fact that physical as well as mental development of human beings depends on their physical fitness by participating in games and sports activities. In the same way sports, psychology plays a key role in the all rounds development of the individual.

"Sports psychology for physical education is that branch of psychology which deals with physical fitness of the individual through his participation in game and sports."

Sports psychology is the subdiscipline of kinesiology that seeks to understand the influence of behavioral processes on skilled

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movement. Exercise science together with various clinical areas of medicine (physical therapy, orthopedics, cardiology, etc.) comprises the larger fielded of sports medicine. Thus, sports psychology is classified as a scientific field of study with sports medicine. Here, sports psychology has three major goals with sports medicine of measuring psychological phenomena, investigation the relationship between psychological variables, and performance and application of theoretical knowledge to improve any players or athletes performance.

Cognitive is an act or process of knowing and a collection of mental process that includes awareness, perception, reasoning, and judgment. Cognitive style is an aspect of overall personality and cognitive processes. It is a bridge between cognitive or intelligence measure and personality measure. Cognitive styles are constructs developed to describe perceptual traits of individuals, have their origins in students of human cognitive in the differential perspective. Learning style is sometime synonymous with cognitive style.

Cognitive style is a hypothetical construct that has been developed to explain the process of mediation between stimuli and responses. The term cognitive style refers to the characteristic ways in which individuals conceptually organize the environment. Cognitive style was viewed by Kagan, Moss, and Sigel as "stable individual preferences in mode of perceptual organization and conceptual categorization of the external environment." These investigators studied cognitive style by analyzing how individuals group objects. They postulated that individuals could be dimensionalized based on their proclivity "to analyze and to differentiate the stimulus environment." Kagan, Rosman, Day, Albert, and Philiphs also discussed this point of view.

Moreover, the game of hockey is highly competitive and needs a wider variety of fitness components, that is, speed, strength, endurance, coordination, reaction time, power, etc. Apart from that, as we know that sports and games require greater eminence in psychological characteristics to excel in the present era of cut-throat competition. Thus, keeping in mind, all above assertions, assumptions, and preoccupations researcher undertook the present research for the assessment and comparison of female intercollegiate hockey players with respect to their cognitive ability (systematic and intuitive) at different participation levels.

Objective of the Study

The objective of the study was to assess and compare the female intercollegiate hockey players with respect to their cognitive ability (systematic and intuitive) at different participation levels and it was hypothesized that there would be no significant difference in the cognitive ability (systematic and intuitive) level of female intercollegiate hockey players at different levels of participation.

MATERIALS AND METHODS

A survey type of research study had been designed to investigate the cognitive ability (systematic and intuitive) level of female intercollegiate hockey players of Himachal Pradesh University at different levels of participation. A selective sampling method was employed and the sample of study consisted of 55 female intercollegiate hockey players comprising 41 quarter final losers and 14 final winners who had represented their respective colleges in the intercollege hockey championship of Himachal Pradesh University, during academic session 2017–18. Hindi Version of Jha's Cognitive Style Inventory (CSI) was used as an assessment tool. The collected data were statistically analyzed using mean, standard deviation, and "t" test and the level of significance was set at 0.05 level.

RESULTS

The findings of the research on the investigated psychological variable are presented in Tables 1 and 2 and their analysis and interpretation follow them along with their discussion.

Interpretation

It is evident from Table 1 that the mean value of cognitive ability (systematic score) level of quarter final looser and final winner female intercollegiate hockey players is 74.17 and 66.64, respectively. The mean difference is 7.53. The standard deviation for quarter final looser and final winner female intercollegiate hockey players came out to be 9.21 and 11.25. The calculated "*t*" value is 2.50 at 53 df which is greater than "*t*" table value (2.39) at 0.02 level of significance. Hence, it is interpreted that the two groups have significant difference.

Thus, as per the result of the statement, the formulated hypothesis for the present investigation, that is, "there would be no significant difference in the cognitive ability (systematic score) level of quarter final looser and final winner female intercollegiate hockey players" is rejected.

It is apparent from Table 2 that the mean value of cognitive ability (intuitive score) level of quarter final looser and final winner female intercollegiate hockey players is 69.61 and 65.14, respectively. The mean difference is 4.47. The standard deviation for quarter final looser and final winner female intercollegiate hockey players came out to be 10.78 and 11.22. The calculated "*t*" value is 1.33 at 53 df which is less than "*t*" table value (2.00) at 0.05 level of significance. Hence, it is interpreted that the two groups have no significant difference.

Thus, as per the result of the statement, the formulated hypothesis for the present investigation, that is, "there would be no significant difference in the cognitive ability (intuitive

Table 1: Comparison of cognitive ability (systematic score) among female quarter final looser and final winner intercollegiate hockey players of Himachal Pradesh

Variable	Group	N	Mean	S.D.	M.D.	Df	*t*-value
Systematic score	Quarter final looser	41	74.17	9.21	7.53	53	2.50*
	Final winner	14	66.64	11.25			

*Significant at 0.02 level ("*t*">2.39)

Table 2: Comparison of cognitive ability (intuitive score) among female quarter final looser and final winner intercollegiate hockey players of Himachal Pradesh

Variable	Group	N	Mean	S.D.	M.D.	Df	*t*-value
Intuitive score	Quarter final looser	41	69.61	10.78	4.47	53	1.33
	Final winner	14	65.14	11.22			

Not significant at 0.05 level ("*t*"<2.00)

score) level of quarter final looser and final winner female intercollegiate hockey players" is accepted.

DISCUSSION ON FINDINGS

1. After going through the findings, the result of the study reveals that the final winners exhibited higher level of cognitive ability (systematic score) level as compared to quarter final losers.
2. Moreover, it was also observed that that the quarter final losers and final winners possessed more or less similar level of cognitive ability (intuitive score) level.

CONCLUSION

Based on the present study, it can be concluded that:

1. There is a significant difference in the cognitive ability (systematic score) level of quarter final looser and final winner female intercollegiate hockey players.
2. There is no significant difference in the cognitive ability (intuitive score) level of quarter final looser and final winner female intercollegiate hockey players.

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Research Article

Importance of psychological characteristics of athletes for peak performance

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INTRODUCTION

According to Privette (1982), peak performance is defined as "behavior which exceeds one's average performance" or "an episode of superior functioning." Peak performance is the ultimate high, the thrilling moment that athletes and coaches work for in their pursuit of excellence. Unfortunately, they also are relatively rare and according to many athletes, non-voluntary. Most athletes and coaches will acknowledge that at least 40–90% of success in sports is due to mental factors. The higher the skill level, the more important the mental aspects become. Rushall (1989) has stated that "psychology is the key to athletic excellence." For example, when the physical, technical, and mental readiness significantly predicted Olympic athletes was assessed, only mental readiness significantly predicted Olympic success (Orlick and Partington, 1988). According to Nicklaus, mental preparation is the single most critical element most critical element in peak performance. Nicklaus believes that golf is 90% mental.

PSYCHOLOGICAL CHARACTERISTICS DURING PEAK EXPERIENCES IN SPORT

Ken Ravizza (1977) interviewed 20 male and female athletes from a variety of competitive levels who related experiences in 12 different sports. Over 80% of the athletes reported having the following perceptions:

- Loss of fear – no fear of failure
- No thinking of performance
- Total immersion in the activity
- Narrow focus of attention
- Effortless performance – not forcing it
- Feeling of being in complete control
- Time/space disorientation (usually slowed down)
- Universe perceived to be integrated and unified
- Unique, temporary, involuntary experience.

Garfield identified eight mental and physical conditions that athletes described as being characteristics of the feelings they have at those moments when they are doing something extraordinarily well:

Mentally Relaxed

It was described most frequently as a sense of inner calm. Some athletes also reported sense of time being slowed down and having a high degree of concentration. By contrast, loss of concentration was associated with a sense of everything happening too fast and being out of control.

Physically Relaxed

Feeling of muscles being loose with movements fluid and sure.

Confident/Optimistic

A positive attitude, feeling of self-confidence and optimism. Being able to keep poise and feelings of strength and control even during potentially threatening challenges.

Focused on the Present

A sense of harmony that comes from the body and mind working as one unit. No thoughts of the past or future. The body performs automatically without conscious or deliberate mental effort.

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Highly Energized
A high frequently described as feelings of joy, ecstasy, intensity, and being charged or hot.

Extraordinary Awareness
A state of mind which the athletes are acutely aware of their own bodies and of the surrounding athletes. They report an uncanny ability to know what the other athletes are going to do. And they respond accordingly. Also a sensation of being completely in harmony with the environment.

In Control
The body and mind seem to do automatically exactly what is right – yet there is no sense of exerting or imposing control.

In Cocoon
The feeling of being in an envelope, being completely detached from the external environment and any potential distractions. Also a sense of complete access to all of one's powers and skills. Athletes "in cocoon" are able to avoid loss of concentration and accelerated, tight muscled, out of control feelings.

PSYCHOLOGICAL DIFFERENCE BETWEEN SUCCESSFUL AND UNSUCCESSFUL ATHLETES

- In the mid-1970s, Mahoney and Avener (1977) compared 1976 U.S. Olympic qualifiers and non-qualifiers in men's gymnastics, they found that the finalists coped easily with competitive mistakes, were better able to control and utilize anxiety, had higher self-confidence and more positive self-talk, had more gymnastics-related dreams, and had more frequent imagery of an internal versus external nature.
- Better performance on the Memphis State University racquetball team compared to less successful performers had higher self-confidence in training and competition reported fewer doubts, had more racquetball thoughts in everyday situations and had dreams and imagery that were more likely portray successful performance (Meyers *et al*., 1979).
- Highlen and Bennett (1979), Canadian National Wrestling team qualifiers compared with non-qualifiers were higher in self-confidence, closer to reaching their maximum athletic potential, more able to block anxiety 1 h before and during competition, and experienced fewer negative self-thoughts one before competition.
- In a wrestling study, comparing placers and non-placers in a Big Ten wrestling tournament, the placers were more self-confident, closer to their athletic potential, more frequent users of attentional focusing to prepare for the meet, and more positively affected by seeing themselves as the undergo (Gould *et al*., 1981).
- Mahoney *et al*. (1987) examined psychological differences in elite, pre-elite, and collegiate athletes in a variety of sports. Elite athletes reported that they experienced fewer anxiety problems, had better concentration before and during competition, were more self-confident, used internal and kinesthetic mental imagery in their mental preparation, were more focused on individual rather than team performance, and were more highly motivated to do well than less elite athletes.
- Studies by Gould *et al*. (1990) and Eklund (1991) revealed that positive expectancies, total concentration, high confidence, a task relevant focus, heightened arousal and intensity, and heightened effort and commitment were related to athletes' all- time best performances. In contrast feelings listless, over or under arousal, lack of concentration, irrelevant or negative thoughts, worries about losing, non-adherence to normal preparation routines, and negative physical feelings (e.g., tired, inadequate warm-up) were associated with all-time worst performances. However, the athletes' doubts turned into confidence during the match suggesting that some temporary self-doubts do not necessarily rule out the possibility of a peak performance.

PSYCHOLOGICAL SKILLS AND PEAK PERFORMANCE

Several studies revealed that imagery was an important skill for peak performance in athletes. Imagery was used to create positive images, mentally rehearse tactics, strategies and techniques, relax and reinforce goals, and objectives. Thought control techniques such as thought stopping, self-talk, positive thinking, and prayers were common. Emotional control skills were used to regulate activation level and to create feelings associated with optimal performance states. Finally, behavioral preparation skills (e.g., separating self from others, distracting self with other activities) typically were used as mental preparation routines.

According to Gould, Ecklund, and Jackson (1990), the more successful Olympic wrestlers were able to effectively cope with distractions and unforeseen events and adhered to their mental preparation plans and pre-competition routines more than the non-medalists. The most difference between the medalists and non-medalists was the extent that their coping strategies were practiced and internalized. The successful athletes had highly developed techniques for coping with distractions, which acted as "automatized buffers" that reduced the impact of negative unforeseen events or allowed the wrestlers to interpret these occurrences positively. Specific coping strategies of the successful wrestlers included using positive thinking, a narrow specific focus of attention, and

changing their environment. The less successful wrestlers on the other hand abandoned competitive plans when under pressure, lost competitive focus, and did not rigorously adhere to the mental preparation plans.

According to McCaffrey and Orlick (1989), the following are the elements of excellence of athletes:

- Total commitment
- Quality rather than quantity of practice
- Clearly defined goals
- Imagery practice on a daily basis
- Focusing on totally on one shot at a time
- Recognizing, expecting, and preparing to cope with pressure situations
- Practice and tournament plans
- Tournament focus plan
- Distraction control strategies
- Post-tournament evaluation
- A clear understanding of what helps them play well versus play poorly.

The use of psychological skills appears to help athletes achieve peak performance. As Csikszentmihalya (1975, 1990) suggests that peak performance is most likely to occur when one's ability matches the challenges within a situation. Eklund's (1919) research indicates that as athletes become better versed in the use of certain mental skills their ability may become more closely matched with high-level competitive challenges. Hence, they may also improve the likelihood of attending peak performances. One important difference between the collegiate wrestlers and the Olympic athletes in the Orlick and Partington (1988) and Gould, Eklund, and Jackson (1990) studies was the lack of formalized precompetitive routines used by the collegians.

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Research Article

"Vitamin 'D' panacea of life" Understanding the need of the day

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ABSTRACT

Background: It has been estimated that 1 billion people worldwide have Vitamin D deficiency or insufficiency. Vitamin D deficiency is very common in India in all the age groups and both sexes across the country. In current retrospective exploratory observations reveal that many sports and non-sportspersons are deficient in Vitamin D. **Materials and Methods:** We have randomly recorded the blood levels of Vitamin D (estimated by standard CLIA method from accredited laboratories) from 9320 non-sportspersons and 600 sportspersons (both sexes aged between 12 and 65 years) from different sports disciplines who visited four centers for medical treatment. A total of 9920 subjects visited with many complaints, that is, shoulder and neck pain (42%), back pain (32%), non-specific arthralgia (20%), and shoulder dislocations (6%). Data collected over a period of 12 years. Their dietary habits and amount of exposure to sunlight were noted. **Results:** Observations revealed that large numbers of sport and non-sportspersons had insufficient to deficient levels of Vitamin D. There is no significant difference between age groups and gender. People who are obese, darker complexion and with indoor habits were deficient more than their counterparts. Among sportspersons, table tennis (60%), badminton (46%), shooting (41%), tennis (26%), cricket (23%), and athletics (17%) players were seriously deficient, respectively. Among non-sportspersons, 97.6% had insufficient levels of Vitamin D (30 ng/ml or less) and 78.9% of them were severely deficient (15 ng/ml or less). **Discussion:** Sociocultural changes resulting in inadequate diet and sunlight exposure, dependencies, and diseases may contribute to chronic Vitamin D deficiency along with other micronutrient deficiencies. Vitamin D is manufactured in the body from multiple pathways. Largely absorbed from UV B through skin from sunlight and from food sources; organs in the body convert it into active circulating form of Vitamin D 3 (calcitriol) for bodily functions. It is unusual to note that many sportspersons were deficient in Vitamin D. Changes in dressing, sun screen application, changes in eating habits, and subclinical malabsorption probably would have contributed to the problem. Lack of awareness and expensive testing methodology may be responsible for insufficient management. The desired Vitamin D levels are 50 ng/ml (125 nmol/L) or more year-round when compared to older recommendations of 30 ng/ml. Above 100 may start causing toxicity. **Conclusion:** Vitamin D deficiency is a serious global health issue. Strategies such as food fortification, education with regard to sunlight exposure, pharmacological supplementation, and frequent monitoring of blood levels are important. There is a need for more epidemiological studies on different age groups and relation to serious pathology due to Vitamin D deficiency.

Keywords: Calcitriol, Micronutrients, Pandemic, Vitamin D deficiency

BACKGROUND

It has been estimated that 1 billion people worldwide have Vitamin D deficiency or insufficiency.[1] India with its sociocultural diversity, receiving reasonable sunlight throughout the year, it was believed that Indians would not suffer from Vitamin D deficiency. Geographical location of the country extending 8.4° N latitude to 37.6° N latitude with tropical weather conditions should ideally provide ample exposure to sunlight. However, Vitamin D regulates calcium absorption and, in conjunction with the parathyroid hormone, bone mineralization. Biochemical studies have implicated Vitamin D

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deficiency in many chronic diseases including, but not limited to, infectious diseases, autoimmune diseases, cardiovascular diseases, diabetes, and cancer. Numerous epidemiological publications support the extraskeletal benefits of Vitamin D and they cannot be ignored even though majority of these are association studies or small randomized controlled trials.

Vitamin D deficiency is very common in India in all the age groups and both sexes across the country.[2-4] Vitamin D insufficiency leads to reduced bone mass, which can be manifested as the debilitating diseases of osteoporosis and osteomalacia in adults and rickets in children.[5] Vitamin D insufficiency occurs in up to half of free-living adults in New Zealand,[6] one-quarter of Australians,[7] 14% of French,[8] 36% of the US young adults, and 57% of the US general medicine inpatients,[9] and particularly in the elderly, including up to 90% in the UK[10] and 86% in Switzerland.[11]

INDIAN SCENARIO

There is a consensus of opinion among the experts that there is a prevalence of varying degrees (50–90%) of Vitamin D deficiency associated with changing dietary habits (with poor dietary calcium intake), hepatic, renal, dermatological disorders, chronic alcoholism, consumption of high fiber diet contributing to phosphates and phytates interfering with Vitamin D stores, and increasing the demand of calcium. Severe malabsorption disorders and food intolerances may also contribute to Vitamin D deficiency and insufficiency.

Vitamin D is manufactured in the body from multiple pathways. Largely absorbed from UV B through skin from sunlight and from food sources; organs in the body convert it into active circulating form of Vitamin D 3 (calcitriol) for bodily functions. Unfortunately, now large number of sportspersons who are supposedly getting exposed to sun are also found to be deficient in Vitamin D. Complexion seems to have a relation with absorption and formation of Vitamin D; darker people have more deficiency than their fair counterparts. Badminton, skating, cricket, table tennis players, and many others were measured with low levels of Vitamin D and the deficiency status in general population can be very high. Our ongoing study of Vitamin D levels in schoolchildren shows serious deficiency in 8 years onward without gender difference. The Vitamin D deficiency is gradually increasing in rural masses; this is of serious concern. The prevalence of Vitamin D in Indian population observed in on-going very large study indicates the serious ness of the situation [Table 1].

SPORTSPERSONS AND VITAMIN D DEFICIENCY

It is unusual to note that many sportspersons are found to be severely deficient in Vitamin D. This may be because of changes in dressing, changes in eating habits, and due to subclinical malabsorption. Food intolerances among sportsperson need to be evaluated as they contribute for poor absorption of micronutrients [Table 2].

SUNLIGHT EXPOSURE: GEOPHYSICAL REFERENCE

Serious effects of ultraviolet (UV) radiation and result of excessive exposure are known to cause 20% of melanoma and 99% of non-melanoma skin cancers.[12] The other deleterious effects of UV exposure include cataracts, photokeratitis, aging of the skin, and sunburn.[13] Together, the global burden of diseases (BOD) due to excessive UV exposure accounts for the loss of 1.7 million disability-adjusted life-years (DALYs) annually.[14]

However, on the other hand, sufficient sun exposure is essential for human health by fulfilling entire requirement of Vitamin D and is obtained by exposing ourselves to UV radiation, causing its synthesis in our skin.[15] The paradoxical effects of sun exposure are erythema (reddening of the skin after sun exposure) and the positive impact of Vitamin D synthesis. Using data from the US EPA Brewer network and computer modeling, the seasonal dependence of Vitamin D UV levels relative to erythemal UV levels[16] was investigated.

LATITUDE AND VITAMIN D DEFICIENCY

Till recently, it was believed that the Vitamin D deficiency in people correlates with latitude. Kimlin *et al*. have concluded that

Table 1: Prevalence of Vitamin "D" in Indian general population

Vitamins	Blood levels	People (Percent)
Vitamin "D" ng/DL	<3	3.7
	3–7.9	31.7
	8–15	43.5
	15.1–20.9	13
	21–30	5.7
	More than 30	2.4

Table 2: Vitamin D deficiency status

Indian sportspersons	
Table tennis	**Percentage**
Badminton	60
Shooting	46
Tennis	41
Cricket	26
Athletics	23
	17

there is practically no latitude gradient of relative Vitamin D UV for the entire USA during summer and indeed during most of the year.[17] This result has important implications for epidemiologic studies of gradients of disease. Namely, it may no longer be accurate to assume Vitamin D levels in populations follow considerable latitude gradients for a large proportion of the year.

Increasing sun time for low latitude locations could needlessly increase the risk of UV overexposure and basing sun exposure requirements for Vitamin D synthesis on erythemal UV measurements may result in UV overexposure and increased risk for skin cancer. Most of the Indian subcontinent is in the lower latitude locations. However, regions on high latitude of the country need increased sun exposure for maintaining Vitamin D sufficiency during winter. Vitamin D synthesis and erythema may, hence, occur at different rates, varying with time of day, season, and latitude. Therefore, considerably more UV is required to maintain Vitamin D sufficiency in winter when compared to summer. In high latitude locations (e.g., >35°N), monitoring Vitamin D UV levels are essential.

VITAMIN D SYNTHESIS

Vitamin D synthesis is strictly confined to the UVB region[17] and cannot occur in the UVA region (above k = 315 nm). UVB levels and hence Vitamin D synthesis are more strongly affected by ozone and scattering from aerosols and pollution, whereas UVA and erythema are less strongly affected. Our bodies have mechanisms for preserving the Vitamin D we acquire during the summer, which have evolved to stabilize and maintain serum levels of 25(OH) D in environments with variable Vitamin D availability.

VITAMIN D DEFICIENCY DIAGNOSIS

It is important to carry out the blood estimation of Vitamin D periodically. The test to determine Vitamin D levels is – 25 hydroxy(OH)2D blood test. This test is slightly expensive in India. It is for INR 1500 or so. It is strongly advised that everyone must get the test done once a year.

DESIRED VITAMIN D LEVELS?

The desired Vitamin D levels are 50 ng/ml (125 nmol/L) or more year-round when compared to older recommendations of 30 ng/ml. Above 100 may start causing toxicity. But then, it is hard to reach that kind of level. Besides, our system regulates Vitamin D production on its own. Hence, toxicity is rare.

VITAMIN D DEFICIENCY PREVENTION AND TREATMENT

The most basic way to prevent as well as treat Vitamin D deficiency is to have unprotected sun exposure for some time on a daily basis. Experts say that 15–20 min in the midday sun is the best to get enough Vitamin D. Wearing high-quality sunglasses to protect the eyes are important. Some sources mention cod liver oil as a good source for Vitamin D. However, I would personally not recommend it because the quality and quantity of Vitamin D you get from this source is not reliable. There are also other health issues reported by the consumption of cod liver oil. Pharmaceutical preparations are better than commercially sold dietary supplements. There are a few food sources for Vitamin D. But then, these may not be the ideal sources for Vitamin D3. They most likely have Vitamin D2 need conversion into D3 for all functions.

CONCLUSION

Vitamin D deficiency is a serious global health issue. Sociocultural changes resulting in inadequate diet and sunlight exposure, dependencies, and diseases may contribute to chronic Vitamin D deficiency along with other micronutrient deficiencies. It is obvious; it may no longer be correct to assume that Vitamin D levels in populations follow latitude gradients. Strategies such as food fortification, education with regard to sunlight exposure, pharmacological supplementation, and frequent monitoring of blood levels are important. There is a need for more epidemiological studies on different age groups and relation to serious pathology due to Vitamin D deficiency.

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Research Article

Health profiles of retired male and female sports persons of Karnataka state

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ABSTRACT

Nowadays, research into the athletic success of athletes is increasingly happening. The well-being of athlete in every aspect is very crucial for success in sports career. It is, therefore, vital to study performance in the perspective of a holistic lifestyle rather than just sport. The benefits of long-term participation in exercise training, whether life-long or adopted in later life, are associated with a number of health benefits which includes decreased health risks associated with various chronic diseases and a reduction of premature death (Hawkins *et al*., 2003). The retirement of the athlete's career is a life-changing event. But ignoring this change can have many negative effects on post-retirement life. The purpose of the present study was to assess the body mass index (BMI) and blood pressure levels of retired male and female sportspersons. To achieve the purpose of the study 40 retired sportspersons who have previously represented Karnataka state in various sports and games in male (n = 20) and female (n = 20) category were selected. The health status of retired sportspersons is assessed through BMI and blood pressure level. Descriptive statistics including mean and standard deviation were employed for the present investigation. Tabular and percent analysis was used to elicit information on various categories of BMI and blood pressure. The sports persons leading retired life after active sports participation are having difficulties in maintaining their healthy body weight and normal blood pressure.

Keywords: Blood pressure, Body mass index, Retirement, Sportspersons

INTRODUCTION

Nowadays, research into the athletic success of athletes is increasingly happening. The well-being of athlete in every aspect is very crucial for success in sports career. Hassle free retirement life is also very essential for a sportsperson to establish himself in sports filed and make a career out of it. It is, therefore, vital to study performance in the perspective of a holistic lifestyle rather than just sport. The universal view of life is far-reaching. Sportspersons health, physical fitness, social status, economic status, and many other factors standardize the sportspersons performance. In addition to the development of sportspersons achievement, it is important to attention on developing aspects of post-athlete life planning.

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The benefits of long-term participation in exercise training, whether life-long or adopted in later life, are associated with a number of health benefits which includes decreased health risks associated with various chronic diseases and a reduction of premature death (Hawkins *et al*., 2003). Socio-economic status and health-oriented behavior, sex, race, race, using of banned drugs enhancing performance, and probably also genetic profile and gene expression should be all included into analysis as potentially explanatory variables of longevity (Agnieszka *et al*., 2017).

Retirement is an actuality that all professional sportspersons face. Retirement from the sport at a given time is an accepted process due to continuous sports participation. However, it

is a difficult task to adapt to the process. Athletes may find themselves enduring stress and emotions while attending high-profile events. Maintaining mental health and well-being is crucial during this period of achievement as well. The retirement of the athlete's career is a life-changing event. But ignoring this change can have many negative effects on post-retirement life.

Sports retirement is a unique occupational transition associated with a plethora of changing behaviors related to nutrition, body, and lifestyle (Samuel and Tenenbaum, 2011). It is experienced only by those who engage in sport at an elite and, occasionally, sub-elite level. An athletic occupation encompasses more than just an individual's time, extending to the broader lifestyle and identity of an individual beyond a traditional career. Dependent on the sport, athletic retirement is often characterized by a reduction in physical training causing loss of lean muscle mass and fitness, altered body composition, and detraining or changes in nutritional practices as a function of occupation (Liu *et al*. 2008).

High blood pressure is ranked as the third most important risk factor for attributable burden of disease in South Asia (Lim *et al*. 2010). Hypertension (HTN) exerts a substantial public health burden on cardiovascular health status and healthcare systems in India (Leeder *et al*. 2004 and Reddy, 2005). HTN is directly responsible for 57% of all stroke deaths and 24% of all coronary heart disease deaths in India (Gupta, 2004). The WHO rates HTN as one of the most important causes of premature death worldwide (Mackay and Mensah, 2004). The Global and Regional Burden of Disease and Risk Factors study, in a systematic analysis of population health data for attributable deaths and attributable disease burden, has ranked HTN in South Asia as second only to child underweight for age (Lopez, 2001). In India, the prevalence of HTN ranges between 20% and 40% in urban areas and 12%–17% among rural adults (Reddy *et al*., 2005).

Globally, the prevalence of overweight and obesity has increased at an alarming rate throughout the world. Extensive literature illustrates that there is an elevated risk of developing a number of chronic diseases and disorders with being overweight and obese and these include, dyslipidemia, coronary heart disease, cardiovascular disease, cerebrovascular disease, gall bladder disease, sleep apnea, mental illness (depression/anxiety), insulin resistance, HTN, atherosclerosis, osteoarthritis, and some cancers (kidney, postmenopausal breast, endometrial, and colon).

Karnataka is one of the prominent states of India, as well as the progressive state in almost every sector. Many athletes from Karnataka have represented India. It is necessary to study the life of retired sportspersons because we come across their condition through daily newspapers and other forms of media after retirement from their sports career. Many athletes have been leading a miserable life after they have not been able to settle socially and economically. The intent of this study was to explore the health conditions of the retired sportspersons.

Objectives of the Study

The purpose of the present study was to assess the body mass index (BMI) and blood pressure levels of retired male and female sportspersons.

METHODOLOGY

To achieve the purpose of the study 40 retired sportspersons who have previously represented Karnataka state in various sports and games in male ($n = 20$) and female ($n = 20$) category were selected. The details are given in Table 1.

The health status of retired sportspersons is assessed through BMI and blood pressure level. BMI level of retired male and female sportspersons is assessed with the help of standing height and weight of the subjects. Blood pressure of retired male and female sportspersons was assessed with the help of Omron blood pressure monitor.

The BMI and blood pressure test were administered to the selected subjects at their residence or workplace. The objectives of the test were made clear by the researcher. Descriptive statistics including Mean and Standard Deviation were employed for the present investigation. Tabular and percent analysis was used to elicit information on various categories of BMI and blood pressure.

Findings of the Study

The results on Mean and Standard deviation of BMI and blood pressure are given in Table 2.

Table 1: Event wise details of retired male and female sportspersons

Game	Men	Women
Athletics	05	04
Basketball	04	06
Cycling	06	04
Hockey	05	06
Total	20	20

Table 2: Details on mean and standard deviation of BMI and blood pressure of retired athletes

	Body mass index	Systolic blood pressure	Diastolic blood pressure
Men	26.46±4.65	122±12.10	84±8.91
Women	24.72±3.10	117±9.43	79±12.84

From Table 2, it is clear that the data on BMI and blood pressure male and female retired sportspersons are normally distributed and has acceptable homogeneity expressed in terms of standard deviation. BMI in men and women was 26.46 ± 4.65 and 24.72 ± 3.10, respectively. The systolic blood pressure in men and women was 122 ± 12.10 and 117 ± 9.43, respectively. The diastolic blood pressure in men and women was 84 ± 8.91 and 79 ± 12.84, respectively. The present data were subjected percent analysis and matched against available norms. The results on BMI are provided in Table 3.

From Table 3, it is clear that the retired sports persons in men section belong to various categories deviating from "Normal" (30%). It is observed that 5% are underweight; 55% are overweight; and 10% are severely obese. In women section, it is observed that 5% are underweight; 45% are normal; and 50% are overweight. Similarly, data on blood pressure was subjected to percent analysis and the results are provided in Table 4.

From Table 4, it is obvious that in terms of systolic blood pressure in men section 10% are having Grade 1 HTN and 90% are having isolated systolic HTN. In women section, all the subjects belonged to isolated systolic HTN category.

In terms of diastolic blood pressure in men section, 20% are having Grade 1 HTN; 5% are having Grade 2 HTN; and 75% are having isolated diastolic HTN. In women, 10% are having Grade 1 HTN; 5% are having Grade 3 HTN; and 85% are having isolated diastolic HTN.

DISCUSSION

In the present study, it is observed that 5% of retired sportspersons in men section are underweight; 55% are overweight; and 10% are severely obese. In women section, it is observed that 5% are underweight and 50% are overweight. The problem lies in the proportion of subjects that deviate from normal ranges. The reasons for overweight and obese can be attributed to unhealthy lifestyle or lack of physical activity. The detraining effect may be one of the major reasons for body weight problems. Stress may also have a prominent effect due to their changed lifestyle. In addition to all these, continuations in excess calorie intake may be a possible reason.

In most, but not all studies reviewed by Walsh *et al*. (2018) the BMI of master athletes was significantly lower than controls. A clinically superior BMI affords master athletes reduced risk with regard to a number of cardio metabolic diseases, osteoarthritis, and certain types of cancers. According to Kujawska *et al*. (2017), there is some evidence for increased longevity in the former elite athletes of aerobic and mixed sports and for decreased longevity in anaerobic, comparing to general population.

In men section 10% are having Grade 1 HTN and 90% are having isolated systolic HTN. In women section, all the subjects belonged to isolated systolic HTN category. In terms of diastolic blood pressure in men section, 75% are having isolated diastolic HTN and in women section, and 85% are having isolated diastolic HTN. Isolated systolic HTN is common in older adults and is a risk factor for incident heart failure. Having a high systolic blood pressure for a long period of time can increase the risk of strokes, heart disease, and chronic kidney disease. The reasons for high blood pressure may be attributed to faulty lifestyle after retirement from active sports. Freedom in food habits after active training may be one of the possible reasons in this regard. Changes in physiological makeup as a consequence of detraining are some of the other reasons.

Table 3: Summary of percent analysis on body mass index of retired sportspersons

Category	BMI range – kg/m^2	Men (%)	Women (%)
Underweight	16.0–18.5	01 (5)	01 (5)
Normal (healthy weight)	18.5–25	06 (30)	09 (45)
Overweight	25–30	11 (55)	10 (50)
Obese Class I (Moderately obese)	30–35	--	--
Obese Class II (Severely obese)	35–40	02 (10)	--
Obese Class III (Very severely obese)	over 40	--	--

Table 4: Summary of percent analysis on blood pressure of retired sportspersons

	Systolic (mm/Hg)	Men	Women	Diastolic (mm/Hg)	Men (%)	Women
Grade 1 Hypertension	140–159	2 (10%)	--	90–99	04 (20)	02 (10)
Grade 2 Hypertension	160–179	--	--	100–109	01 (5)	--
Grade 3 Hypertension	180 or above	--	--	110 or above	--	01 (5)
Isolated systolic hypertension	Systolic >140	18 (90%)	20 (100%)	<90	15 (75)	17 (85)
Hypertensive urgency	> 180	--	--	>120	--	--

CONCLUSION

The sports persons leading retired life after active sports participation are having difficulties in maintaining their healthy body weight and normal blood pressure. About 55% are overweight and 10% are severely obese in men section. About 50% are found to be overweight in women section.

In terms of blood pressure of retired sportspersons, 90% are having isolated systolic HTN in men section and all the subjects belonged to isolated systolic HTN category in women section. Further, 75% are having isolated diastolic HTN in men and 85% are having isolated diastolic HTN women section.

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Research Article

Effect of Fartlek training for development of aerobic fitness among B. Ped students of Osmania University, Hyderabad

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ABSTRACT

The purpose of the study is to find out the effect of Fartlek training for development of Aerobic Fitness among B. Ped Students of Osmania University. The study is delimited to the Male B. PEd students Studying in Haji Ghouse Peeran Memorial College of Physical Education, Osmania University between the age group of 20 and 22 years. The sample for the present study consists of 20 male B. Ped Students of Osmania University, of which ten are experimental group and ten are controlled group. Fartlek training was given to experimental group on alternate days for 6 weeks along with general training of physical education and control group was given the general training of physical education. Pre-test and post-test were conducted for 12 min cooper test to assess the aerobic fitness of both the groups. This study shows that the experimental group has got rapid improvement of Aerobic Fitness due to Fartlek training compare to control group. It is concluded that due to Fartlek training there is an improvement of Aerobic fitness. It is recommended that the coaches must include the Fartlek training program for sports persons to develop the aerobic fitness.

Keywords: Aerobic fitness, B. Ped students, Hill running

INTRODUCTION

Fartlek, which means "speed play" in Swedish, is a training method that blends continuous training with interval training. The variable intensity and continuous nature of the exercise place stress on both the aerobic and anaerobic systems. It differs from traditional interval training in that it is unstructured; intensity and/or speed varies, as the athlete wishes. Most Fartlek sessions last a minimum of 45 min and can vary from aerobic walking to anaerobic sprinting. Fartlek training is generally associated with running, but can include almost any kind of exercise.

Swedish coach Gösta Holmér developed Fartlek in 1937, and, since then, many physiologists have adopted it. It was designed for the downtrodden Swedish cross country running teams that had been beaten throughout the 1920s by Paavo Nurmi and the Finns. Holmér's plan used a faster-than-race pace and concentrated on both speed and endurance training.

Dr. Rajesh Kumar (2015) studied about the effect of hill running for development of aerobic endurance among sepak takraw players of Hyderabad District in Telangana The significance of this study is to find out effect of hill running for development of aerobic endurance among Sepak Takraw players of Hyderabad district which will be helpful to Coaches and Trainers to develop the endurance ability. The objective of the study was to determine the effects of the hill running for development of endurance ability among sepak takraw players. The sample for the present study consists of 20 male sepak takraw players out of which ten are experimental group and ten are controlled group. Hill running training such as short hills, medium hills, long hills, and mixed hills running was given to experimental group on alternate days for 8 weeks along with general training of sepak takraw and control group was given the general training of sepak takraw. Pre-test and post-test were conducted for 12 min cooper test to assess the aerobic endurance of both the groups. This study shows that the experimental group has got rapid improvement due to Hill

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Table 1: The statistical analysis of effect of Fartlek training on B.Ped students in pre- and post-test in 12 min cooper test

S. No	Subject	*n*	Experimental		Control		*t*-Value	Df	*P*-value	Inference
			Mean	SD	Mean	SD				
1	Pre-test	10	1761.00	89.38	1772.00	108.40	0.554	18	0.580	Non sig
2	Post-test	10	2869.00	385.44	1752.00	94.20	19.906	18	0.000	Sig

running compare to control group. It was concluded that due to Hill running there is an improvement of Aerobic Endurance. It was recommended that the coaches must include the Hill running programs to athletes for development of endurance.

METHODOLOGY

The study is delimited to the Male B. Ped Students Studying in Haji Ghouse Peeran Memorial College of Physical Education, Osmania University between the age group of 20 and 22 years. The sample for the present study consists of 20 male B. Ped Students of Osmania University out of which ten are experimental group and ten are controlled group. Fartlek training was given to experimental group on alternate days for 6 weeks along with general training of physical education and control group was given the general training of physical education. Pre-test and post-test were conducted for 12 min cooper test to assess the aerobic fitness of both the groups.

RESULTS AND DISCUSSION

Table 1 showing the statistical analysis of effect of Fartlek training on B.Ped students in pre- and post-test in 12 min cooper test.

In pre-test among experimental group and control group B.ped men students in relation to cooper 12m run test. In pre-test, experimental group mean value is 1761.00, SD value is 89.38, and control group mean value is 1772.00 and SD value is 10840. The degrees of freedom were 18. The t-value is 0.554 and Sig. (two-tailed) is 0.580 which is Greater than 0.05. Hence, there is no significance mean difference between experimental and control groups in pre-test.

In post-test among experimental group and control group B.Ped men students in relation to Cooper 12m run or walk test. In post-test, experimental group mean value is 2869.00, SD value is 385.44, and control group mean value is 1752.00 and SD value is 94.20. The degrees of freedom were 18. The t-value is 19.906 and Sig. (two-tailed) is 0.000 which is <0.05. Hence, there is a significance mean difference between experimental and control groups in post-test. Cooper 12 m Run test.

CONCLUSIONS

It was clearly found that there is a significant difference on effect of Fartlek training program between pre-test and post-test of experimental group of B.Ped. men students in relation to the 12 min run or walk cooper test.

Recommendations

- Similar studies can be conducted on female B.PEd Students and other sports persons. The study helps the physical educationist and coaches for selecting the sports persons.
- The study also helps the physical educationists and coaches understanding the knowledge and performance of the players.
- The study also helps players and coaches to selecting the games and sports depending on the performance.
- The study may be conducted on other related variables/ skills.

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Research Article

Comparison of explosive power among Basketball and Football players of Hyderabad district in Telangana Sate

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ABSTRACT

The purpose of the study is to find the Explosive Strength among Basketball Players and Football Players of the Hyderabad District in Telangana State. The sample for the study consists of 20 basketball players and 20 football players of Hyderabad District between the age group of 16 and 18 years. To assess the explosive strength the Standing Broad Jump Test is conducted by the Technical Officials. The results of the study show that the Basketball Players are good in Explosive Strength Compare to Football Players. It is recommended that conditioning program must be given to basketball players and football players to improve the motor qualities.

Keywords: Basketball, Explosive strength, Football

INTRODUCTION

Sports training are done for improving sports performance. The sports performance, as any other type of human performance, is not the product of one single system aspect of human personality.

Motor fitness refers to the capability of an athlete to perform effectively at their particular sport. The components of motor fitness are: Agility, balance, coordination, and power which entails speed and strength and finally reaction time.

Football is most popular sports in the world. The team sport played with a spherical ball between two teams of 11 players. It is played by approximately 250 million players in over 200 countries. The game is played on a rectangular field called a pitch with a goal at each end. The object of the game is to outscore the opposition by moving the ball beyond the goal line into the opposing goal. The team with the higher number of goals wins the game.

Basketball, is a team sport in which two teams, most commonly of five players each, opposing one another on a rectangular court, compete with the primary objective of shooting a basketball through the defender's hoop while preventing the opposing team from shooting through their own hoop. A field goal is worth two points, unless made from behind the three-point line, when it is worth three. The team with the most points at the end of the game wins, but if regulation play expires with the score tied, an additional period of play (overtime) is mandated.

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Prof. Loka Bavoji Laxmikanth Rathod and Prof. K. Deepla (2017) Studied about Comparison of Explosive Power among Korf Ball Players and Throw Ball Players of the Hyderabad District in India.

Amir Majeed Bhat Mubashir Nisar, Tariq Ahmad Dar (2018) Analysis of Speed and Agility Between Male Volleyball Players And Basketball Players of Annamalai University The main aim of the study was to compare the speed and agility among volleyball players and basketball players of Annamalai University. Twenty male volleyball and twenty basketball players were randomly selected for the study. 50 m run test was used to measure the speed and illinois agility test was used to measure the agility among the volleyball and basketball players. This study was limited to male volleyball and basketball players of Annamalai University. The result revealed that basketball players have good speed and agility as compared to volleyball players.

Table 1: The mean values and independent samples test of standing broad jump between basketball players and football players

Variables	Group	Mean±SD	*t*	*P*-value
Standing broad jump	Basketball players	2.29±0.156	3.54	0.001
	Football players	2.25±0.158		

*Significant at 0.05 level

METHODOLOGY

The sample for the study consists of 20 basketball players and 20 football players of Hyderabad District between the age group of 18 and 20 years. To assess the explosive strength the Standing Broad Jump Test is conducted by the Technical Officials.

RESULTS AND DISCUSSION

The results of the study show that the basketball players are good in explosive strength compare to football players.

In Table 1, the mean values of basketball players in standing broad jump are 2.29 and football players are 2.25. The Standard Deviation on basketball players is 0.156 and football players is 0.158 and *t* is 3.54 and *P* = 0.001.

CONCLUSIONS

It is concluded that the basketball players are good in explosive strength compare to football players. Explosive power in basketball is manifested through various variants of jumps, starting acceleration, sudden changes in direction, deceleration, sudden stops, and passing. The results confirmed that explosive power is a significant characteristic of professional basketball players and one of the most important factors for achieving top results. The results show that in spite of the inborn coefficient, the development of explosive power can be realized through planned, rational, and well-organized training. A positive correlation was determined between explosive power and running at short distances, jumps and throwing, as well as between explosive power and lean body mass in basketball players of different ages. It is necessary to give greater attention to the training of explosive power, because it is an effective means that contributes to the efficiency of the basketball player.

Recommendations

Similar studies can be conducted among females and in other sports and games. This study is useful to the coaches to prepare the conditioning program to improve their skills in basketball and football.

CONFLICTS OF INTEREST

There are no conflicts of interest in the study.

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Research Article

A analytical study of injuries among athletes of Jawaharlal Nehru Technological University Anantapur

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Received: 16-12-2020 **Acceptance:** 29-12-2020

ABSTRACT

The practice of athletics can lead to an increased risk of injury. Engaging in sport activities has numerous health benefits but also carries the risk of injury. Sports trauma commonly effects joints of the extremities, that is, knee, ankle, hip, shoulder, elbow, and wrist. The objective of the study is to investigate the frequency of injuries among Athletes of Jawaharlal Nehru Technological University. The sample for the study consists of 100 male athletes who include 25 Throwers, 25 Sprinters, 25 Middle and long distance Runners, and 25 Jumpers those who participated in the Jawaharlal Nehru Technological University Inter College Athletics Championships for the year 2019–2020 between the age group of 18 and 25 years. The data are collected through questionnaire. The results of the study show that throwers secured 50% injuries in the lower extremities, 30% injuries in vertebral column, and 20% injuries in the upper extremities, Sprinters secured 80% injuries in the lower extremities, 15% injuries in vertebral column, and 5% injuries in the upper extremities. Middle and long distance runners secured 87% injuries in the lower extremities, 10% injuries in vertebral column, and 3% injuries in the upper extremities. Jumpers secured 80% injuries in the lower extremities, 13% injuries in vertebral column, and 7% injuries in the upper extremities. It is concluded that athletes must have good conditioning and prevention to avoid the injuries. This type of study is useful to coaches to give proper coaching for development of motor qualities for prevention of injuries among athletes.

Keywords: Injuries, Lower extremities, Upper extremities, Vertebral column

INTRODUCTION

Engaging in sports activities has numerous health benefits but also carries the risk of injury. At Every Age Sports Persons sustain a wide variety of soft tissue, bone, ligament, tendon, and nerve injuries caused by direct trauma or repetitive stress. Different sports are associated with different patterns and types of injuries, whereas age, gender, and type of activity influence the prevalence of injuries. Sports trauma commonly affects joints of the extremities, that is, knee, ankle, hip, shoulder, elbow, wrist, and spine. The sport injuries that occur in competition or practice have loss of time for participation in sport.

According to the TRIPP model (Finch, 2006), the first step in injury research is to understand the extend of the problem.

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The prevalence and prevalence proportion of sport injuries has been widely investigated across sports. Unfortunately, such studies have only included groups selected by either one or more criteria, such as specific sport (Jacobsson *et al*., 2012), level (Hall *et al*., 2013), age (Scase *et al*., 2012), or injury type (Maselli *et al*., 2015).

Purpose of Research

The objectives of the study is to investigate the frequency of injuries among athletes of Jawaharlal Nehru Technological University This study was designed to investigate the most common types of injuries, mechanisms of injury, activities leading to injury, time and place of injury occurrence, and time lost to injury.

Population and Sample Group

The sample for the study consists of 100 male athletes which includes 25 Throwers, 25 Sprinters, 25 Middle and long distance Runners, and 25 Jumpers those who participated in

the Jawaharlal Nehru Technological University Inter College Athletics Championships for the year 2019–2020 between the age group of 18 and 25 Years.

Research Instruments

All the players were given a questionnaire regarding the sports injuries occur while playing athletics during the practice and competition. All the sports persons are doing regular practice since minimum last 3 years.

The questionnaire consisting of the following injuries:

1. Lower Extremities
2. Upper Extremities
3. Head
4. Neck
5. Spine.

RESULTS

The results of the study shows that Throwers Secured 50% injuries in the lower extremities, 30% injuries in vertebral column, and 20% injuries in the upper extremities, Sprinters secured 80% injuries in the lower extremities, 15% injuries in vertebral column, and 5% injuries in the upper extremities. Middle and long distance runners secured 87% injuries in the lower extremities, 10% injuries in vertebral column, and 3% injuries in the upper extremities. Jumpers secured 80% injuries in the lower extremities, 13% injuries in vertebral column, and 7% injuries in the upper extremities. It is concluded that athletes must have good conditioning and prevention to avoid the injuries. This type of study is useful to coaches to give proper coaching for the development of motor qualities for prevention of injuries among athletes.

The majority of sports injuries are soft-tissue in nature and because many of injuries arise in football is due to improper body mechanics and improper sport techniques [Tables 1-4].

Table 1: Percentage of injuries among throwers

Lower extremities injuries	Upper extremities	Head	Neck	Vertebral column
50	20	Nil	Nil	30

Table 2: Percentage of injuries among sprinters

Lower extremities injuries	Upper extremities	Head	Neck	Vertebral column
80	05	Nil	Nil	15

Table 3: Percentage of injuries among middle and long distance runners

Lower extremities injuries	Upper extremities	Head	Neck	Vertebral column
87	03	Nil	Nil	10

Table 4: Percentage of injuries among jumpers

Lower extremities injuries	Upper extremities	Head	Neck	Vertebral column
80	13	Nil	Nil	7

DISCUSSION

It is concluded in throwers that the lower extremities injuries are 50%, upper extremities 20, and vertebral column 30%. It is concluded in sprinters that lower extremities injuries are 80%, upper extremities 5, and vertebral column 15%. It is concluded in middle and long distance running that the lower extremities injuries are 87%, upper extremities 3, and vertebral column 10%. It is concluded in jumps that the lower extremities injuries are 80%, upper extremities 13, and vertebral column 07%.

Research Recommendations

Sufficient warm up, proper technique, correct bio mechanics, proper conditioning, optimizing balance, coordination, optimizing reaction times, optimal diet, adequate rest, and positive attitude will reduce the risk of injuries. Increase your flexibility by performing dynamic warm up before practice and competition followed by static stretching post-activity.

Recommendations' for Further Research

Consult a Coach or Physical Trainer to incorporate the conditioning programs during the practice. Have a pre-season physical examination and follow your doctor's recommendations

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Research Article

Comparison of speed among Kabaddi and Kho Kho B. Ped players of Siddhartha College of Physical Education, Osmania University

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ABSTRACT

Physical fitness is a general state of health and well-being and more particularly, the capability to perform aspects of sports, occupations, and every day activities. Moreover, it is achieved through proper diet and physical exercise. The components of physical fitness include cardio respiratory endurance, muscle strength, muscle endurance, flexibility, and body composition. Physical fitness involves the performance of the heart and lungs, and the muscles of the body. Regular exercise keeps a person physically strong and mentally, emotionally strong as well. The purpose of the study is to find out speed among Kabaddi and Kho Kho Players of B.PEd Students Studying in Siddhartha College of Physical Education, Osmania University. To assess the speed the 50 M Run Test is conducted by the Technical Officials. It was found that Kho Kho Players are having good speed compare to Kabaddi Players. Hence, it is recommended that conditioning program must be included by Coaches of Kabaddi and Kho Kho Players to improve the performance among the players.

Keywords: Kabaddi and Beach Kabaddi, Speed, Strength, Stamina

INTRODUCTION

Sport is an institutionalized competitive activity which involves rigorous physical exertion or the use of relatively complex physical skills by individuals whose participation is motivated by the combination of intrinsic satisfaction associated with the activity itself and the external reward earned through participation.

Sport is an integral part of life for most people on this planet; therefore, majority of people are involved in the field of sport without any doubt. Introgression to any field of sport gives you a new perspective to have more supervision on the performance as well as output of athletes.

Physical fitness is the ability of the body systems to work together efficiently to allow people to be healthy and effectively perform activities of daily living (Corbin and Lindsey 2007).

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Hoeger and Hoeger, 2005 says, in terms of prevention of diseases, the main emphasis of any fitness programs should be placed on the health-related fitness as skill-related fitness is crucial for success in sports and athletics, and it also contributes to wellness.

Physical activity is categorized as being of light, moderate, or vigorous intensity, and most health benefits have been associated with moderate to vigorous intensity physical activity (National Advisory Committee on Health and Disability 1998; US Surgeon General 1996).

METHODOLOGY

The samples were collected from the 25 men Kabaddi players and 25 Kho Kho players studying in Siddhartha

Table 1: The mean values SD, of "*t*" value and *P* value between men Kabaddi and Kho Kho Players in 50 M Run

Subjects	*n*	Mean	SD	*t*-value	*P*-value
Kabaddi Players	25	5.00	0.23	1.401	0.01
Kho Kho players	25	4.11	0.12		

College of Physical Education during the year 2018–2019. To assess the speed the 50 M Run Test is conducted by the Technical Officials among B.Ped Kabaddi and Kho Kho players studying in Siddhartha college of Physical Education, Osmania University.

RESULTS AND DISCUSSION

The mean of Kabaddi Players in 50 M Run is 5.00 and Kho Kho Players is 4.11. Hencem Kho Kho Players are having better mean than Kabaddi Players [Table 1].

CONCLUSION

It was found that Kho Kho Players are having good speed compare to Kabaddi Players. Hence, it is recommended that conditioning program must be included by Coaches of Kabaddi and Kho Kho Players to improve the performance among the players.

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Research Article

The effect of moderate intensity aerobic, strength, and interval training program on HDL-C in young men

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ABSTRACT

Background: This study examined the impact of 16-week program of maximal intensity aerobic, strength, and interval training program on HDL-C in 60 untrained men ages 21–25 years. **Objective:** The aim of the study was to investigate the training effect of 16 weeks of maximum intensity progressive aerobic, strength, and interval training program on HDL-C in young men. **Methods:** Participants were randomly assigned to an aerobic-based training group (ABTG) n = 15, strength-based training group (SBTG) n = 15, interval-based training group (IBTG) n = 15, and control group (CG) n = 15 participants in the experimental groups performed their training protocols. **Results:** Maximum intensity aerobic, strength, and interval training program on HDL-C show significant improvement when compared to control group and in between exercise protocol groups HDL-C is identical.

Keywords: Aerobic, HDL-C, Interval, Strength

INTRODUCTION

The health-related physical fitness which is considered as key component in an individual's life is develop and protected through participation in various physical activities. This physical activity may be by means of direct involvement in various kinds of activities or else through leading active and quality lifestyle. The quality life of an individual is measured not by the length of life alone but mainly on how an individual is possessed with better vigor and health to save him and the society. High-density lipoprotein Cholesterol (HDL-C) is considered the most potent independent risk factor for coronary heart disease (CHD) and is inversely correlated with CHD. High levels of HDL-C may have a protective role against coronary atherosclerosis.[1] Endurance exercise training characterized by continuous activity at moderate exercise intensity demonstrates significant increases in HDL-C in both men and women after a period of training, typically 20–30% for endurance athletes compared with inactive controls.[2,3] Aerobic based training has been proposed as an effective mechanism for improving cardio vascular protection, with training resulting in increases of HDL-C in men 18 years of age and older[4] also found positive training related adaptation on total cholesterol, triglycerides, low-density lipoproteins cholesterol, and high-density lipoprotein cholesterol[5] or only on low-density lipoprotein cholesterol, and T.C/HDL-C without changes on HDL-C and T.G.[6] Considering the observed deterioration of the cardio vascular system and the metabolic profile that tends to accompany young men, it is important to know the potential benefits derived from the exercise. Although, the effects of aerobic versus resistance training on cardio vascular risk factors have been compared.[7,8]

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METHODOLOGY AND MATERIALS

Sixty sedentary individuals (21–25 years) volunteered (mean (SD) age ± 22.5 2 years to participate in this study. Participants were informed about any potential risks and/or discomforts associated with participation in this study and were required to provide their written informed consent before being included in the study. Participants were randomized into three training groups and one control group. All the participants were from

the various colleges of Kurnool city under the Rayalaseema University, Kurnool, Andhra Pradesh, India.

Aerobic-based Training Group (ABTG)

The training was supervised by an exercise physiologist and the frequency was kept 3 times per weeks for 16 weeks with 45 min/session. The intensity of the main part of the session started with work heart rate (HR) 40–50%$_{reserve}$ (1st–4th week) increasing progressively to 51–60% HR$_{reserve}$ (5th–8th week), 61–70% HR$_{reserve}$ (9th–12th week), and 71–80% HR$_{reserve}$ (13th–16th week).

Strength-based Training Group

After an adequate warm-up the participants completed resistance exercise for 3 days a week for 16 weeks. They performed eight exercises with elastic bands for the major muscular groups respecting the following progression:

- 1 set of 8 repetitions (1st–2nd weeks)
- 1 set of 12 repetitions (3rd–4th weeks)
- 2 sets of 8 repetitions (5th–6th weeks)
- 2 set of 10 repetitions (7th–8th weeks)
- 2 sets of 12repetitions (9th–10th weeks)
- 2 sets of 15 repetitions (11th–12th weeks)
- 3 sets of 12 repetitions (13th–14th weeks)
- 3 sets of 15 repetitions (15th–16th weeks) an interval period of at least 3 min was assured between sets of the same exercise.

Interval-based Training Group

The experimental participants run a distance of 3.2 km 3 days/week for 16 weeks. Participants ran 4 sets of 800 m interval, that is, 4 × 800 min interval 1:1 work:rest ratio at approximately 60–70 of their age predicted maximal heart rate (HR Max 220–age in complete years).

Control Group

The control group was instructed not to undertake any vigorous exercise during the training period.

Materials

Venous blood samples were collected in the morning between 8 AM and 9.30 AM by two specialized staff nurses before the training session and the blood samples have collected after completion of 16 weeks training session. HDL–C was determined using a direct two point Kinetic assay kit (CH2652, Randox, Laboratories, Ltd., U.K.).

Statistical Analysis

Analysis of Covariance technique was used to study the effect of the experimental variable on the selected physiological variables. Scheffe's *post hoc* test also applied to find out the source of significant difference among the groups and to test the hypotheses to arrive at conclusion. The level of significance was 0.05.

ANALYSIS ON HDL CHOLESTEROL

Table 1 depicts analysis of covariance for the HDL cholesterol of the subjects on the experimental variable selected. The table indicates that there is significant effect through the selected experimental variable, that is, aerobic, interval, and strength-based training for the selected experimental period. The obtained F value, that is, 51.13617 is much higher than the table F value, that is, 2.78 and hence the selected experimental variables caused the significant change in the selected HDL cholesterol levels of the subjects.

Table 2 contains the mean values of the selected criterion variable, that is, HDL cholesterol of the subject. The table brings out the following observations. The ABTG showed significant improvement in HDL cholesterol levels when compared to the other two groups, namely, IBTG and SBTG. The aerobic-based training group's post training HDL cholesterol mean is 53.887, the interval-based training group's post-training HDL cholesterol mean is 47.454 and the strength-based training group's post-training HDL cholesterol mean is 45.224. When compared with the mean values of the three groups, it is clear that the ABTG showed significant improvement in HDL cholesterol when compared to the other two groups. The interval-based training group also improvement in the HDL cholesterol levels when compared to the strength-based training group. This simple analysis on the post-training adjusted mean values shows that there is significant improvement in the HDL cholesterol levels of the subjects due to the selected activity at the selected intensity.

Table 1: Adjustment on pretest. Analysis of Covariance for HDL cholesterol (For pre-training and post-training)

SSTY.X - 1529.063					
SSWGY.X - 400.0716					
SSBGY.X - 1128.991					
ANCOVA table					
Source	**DF**	**SS**	**MS**	**F**	**CR.F**
Total	59	1529.063			
BG	3	1128.991	376.3303	51.73617	2.78
WG	55	400.0716	7.274028		

Table 2: Pre-training, Posttraining, and adjusted Post-training means for HDL Cholesterol

Groups	N	MX	MY	MY.X
SBTG	15	41.8	46.33333	45.22428
IBTG	15	40.26667	47.53333	47.45492
ABTG	15	42.4	55.4	53.88765
CG	15	36.13333	38.4	41.09983
		40.15	46.91667	46.91667

Table 3: Scheffe's *post hoc* test for HDL cholesterol. cd for Scheffe's test

CD=√(a-1) F√((2(MsError)/n)) 2.781			
Individual comparisons for HDL cholesterol			
Groups and values	ABTG	IBTG	SBTG
	53.88765	47.45492	45.22428
IBTG	−6.432734		
47.45492	Sig.		
SBTG	8.663373	2.230639	
45.22428	Sig.	N.Sig.	
CG	12.78782	6.355089	4.124449
41.09983	Sig.	Sig.	Sig.

Although there is variance in the mean values of the HDL cholesterol because of the three protocols of the exercise, to find out the real difference and the cause of significant difference the Scheffe's *post hoc* individual comparison test was conducted.

The Scheffe's *post hoc* individual comparison test for the individual groups is presented in Table 3. The individual comparisons through the Scheffe's *post hoc* test elicited that the ABTG group has brought out significant improvement in the HDL cholesterol of the subjects when compared to the other two experimental protocols of exercise. The IBTG and SBTG post-training adjusted averages are different in values, the Scheffe's *post hoc* comparison test indicated that the difference between the groups is insignificant and hence the training effect of the IBTG and SBTG is identical. However, all the three exercise protocol groups of the experimentation showed improvement in the HDL cholesterol levels as per the Scheffe's *post hoc* individual comparison test when compared to the control group.

CONCLUSIONS AND RECOMMENDATONS

Conclusions

The following conclusions have been derived after analyzing the experimentation results through the appropriate statistical tools:

1. All the three different protocols selected for the aerobic based training exercise capsule, interval based training capsule and strength-based training capsule at the moderate intensity of maximal heart rate caused for the significant increase in the HDL cholesterol levels of the subjects.
2. Among the three different protocols for each exercise capsule the aerobic based training for the experimentation period showed more significant increase in HDL cholesterol when compared to the other two protocols of the exercise capsules.

Recommendations

The following recommendations are offered by the scholar in this regard:

1. Aerobic exercise programs at a moderate intensity of 60–70% of the maximal heart rate of not <4 km distance should be needed to better control the precipitating factors for the degenerative diseases such as coronary heart disease and hypertension.
2. Similar study may be conducted cross sectionals for various populations changing the geographical limitations.
3. Same type of study may be done for various ages of the same geographical population or to the different geographical area population.
4. Similar study may be conducted for longitudinal studies with an increased experimentation period.
5. Many similar studies may be conducted changing the intensity factor of the experimentation exercise protocol.

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Research Article

Coaching triathlon and structuring training for athletes

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ABSTRACT

The job of coaches now is to come up with a training plan for their athletes and be able to communicate the plan and track progress against it. Hopefully, by now it becomes clear that there a vast number of ways of considering this information and a multitude of different ways to combine this information to create plans.

Keywords: Aenarobic session, Athletes, Coaching, Recovery, Structure

INTRODUCTION

At this point, we return to the training theory model seen in the introduction to sport science section. We have seen that there are several different components that determine fitness in Triathlon (Components of Fitness); we have a basic understanding of the human body's mechanisms (Human Systems) for helping achieve these, and how Principles of Conditioning can be used to deliver improvements. Finally, we have considered different ways of Measuring Fitness within a Triathlon setting. You will hear different views on this subject, some coaches will declare their approach is the best approach, others will state there are no right or wrong ways to coach. The important aspect for coaches to consider is that there is some basic scientific knowledge that underpins current best practice, and this should guide the coaches' focus. Within those boundaries; however, the best way to coach will depend on the athlete, and the objectives of that athlete, and how they and the coach like to work. Therefore, always keep in mind that when developing training plans constant review and revision will be necessary and tracking progress over a long time, will tend to show what works and what does not in your context (environment and athletes).

The following section discusses some of the key ideas and principles that will be of use to coaches when creating training programs.

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INDIVIDUAL SESSIONS

The first place to start is with describing and communicating individual sessions. We will first start with a recap of some basic terminology before progressing with some ways to describe sessions and finally include some basic guidelines for different types of session.

BASIC TERMINOLOGY

When designing conditioning sessions coaches need to understand some basic terminology:

Intensity

We have covered intensity and the various ways to measure it in Measuring Fitness Section. Modifying intensity within a session can have specific and even dramatic changes on the outcome of a session.

SETS AND REPETITIONS

A set is a group of exercises, each of which is made up of a number of repetitions. A simple example would be to get an athlete to complete 4 sets of 15 press ups, often described as 4 sets of 15 repetitions.

In triathlon, we are usually concerned with a set being made up with a number of repetitions of a swim, bike, or run activity. For example, in swimming a set could be 10 × 100 m swim. This example could be considered as 1 set of 10 repetitions. This is a slightly different perspective from those familiar with gym based or weight exercises, where there are likely to be more sets, but each is somewhat shorter. This is partly due to the fact that ultimately triathlon is an endurance sport, and activities even at a higher intensity are likely to be much longer than in other some other sports.

RECOVERY

Recovery is the rest between each repetition, and also between sets. A certain amount of recovery is required to aid the athlete to recover to repeat the next repetition. Getting the recovery correct for the intensity of effort is important. With the above example, we may swim 10 × 100 m with 15 s rest between each 100 m.

Duration or Distance

Each repetition should be for a specific time or distance. An athlete may do a distance-based repetition (as in 10 × 100 m swim) or a time-based set, 5 × 5.

Describing Sets

For each conditioning session you should expect to see it written in the following or a similar way, covering all these areas discussed previously.

Repetitions (number of):

- Distance (or length of time) of each repetition.
- Intensity.
- Time for recovery.

A common mistake for coaches is to omit one or more of these elements when writing a session.

For example, using the 10 × 100 m swim example. If there is no rest and intensity given, this can be a completely different set depending on how it is tackled. A swimmer could swim this set in many ways, for example, some options they could swim each repetition in:

1. 1 min 45 and take 10 s rest;
2. 1 min 20 and take 2 min rest;
3. 1 min 55 and take 5 s rest.

Each of these examples will produce a different training effect.

Without specifying all the elements, the coach (and participant) will not be sure of the training effect and outcome of the session. Therefore, always express any activity with all four elements:

Endurance Sets

Endurance sets are arguably the simplest to construct. The intensity of endurance sessions is generally low enough to enable the athlete to continue without stopping, and therefore often there may just be a single repetition, with rest often not being required within the session.

For example, a basic endurance session could be:

Run for 1 h 30 min at RPE of 5. There are no intervals and no rest within the session.

This would meet the physiological needs of an endurance session. The impact would depend on the athlete, for example:

Elite Ironman athlete this is likely to be a relatively easy maintenance session.

For an age grouper whose longest previous session was 1 h 25 it could be a key development session, extending their endurance capabilities. For a novice age group athlete, it could be an excessively demanding session which could leave them injured or in significant deficit. Remember it is always necessary to understand the athlete before setting a session.

Other points to consider for endurance sessions:

Would a warm up or drill session be beneficial before a long continuous session over an hour. Would the athlete benefit from small breaks during the session? While maybe not necessary physiologically, they could aid mental side, keep athlete focused? Where should you conduct the session, for example, a trail run, or open water swim may be more motivating than conducting the session in a pool or on a running track. Consider who to put together for these sessions, due to continuous nature it is usually best to put athletes of similar ability together for these sessions. Swim endurance sets are generally up to 1 h, run endurance sets may reach 2 h for experienced well-conditioned athletes racing longer distances, bike endurance sessions can vary depending on target event, but can generally range from 2 to 4 h with up to 6 for those racing long distance events. These sessions can also be useful for coaches to spend some time analyzing triathletes' technique and providing feedback in the rest periods. These sessions can also be broken up, or modified to add some variety, while still having similar training effects. For example, 3 sets of – 20 min run at RPE of 5, 1 min walk, 2 min drills (choice drill per athlete), ad 2 min run at

RPE 7 (considering good running form). The majority of this session is still RPE 5, and total duration is 1 h 30. It just has some drills and some shorter sections running faster to ensure focus is maintained, add some variety, and hopefully improve running form. The intensity of these endurance sessions can become more intensive and still remain under threshold (LT-2) intensities. This is one reason why several zonal systems break this zone into smaller zones.

Threshold Sets

Remember by threshold, we are talking about the Lactate Turn-point 2. Carrying out sessions around this key marker is a good way for a triathlete to be able to improve this threshold and hold a high percentage of their VO_2max velocity over a long period of time. The intensity of a set based on threshold should obviously be the same at they can hold for an hour. Many of the systems that coaches use are based around testing this threshold, so usually we should have a reasonably accurate value their threshold pace or power output. For example, a well-trained athlete may have a threshold bike power output of 300 watts. Once we know this it is quite easy to construct threshold session. While in theory the athlete should be able to complete an hour at 300 watts, what appears to work better most of the time is to split this session up into more manageable chunks with rests in between. The most common sessions tend to have a ratio of work:rest of 5:1 and usually have a total work time of approximately 30 min. A session of 6 repetitions of 5 min with 1 min rest at 300 watts would fit well for our example athlete. Equally 3 × 10 min with 2 min rest at 300 watts would also work.

Remember these are just guidelines and there are a wide variety of ways of constructing sessions that broadly meet these criteria. The same type of set construction works well for swim/run sessions. Some coaches like to construct sessions where the athlete is required to work above and below the threshold, and there is some evidence these work well to. Using our example athlete:

5 Sets of:
- 1 min at 280 W
- 1 min 290 W
- 1 min 300 W
- 1 min 310 W
- 1 min 320 W
- 1 min 120 W.

Novice coaches can stick within the broad guidelines, as you develop as a coach consider designing your own sessions, but remember to record what happened, so you can work out which sessions produce the best gains for your athletes.

VO_2max

Aerobic Power or VO_2max sessions are the next level up in intensity. Remember that this is a pace that most people can maintain for maybe 10 min approximately.

As a general rule provide equal or slightly less recovery time than the repetition time. The work: rest ratio is approximately 1:1

One of the issues to be considered when training at this intensity is that it can take 90 s to 2 min to reach VO_2max during an interval, so more careful assessment of rest is required. For example, if the repetitions are only 1 min in duration and the athlete fully recovers before the next repetition the next repetition they may never be fully at VO_2max despite working at the correct velocity. For this reason, it may be better to perform longer repetitions between 3 and 5 min to guarantee some time spent at the correct intensity. It then is less critical is the recovery time is not quite correct.

An example run session may therefore be:
5 repetitions of 5 min at RPE 9/10 with 4 min jog recovery between repetitions.

Reference: Daniels' Running Formula (2014) - 3rd Edition, Human Kinetics, page 57.

Anaerobic Session

These sessions are aimed at improving anaerobic power. The work:rest ratio is now 1:3. The rest is approximately 2–3 times longer than the time spent training.

The total amount of time spent completing the work element of each repetition should be a maximum of 15 min for an experienced well-trained athlete. These sessions bring with them more significant risk in terms of injury. Hece, while these sessions can add vital components to the training regime of experienced athletes, they are probably too risky for novice athletes.

Speed Sets

Here, the athlete is operating at very fast speeds, with the aim to improve maximum speed for short distances. This can also have a beneficial impact on technique in all three disciplines. The aim is to go almost as fast as possible but for very short and then allow long recoveries before repeating. For these efforts, the recoveries almost cannot be too long; however, the coach will need to manage the group carefully to avoid boredom. As a general guide use a work:rest ration of 1:5-8.

Part of the aim is to swim sufficiently fast, but not to allow fatigue affect form, so a common error for coaches s to have repetitions that are too long for the capabilities of the athletes. The duration of the repetition ideally should be between 10 and 15 s. We can immediately see that many age group swimmers would be unable to complete even 25 m in this time.

EXAMPLE SWIM SESSION

8 × 20 m with 60 s rest at RPE of 9–10/10. Swim as fast as you can over each 25 m.

Periodization

Periodization in sports coaching is a concept that is popularly linked with Russian physiologist Leo Matveyev and was expanded on and developed further by Romanian sport scientist Tudor Bompa. When planning anything in life other than the simplest of tasks it is advisable and helpful to break down the overall objective into a series of smaller tasks, each of which may be further broken down yet again. This is a simple tenet of project planning and transfers well to any sports coaching plan. For example, to win an Olympic medal in 4 years, an elite athlete will have to develop in a host of areas, including mentally, tactically, and physically, which will be aided by technical improvements and may require them to be supported socially, financially, and emotionally. It can easily be imagined that many of these areas of development will take a substantial time and effort to develop, and it would be easy to lose our way as either coach or athlete in trying to achieve these complex sub-goals within the context of the wider picture. While this high performance example may be more complex than most coach's face the same issues are still true for a youth who wishes to race at the inter-regional championships; an age grouper wishing to qualify for European or World Age Group championships; or indeed a novice wishing to complete their first standard distance Triathlon. The concept of periodization is based on the fundamental idea that there is a best way to organize the training so that the best use of training time and resources will achieve the greatest improvement for the athlete.

There are a variety of different models for periodizing endurance training which generally follows a process of progressive loading and then a recovery/adaptation period (see principles of training section). The different models tend to differ on the approach to the loading over a period of time.

Note: Periodization is often considered to be fundamentally concerned with physical conditioning, and this view is often prevalent within Triathlon; however, the principals can equally extend to mental skills training (Psychology), or skills, and technique development. In its simplest terms breaking a plan down into smaller more manageable chunks usually uses the terms Macro/Meso/Micro.

Image of a Periodization overview, showing link between macro, meso, and micro cycles.

In this example, the macro period is October 2013 to Set 2014, there are four meso cycles (October to January; February to mid-April; mid-April to August; September) the second meso cycle is shown being broken down into 12 weeks long microcycles.

The macro period is usually the time period that relates to the goal in mind, so if the goal is related to a performance at the Olympic Games then the macro period could be a 4-year period. For most athletes and coaches' macro usually relates to a year-long cycle. It does not need to be, but as humans we are usually very good at thinking in terms of years.

The micro cycle is usually a small unit of time that is easy to think about. For most people that is usually a week, because that fits in with our job or school patterns. However, there is no specific reason it needs to be this. It should be small enough to think about conceptually. For example, for those working in some jobs may do a 10-day-on 4-day-off pattern, so they find a 2-week period easier to think about.

The meso cycle – meaning middle or intermediate, fits between these micro and macro as you may expect. A meso cycle can range significantly, but typically tends to be between 3 weeks and 2–3 months long. Some people will be familiar with terms for periods such as Base, Build, Taper, Race, and Recovery. Other models use the terms General Preparation, Specific Preparation, Pre-Competition, Competition, and Transition. Different periodization models suggest different approaches to the variation of training over the duration of the whole macros cycle, with any significant changes in training usually being experienced when moving from one meso cycle to the next.

Volume, Intensity, Specificity

Each model works with the same variables – volume, intensity, and specificity and relies on principles of training such as adaptation and recovery. See Principles of conditioning section.

Volume is the total amount of training completed, in triathlon it makes most sense to use hours of training as a unit of volume as this is somewhat comparable across each of the disciplines. Intensity – is a measure of how hard the training is, at an extreme, a 30-min easy walk is of very low intensity, where as a series of maximal maintainable paced 400 m repetitions on a track with 5 min of rest between is of very high intensity for a triathlete. Specificity – the concept here is that to be effective training should be specific to the demands of the sport. The general concept is that the closer to the race – the more specific (more like the race conditions) the training should be. The further away the race the more general the training can be.

Intensity

Different approaches and systems use different names and terminology for different parts of the program. Often these phrases are used to name sections of a plan, usually at a Meso level. The following table explains some examples:

Preparation	General preparation	Accumulation
Base	Specific preparation	
Build	Transformation	
Peak	Pre-competition	
Race	Competition	Realization
Transition	Recovery	

Different coaches will sometimes mix terminology from different systems. The important thing for coaches to adopt a system that:

Pros and Cons of Periodization

A focus on periodization does encourage a coach to engage with planning, and while most plans never withstand full implementation, having a plan is usually superior to no plan at all, because it encourages thinking about what could/should happen, it also gives the coach a model to reflect against. Having a plan also enables the coach to get started with a process, without a plan we are often left floundering.

A review by John Kiely (2012) suggests that coaches need to take care not just to follow periodization models because that is how we have always done it but should seek to find out what works. The key suggestion is to move to a model where there is a plan for development, but the key element is that there is a mechanism to assess the outcomes of training and adapt.

Another key finding was that it might be the variability of training that has a greater effect than any specific training model. Also suggested that repeating a specific type of training for several weeks consecutively, that is, same set that is just progressed in a micro way, for example, reduction of rest interval by 10 s/week, can provide quick gains for a short period of time. However, over a longer time a lack of variability in training may lead to a lack of mental engagement, and possibly overtraining, and result in lower gains. Therefore, a more holistic model of athlete development should be prioritized.

A criticism of periodization is that it encourages the thinking that there is a best way to allocate training resources to achieve the greatest improvement. However, most studies that periodization models are based on report "average" findings, with individual responses to training being either greater or less than the average. The underlying argument for much of the research is therefore that you cannot predict individual responses to a given training stimulus. With the disparity on the basic biology of the range of athletes a coach may come into contact with, it seems unlikely there is a best way to construct' training based on any one periodization model. It is, therefore, important to consider, what works for who in what context and why.

That said, in some environments – club based adult participation, where coaches have a wide cross section of abilities and participation rates, a model that "on-average" works may well be the best fit for the situation as a generic response to the problem of how to organize training. This may also be all that can reasonably be expected with the constraints of the context in which coaches sometimes operate.

However, for a squad environment or one where a coach is concerned with improvements for each individual, a greater degree of variability of approaches may be required. Consider two swimmers in the same lane, both swim 6 min 40 s for 400 m. Swimmer A however swims 200 m in 3 min, Swimmer B in 3.10. The Swim Smooth CSS test would indicate that Swimmer A would be better served by working on their endurance, while swimmer B would be better served by working on strength. Within a single lane, the different needs of two swimmers – who on face value are of equal value suggest a different training regime/periodization model would be more suitable.

Whilst this presents a problem for a coach, at least being aware of the issue can help them discuss with athletes what they could do on their own to supplement club sessions.

Periodization Paradigms in the 21st Century: Evidence-Led or Tradition-driven? John Kiely (2012) International Journal of Sports Physiology and Performance, 7,p242-250. Human Kinetics.

- They understand;
- Has appropriate progression for their athlete's needs;
- Can be communicated easily to athletes.

Coaching Implications

This section has provided a brief overview for coaches in how build on the knowledge discussed in other sections to construct training sessions and programs. The information provided while a simplified approach should give enough information to those coaches new to coaching to start to construct basic programs.

It is important that coaches remember the key points in the introduction to sports science section, including:

- Ensure they do no harm to athletes.
- Work within their own capabilities and experience.
- Seek help and guidance from more experienced and knowledge coaches where possible.

If in doubt, do not do the session, it is not worth risking the health and welfare of the athlete. By following the simple process of planning (according to the guidance), testing, and recording outcomes a good coach can learn for themselves what works, and in many cases, this is the required approach anyway to work out what works specifically for a given athlete.

CONCLUSION

As the sport of triathlon demands highly Strong athlete to perform for Swim, bike, and running with his/her strong power, Agility, flexibility, and force to give their best performance at national and international levels both for male and females as well as in the term of Junior and senior levels. The coaches must look at the athletes profile first before they plane to arrange their training according to their Age, sex and the required level of competition. The prior analysis the race course is key for coaches and athletes. There is enough data available for proper prepare the athletes for a competition. The race calendar should and training be designed (whenever is possible) based on the athletes' characteristics.

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Research Article

Comparison on explosive power of legs among basketball and handball players of Hyderabad District

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ABSTRACT

The purpose of the study is to find the explosive power among basketball and handball players of Hyderabad district. The sample for the study consists of 20 basketball players and 20 handball players of Hyderabad between the age group of 18 and 20 years. To assess the explosive power, the standing broad jump test was conducted for the study. It is concluded that basketball players are having more explosive power compare to handball players. It is recommended that conditioning training must be given to all basketball players and handball players.

Keywords: Explosive power, Conditioning, Standing broad jump test, etc

INTRODUCTION

Basketball is a sport, generally played by two teams of five players on a rectangular court. The objective is to shoot a ball through a hoop 18 inches (46 cm) in diameter and mounted at a height of 10 feet (3.048 m) to backboards at each end of the court. The game was invented by Dr. James Naismith who would be the first basketball coach of the Kansas Jayhawks, one of the most successful programs in the game's history. A team can score a field goal by shooting the ball through the basket being defended by the opposition team during regular play.

Handball also known as team handball, Olympic handball, European team handball, European handball, or Borden ball is a team sport in which two teams of seven players each (six outfield players and a goalkeeper) pass a ball to throw it into the goal of the other team. A standard match consists of two periods of 30 min, and the team that scores more goals wins.

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Chatterjee *et al*. studied to compare strength ability, agility, and dynamic balances between volleyball and basketball players. For the purpose of the study, a total of 40 players (20 volleyball and 20 basketball players) were selected randomly from Tansen Athletic Club of Durgapur. To compare the strength, agility, and dynamic balances between volleyball and basketball vertical jump test (Sargent jump), SEMO agility test and modified bass test were administrated to the subject. The age of the subject was between 15 and 17 years. The collected data were analyzed using independent "*t*" ratio to find out the significant difference between volleyball and basketball players. The result of the study showed that there was a significant difference on strength, agility, and dynamic balances ($t = 0.136$, $P > 0.05$) between volleyball and basketball players.

Kalsi *et al*. studied on different motor abilities among university level volleyball and basketball male players of Guru Nanak Dev University, Amritsar, and Lovely Professional University, Phagwara, Punjab. The main aim of the study was the comparison between volleyball and basketball players with different motor abilities. The purpose of the study was to compare arm strength and leg strength of volleyball and basketball players. In the present study, investigator has

taken a total of 30 samples. For analysis and interpretation of data, a comparative analysis of the selected variable was statistically analyzed by "*t*-test." The data of both groups were calculated separately for both the variables. Different types of descriptive statistic such as mean and standard deviation were computed to describe each variable statistically. The level of significance was set at 0.05. To know the difference in the selected variables, the individual "*t*-test" was used. It was found that volleyball and basketball players do not have significant difference between the variables; arm strength and leg strength.

METHODOLOGY

The sample for the study consists of 20 basketball players and 20 handball players of Hyderabad between the age group of 18 and 20 years. To assess the explosive power, the standing broad jump test was conducted for the study.

Standing broad jump test.

Purpose

The purpose of the study was to measure the explosive power of the legs.

Equipment Required

Tape measure to measure distance jumped, non-slip floor for takeoff, and soft landing area preferred. Commercial long jump landing mats are also available. The take-off line should be clearly marked.

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 forward drive. The subject attempts to jump as far as possible, landing on both feet without falling backwards. Three attempts are allowed.

Table 1: Comparison of mean values, SD, df, "*t*-value," and *P*-value among basketball and handball players on standing broad jump

Subjects	*n*	Mean	SD	df.	"*t*-value"	*P*-value
Handball players	20	2.0000	0.00000	38	−9.761	0.000
Basketball players	20	2.7667	0.43018			

RESULTS AND DISCUSSION

The mean value of handball players is 2.0000, SD value is 0.0000, and basketball, the mean value is 2.7667 and SD value is 0.43018. The degree of freedom is 38. $t = -9.761$ and $P = 0.000$. It is very clear a significant difference there is a difference in standing broad jump among basketball players and handball players.

CONCLUSION

It is concluded that basketball players are having more explosive power compare to handball players. It is recommended that conditioning training must be given to all basketball players and handball players.

Recommendations

Similar studies can be conducted on female players and other team game players and individual game players.

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Research Article

An analytical study of injuries among long-distance runners of Hyderabad

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ABSTRACT

The practice of long-distance running can lead to an increased risk of injury. Engaging in sport activities has numerous health benefits but also carries the risk of injury. Long-distance running commonly affects knees, lower leg, foot, ankles, hips, pelvis, groin, etc. The objective of the study is to investigate the frequency of injuries among long-distance runners of Hyderabad. The sample for the study consists of 100 male long-distance runners of Hyderabad district between the age group of 20 and 22 years those who have participated in OU Cross Country Races, Golden Mile Run, Hyderabad District Athletics Championships, Summer Road Run and C. Devender Yadav Memorial Run during the year 2019. The data are collected through questionnaire. The results of the study show that lower extremities injuries include 90%, knee injuries 45%, lower leg injuries 10%, upper leg injuries 5%, foot injuries 10%, ankles injuries 15%, and hips, pelvis, and groin injuries 5%, upper extremities include shoulder injuries 3% and lower back injuries 7%. It is concluded that athletes must have good conditioning and prevention to avoid the injuries. This type of study is useful to coaches to give proper coaching for the development of motor qualities for the prevention of injuries among long-distance Runners.

Keywords: Injuries, Knee injuries, Foot injuries, Lower back injuries, etc

INTRODUCTION

Sports injuries could be the result of critical trauma or repetitive stress related to athletic activities. Bones or soft tissue such as ligaments, muscles, and tendons could be affected by sports injuries. As the rate of participation in professional sport activity increases, so does the probability of getting sports related injuries. As a result a thorough knowledge is required to prevent, cure, and manage such injuries to improve well-being of athletes. A sport injury can be referred to any injury, pain, or physical damage that happen due to sport, workouts, or physical activities. Sport injuries are mostly related to musculoskeletal system which pertain muscles, bones, joints, and tissues such as ligaments and tendons. The sports injuries can be classified to acute or chronic injuries. Long-distance runners need to cover lot of mileage to get better performance. There is a chance of long-distance runners to get more injuries during training and in competition.

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Gallo *et al*. (2012) studied about common leg injuries of long-distance runners: Anatomical and biomechanical approach. Long-distance running (>3000 m) is often recommended to maintain a healthy lifestyle. Running injury rates increase significantly when weekly mileage extends beyond 40 miles cumulatively. With the development of running analysis and other diagnostic tests, injuries to the leg secondary to bone, musculotendinous, and vascular causes can be diagnosed and successfully managed. Searches used the terms running, injuries, lower extremity, leg, medial tibial stress syndrome, compartment syndrome, stress fractures, popliteal artery entrapment, gastrocnemius soleus tears, and Achilles tendinopathy. Sources included Medline, Google Scholar, and Ovid from 1970 through January 2012. Tibial stress fractures and medial tibial stress syndrome can sometimes be prevented and/or treated by correcting biomechanical abnormalities. Exertional compartment syndrome and popliteal artery

entrapment syndrome are caused by anatomic abnormalities and are difficult to treat without surgical correction. Leg pain due to bone, musculotendinous, and vascular causes is common among long-distance runners. Knowledge of the underlying biomechanical and/or anatomic abnormality is necessary to successfully treat these conditions.

Purpose of Research

The objectives of the study are to investigate the frequency of injuries among long-distance runners of Hyderabad. This study was designed to investigate the most common types of injuries among long-distance runners.

Sample Group

The sample for the study consists of 100 male long-distance runners of Hyderabad district between the age group of 20 and 22 years those who have participated in OU Cross Country Races, Golden Mile Run, Hyderabad District Athletics Championships, Summer Road Run and C. Devender Yadav Memorial Run during the year 2019.

Research Instruments

All the players were given a questionnaire regarding the sports injuries occur while during the practice and competition. All the sportspersons are doing regular practice since minimum past 4 years.

The questionnaire consisting of the following injuries:

1. Lower extremities
2. Upper extremities
3. Head
4. Neck
5. Vertebral column

Data Collection

The data were collected personally those who have participated in OU Cross Country Races, Golden Mile Run, Hyderabad District Athletics Championships, Summer Road Run and C. Devender Yadav Memorial Run during the year 2019.

RESULTS AND DISCUSSION

The results of the study show that the lower extremities injuries include 90%, knee injuries 45%. lower leg 10%, upper leg 5%, foot 10%, ankles 15%, and hips, pelvis, and groin 5%, upper extremities include shoulder pain 3% and lower back 7%. It is concluded that long-distance runners must have good conditioning and prevention to avoid the injuries. This type of study is useful to coaches to give proper coaching for the development of motor qualities for prevention of injuries among long-distance runners.

Table 1: Percentage of injuries among long-distance runners

Lower extremities injuries	Upper extremities	Head	Neck	Vertebral column
90	3	Nil	Nil	7

Research Recommendations

Sufficient warm-up, proper technique, correct biomechanics, proper conditioning, optimizing balance, coordination, optimizing reaction times, optimal diet, adequate rest, and positive attitude will reduce the risk of injuries. Increase your flexibility by performing dynamic warm up before practice and competition followed by static stretching post-activity. Consult a coach or physical trainer to incorporate the conditioning programs during the practice. Have a pre-season physical examination and follow your doctor's recommendations. Be aware of poor field conditions and shoes in long-distance running increase injury rates. Avoid overuse injuries – more is not always better.

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Research Article

Comparison of abdominal strength among Football and Hockey Players of Nizamabad District in Telangana State

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ABSTRACT

The purpose of the present study was to find out the abdominal strength among football and hockey players of Nizamabad district in Telangana state. The sample for the study consists of 15 male football and 15 male hockey players between the age group of 18 and 20 years. To assess the abdominal strength, sit ups tests were conducted. This study shows that hockey players are having more abdominal strength compare to hockey players. This type of study is useful to coaches to give proper coaching for the development of motor qualities among all sports and games.

Keywords: Abdominal strength, Motor qualities, Sit ups

INTRODUCTION

Physical fitness is the ability to do every day demands with energy, without undue fatigue and with plentiful vitality to engage in recreation interests and to meet the difficult situations. Physical fitness composted of fitness elements which are speed, control, endurance, balance, etc. Physical fitness is the most important factor in all sports and games. Hockey is a field game played both men and women. Each team has 11 players, who use a stick with a hook which forms the head to hit the ball along the ground. The object of the game is to send the ball into the opponent's goal wins. The team consists of 16 players. Hockey at any level is a thrilling game enjoyed by players of all ages. The vast majority play the game primarily for social reasons and do not normally have the opportunity for the sort of coaching that could significantly improve their individual skills and overall performance.

Football is a team sports involve kicking the ball to score the goal. Football is a field game played both men and women. Each team consists of 11 players, kicking a ball to score a goal.

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Dr. Hari Singh, Gaurav (2016) studied the physical fitness among goal keepers of football and hockey of Himachal Pradesh. The purpose of the study was to analyze the differences in physical fitness variables between goal keepers of football and hockey. This study was conducting on 20 goal keepers of football and hockey with an aim to find out differences in physical fitness variables between the goal keepers football (n = 10) and goal keepers of hockey (n = 10). The data for the present study were collected in the intercollege competition organized by Himachal Pradesh University, during the session 2011–2012. AAHPER physical fitness test (AAHPER, 1976) was used to assess the physical fitness level. To analyze the difference in physical fitness variable between two groups of football and hockey were determined through "t" test. From the findings, it has been found that goal keepers of hockey possess greater arm and shoulder strength endurance, agility, leg explosive strength, speed, and cardiovascular endurance and football players are more superior in abdominal strength endurance.

METHODS AND MATERIALS

The sample for the study consists of 15 male football and 15 male hockey players between the age group of 18 and 20 years. To assess the abdominal strength, 1 min sit ups test was conducted.

RESULTS AND DISCUSSION

Table showing the mean values, SD, df, "t" value, and *P*-value of football and hockey groups in relation to the sit ups.

S. No.	Subjects	N	Mean	SD	df.	'*t*' value	*p*-value
1.	Football players	15	33.6333	1.7904	28	−22.708	0.000
2.	Hockey players	15	39.7667	2.8000			

The football players mean score in sit-ups is 33.63 and hockey players mean score in sit ups is 39.76. The finding of the analysis shows that there is a significant difference between the football players and hockey players in abdominal strength.

CONCLUSIONS

The hockey players are having better abdominal strength compare to football players. The abdominal area is the core area for hockey players to move around and sides in hockey. A strong core makes all the moving parts of the body simply work better.

Recommendations

It is recommended that similar studies can be conducted on other events and also female sportspersons. This type of study is useful to coaches to give proper coaching for the development of motor qualities among sports and games.

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Research Article

Effect of medicine ball exercises for the development of shoulder strength among B.Ped students of KVM College of Physical Education, Kulkacherla, Osmania University

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ABSTRACT

The purpose of the present study was to find out the effect of medicine ball exercises for the development of shoulder strength among B.Ped students of KVM College of Physical Education, Kulkacherla, Osmania University. The sample for the present study consists of 20 male B.Ped students out of which 10 are experimental group and 10 are controlled group. Medicine ball exercises were given to experimental group on alternate days, that is, three sessions per week and controlled group were given the general training for 6 weeks. Pre-test and post-test were conducted on pull ups to the experimental group and controlled group. This study shows that due to the medicine ball exercises, there is an improvement of the experimental group in shoulder strength. It is concluded that due to medicine ball, there will be improvement in shoulder strength.

Keywords: Medicine ball exercises, Pull ups, Shoulder strength

INTRODUCTION

Medicine ball exercises for building strength, speed, endurance, agility, improving cardiovascular fitness, and boosting your overall health. Avery Faigenbaum (2006) medicine ball training can be used to enhance muscle strength, muscle power, flexibility, endurance, coordinations, agility, balance, and speed.

Pramod and Dr. Divya (2019) studied the effect of medicine ball training on shoulder strength and abdominal strength and endurance among Sudan school boy's football players in Qatar. To achieve the purpose of this study, 30 (n = 30) interschool football boys player of Sudan nationalities randomly selected as subject from Indian school Doha-Qatar. Their age ranged between 13 and 17 years. The selected participants were randomly divided into two groups. Group I considers as experimental group (n = 15) and Group II acted as control group (n = 15). Experimental group (EG) underwent medicine ball training (MBT) three alternative days in a week and training section lasted 60 min for 6 weeks. Control group (CG) was not performing any specific training but they were participated in regular activities. The shoulder strength (SS) was assessed by Warner test of soccer skill (in meter) and abdominal strength and endurance (ASE) was assessed by AAHPER Youth Fitness Test (in number) which were selected as variables. The pre- and post-test data were collected on selected criterion variables before and immediately after the training program. The pre- and post-test scores were statistically examined by the dependent "t" test and analysis of covariance (ANCOVA). The level of significant was fixed at 0.5 level of confidence, which was considered as appropriate. It was concluded that the experimental group had shown significantly improved in SS and ASE due to MBT and control group had not showing any significant improvement in SS and ASE.

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MATERIALS AND METHODS

The sample for the present study consists of 20 male B.Ped students of KVM College of Physical Education, Kulkacherla,

Table 1: Mean values and paired samples statistics of pull ups between experimental and control groups of B.Ped students

Variables	Group	Pre-test Mean ± SD	Post-test Mean±SD	*t*	*P*-value
Pull ups test	Experimental	10.33±0.479	12.73±0.868	4.47	0.000
	Control	10.27±0.450	9.80±0.714		

*Significant at 0.05 level

out of which 10 are experimental group and 10 are controlled group. Medicine ball exercises were given to experimental group on alternate days, that is, 3 sessions/week and controlled group was given the general training for 6 weeks.

The following are the medicine ball exercises which were given 3 times a week for 6 weeks to B.Ped students on alternate days to the experimental group.

1. Biceps curls with medicine ball
2. Triceps curls with medicine ball
3. Russian twist
4. Bent over rowing
5. Up right rowing
6. Half squats
7. Side wards bend
8. Heel raising with medicine ball
9. Wall pass
10. Sit ups with medicine ball

Pre-test and post-test were conducted on pull ups to the experimental group and controlled group.

RESULTS AND DISCUSSION

Table 1 shows the mean score of pre-test and post-test in the control group and experimental group of B.Ped students of KVM College of Physical Education in the pull ups test this finding was analyzed using paired "*t*" test inferential statistics to find out whether there is a significant difference between the mean score of the pre-test and post-test of shoulder strength within the control group and experimental group.

The experimental group pre-test mean score in pull ups is 10.33 compare to post-test score is 12.73, there is an improvement of mean score 2.40 between pre-test and post-test due to medicine ball exercises The control pre-test mean score in pull ups is 10.27 compare to post-test score is 9.80, there is a decrease of mean score timing 0.47 between pre-test and post-test due to general training.

The finding of the analysis shows that there is no significant difference between the pre-test and post-test within the control groups in terms of shoulder strength and the findings of experimental group analysis show that there is a significant difference between the pre-test and post-test within the experimental group in terms of shoulder strength.

CONCLUSIONS

There was a significant improvement on shoulder strength due to medicine ball training among B.Ped students of KVM College of Physical Education, Kulkacherla. However, the control group had not shown any significant improvement on shoulder strength.

Recommendations

It is recommended that similar studies can be conducted on other events and also female Javelin students. This type of study is useful to coaches to give proper coaching for the development of motor qualities among physical education college students.

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Review Article

A analytical study of injuries among sprinters and throwers of Dr. Babasaheb Ambedkar University, Maharashtra

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ABSTRACT

The objective of the study is to investigate the frequency of injuries among sprinters and throwers. The sample for the study consists of 30 throwers and 30 sprinters those who are studying in different colleges of Dr. Babasaheb Ambedkar University between the age group of 18 and 25 years. The data are collected through questionnaire. The results of the study show that throwers secured 25% injuries in lower extremities, 30% injuries in vertebral column, and 45% injuries in upper extremities, sprinters secured 75% injuries in lower extremities, 15% injuries in vertebral column, and 10% injuries in upper extremities. It is concluded that athletes must have good conditioning and prevention to avoid the injuries. This type of study is useful to coaches to give proper coaching for the development of motor qualities for prevention of injuries among sprinters and throwers.

Keywords: Injuries, Lower extremities, Upper extremities, Vertebral column, etc.

INTRODUCTION

Engaging in sports activities has numerous health benefits but also carries the risk of injury. At every age, sportspersons sustain a wide variety of soft tissue, bone, ligament, tendon, and nerve injuries caused by direct trauma or repetitive stress. Different sports are associated with different patterns and types of injuries, whereas age, gender, and type of activity influence the prevalence of injuries. Sports trauma commonly affects joints of the extremities, that is, knee, ankle, hip, shoulder, elbow, wrist, and spine. The sports injuries that occur in competition or practice have loss of time for participation in sport.

Rolf (1995) studied overuse injuries of the lower extremity in runners. The purpose of this article is to review the literature on overuse injuries of the lower extremity in runners and to discuss briefly today's knowledge concerning etiology, diagnosis, and treatment. Running is a natural entity in many sports and a majority of runners will sustain one or more overuse injuries throughout the career, in most cases affecting the lower extremity. A runner may be regarded as an athlete who regularly runs as the predominant physical activity. From that point, we should subdivide the definition "runner" considering the character of different sports or recreational activities performed. Overuse injuries are often described merely from symptoms, including several different etiological and path anatomic correlates covering a variety of ailments. The clinical approach should be focused on a thorough history and physical examination. Analysis of possible injury mechanisms, correction of associated extrinsic and intrinsic factors, and advice on alternative training should be given. A knowledge of specific demands from the type of running performed is necessary to evaluate the symptoms presented. Overuse etiology has to be considered multi factorial with a yet unsolved exact path physiology needing further research. The definition of a "runner," of "running," and of "overuse injury" should be established and agreed on. This review attempts to draw attention to the huge multidisciplinary work that has to be done to better understand the mechanisms causing an overuse injury in a runner and to define diagnoses on a scientific base, whether or not eccentric or intrinsic factors predispose or trigger.

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PURPOSE OF RESEARCH

The objective of the study is to investigate the frequency of injuries among sprinters and throwers. This study was designed to investigate the most common types of injuries, mechanisms of injury, activities leading to injury, time and place of injury occurrence, and time lost to injury.

POPULATION AND SAMPLE GROUP

The sample for the study consists of 30 throwers and 30 sprinters those who are studying in different colleges of Dr. Babasaheb Ambedkar University between the age group of 18 and 25 years. Thirty throwers include shot putter, discus, javelin, and hammer. Sprinters include 100 M, 200 M, and 400 M athletes.

RESEARCH INSTRUMENTS

All the players were given a questionnaire regarding the sports injuries occur while playing athletics during the practice and competition. All the sportspersons are doing regular practice since minimum last 3 years.

The questionnaire consisting of the following injuries:

1. Lower extremities
2. Upper extremities
3. Head
4. Neck
5. Spine.

RESULTS

The results of the study show that throwers secured 25% injuries in lower extremities, 45% injuries in upper extremities, and 30% injuries in vertebral column. Sprinters secured 75% injuries in lower extremities, 15% injuries in vertebral column, and 10% injuries in upper extremities. It is concluded that athletes must have good conditioning and prevention to avoid the injuries. This type of study is useful to coaches to give proper coaching for the development of motor qualities for the prevention of injuries among sprinters and throwers.

The majority of sports injuries are soft tissue in nature and because many of injuries arise in sprints and throws which are due to improper body mechanics and improper sport techniques.

RESULTS DISCUSSION

It is concluded that throwers secured 25% injuries in lower extremities, 45% injuries in upper extremities, and 30% injuries in vertebral column.

Table 1: Percentage of injuries among throwers (30 male throwers)

Lower extremities injuries	Upper extremities	Head	Neck	Vertebral column
25	45	Nil	Nil	30

Table 2: Percentage of injuries among sprinters (30 sprinters)

Lower extremities injuries	Upper extremities	Head	Neck	Vertebral column
75	10	Nil	Nil	15

It is concluded that sprinters secured 75% injuries in lower extremities, 15% injuries in vertebral column, and 10% injuries in upper extremities.

Sprains and strains are the most common lower extremity injuries in athletics. The severity of these injuries varies. Cartilage tears and anterior cruciate ligament sprains in the knee are some of the more common injuries that may require surgery. Other injuries include fractures and contusions from direct blows to the body.

Shin splints (soreness in the calf), patellar tendinitis (pain in the knee), and Achilles tendinitis (pain in the back of the ankle) are some of the more common injuries among sprinters. Injuries to the upper extremities usually occur from falling on an outstretched arm. These conditions include wrist sprains, wrist fractures, and shoulder dislocations which are common among throwers.

RESEARCH RECOMMENDATIONS

Sufficient warm-up, proper technique, correct biomechanics, proper conditioning, optimizing balance, coordination, optimizing reaction times, optimal diet, adequate rest, and positive attitude will reduce the risk of injuries. Increase your flexibility by performing dynamic warm up before practice and competition followed by static stretching post-activity.

CONFLICTS OF INTEREST

There are no conflicts of interest in the study.

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