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Research Article

Current status of team learning of physical education students university of education – Thai Nguyen University

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ABSTRACT

By conventional scientific research methods, the study conducted a survey of the current situation and factors affecting the learning outcomes in groups, research and build a model to improve group learning efficiency for students majoring in Physical Education in University of Education – Thai Nguyen University, through which cooperation skills are developed, share information, critical thinking, contributing to improving the quality of learning for students, and meet the training requirements of the school.

Keywords: Group learning, Method, Physical education, Reality, Soft skills

QUESTION

Student of Physical Education in University of Education – Thai Nguyen University familiar with this method. The positives of group learning are undeniable, but not all groups of students achieve the best results with this method of learning, and sometimes even some students feel that it is even more beneficial formative and often less effective than working individually. The problem is how to make this learning method widely implemented, really promote efficiency in students, help students quickly grasp, occupy knowledge, and get learning results the best.

RESULTS AND DISCUSSION

We conducted interviews with 60 students of Physical Education, courses 54, 55, and 56 studying at the school to see if they self-assess their effectiveness in group learning activities, the interview results are presented in Table 1.

Interview results show that 36.7% of students think that their teamwork efficiency is good. The number of students who answered that they had normal and ineffective group work efficiency accounted for 30%, the remaining 33.3% of students said that their group work efficiency is not effective. Combining the above survey data with the comments of teachers in the school, especially teachers in subjects that often have to work in groups, the student's teamwork efficiency is still low, most of the students' group work is not effective. These data show that the group learning method of students has not brought into full play its advantages in the learning process at school.

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CURRENT STATUS OF STUDENTS' INTEREST IN UNIVERSITY OF EDUCATION – THAI NGUYEN UNIVERSITY ABOUT GROUP LEARNING ACTIVITIES

To assess students' interest in group learning activities, the author conducted a survey of 60 students majoring in Physical Education at the University of Pedagogy – Thai Nguyen University, the results are shown in Table 2 as follows:

Results of interviews with students majoring in Physical Education in University of Education – Thai Nguyen University on the level of excitement when working in groups, there are four answers, accounting for 6.7% of students, who think that they are very interested and like to study in groups as a contribution to solving common problems. There are 15 opinions, accounting for 25% of students that group study is normal, there are 26 comments,

accounting for 43.3% of students, answered that they were not interested in studying in groups. This proves that physical education students of the school are still thinking about learning in the traditional way, have not yet learned about group learning methods.

THE STATUS OF STUDENTS' SATISFACTION WITH THE ACTIVE ROLE OF THE GROUP LEADER

Team leader is a person who has an extremely important position and role in the operation of the group, the role of the group leader is to develop an activity plan and organize for you to study and discuss the content of the lesson. To assess the level of satisfaction of students about the role of the group leader, we interviewed 60 students of the physical education major about their satisfaction with the role of the group leader in the group's activities. The results are presented in Table 3.

Interview results show that 50% of students are very satisfied and 40% of students are satisfied, the majority of students answered that the biggest task of the group leader is to run and organize work for the whole group, to do so, they need to be good at inspiring, motivating, and coordinating team members.

Table 1: Interview results on the effectiveness of group learning (*n*=60)

Múca độ degree evaluation	Choice	%
Not effect	20	33.3
Normal	18	30.0
Effective	12	20.0
Very effective	10	16.7

CURRENT STATUS OF STUDENTS' TEAMWORK SKILLS IN UNIVERSITY OF EDUCATION – THAI NGUYEN UNIVERSITY

Teamwork can simply be understood as many people working together to accomplish a task well toward a common goal. This way of working will help individuals to complement each other's shortcomings and improve themselves. During the learning process, students often work in groups. So how to make the group's work most effective?, how must the members have teamwork skills?. To answer this question, we conducted an interview with a questionnaire of 20 teachers who are majoring in physical education at the University of Education – Thai Nguyen University, the interview results are illustrated in Table 4.

The results of the interviews with teachers showed that the level of proficiency in group study skills of students majoring in Physical Education at University of Pedagogy – Thai Nguyen University is still limited, especially conflict resolution skills, information sharing skills, skills in building rules of group activities, skills in self-checking – evaluating group activities, so group learning activities have not achieved results. Best results.

CURRENT STATUS OF METHODS OF CONDUCTING GROUP ACTIVITIES OF STUDENTS MAJORING IN PHYSICAL EDUCATION AT UNIVERSITY OF EDUCATION – THAI NGUYEN UNIVERSITY

The method of conducting group activities has a very important position, determining the quality, and effectiveness of group

Table 2: Students' interest in group work in university of education – Thai Nguyen university (*n*=60)

Course	Number of students	Mức độ Level							
		Very excited		Interest		Normal		Not interested	
		Choice	%	Choice	%	Choice	%	Choice	%
Course 54	20	0	0.0	6	30.0	4	20.0	10	50.0
Course 55	20	2	10.0	5	25.0	5	25.0	8	40.0
Course 56	20	2	10.0	4	20.0	6	30.0	8	40.0
Total	60	4	6.7	15	25	15	25	26	43.3

Table 3: Satisfaction with the role of the group leader in the group's activities (*n*=60)

Position	Level							
	Very pleased		Contentment		Normal		Unsatisfied	
	Choice	%	Choice	%	Choice	%	Choice	%
Group captain	30	50.0	24	40.0	6	10.0	0	0.0

Table 4: Status of skills performance of students majoring in physical education at university of pedagogy – Thai Nguyen university (*n*=20)

Number	The skills	Level					
		Competently		Relatively proficient		Not proficient	
		Choice	%	Choice	%	Choice	%
1	Plan group activities	2	10.0	9	45.0	9	45.0
2	Develop rules for the group's activities	1	5.0	4	20.0	15	75.0
3	Clear and reasonable assignment of tasks	3	15.0	7	35.0	10	50.0
4	Organize discussions and exchanges	5	25.0	7	35.0	8	40.0
5	Document study	1	5.0	12	60.0	7	35.0
6	Actively and actively listen	2	10.0	13	65.0	5	25.0
7	Share information	2	10.0	14	70.0	4	20.0
8	Conflict resolution	0	0.0	12	60.0	8	40.0
9	Self-check and evaluate the group's activities	1	5.0	14	70.0	5	25.0

Table 5: Evaluation of the method of conducting group activities of students majoring in physical education at university of education – Thai Nguyen university (*n*=60)

Methods of implementation	Frequent		Not very often	
	Choice	%	Choice	%
Divide equally among members	25	41.7	35	58.3
Focus on individual excellence	31	51.6	29	48.4
Based on the members' ability	35	58.3	25	41.7

Table 6: Interview results on the level of teachers' interest in practicing group study skills of students majoring in physical education at university of education – Thai Nguyen university (*n*=60)

Number	The skills	The level of interest of the teacher					
		Frequent		Rarely cares		Not interested	
		Choice	%	Choice	%	Choice	%
1	Plan group activities	45	75.0	15	25.0	0	0.0
2	Develop rules for the group's activities	48	80.0	11	18.3	1	1.7
3	Clear and reasonable assignment of tasks	45	75.0	15	25.0	0	0.0
4	Organize discussions and exchanges	45	75.0	15	25.0	0	0.0
5	Document study	45	75.0	13	21.6	2	3.4
6	Actively and actively listen	54	90.0	6	10.0	0	0.0
7	Share information	48	80.0	12	20.0	0	0.0
8	Conflict resolution	54	90.0	6	10.0	0	0.0
9	Self-check and evaluate the group's activities	51	85.0	7	11.6	2	3.4

learning activities. Through our observations, we summarize how to conduct group activities of students majoring in Physical Education at the University of Education – Thai Nguyen University, the results are presented in Table 5:

The interview results show that the assignment of tasks in the group is not appropriate, the groups mainly assign them in the way of "dividing equally among members," accounting for 41.7%, or "focusing on outstanding individuals," accounted for 51.6%, only 58.3% of the other opinion was to divide tasks based on the capacity and ability of each member.

CURRENT STATUS OF THE LEVEL OF INTEREST OF LECTURERS IN THE PRACTICE OF GROUP STUDY SKILLS OF STUDENTS MAJORING IN PHYSICAL EDUCATION AT UNIVERSITY OF EDUCATION – THAI NGUYEN UNIVERSITY

The group learning method is applied in most of the students' subjects. Hence, sometimes students have to study in groups

too much at the same time. This causes fatigue and boredom among students. This also significantly affects the effectiveness of students' group learning. To find out the level of interest of teachers in students' group study skills, we conducted student interviews about the level of teachers' interest in group learning activities of students majoring in Education. Physical education at University of Pedagogy – Thai Nguyen University, the results are presented in Table 6.

The results of the interview show that teachers often care, exchange, guide, provide skills, and group study methods for students, as shown in the rate of more than 70% of teachers who pay regularly. Interested in group working skills of students majoring in Physical Education at University of Pedagogy – Thai Nguyen University.

CONCLUDE

Group learning activities of students are developing, attracting many students to participate, but there are still many limitations. The effectiveness of teamwork is not really high, one of the reasons is that students do not understand the benefits of group learning activities, so most students are still passive in the learning process.

The research results assess the current status of factors affecting group learning activities, on that basis, to improve the effectiveness of group learning, the spirit of self-study, solidarity, and creativity in each student. Majoring in Physical Education at the University of Pedagogy – Thai Nguyen University. From there, proceed to build and apply a group learning model for students majoring in Physical Education at the University of Education – Thai Nguyen University.

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Research Article

Ladies! Keep going: The teeter-totter coaching theory

Rosil B. Rabadon, Lerly A. Ferrera, Deleaine Louix C. Pepito, Albert A. Jalandoni, Rizza R. Caumeran, Long Zhang, Yuanfu Yuan Zhong

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ABSTRACT

Female coaches enjoyed coaching boys, yet they believed that they needed to be physically competent to prove themselves while coaching a boys' team. They also described struggling to be respected and often felt they needed to employ masculine characteristics to be successful (La Fountaine and Kamphoff, 2016). The purpose of this qualitative study was to explore the experiences of women who have coached male athletes. Five female coaches who had coached or were currently coaching a men's team at the selected universities were interviewed, and a cross-case analysis method was used for tagging data and determining themes. Four primary themes emerged: (1) Informants had a varied athletic history, (2) participants had a coaching influences and support, (3) participants used an intense coaching philosophy, and (4) participants experiences work-life constraints. Thus, the number of women coaching men is low. Future research should focus on the coaching development opportunities for female coaches.

Keywords: Coaching opportunities, Female coaches, Male athletes, Professional development

INTRODUCTION

Sports has been one of the most valued activities in our lives. These are the activities that people participated whatever our language, culture, and traditions are. In order for us to excel in competitive sports, we need the help of our coaches. However, one of the clearest signs of disparity between men and women is coaching (Concordia University of Chicago, 2021). Associated with such masculine imagery, sports serve to legitimize a perceived natural superiority of men and reinforce the inferiority of females who are defined with reference to relative weakness, passivity, and grace – the characteristics of femininity. Therefore, sports are often described as a "male preserve." This might be the reason why we can only find few female coaches handling male athletes.

METHODOLOGY

The qualification for participation was to be a female who had served or was currently serving as the head coach of a male sport team that was not linked with a female team. The interview questions were taken from the study of Blom *et al*. There were modifications in the questions as to answer the domain of inquiry of the researchers. All interviews were conducted over a video call or face to face which lasted between 60 and 120 min. After the approval, a content analysis using *in vivo* and selective methods were performed. Qualitative data analysis followed by the guidelines set by Côté *et al*. (1993). Using a cross case analysis, researchers created the initial codes of meaningful units of text.

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RESULTS AND DISCUSSION

There were four primary themes emerged from the data, with one themes talks about their background before coaching (varied athletic history) and the rest talks about their experiences while coaching (coaching influence and support, intense coaching philosophy, and work-life constraints). Overall, participants revealed that they had both pleasant and unpleasant experiences coaching male athletes. One of the themes emerged is varied athletic history, this is in relation to Johnson *et al*. (2011). Ultimately, coaches should be passionate about teaching sport skills to their athletes. Coaches must be life-long learners of sport to properly train their athletes for peak performance. As the profession of sport coaching has evolved and sport has become a multi-billion-dollar industry,

many coaches have discovered sport incorporates both physical and mental training. Therefore, in today's sports world, several disciplines have been integrated into the science and art of training athletes. A coach will somehow succeed in their coaching career if they had vast background in playing the coach sports before coaching and if they exposed themselves in playing various sports since then.

THE TEETER-TOTTER COACHING THEORY

The birth of "The Teeter-Totter Coaching Theory" was introduced to explore the stories of female coaches handling male athletes. The term teeter-totter is another term for seesaw, which defines as a plaything consisting of a board balanced on a fulcrum where the board is ridden up and down by children at either end. Furthermore, the theory was inspired by the teeter-totter principle by Wake Coaches (2019) "the fastest way to get through a learning curve is to intentionally fall in the extreme, past your goal, rather than trying to get it perfect on your first try. The varied experiences encountered by the female coaches are similar to the directions of the teeter-totter which is to go up and down or side by side.

CONCLUSION

Female coaches live experiences has been a roller-coaster ride. They have been put up to different challenges and inspirations to keep going. Furthermore, several female coaches stayed in their position no matter what the challenges along the way, however, some of them quit. It is vital to give equal opportunities to women specially in the field of coaching male-athletes.

Recommendations

It is recommended that female coaches should be given equal opportunities, professional growth, and updated trainings in handling male-athletes. Finally, for future research, school administrators must allocate funding to explore similar studies.

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Research Article

Analysis on the effect of specific yogic practices and aerobics training protocol on bio-motor and psychological variables of high school students

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ABSTRACT

"Action is movement with intelligence; the world is filled with movement. What the world needs is more conscious movement, Physical fitness is considered as the most desirable lifestyle component of human beings to lead healthy and very active life. This aspect of the human life is now given so much of importance and studied worldwide very extensively. The physical educators around the world sponsor for the concept of all round development of the human beings through the physical activities. All round development of the individual encompasses the development of the individual's physical, mental, social, and emotional aspects. Exercise has an important role in these days in every human being. Exercise assumes a significant job, in light of the fact that expanded requests and quick life approach needs a sound body. Man from the earliest stages of the life was free and was very much aware of its needs every now and then. Be that as it may, for each reason and each progression, it needs legitimate fitness and striking choices based on which it is predominant on other living species. Hence, fitness remains the primary worry for him from the date of development of human life on this planet. To improve any athletic performance, strength must always be trained in concert with the other biomotor abilities. Most of us recognize muscular strength and power as being important to all sports that are dominated by speed and explosiveness. For instance, strength appears to significantly influence running speed. In current world, to accomplish total or criteria required fitness for the specific undertaking various endeavors were made to accomplish it through various methods and strategies and is particularly fruitful in that. The most prevalent and most satisfactory procedure is explored. By this procedure, everybody attempts to add to field of life.

Keywords: Aerobic, Bio-motor, Psychological, Yogic practices

INTRODUCTION

Yoga and Yogic Practices

The word "Yoga" originates from Sanskrit word YUJ and means "to join, to unite." Yoga exercises have a holistic impact and bring body, mind, consciousness, and soul into balance. In this way, Yoga assists us in coping with everyday demands, problems, and worries. Yoga helps to develop a greater understanding of our self, the purpose of life, and our relationship to God. On the spiritual path, Yoga leads us to supreme knowledge and eternal bliss in the union of the individual Self with the universal Self. Yoga is that supreme, cosmic principle. It is the light of life, the universal creative consciousness that is always awake and never sleeps; that always was, always is, and always will be.

Many thousands of years ago in India, Rishis (wise men and saints) explored nature and the cosmos in their meditations. They discovered the laws of the material and spiritual realms and gained an insight into the connections within the universe. They investigated the cosmic laws, the laws of nature and the elements, life on earth, and the powers and energies at work in the universe – both in the external world as well as on a spiritual level. The unity of matter and energy, the origin of the universe, and the impacts of the elementary powers have been described and explained in the Vedas. Much of this knowledge has been rediscovered and confirmed by modern science.

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Yoga is a historical foundation for healthiness and happiness in life. It is very helpful for harmony of mind and the body. Yoga is the way of becoming physically and mentally well-being. It contemporizes the function of the muscle and the mind. It is a path that can lead us toward health (Batch, 1987).

Yoga is not a very old story buried in nothingness. It is the most valuable and important need of today and the culture of tomorrow (Satyananda, 1969).

It is a mode of existence (life). It is a perfect procedure to educate our body, mind and inner spirit. This is an art of best living which was practiced in India thousands of years ago but as yoga deals with full harmony of life; its instructions are applicable today as they were in the primordial period. Some people think that yoga belongs to one religion but its benefits were experienced by the Buddhists, Jews, Muslims, Christians, Hindus, and the Atheists also. Yoga is in unification together with each and every one (Kindersley, 1996).

Today in this quickly developing world, the capabilities for the survival have gone up and one need to face part of rivalries. One may be wealthy in materialistic sense. Be that as it may, keeping a healthy perspective is troublesome because of the enormous number of issue of day by day life. Because of the pollution likewise, the health status is aggravated. Numerous individuals do not breathe appropriately and are uninformed of this reality. Legitimate breathing significantly improves our entire physical and mental prosperity.

Aerobic Exercises

Aerobic exercise, also known as cardiovascular exercise, is an activity that is sustained for a long period of time, that is rhythmic, and that affects large muscle groups. Aerobic exercise impacts the cardiovascular and circulatory system and makes your heart stronger and more efficient. Aerobics, step classes, water aerobics, and swimming are examples of aerobic exercises involving the use of some type of equipment. Specific kinds of equipment that can be used specifically for aerobic exercises include treadmills, elliptical machines, bicycles, and jump ropes. Furthermore, active sports such as football, basketball, hockey, and such others are great for aerobic exercises.

Aerobic exercises can also be done without the use of equipment. Many people who do not have gym memberships or who do not want to purchase any kind of equipment engage in this option for aerobic exercise. Once again, aerobic exercises include activities that last for a long period of time with a high heart rate. Jogging and running long distances are the most common forms of aerobic exercise that can be done without any kind of equipment. Another example of aerobic exercise, which is an alternative to jogging and running that many people actually find enjoyable and fun, is dancing. Specific kinds of dance include jazz, tap, hip hop, and others.

OBJECTIVES OF THE STUDY

The main objectives of the Research Paper are as follows:

1. To understand the concept of Yogic Practices and Aerobic Training
2. To Analysis on the Impact of Specific Yogic Practices and Aerobics training protocol on Bio Motor and Psychological Variables of High School Students.

RESEARCH METHODOLOGY

For this study, researcher chose 40 high school students to analysis on the impact of specific yogic practices and aerobics training protocol on bio motor and psychological variables of high school students. The subjects were partitioned in to two groups similarly with 20 each as experimental and control group. Every one of the students that were chosen for the research, were under went aerobic training protocol and specific yogic practices classes. The pre- and post-test were led on chosen variables of bio motor variables of speed, strength, explosive power, flexibility, psychological variables of anxiety, and Self-confidence. Each and every component was measured with standardized Test.

ANALYSIS AND RESULTS

The gathered data of experimental and control groups were factually broke down by utilizing mean standard deviation and t-test and displayed in Tables 1 and 2. The dimension of hugeness was fixed at 0.05 dimension of confidence with the

Item	Variables	Test	Unit of measurement
Bio motor variables	Speed	50 meters dash	In seconds
	Explosive power	Standing broad jump	In centimeters
	Strength	Sit ups	In number
	Flexibility	Sit and reach test	In centimeters
Psychological variables	Anxiety	Modified STAI	Rating scale
	Self confidence	Questionnaire	Rating scale

Table 1: The mean, standard deviation, and t-value of control group

S. No.	Bio-motor and psychological parameter	Pre-test mean	Post-test mean	SD	Mean difference	t-value
1	Speed	8.28	7.49	2.31	0.39	2.91*
2	Explosive power	2.02	2.08	5.26	−0.06	1.34
3	Strength	17.79	18.07	8.64	−0.28	1.06
4	Flexibility	18.56	18.58	0.43	−0.02	0.68
5	Anxiety	22.85	26.28	1.04	−3.43	0.74
6	Self-confidence	35.86	33.84	0.64	2.78	1.98

Table 2: The mean, standard deviation, and t-value of experimental group

S. No.	Bio-motor and psychological parameter	Pre-test mean	Post-test mean	SD	Mean difference	t-value
1	Speed	8.43	8.12	0.55	0,31	2.15*
2	Explosive power	1.97	2.10	2.42	−0.13	3.68*
3	Strength	18.65	19.22	0.66	−0.57	2.44*
4	Flexibility	17.86	19.31	3.51	−1.45	6.69*
5	Anxiety	23.42	19.14	0.32	4.28.	2.22*
6	Self-confidence	32.42	41.12	1.24	−8.69	6.08*

table estimation of 2.10. The t-estimations of 2.10 and above were viewed as huge in this investigation. In the tables, it was meant by star (*) which demonstrates 0.05 noteworthy dimension.

Table 1 indicates that the mean, standard deviation, and t-value of pre- and post-test scores of control group. The mean estimation of post-test scores of standing broad jump, sit ups, sit and reach, resting heart rate and breathe holding time respiratory rate, systolic pressure, and diastolic pressure were showed that there is no significant difference of mean estimation pre- and post-test scores. Only the t-value of 50 *m* dash (2.91) showed significant difference between pre-test and post-test.

Table 2 indicates the mean, standard deviation, and t-values of pre- and post-test scores of experimental group. The mean value post-test scores of all the chose variables were improved and it demonstrated the impact of specific yogic practices in the bio-motor and psychological parameters. The most astounding critical value was found in flexibility (6.69) followed byself confidence (6.08).The t-value of all the chose variables was over the table value of 2.10 and it appeared noteworthy improvement in the chose variables.

CONCLUSION

Yoga provides unselfishness and enormous love. Yoga advocates virtue and patience. Specific Yogic practices additionally give gladness, ground-breaking tonic for the mind, masculinity, considerateness with the limit with respect to block attempt, and self-examination. The consequences of the present study demonstrate the adequacy of yogic practices in bio-motor and psychological systems and on high school students. The control group post-test means score demonstrates that the physical training alone insufficient to improve the proficiency. In the experimental group, all the chose variables were altogether improved in some degree and it instruct us that specific yogic practices and aerobic training are valuable to everybody in especially sports people to accomplish the higher level of performance in light of the fact that the chose variables in the examination were progressively identified with the sports men as well. From the investigation, it is reasoned that yogic practices group observed to be superior to aerobic exercises group in improving flexibility, anxiety, and self-confidence.

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Research Article

Formulated cool down phase of exercise – Exercise medicine

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ABSTRACT

There are no precise formulation or guideline as when to cease to exercise; which is the cooldown phase. Sudden deaths, though it is remote, have been found only to occur during the cessation of the activity. Hence, this paper hypothetically draws a formulation based on the data collected on the cooling down phase crossing the two axis to coincide: The time taken and the numbers of heart beat. Recovery of the heart rate (HR) immediately after exercise is a deceleration mechanism of the vagal activation. Although attention has been given to the prognostic implications of changes in HR during exercise, (Ellestad and Wan, 1975; Sandvik *et al*., 1995; Lauer *et al*., 1996) the prognostic value of the rate of decline in HR after the cessation of exercise, the time taken and or the rate of the reduction of HR falls on cessation of exercise has not been well characterized which could have led to the many unexplained sudden death in physical activities. This research will prove of the HR decelerates on the vagal tone activation progressively when the dosage of the activity decelerates and over 5 min which we hypothetically maps this time phase to be the reabsorption of serum potassium safely back to the cells without triggering arrhythmia.

Keywords: Sudden deaths, Heart rate, Vagal tone activation etc.

INTRODUCTION

Many research papers have proven the importance on the warming up phase gearing the body for an exercise routine for peak performances. There are no precise formulation or guideline as when do you cease to exercise; which is the cool down phase. Sudden deaths, though its remote, have been found only to occur during the cessation of the activity. Hence, this paper hypothetically draws a formulation based on the data collected on the cooling down phase crossing the two axis to coincide: The time taken and the numbers of heart beat.

Recovery of the heart rate (HR) immediately after exercise is a deceleration mechanism of the vagal activation. Although attention has been given to the prognostic implications of changes in HR during exercise, (Ellestad and Wan, 1975; Sandvik *et al*., 1995; Lauer *et al*., 1996) the prognostic value of the rate of decline in HR after the cessation of exercise, the time taken and or the rate of the reduction of HR falls on cessation of exercise has not been well characterized which could have led to the many unexplained sudden death in physical activities (Figure 1).

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The graph illustrates the change in HR from rest in a subject undergoing a 30-min period of moderate dynamic exercise followed by a 30-min recovery period. The timing of the contribution from changes in cardiac vagal and cardiac sympathetic activity and their relation to central command and inputs from exercising muscle, as discussed in the text, is indicated schematically. Based on data from various sources.

Following moderate and longer periods of dynamic exercise, however, the sharp fall in HR does not reach the baseline (HR before exercise commence) value but continues to decrease slowly in an exponential manner over many minutes, and longer depending on the duration and intensity of the exercise (Carter R 3rd *et al*., 1999; Takahashi *et al*., 2000; Brown *et al*., 1993; Miyamoto, *et al*., 1982; Takahashi *et al*., 2000; Hautala, *et al*., 2001; Murrell, *et al*., 2007).

During this period, there is a coordinated cardiac vagal–sympathetic interaction, which ensures that there is sufficient cardiac output to prevent circulatory collapse while the dilated muscle vascular beds recover. This is probably enabled by

slow reduction of sympathetic nerve activity, which is still being reflexed enhanced by muscle metaboreceptors as the muscles recover, and by the slow clearance of circulating catecholamines (Hart *et al*., 2006).

Dr. Gary Mak, specialist in cardiology and President of the Hong Kong Association of Sports Medicine and Sports Science warned of stopping abruptly after running but should follow through a long and slow cool-down period with the concern of high risk of arrhythmia and vasovagal syncope. Abrupt stopping will put the heart under high stress as it will aggravate the imbalance between sympathetic nervous system and parasympathetic system, which are responsible for the exercise and cool-down of our bodies. Abrupt stopping might trigger either one of the following situations:

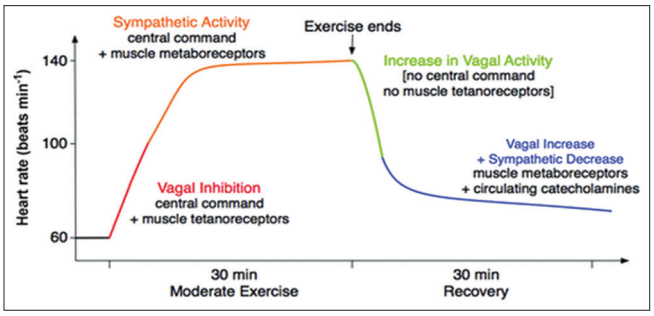

Figure 1: Changes in heart rate during and following exercise

- *Sympathetic nervous system*, which functions to increase HR to support the body for exercise, might become persistently hyperactivity and causes arrhythmia or even sudden death.
- *Parasympathetic system*, which functions to restore normal HR after exercise, might act too quickly and causes low blood pressure and slow HR which in turn triggers vasovagal syncope.

Objective

The purpose of this study is to examine a formulated guideline to the post-exercise recovery guide (called as "HR return" [HRrtn]) to progressively cool down after a bout of exercise session to prevent post exercise arrhythmias which has been the leading cause of death. It has been documented that on cessation of exercise at any level of maximum HR (MHR), the elevated HR will not return to its baseline for many minutes.

During the first minute after cessation of exercise, the concentrations of both catecholamines increased still further while potassium decline rapidly have been termed the "vulnerable period" regarding the occurrence of lethal cardiac arrhythmias. The researchers propose that the rapid decline of potassium concentration while catecholamine levels are elevated to near maximal levels may contribute to the vulnerability of some individuals to post exercise arrhythmias (Young *et al*., 1992).

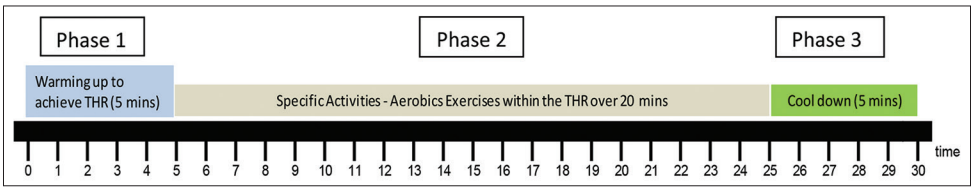

Figure 2: Phase 1: The specific warming up time is 5 min before proceeding to the specific activity (aerobics exercises), that is, the elevation of the resting HR (RHR) to the desired target heart rate training (THR) zones for specific adaptations. Phase 2: Specific activities and its intensities–Specific activities relates to the specific types of exercises. Phase 3: Cool down – There are no conclusive literature on this phase as compared to warming up. Looking at this cooling phase to be critical and it is important to formulate a guide to a proper regimented cooling down phase. Cooling down after a workout is seemed to be more critical than warming up as its relation to mortality. Sudden death is seen not only during exercise, but often immediately after cessation. The term "post-exercise peril" has been used to refer to the risk of cardiac arrhythmias during the first few minutes after cessation of strenuous exercise.

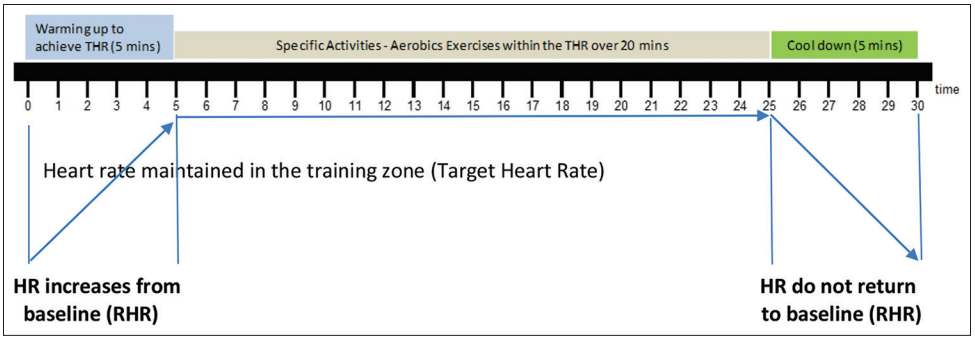

Figure 3: Heart rate maintained in the training zone (Target Heart Rate)

According to the American Council on Exercise, if you suddenly stop after doing exercise that gets your HR up you can be at the risk of getting blood pooling syndrome (BPS). During strenuous activity, your heart sends blood to the muscles because of their increased need for oxygen and nutrients. The blood vessels in your legs and feet expand causing more blood to flow into your lower extremities. BPS is when you suddenly stop without taking time to cool down causing your HR to drop abruptly. This can cause blood to stay and pool in your lower body instead of circulating back to the heart which can cause dizziness and fainting.

The risk is greater for serious athletes because their HR is slower and their veins can hold more blood than the average person. Those with heart disease are also at greater risk because blood vessels leading to the heart are narrowed making it harder for blood to get to the heart.

A cool down is the best way to avoid BPS. To determine the cool down phase based on the HR achieved or the time taken as cool down considering the variables of exercisers physical fitness status as the main component and taken into consideration that subjects are healthy with no cardiovascular diseases/complications.

This paper is the first of three phases. The first phase is the data collection of how the HR decelerate with healthy subjects based on a hypothetical equation. The second phase will be comparison of healthy and subjects with cardiovascular conditions in their post-exercise HR deceleration in time and the variables of the HR deceleration. The third phase will be the meta-analysis of the deceleration variables to subjects with pathophysiology of the subjects' cardiovascular conditions.

The Recommended Elevation of HR during Exercise

The three phases of exercise are as below:

After physical activity, your heart is still beating faster than normal, your body temperature is higher and your blood vessels are dilated. Exercise-induced hypotension also identifies subjects at increased risk for ventricular fibrillation in the exercise laboratory. This means if you stop too fast, you could pass out or feel sick.

Therefore, we are to determine the HR in an estimated time (5 and 7 min) on cessation of exercise matches with the HRrtn formula.

Formulation – CP Method Calculation for the Cool Down duration to Cease Exercising

Assuming the exerciser's THR is 130 bpm (moderate level) and the RHR is 70 bpm. The difference of the elevated numbers of heart beat (THR) from the baseline (RHR) is 60 beats (130 bpm – 70 bpm) then dividing to equal half (60 bpm/2) gives the value of 30 bpm. Add this value to the RHR, its gives a final value of 100 bpm (30 bpm + 70 bpm) called as the HR return (HRrtn).

$$\{THR-RHR+RHR = HRrtn\}\ 2$$

The determined HRrtn as calculated from the formula will then be the crucial part of guide in the cool down phase but is also dependent on the time taken for each individual exerciser if they are able to acquire the numbers of HRrtn (bpm) in 5–7 min. As the HR recovery (HR recovery) is determined in the 1st- and 2nd-min post-exercise, we allowed the exerciser to cool down for 5–7 min and determine the HR at the end of 7 min.

With a constancy of time and HR of individual exerciser, we assumed that it would be safe for the exercise to completely stop their exercise session.

RESULTS

Table 1 is a summary of the various demographics profiles of the subject, such as age (32.71 ± 13.34 years old), MHR (187.29 ± 13.34 bpm), percentage of target HR (Percent_THR) (0.62 ± 0.3), target HR (THR) (116.07 ± 8.50 bpm), and HR return (HRrtn) (101.34 ± 6.78 bpm).

Table 2 is a summary of the HR response across the time of resting, exercise, and cooling down.

Pearson-product moment correlation coefficient was computed to assess the relationship between the various variables (Table 3). There were positive correlations between HR_END and HR_26 min ($r = 0.924$, $n = 83$, $P < 0.01$), HR_END and HR_30 min ($r = 0.611$, $n = 83$, $P < 0.01$). Overall, there were strong and positive correlations between HR_END and HR_26 min and moderate correlation between HR_END and HR_30 min. Decrease in exercise intensity to 50% MHR in HR_END prompted a decrease in HR and was correlated with decrease in HR_26 min and HR_30 min.

In terms of the effect of the THR on HR data, positive correlations were found between THR and HR_5 min ($r = 0.854$, $n = 83$, $P < 0.01$) after warm up stage, THR and HR_26 min ($r = 0.758$, $n = 83$, $P < 0.01$) after 1 min of cool down has elapsed, THR and HR_30 min ($r = 0.674$, $n = 83$, $P < 0.01$) post-cooling down, and THR and HRrtn ($r = 0.760$, $n = 83$, $P < 0.01$). Positive correlations were observed between THR and HR profile throughout the stages of the exercise. The modulation of the exercise intensity according to the THR was correlated to the systematic increase in warm up HR_5 min, and decrease in HR_26 min, HR_30 min and HRrtn.

Table 1: Descriptive statistics (I)

	N	Min	Max	Mean	SD	Skewness		Kurtosis	
							Standard error		Standard error
Age	83	18	65	32.71	13.34	1.123	0.264	0.112	0.523
MHR	83	155	202	187.29	13.34	−1.123	0.264	0.112	0.523
Percent_THR	83	0.55	0.65	0.62	0.03	−0.568	0.264	-0.575	0.523
THR	83	85.30	131.30	116.07	8.50	−0.761	0.264	0.942	0.523
HRrtn	83	74.10	113.80	101.34	6.78	−0.849	0.264	2.294	0.523

Table 2: Descriptive statistics (II)[a]

	N	Min	Max	Mean	SD	Skewness		Kurtosis	
							Standard error		Standard error
RHR	83	63	106	86.60	8.99	−0.135	0.264	−0.330	0.523
HR_5 min	83	74	133	113.82	9.16	−0.892	0.264	3.100	0.523
HR_10 min	83	81	135	117.71	9.13	−0.916	0.264	2.066	0.523
HR_END	83	89	141	119.77	9.40	−0.475	0.264	0.568	0.523
HR_26 min	83	78	130	108.49	9.52	−0.236	0.264	0.335	0.523
HR_30 min	83	74	113	99.67	7.71	−0.617	0.264	0.424	0.523

[a]Values tabulated are median of all trial corresponding to each subject

Table 3: Pearson-product moment correlation coefficient

Variables (I-J)		r	r^2
(I)	(J)		
HR_END	HR_26 min**	0.924	0.854
	HR_30 min**	0.611	0.373
THR	HR_5 min**	0.854	0.729
	HR_26 min**	0.758	0.575
	HR_30 min**	0.674	0.454
	HRrtn**	0.760	0.578
HR_26 min	HR_30 min**	0.720	0.518
	HRrtn**	0.745	0.555
HR_30 min	HRrtn**	0.881	0.776

**Significant at<0.01

Moderate, positive correlations were found between HR_26 min and HR_30 min ($r = 0.720$ $n = 83$, $P < 0.01$) post-cooling down and between HR_26 min and calculated HRrtn ($r = 0.745$, $n = 83$, $P < 0.01$). The low intensity cool down session showed positive correlation towards lowering the HR of the subject. In contrast, a strong and positive correlation was found between post-cooling down HR_30 min and the suggested HRrtn ($r = 0.881$, $n = 83$, $P < 0.01$). This indicated that the administration of the exercise regime brought about a highly correlated outcome to the calculated HRrtn.

The response of THR_Target, HRR_Target, and HRrtn_Target is cross-tabulated with the corresponding age groups. THR_Target denotes the HR response at the 5th-min mark of exercise. In this mark, the subject is expected to reach the warmed-up stage according to the intensity administered. HRR_Target denotes the HR recovery state at the 26th min mark, 1 min after the end of the exercise stage. The expected HR reduction is at least 12 bpm or higher. HRrtn_Target is denoted by the equation in the previous section. The subject should attain the suggested level of HR response as stated in HRrtn (Table 4).

In the 18–24 years old age group, there were an even split of 18.1% each between the percentage of subjects who attained the THR_Target. About 2/3 of the subject were able to recover more than 12 bpm across all three intensity of exercise. Similar outcome was recorded; where 19 out of the 30 managed to recover on the 30th min mark to at least the level of HRrtn.

In the 25–31 years old age group, there was a close split of just over half (12.0%) of subjects who attained the missed out on THR_Target, where most of it came from the 65% intensity. Similarly, about 2/3 of the subject were able to recover more than 12 bpm across all three intensity of exercise. Significant outcome was recorded; where 15 out of the 19 managed to recover on the 30th-min mark to at least the level of HRrtn.

In the 32–38 years old age group, slight higher percentage (8.4%) of subjects was unable to reach the THR_Target, coming from 60 and 65% intensity. Similarly, about 2/3 of the subject were able to reach the HRR_Target and HRrtn_Target with almost identical outcomes. Compared to other age groups, almost identical outcome were observed in THR_Target (higher

Table 4: THR_Target, HRR_Target, HRrtn_Target and Age_Cat Cross Tabulation

Age	18–24 years old			25–31 years old			32–38 years old			39–45 years old			46–52 years old			53–59 years old			60–66 years old			Total
	Yes	No	Sum	Yes	No	Sum	Yes	No	Sum	Yes	No	Sum	Yes	No	Sum	Yes	No	Sum	Yes	No	Sum	
THR																						
55%	2	0	2	1	1	2	1	0	1	0	0	0	0	0	0	0	0	0	0	1	1	6
60%	10	12	22	5	1	6	2	3	5	0	3	3	0	0	0	0	1	1	0	0	0	37
65%	3	3	6	3	8	11	2	4	6	2	1	3	2	2	4	3	3	6	1	3	4	40
N	15	15	30	9	10	19	5	7	12	2	4	6	2	2	4	3	4	7	1	4	5	83
%	18.1	18.1	36.1	10.8	12.0	22.9	6.0	8.4	14.5	2.4	4.8	7.2	2.4	2.4	4.8	3.6	4.8	8.4	1.2	4.8	6.0	100
HRR																						
55%	2	0	2	1	1	2	1	0	1	0	0	0	0	0	0	0	0	0	1	0	1	6
60%	14	8	22	5	1	6	4	1	5	2	1	3	0	0	0	1	0	1	0	0	0	37
65%	5	1	6	6	5	11	3	3	6	0	3	3	1	3	4	1	5	6	3	1	4	40
N	21	9	30	12	7	19	8	4	12	2	4	6	1	3	4	2	5	7	4	1	5	83
%	25.3	10.8	36.1	14.5	8.4	22.9	9.6	4.8	14.5	2.4	4.8	7.2	1.2	3.6	4.8	2.4	6.0	8.4	4.8	1.2	6.0	100
HRrtn																						
55%	1	1	2	2	0	2	1	0	1	0	0	0	0	0	0	0	0	0	1	0	1	6
60%	12	10	22	5	1	6	3	2	5	2	1	3	0	0	0	1	0	1	0	0	0	37
65%	6	0	6	8	3	11	4	2	6	1	2	3	2	2	4	5	1	6	3	1	4	40
N	19	11	30	15	4	19	8	4	12	3	3	6	2	2	4	6	1	7	4	1	5	83
%	22.9	13.3	36.1	18.1	4.8	22.9	9.6	4.8	14.5	3.6	3.6	7.2	2.4	2.4	4.8	7.2	1.2	8.4	4.8	1.2	6.0	100
THR	37	46																				
HRR	50	33																				
HRrtn	57	26																				

Table 5: Percent_Cat and THR_30 min_Return_Cat Cross Tabulation

	Percent_Cat				
	55%	60%	65%	Total	%
THR_30 min_Return_Cat					
≥1 bpm	5	23	29	57	68.7
≤−1 bpm	1	14	11	26	31.3
N	6	37	40	83	100.0
%	7.2	44.6	48.2	100	

negative rate at 60%) and HRR_Target (higher negative rate at 65%) in 39–45 age group; THR_Target and HRrtn_Target (even) in 46–52 age group; THR_Target and HRrtn_Target (even) in 60–66 age group. 53–59 age group showed negative responses in both THR_Target (4.8%) and HRR_Target (6.0%); however, positive outcome was observed in HRrtn_target (7.2%), where most of it came from the 65% exercise intensity.

Overall, only 37 out of 83 (44 6%) managed to reach the THR_target. In contrast, 60.2% (50 out of 83) managed to recover sufficiently at HRR_target. Likewise, 68.7% (57 out of 83) reached HRrtn_Target level after 5 min of low intensity cooling down.

Table 5 is a summary of the distribution of the relation between the exercise intensity and the HR response at 30 min mark. Positive responses of various percentages where obtained using the exercise intensity above. Overall, the response of the subject to the exercise is evident by the success rate of recovering to the HRrtn level.

DISCUSSION

With this guide of HRrtn, we are furthering our studies to:

a) Determine the time difference taken to arrive at the HRrtn for trained and untrained healthy subjects.
b) Determine the time taken to arrive at the RHR (pre-exercise level).
c) Cross examine the HR of the exercisers based on the variables of age factor and general cardiovascular fitness level.

Base on the similarity of the tabulation of exercisers' HR and the formulation value, we recommend that exercisers can cease their exercise session on their HR reaches the HRrtn value as a guide.

CONCLUSION

The cooling down as part of the physical activity regime should be executed in a proper protocol to avoid discomfort and even sudden death though is remotely reported. This paper was not only benefits exercisers but through the fitness and health industry, the time taken was from warming up to end of exercise and cooling takes only 30 min which normally all exercisers are allowed to use the cardio machine. As we have demonstrated the entire exercise regimes takes no more than 30 min, it would be also justifiably to encourage busy individuals to exercise with a correct dosage and the right protocol.

Calculation of the HRrtn is simple and easily apprehensible.

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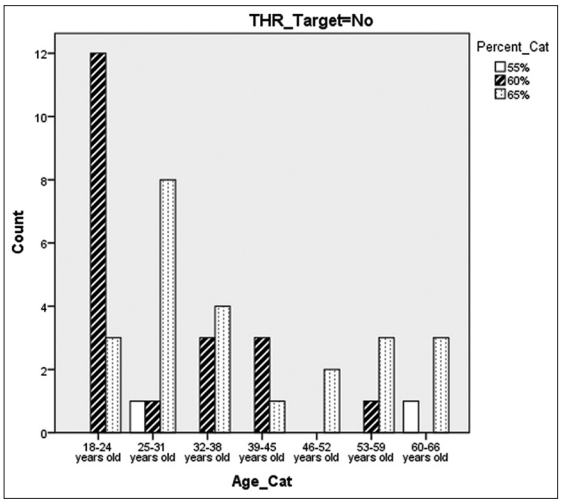
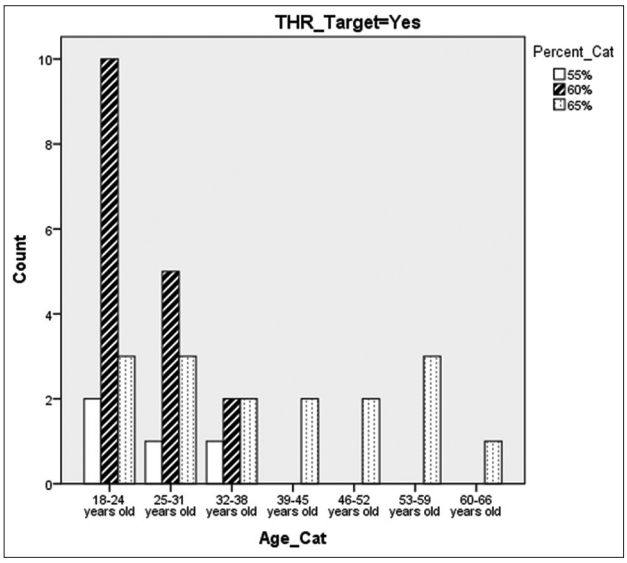
APPENDICES



Appendix 1: THR_Target, Percent_Catand Age Cat Cross Tabulation (No)



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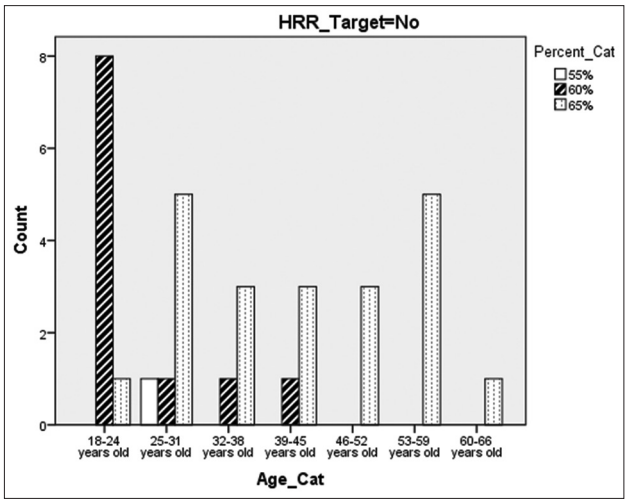

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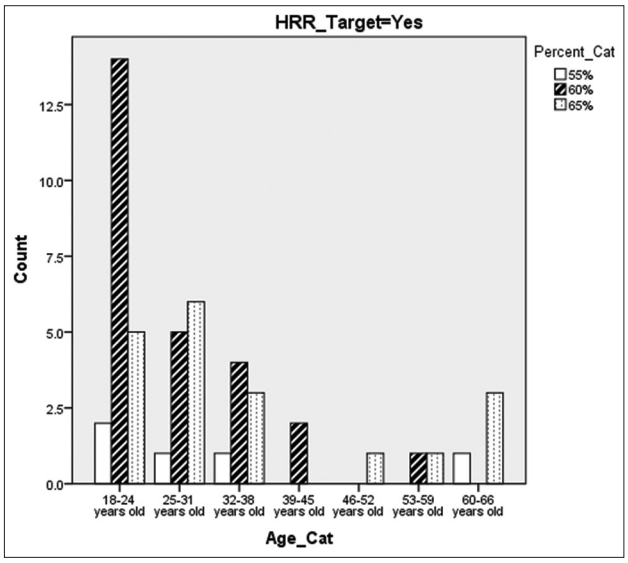

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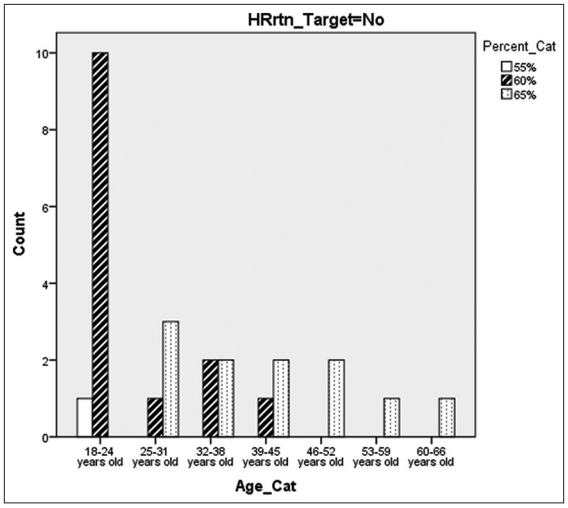
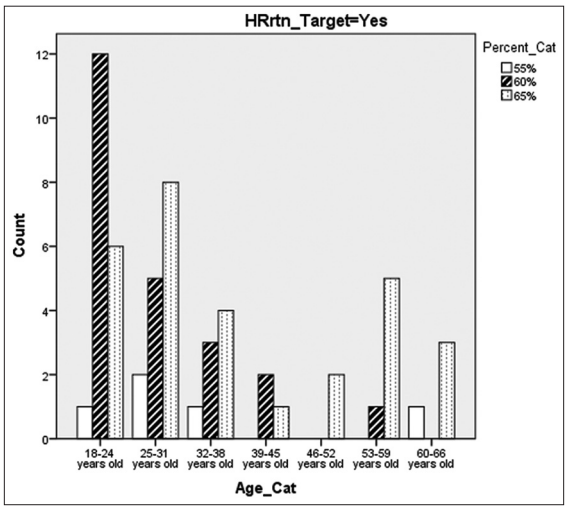
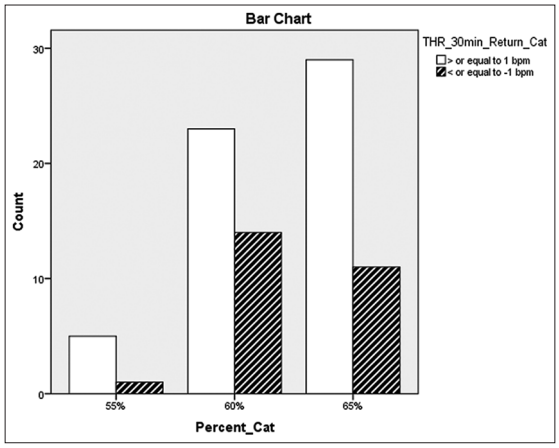


Appendix 5: HRrtn_Target, Percent_Catand Age_Cat Cross Tabulation (No)



Appendix 6: HRrtn_Target, Percent_Catand Age_Cat Cross Tabulation (Yes)



Appendix 7: Percent_Cat and THR_30 min_HRrtn Cross Tabulation

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Research Article

Analysis of physical and motor fitness of under 14 year old boys from Hardoi district of Uttar Pradesh

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ABSTRACT

Motor fitness, a subset of physical fitness, refers to an individual's capacity to do a motor task or movement activity, and it is a component of overall physical fitness. This research aims to determine the levels of physical and motor fitness possessed by males who are enrolled in secondary education compared to specific established criteria. As research participants, a total of 150 boys under 14 were chosen to participate in the study. These boys came from sixth to ninth class. The components include a 50-meter dash for determining acceleration and speed, a 4 × 10-m shuttle run for speed and agility, a standing broad jump for determining the explosive power of the legs. Every one of the examinations went according to plan as established. The data that were acquired were examined by making use of the proper statistical methods. According to the study's findings and considering the research's constraints, speed, agility, and explosive power of the school-aged boys all increase from Class 6–9.

Keywords: Acceleration, Athletics, Motor fitness, Physical fitness, Speed

INTRODUCTION

There are many studies for evidence that being physically active lowers the risk of death and disability from a number of chronic conditions. Being physically fit is equated with having the capacity to exert effort. Human flourishing encompasses many different dimensions, including but not limited to bodily health, emotional well-being, social integration, intellectual acuity, and career success.[2,3] Overall health and wellness include physical fitness. It is a measure of someone's physical capacity to accomplish some task. To be physically fit, one must focus on improving their body's biological function.[4-7] Hence, fitness in the gym is also a measure of your physiological and biological health. Physical fitness includes the ability to move efficiently. The ability to do a motor task or move in some way is indicated.

According to Barrow, "motor fitness" is "a readiness or preparation with specific respect for major muscular action without excessive tiredness.[1]" Motor fitness includes many abilities, including speed, strength, stamina, pliability, agility, balance, coordination, and more. Synonymous with "neuromuscular coordination," this is the ability to control one's muscles effectively.

Due to the multifaceted character of motor fitness, a single test cannot adequately measure it. Different tests are used to evaluate various aspects of motor fitness.[8] There are a number of motor fitness tests that may be used to determine an individual's overall level of motor fitness. A motor fitness test battery is a group of several types of motor fitness tests used together. Various motor fitness tests are combined to form well-known "batteries" for assessing one's physical fitness.[10,11]

Similar to the Barrow Motor Ability Test, battery consists of tests such as standing wide jump, jig-jag run, and medicine ball component, the AAHPERD YOUTH FITNESS TEST battery is made up of six tests: pull-ups, standing broad leap, a 50-yard run, and a 600-yard run and walk.[9]

Exercise, age, sex, diet, and other lifestyle choices all have a role in a person's motor fitness level. Numerous studies have been conducted on the topic of physical fitness, with a focus on the effects of age, gender, and other characteristics.[5] The current research followed a similar line of inquiry by examining how boys' motor fitness evolved. Because physical

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fitness is a prerequisite for most activities a man must do in his everyday life, any nation has to encourage its citizens to become physically fit. A dysfunctional person is a drain on society. All occupations, including those of student, doctor, engineer, scientist, politician, and athlete, demand a high level of health and fitness. The current research aims to determine how physically fit are the boys under 14, when compared to a set of norms.

FITNESSLEVEL TESTING METHODS

One hundred and fifty boys under 14 were randomly picked from 6th to the 9th standard. They were from different schools in Hardoi, Uttar Pradesh. They mainly hailed from lower-class households. Some aspects of motor fitness, such as acceleration and velocity, were quantified. A 50-m sprint and 40-m shuttle runs a standing wide leap to test leg explosiveness to test overall stamina. As is customary, we systematically conducted all of our tests. The tests were performed on an authentic grass field. The current investigation made use of a variety of instruments and apparatus to compile its data. A body composition analyzer using a weighing machine.

50 m Dash

The mean duration for the 50-m dash for boys in Class 6 was 8.52 s, and this figure dropped for boys in Class 9. This signifies a progressive increase in speed from Class 6 to class 9.

Standing Broad Jump

The mean standing broad jump distance for males in Class 6 is 1.90 cm, which increases for Classes 9. The leg's explosive power has risen from Class 6 to Class 9.

4×10 m Shuttle Run

The mean duration for a shuttle run in Class 6 was 11.78 s. From Class 6 to Class 9, this number went down. The run included weight measurement, a tape to measure height and distance, a stopwatch to measure time, two wooden blocks for the shuttle run test, a jumping pit for the standing broad jump test, and other things such as a whistle, cone, and rope. The mean was used to figure out what was most common. Standard deviation was used to figure out how different things were. The t-test was used to figure out how significant the difference between the two means was. This means that agility gets better from Class 6 to Class 9.

Table 1: Mean and SD of different age group based motor fitness components

Class	50 m dash	Standing broad jump	4×10 shuffle Run (s)
6	8.52±0.54	1.90±0.18	11.78±1.68
9	7.25±0.45	2.20±0.15	10.51±0.53

T-VALUE

The t-test was employed to determine whether or not the observed improvements in motor fitness were statistically significant.

The mean is evaluated using:

$$\bar{X} = \frac{\Sigma x}{N},$$

And standard deviation

$$SD(\sigma) = \sqrt{\frac{(x-\bar{x})^2}{N}},$$

Then t-test is evaluated as:

$$t = \frac{\left(\overline{x1} - \overline{x2}\right)}{\sqrt{\frac{\sigma_1^2}{N_1} + \frac{\sigma_2^2}{N_2}}}$$

50 m Dash

The *t*-value for the difference between Class 6 and 9 was more than the necessary value at the 0.05 level with 78° of freedom. The difference was not statistically significant in the other situations. As a result, it became clear that Class 9 athletes had far more success in the 50-m sprint than their Class 6 counterparts.

Standing Broad Jump

It can be observed that the *t*-value for the distinction between Classes 6 and 9 was more than the minimum table value of 0.05, with 78° of freedom.

As a result, it was clear that the standing broad jump performance in Class 9 was noticeably more impressive than in Class 6.

Table 2: *t*-value for 50 m dash

Class	Mean	Difference	*t*-value
6	8.52	0.42	3.43
9	7.25	0.25	2.75

Table 3: *t*-value for standing broad Jump

Class	Mean	Difference	*t*-value
6	1.92	0.11	3.07
9	2.20	0.04	0.17

Table 4: *t*-value for Shuttle run

Class	Mean	Difference	*t*-value
6	11.78	0.56	2.25
9	10.50	0.02	0.03

Shuttle Run

When comparing Classes 6 and 9, it was discovered that the *t*-value had a level of significance that was more than the permissible table value at the 0.05 level for 78° of freedom. The transition between 6th and 9th grade is illustrative of this phenomenon. This demonstrated that Class 9s shuttle run performance was much higher than that of Class 6.

Discriminatory functions for student categorization are discussed in the context of the results obtained. The previous research has shown a favorable correlation between mental and motor development trajectories, and this study adds to the body of data suggesting that motor development is also favorably associated with academic performance. This suggests that children with well-developed motor skills may have improved cognitive function and academic performance, an idea supported by the previous research. Many factors, including anatomy, climate, altitude, diet, the surrounding environment, and way of life, contribute to a person's physical fitness or motor ability, Personality traits, psyche, etc. from Class 6 to 9, the performance improved dramatically in terms of speed. The standing broad jump dramatically increased performance from Class 6 to Class 9.

CONCLUSIONS

Based on the findings and considering the scope of the research, it seems that male students' pace improves from 6th to 12th standard. From sixth class onward, a boy's ability to put out force with his legs grows. Between the sixth and ninth class, males under 14 substantially improve their agility. This is the first point after which the train's momentum stops growing. School-aged boys' abdominal muscle strength improves from sixth to ninth class. Generally speaking, a boy's stamina improves from sixth class to ninth class.

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Research Article

Characteristic and correlations between somato type with the performance of elite junior female swimmers

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ABSTRACT

The aim of the study was to evaluate the correlations of the somatotype variables with freestyle performance of six elite junior female swimmers (mean ± SD: age 15.33 ± 1.63 years, height 158.8 ± 4 cm, and weight 57.1 ± 4.4 kg). The subject volunteered for participating in this study, which was approved by Ho Chi Minh city Sports University and Ho Chi Minh city National Sports Training Center. Result showed that there were very high negative correlations between freestyle performance and Meso (r = −0.836–−0.911), were significant different $P < 0.05$. There were not correlations significant different $P > 0.05$ of freestyle performance with Endomorphs (r = 0.385–0.636) as well as with Ectomorphs (r = −0.372–−0.567). These findings indicate that Mesomorphs variable should be used to evaluate the effects of training and to predict performance for junior female swimmers.

Keywords: Correlation, Somatotype, Mesomorphs, Ectomorphs, Endomorphs

INTRODUCTION

First data on human somatotype, or constitution, originate from the time of ancient Greece, from Hippocrates (460–377 BC). The Roman physician Galen in the first century AD also addressed issues of the constitution. Significant scientific names who have addressed the issue of the constitution in the 19th and 20 century are Rosten and Sigaud (French School), De Giovanni, Viola and Pende (Italian School), and Conrad Kretschmer (German School), Sheldon, Rice and Ejzenk (American School) and Černorcki, Serebrovskaja and Krylov (Russian school) (Raković, 2015). The above authors and some others who will not be mentioned here contributed to the emergence of currently valid and commonly applied Heath-Carter method for the determination of human somatotype. The data on the three components of somatotype, endomorphic, mesomorphic, and ectomorphic 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 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).

According to Faulkner (1967), "Body structure can play an important part when determining the swimming performance level." Somatotype is a structural factor when increasing the aerobic preparedness and may be helpful when identifying the talented individuals for long-distance swimming disciplines (Chaquachi, 2005). However, it is not simple to exactly determine the influence of the somato type training interaction effect on the aerobic capacity factors.

According to Smerecká (2014), swimming performance is mostly determined by the anatomic factors, such as the body dimensions and proportions, water resistance influenced by the size of a body intersection, the appropriate strength, especially that of arms, and torso, explosiveness (short distances) and endurance abilities (long distances). Smerecká (2014, cited in Grasgruber and Cacek, 2008) notes "Mastering the swimming technique and coordination of movements is important, along with the flexibility of a shoulder joint (backstroke, front crawl and especially butterfly), femoral joint, ankle, and

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torso." "Timely determination of the somatotypes of athletes helps to improve their performance and body development according to their needs, especially according to the individual sports and disciplines" (Nigam, 2011). Smerecká (2014, cited in Urban and Kandráč, 2012) "Certain somatotypes have particular morphological predispositions for kinetic activity, whereas the variety of reactions to a physical load provides diversified outcomes, so it is manifested with various somatotypes miscellaneously". Hence, finding correlations between somatotype variables and swimming performance is necessary to evaluate the effects of training as well as to predict performance for junior female swimmers.

METHODS

Six elite females junior swimmers (mean ± SD: age 15.33 ± 1.63 years, height 158.8 ± 4 cm, weight 57.1 ± 4.4 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 Sports Training Center. These swimmers had average 5–6 years experienced. 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 (epicondylar humerus and femur), and two limb girths (arm flexed, tensed, and calf). The following descriptions are adapted from Carter *et al*., (1990). Further details are given by Ross and Marfell-Jones (1991), Carter. L (1996), Ross, Carr, and Carter (1999), Duquet and Carter (2001), and the ISAK Manual (2001). To gain the data, we used a standard Martin anthropometric set, consisting of scales, a little adjustable caliper, a skinfold caliper measuring and a rolling meter. The anthropometric somatotype variables and the 100 m, 200 m, and 400 m freestyle performance were measured in the pre- and post-training year cycle.

Statistical Analysis

The data were analyzed using descriptive statistics for somatotype and performance variables. Pearson correlation coefficient (r) was analyzed for finding the correlation of somatotype variables with the 100 m, 200 m, and 400 m freestyle performance. Statistical analysis: SPSS was used to apply formulas statistical by calculating: average, standard deviation, and correlation.

RESULTS

The result showed that having a change in Endo indices after a training year cycle, most of the athletes are on the Ectomorphic–Mesomorph category of the somatochart, the mean somatotype variables were 2.58-3.83-3.08. Endo category was significant different $P < 0.05$, Meso and Ecto were not significantly different $P > 0.05$after training year cycle.

The result in Table 2 showed that: The subject's somatotype is in the Ectomorphic – Mesomorph category of the somatochart, mean somatotype variables were 2.58-3.83-3.08. There were very high negative correlations between freestyle performance and Meso (r = −0.836–−0.911), were significant different $P < 0.05$. The result also revealed that there were not correlations significant different $P > 0.05$ of freestyle performance with Endomorphs (r = 0.385–0.636) as well as with Ectomorphs (r = −0.372–−0.567).

DISCUSSION

The main finding of this study was that correlations coefficient between somatotype variables and the 100 m, 200 m, and 400 m freestyle performance. Only there were very high correlations between freestyle performance and Meso variable (r = −0.836–−0.911). According to Carter-Ackland (1994), in endurance and strength-speed sports, the body fat values are lower when compared to sports, in which the training is focused on kinetic abilities**.** According to Sprague (1976), the somatotypes of swimmers in various specializations. The differences were determined not only between the swimming disciplines but also between the swimming distances. 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." According to Ackland (2009) for swimmer measured at the 1991 World Swimming Championship, the swimmer's somatotype was 2-5-3, which placed these athletes in the Ectomorphic – Mesomorph category of the somatochart. This group was characterized by a low level of adiposity, moderate-to-high musculoskeletal robustness and moderate linearity. Most studies on high-level swimmers during the

Table 1: Somatotype variables of subjects and changes over a training year cycle

Somatotype variables	Post season		Change	*P*-values
	X̄	±SD		
Endo	2.58	±0.58	−0.75	0.001*
Meso	3.83	±0.93	1.5	0.08
Ecto	3.08	±0.2	0.17	0.576

Table 2: The correlations coefficient (pearson) between the somatotype variables and the 100 m, 200 m, and 400 m freestyle performance

Performance	Endo	Meso	Ecto
100 m	0.636	−0.911*	−0.555
200 m	0.533	−0.890*	−0.567
400 m	0.385	−0.836*	−0.372

Note: *. Sig<0.05

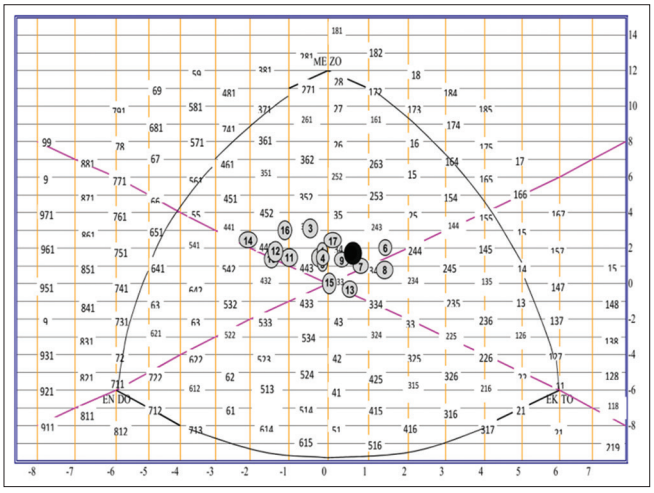

Figure 1: Mean somatotype chart of world elite swimmers were counted by Carter (1990 – gray point) and Vietnam junior female swimmers (2017 - blackpoint)

Note 1: Mexico City Olympics (1968); 2: Moreal Olympics(1976); 3: Munich Olympics(1972); 4: Venezuela (1981); 5: Brazil(1975); 6: Manchester club(1977); 7: Austin, club (1982); 8: Meleski *et al*.; 9: Chula Vista club (1976); 10: San Diego State University (1976); 11: San Diego State University (1978); 12: San Diego State University (1980); 13: Belgium (1981); 14:Ontario, University; 15: Ontario, Club (1980); 16: Bolivar Games (1981); 17: Cuba (Alonso,1986)

past 20 years have revealed the similar result. William (1993) studied on 43 collegiate female sprint swimmers showed that there were moderate correlations between 100 yard event times and Meso (r = 0.392); Ecto (r = 0.441) were significantly different $P < 0.05$.

Somatotype of Word Elite Swimmers (Carter, 1990) and Vietnam elite junior female swimmers (2017) is demonstrated in Figure 1.

Figure 1 demonstrates the Vietnam junior female swimmer's characteristic of somatotype is consistent with the somatotype of World elite swimmers (Carter, 1990). There was not big difference in somatotype of World elite swimmers (from 1968 to 1986) and Vietnam junior female swimmers (2019).

CONCLUSION

The result of the present study showed that having a change in Endoindices after a training year cycle, most of the athletes are on the Ectomorphic–Mesomorph category of the somatochart, the mean somatotype variables were 2.58-3.83-3.08. This data recorded the high correlation between freestyle performance (100 m, 200 m, and 400 m) and Meso (r = −0.836–−0.911); therefore, Mesomorphsvariable should be used to evaluate the effects of training and to predict performance for junior female swimmers. There were no correlations significantly different ($P > 0.05$) between 100 and 400 m freestyle performance and Endomorphs (r = 0.385–0.636) and Ectomorphs (r = −0.372–−0.567).

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Research Article

The proposed some perspectives on the development of physical education and sports for ethnic minorities in the northern mountainous region in Vietnam

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ABSTRACT

The article investigated and proposed some perspectives on the development of physical education and sports for ethnic minorities in the northern mountainous region in Vietnam, to create a scientific basis for proposing solutions, policies on physical strength development, contributing to improving the quality of human resources for ethnic minorities in the northern mountainous area in Vietnam by 2030.

Keywords: Ethnic minorities, Perspective, Physical strength

STATEMENT OF THE PROBLEM

The state of Vietnam has many specific policies to encourage and support ethnic minorities in healthcare and physical development.[1] Besides the achieved results, the policies on physical education and sports development for ethnic minorities still have certain limitations, directly affecting the physical development process and the quality of human resources of the ethnic minorities. Therefore, proposing a perspective on physical development for ethnic minorities in general and ethnic minorities in the North of Vietnam in particular is identified as an urgent issue. This proposal will create a scientific basis for solutions and policies to develop physical training and sports, contributing to improving the quality of human resources of ethnic minorities by 2030.[2]

RESEARCH METHODS

The study used the method of document analysis and synthesis. The documents included: Legal documents, research results of domestic scientific works on physical education, and sports development for ethnic minorities in Vietnam.

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RESEARCH FINDINGS AND DISCUSSION

From the research results and analysis of the current situation of sports development of ethnic minorities as well as policies related to physical development of ethnic minorities, we proposed some points of view as followed:

View point 1. The policy on physical training and sports development for ethnic minorities in the northern mountainous region of Vietnam is influenced by both direct and indirect factors. The direct factors are awareness, medication, healthcare, and sports. The indirect factors are education-training and socioeconomic development, hunger eradication, and poverty reduction.

There are many factors affecting the development of physical training and sports for ethnic minorities. However, it is necessary to identify the direct and indirect factors. In particular, among the factors, it is also necessary to identify those that need to be prioritized and there should be a clear plan, avoiding generalization and spreading. At the same time, it is also necessary to take into account the synchronicity of the factors. For example, exercise, and sports must be associated with a nutritional balance to have a positive impact on physical fitness, but ensuring nutrition depends on socioeconomic conditions, hunger eradication, and poverty reduction.

View point 2. Developing physical fitness for ethnic minorities is the national development task, contributing to the realization of the aim "Equality, respect, solidarity, harmonious settlement of relations among ethnic groups, and helping each other develop."

It is time for the State of Vietnam to unify the awareness and consider the physical development and stature of ethnic minorities as the central task, basic, and urgent strategy of the nation. It needs to be done in parallel with the task of socioeconomic development because of the dialectical relationship between these two issues. It is necessary to define that the development of physical training and sports is the development of physical strength and build for ethnic minorities, which is an important content in the national policy and legal system and must be institutionalized in programs, schemes, projects, and policies for the development of ethnic minorities and mountainous areas in the coming years; considering this as one of the most important goals in human development, contributing to the realization of the goal of "Equality, respect, solidarity, harmonious settlement of relations among ethnic groups, and helping each other develop" as the Document of the 12th Party Congress determined.

View point 3. Developing physical training and sports for ethnic minorities in the northern mountainous area of Vietnam must take the internal strength and starting point of each ethnic group as the basis and foundation; common ground in physical fitness as a goal and cultural, human, natural, and socioeconomic conditions of each ethnic group as important tools for development.

The actual situation of ethnic minorities in the northern mountainous region of Vietnam shows that in addition to the common characteristics of ethnic minorities have its own characteristics, associated with geocultural, geopolitical, and geoeconomic characteristics. Among ethnic minorities, there are ethnic groups that have approached general development of the whole country, but there are also a large number of ethnic groups who are in very difficult conditions. Although it can be said that developing the physical strength and stature of ethnic minorities is a basic and urgent national task, it needs to be carried out in a careful and methodical manner, with a suitable plan, steps, and manners of impact for each ethnic group, each region, and each period. It is necessary to agree on the viewpoint that developing physical strength is based on internal resources, capabilities, and conditions of each ethnic group and each region, considering those as the basis and foundation. The goal is to approach the common ground of the whole country, but not to impose, be subjective, hasty, and use external forces to replace internal forces, but to be based on culture, people, natural conditions, and socioeconomic factors of each ethnic group, considering these factors as important tools to solve the problem of developing sports for ethnic minorities in the northern mountainous area of Vietnam.

View point 4. Considering socioeconomic development as a key decisive task and a breakthrough which should be given priority in order to promote and develop the physical strength of ethnic minority people, and vice versa, take physical development to develop socioeconomy in ethnic minority and mountainous areas.

Obviously, economic development, improvement of the living standards of ethnic minorities are the breakthrough, key, and decisive solutions to the development of physical strength of ethnic minorities. Simultaneously, it is necessary to quickly solve social problems that do not actively affect the development of sports among ethnic minorities such as: Drug addiction, alcoholism, child marriage, inbreeding marriage, negative customs, and habits in social life. These are two sides of the same problem, which have a reciprocal effect on each other. Socioeconomic development creates important conditions for the development of physical training and sports movements among ethnic minorities, thereby improves physical fitness and improving physical fitness will have a positive impact on economic development. When the society is developed, including socioeconomic development, it will lead to positive changes in awareness and education level, then the ethnic minorities themselves will know what they have to do to improve the quality of life for themselves, including maintaining and developing the sports movement.[3]

View point 5. Development of physical training and sports for ethnic minorities in the northern mountainous area of Vietnam needs to have a focus, which is on: Reproductive health, maternal and child health, and the health of the young generation; ethnic minority areas with difficult and extremely difficult socioeconomic conditions, poor physical condition, and ethnic minorities with a small population.

In the context of economic and social development of slow ethnic minorities, poverty is still an unresolved problem; the physical strength and stature of ethnic minorities in this area is lower than the common ground, with the condition of limited national resources, many tasks that needs priority, the approach to and solving of the problem of sports development for ethnic minorities needs special attention with the viewpoint "Focused development." It is still necessary to have a comprehensive strategy that comprehensively addresses all issues and solutions to develop physical training and sports of ethnic minorities. In a series of issues that need to be selected, it is necessary to identify the "key points" so that when we use the policies "to activate" the "key points" it will bring about positive outcomes, positive impact, creating the highest efficiency and effectiveness. With that requirement, and at the same time basing on the current situation of physical training and sports movements of ethnic minorities in the northern mountainous area of Vietnam, the focus in development is: Reproductive health, maternal and child health, and the health of the young

generation; ethnic minorities with difficult and extremely difficult socioeconomic conditions; ethnic minorities with a small population. These are the aspects that, when solved well, will have a great impact in the context of limited resources of the state.[3,4]

View point 6. Developing physical training and sports for ethnic minorities in the northern mountainous area of Vietnam is the responsibility of the party committees, authorities, organizations, social organizations, community, and the entire people of different ethnic groups in which the state has the leading role (promulgating mechanisms and policies and ensuring the budget; mobilizing and effectively using resources; providing services for the development of sports to improve physical strength, and stature of ethnic minorities...).

Given the characteristics of Vietnam political institutions, the leadership role of the party is very important. Recognizing the important role of sports development for ethnic minorities in the northern mountainous areas of Vietnam is a must, but that awareness must be transformed into specific mechanisms and policies; developing physical training and sports for ethnic minorities to contribute to improving the quality of human resources of ethnic minorities. Before becoming specific mechanisms and policies, awareness needs to be transformed into guidelines of the party. Party committees from central to local levels (especially localities with a large number of ethnic minority people) need to define physical development of ethnic minority people as a regular responsibility of political and social organizations in the area. When the directive on physical development of ethnic minorities is included in the Party's resolution, local governments will have the basis to institutionalize it into policies; programs and projects on physical development of ethnic minorities. Thus, to develop the physical strength of the ethnic minorities, it is necessary to have the involvement of agencies, in which the party, with the leading role, gives the policy of leadership and the state and the authorities have the responsibility to implement specific policies.[4]

CONCLUSION

In the process of establishing solutions and policies to develop physical training and sports, contributing to improving the quality of human resources of ethnic minorities in the northern mountainous areas of Vietnam by 2030, it should be based on the viewpoint that the physical development of ethnic minorities is influenced by factors, both direct (awareness, medication, health care, physical education, and sports) and indirect (education-training and socioeconomic development, hunger elimination, and poverty reduction). Developing physical training and sports for ethnic minorities is the national development task. There must be a suitable plan, steps and manner of impact taking socioeconomic development as a central task with priority. At the same time, it is necessary to stimulate the sense of responsibility of party committees, authorities, organizations, social organizations, communities, and ethnic minority people to develop the physical education and sports movement, thereby contributing to improving the physical strength and stature of ethnic minorities.

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Research Article

Rehabilitation strategies to reduce delayed onset muscle soreness in disabled athletes

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ABSTRACT

Purpose: Delayed onset muscle soreness (DOMS) is common symptops in both elite and amateur athletes. The degree of presentation can range from muscle tension to serious pain. There are still many unanswered questions regarding muscle soreness, particularly with regard to disabled athletes, and the dosage combination of rehabilitative measures. **Objects:** Seven disabled athletes participated in this study (four powerlifters and three throwers). All athletes signed an informed consent document and this research was approved by the Scientific Board of Hochiminh City University of Sport. **Methods:** The rehabilitation program is 8-week long consists of active training and stretching exercises, sport massage, hot and cold sauna, and high intensity laser therapy. **Results:** The 3/4 powerlifters and 3/3 throwers have a Visual analog scale pain scale of <1 point, which means that the athlete is almost back to normal after the rehabilitation program. **Conclusion:** It can be concluded that by using the designed rehabilitation program, we found the less muscle pain or DOMS has been reduced. Evidence suggests that a combination of therapies, used appropriately, is beneficial in significantly reducing muscle soreness. Para-athletes and coaches who have adopted a treatment program should know that what they expect the positive effects of the program have paid off.

Keywords: Delayed onset muscle soreness, Disabled athlete, DOM, Power lifter, Rehabilitation, Thrower

INTRODUCTION

Delayed onset muscle soreness (DOMS) is common symptops in both elite and amateur athletes. The degree of presentation can range from muscle tension to serious pain. The mechanism, therapeutic effect, and relevance to athletic performance are controversial, and this can happen in any athlete. DOMS is most common at the beginning of a new training cycle or when athletes are returning to training after a period of inactivity. Muscle aches also occur with a change in the mode or type of movement at any time of the year. Eccentric activities cause microtrauma with greater frequency and severity than other types of muscle activity. Exercise intensity and duration are also important factors in the onset of muscle soreness. Several theories have been put forward for the mechanism of muscle soreness, namely: Lactic acidosis, muscle spasms, connective tissue damage, muscle damage, inflammation, and enzyme drainage theories. However, the integration of two or more theories has the potential to explain muscle soreness. DOMS can affect exercise performance by reducing joint range of motion, shock, and peak torque. Changes in muscle sequence and movement patterns can also occur, causing unfamiliar stress on ligaments and tendons. These compensatory mechanisms may increase the risk of further injury if attempting to return to exercise early.

Active movements, stretching, and massage have shown different effects according to the technique, duration of application, or the combined dose used. Cryotherapy, heat therapy, ultrasound, and electromagnetic or laser therapy have demonstrated varying effects in reducing muscle pain or symptoms of muscle soreness or in rehabilitation. Active exercise is the most effective pain reliever during times of muscle soreness, but the pain relief is only temporary. Athletes who must train daily should be encouraged to reduce the intensity and duration of their workouts for 1–2 days after an intense workout that causes muscle soreness. In addition, exercises that target the least affected body parts should be encouraged to allow the most affected muscle groups to recover. Specialized exercises or new activities should be introduced gradually over a 1 or 2 week period at the beginning or during the training season or cycle to reduce the degree

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of physical impairment or training interruption. There are still many unanswered questions regarding muscle soreness, particularly with regard to disabled athletes, and the dosage combination of rehabilitative measures.

METHODS

Seven disabled athletes participated in this study (four powerlifters and three throwers). All athletes signed an informed consent document and this research was approved by the Scientific Board of Hochiminh City University of Sport.

Athletes completed a questionnaire about their body status during a week of training with visual analog scale (VAS), the levels of muscle soreness ranged from 0 to 10 points. The survey was repeated after the application of rehabilitation measures.

The rehabilitation program is 8-week long consists of active training and stretching exercises, sport massage, hot and cold sauna, and high intensity laser therapy (HILT):

Active training and stretching exercises were applied in each training day with 20 min at the last training session.

Athletes received 30 min of sport massage 3 times per week by physiotherapists: 5 min of effleurage (stroking), 5 min of petrissage (kneading), 5 min of tapotement (provide energy and stimulation to the athlete's muscle tissues), 5 min of friction massage (creating an inflammatory response, thus breaking down and separating scar or adhered tissues), 5 min of tapotement (percussion) and 3 min of vibration (shaking the target muscle groups, a movement that promotes relaxation and improved circulation), and 2 additional minutes of effleurage.

Dry sauna and wet sauna were set at 45°–50°C for 10 min each and cool water immersion Jacuzzi was set at 15°–20°C for 15 min, for those scheduled twice per week.

The HILT (iLux XP-30W made in Italia) was used twice weekly recommended by World Association of Laser Therapy with biostimulation at 20 W for 8 min per spot and reduce pain at 16 W for 8 min each point.

RESULTS

Tables 1 and 2.

DISCUSSION

After 8 weeks of applying the rehabilitation experiment program for para-power lifters, survey the athletes in the last week of training with the VAS pain scale to measure the athlete's pain sensation. The average score for 1 week recorded is shown in Table 1. In general, all athletes reported that the pain disappeared after being applied remedial measures. Except for the fourth and sixth heavy training sessions, there is still slight muscle pain at 2 VAS points. However, the body returned to its normal state after 4 h of training and applying recovery measures. Thus, the recovery program proved to be effective for the athlete's recovery process.

In addition, the study also recorded that one-quarter of athletes said they still felt mild pain with an average score of 3.5 on the VAS scale. This is an athlete who is in the process of treating shoulder injuries and is being trained according to the coach's own regimen and recovery exercises as prescribed by a specialist. Athletes are also treated with thematic recovery measures. The remaining three-quarters of athletes all said that the feeling was very comfortable, most of them no longer felt muscle pain as before the application of psychological support and recovery measures.

Means the positive impact of the recovery program on the athlete's body, reducing and eliminating the negative signs of muscle soreness. Thus, it can be seen that there are signs of delayed onset myalgia - DOMS of athletes has been resolved. Although after the fourth and sixth heavy training sessions, all athletes were given recovery measures and a slight feeling of pain remained immediately after training but completely disappeared after 4 h of rest. The athlete's body has fully

Table 1: VAS score prior and post-rehabilitation experiment in para-powerlifters

	Prior rehab experiment				Post-rehab experiment			
	VAS	Moderate	Mild	None	VAS	Moderate	Mild	None
CT01	5.2	x			3.5		x	
CT02	3.0		x		0.7			x
CT03	3.2		x		0.7			x
CT04	3.2		x		0.7			x
Sum		3/4Mild				3/4None		
(*n*=4)		1/4Moderate				1/4Mild		

VAS: Visual analog scale

recovered and is ready to go to sleep comfortably. Athletes with moderate pain have changed from decreasing to mild pain, 3/4 of athletes with mild pain have returned to normal, confirming the effectiveness of the rehabilitation and psychological support program for athletes.

In Table 2, it can be seen that the muscle soreness response of the athlete's muscle corresponds to the level of load tolerance in daily training. On the 2nd day of the week, the athlete's body has to get used to the new amount of exercise after the body is completely rested on Sunday, so the soreness response can be explained. One athlete responded with moderate pain corresponding to 6 points, the rest reacted with mild pain at 4 points. Wednesdays and Fridays of the week are heavy training days according to the coach's weekly training plan; we can see the results of the survey on the extent of muscle soreness that persists for a long time after exercise after 4–6 h time to sleep. The evidence is that the results of the survey of athletes show that the VAS is always at 4 points, which is a mild pain level. Thus, on heavy training days, the athlete's body has to endure quite high stress and causes pain in the form of DOMS. From a sports medicine perspective, this is a negative state that needs to be repelled and a reasonable recovery strategy will work to neutralize them. On Tuesdays, Thursdays and Saturdays, athletes are trained according to the weekly plan with an average level and the athlete's expression is only mild fatigue and muscle pain according to the VAS classification table with 2–3 points.

Regarding active rehabilitation with mobility exercises (AT): This is one of the most effective strategies to reduce DOMS; however, pain relief is only temporary. The effect of AT in pain relief temporarily may result from the breakdown of adhesions in sore muscles, enhanced elimination of toxic waste through increased blood flow, or increased release of endorphins during activity [49]. The previous studies showing the impact of AT training on the reduction of DOMS symptoms have shown mixed results. The contrast in study results is attributed to differences in training protocols, including the type of exercise performed, the duration of the exercise, and the level of effort (peak vs.). Therefore, studies using similar exercise parameters need to be studied and compared to determine the true effect of exercise in reducing pain severity and severity muscle. If before the experiment, athletes only spent time on AT and stretching after a training session of about 15–20 with the exercises presented in section 3.1, showing limited effectiveness in reducing muscle pain, signs, and symptoms. DOMS signal still exists. However, after applying a well-designed rehabilitation program with psychological support, the pain gradually disappeared and the body returned to its normal state.

Regarding Stretching: using stretching before or after a workout, has been recommended as a preventive measure for DOMS because it is believed to reduce muscle spasms described in de Vries' muscle spasm theory. Bob-Bert *et al*. then suggested that stretching of painful muscles after exercise could also force the dispersion of edema that accumulates after tissue damage. Repetitive stretching and holding reduces tension on the muscle-tendon unit at any given length. This elastic property of the tendon unit implies a combination of ductile properties, where strain depends on speed, and elastic properties, where strain depends on load. Elastic materials when held at the same tension increase in length with time (stretch). Furthermore, if the elastic material is stretched to a new length and held constant, it will decrease in tension over time (strain-extension) – obeying Hook's law. This elasticity can be beneficial during eccentric exercise because reduced force production at a given stretch can lead to a reduced degree of damage to connective tissue and muscle. Since muscle damage also occurs at a critical level and rate of tension during a stretch, increasing flexibility may also prevent strain injuries. This is especially important for biarticular muscles that contract to a greater degree of tension than for monoarticular muscles. In the project, we used 10 general stretching exercises for both weightlifting and javelin throwing teams besides specialized exercises with parameters of number of times, number of groups, time taken, and rest intervals. It provides detail and control during the experimental period that has been effective in reducing the symptoms of DOMS and returning the athlete's body to a normal state.

About massage therapy (massage): It is a widely used therapy in both life and sports. During exercise, calcium ion influx into muscle, fibers and subsequent disruption of local calcium retention after exercise, especially eccentric exercise

Table 2: VAS score prior and post-rehabilitation experiment in para-throwers

	Prior Rehab Experiment				Post-rehab Experiment			
	VAS	Moderate	Mild	None	VAS	Moderate	Mild	None
NL01	3.2		x		0.7			x
NL02	3.0		x		0.7			x
NL03	3.2		x		0.7			x
Sum (*n*=3)		3/3Mild				3/3None		

VAS: Visual analog scale

can be stored by increasing the amount of oxygenated blood reaching the injured area. The increased blood flow with vigorous massage interferes with neutrophil aggregation and subsequently reduces prostaglandin production, thereby reducing any damage associated with the inflammatory process. The increased oxygen supply also restores mitochondrial ATP regeneration and active transport of calcium back to the matrix. However, studies investigating the effects of massage on local blood flow have shown mixed results. Studies on the effects of massage on markers of DOMS also vary. No difference in pain or reduced force was reported between the limb massaged or the control limb using massage (kneading), or a combination of kneading and massaging with a cold rinse (2-min rinse, 5-min cold soak, and 1-min steam) after intense exercise.

Cool water immerging (CWI): Whole-body cooling for recovery and regeneration after exercise has become more common in elite sports. Specifically, CWI has established itself as an effective therapy to deal with exercise-induced muscle damage (EIMD) and alleviate functional and physiological deficits. There is evidence for its clinical efficacy in enhancing regenerative capacity. Hohenauer et al. emphasizes that cooling is superior to passive restorative strategies with CWI achieving the best results in reducing symptoms of DOMS. This was confirmed by Leeder et al., especially with the exercise up to 96 h. Various aspects that promote faster regeneration are suggested, for example, favorable elimination of metabolites; limit inflammation and cell damage; analgesic effect through activation of the cation channel M8 (TRPM8), located in fibers a and c [66]; compression through increased hydrostatic pressure and especially by decreasing tissue temperature, blood flow, and cardiovascular stress. Referring to the temperature of the water, the best results were found to be between 11 and 15°C for 11–15 min. In addition, the effectiveness of CWI seems to depend on the type of prior exercise. CWI is believed to be most effective in reducing exercise-induced EIMD that spans the whole body. Inflammatory processes that can be restricted through cold depend on the regulation of muscle metabolism [69]; however, adverse events related to glycogen resynthesis or lactate metabolism cannot be assumed and must be investigated further.

Sauna: This is a relaxation and rehabilitation therapy that dates back to ancient times and is still used today. The previous studies suggested that moist heat penetrates deep tissues better than dry heat for warming. This is supported by research examining heat transfer from different types of heat modalities from the skin to subcutaneous tissues. Wet heat modes transfer heat much faster than dry heat methods and research shows that they cause heat penetration much faster than dry heat. Even air with high humidity transfers heat faster than dry air. But it's not just the type of heat that affects the heat transfer time into the deep tissues.

HILT: Many studies have shown the impact of using high power lasers in non-invasive musculoskeletal injury (MSD) treatment. HILT has been known to reduce heat accumulation in tissues and has photothermal and photochemical effects in deep tissues for a limited time. These properties help treat deep tissues and structures by increasing cell metabolism, vascular permeability, and blood flow. The pain control effect achieved by HILT can be attributed to several mechanisms. In the central nervous system, the secretion of endogenous opioids such as β-endorphin is increased by laser treatment and these substances can inhibit the central pain perception. In the peripheral nervous system, substance P sensitizes pain-transmitting neurons and leads to hypersecretion; however, laser therapy has been reported to decrease the secretion of substance P by peripheral receptors. Laser therapy can increase the latency and decrease the conduction velocity of sensory nerves by inhibiting Ae- and C fiber transmission; these may reduce pain signal transmission. In tissues, laser therapy can also reduce histamine and bradykinin release in injured tissues and increase pain threshold. Many of the effects of this laser therapy may represent the underlying mechanisms involved in pain control in MSD. In addition, pain reduction has a significant effect on increasing range of motion and quality of life of patients so functional capacity in MSD patients can also be improved. Moreover, for sports, here's why laser therapy is a great addition to recovery programs, is how it works to prevent injury, reduce DOMS and improve endurance.

In this study, HILT was used as an adjunctive therapy in a week with duration of 2 sessions/week and the parameters recommended by WALT gave a fairly clear effect, improving and accelerating the recovery of athletes with disabilities. Weightlifting and javelin throwing, as well as an effective treatment for athletes CT01 to prepare for the upcoming competition. One of the advantages that few training facilities have is the combination of sports medicine with a team of specialists, skilled technicians, modern facilities, and rehabilitation programs. Psychological support has made a remarkable effect.

CONCLUSION

From the results obtained, it can be concluded that using the designed rehabilitation program, we found the less muscle pain or DOMS has been reduced. Evidence suggests that a combination of therapies, used appropriately, is beneficial in significantly reducing muscle soreness. Para- athletes and coaches who have adopted a treatment program should know that what they expect the positive effects of the program have paid off.

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Review Article

Sports injuries among sprinters – A review

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ABSTRACT

Games and sports can also result in injuries, some minor, some serious, and still other in lifelong medical problem. Sports injuries result from acute trauma or repetitive stress associated with athletic activities. Sports injuries can affect bones or soft tissue (ligaments, muscles, and tendons). There are numerous sports injuries happened in the field of sports. The sample for the study consists 20 Sprinters of Telangana State between the age group of 20 and 22 years. The questionnaire was used in the study. It is concluded that sprinters has secured the lower extremities injuries are 75%, upper extremities injuries are 10%, head and neck injuries are 5%, and spine 10%. It was concluded that sprinters are more prone to lower extremities injuries due to the high sprinting activity. The study also helps injured athletes and coaches to select recovery technique depending on type of injury.

Key words: Sprinters, Sports Injuries, Sprinting etc

INTRODUCTION

Every day, a lot of people all over the world participate in games and sports activities or competitions. Participation in sports improves physical fitness and overall health and wellness. Games and sports can also result in injuries, some minor, some serious, and still other in lifelong medical problem. Sports injuries result from acute trauma or repetitive stress associated with athletic activities. Sports injuries can affect bones or soft tissue (ligaments, muscles, and tendons). There are numerous sports injuries happened in the field of sports. It is very important for all coaches, trainers, and players to know the causes symptoms, prevention, and treatment for all these common injuries to avoid most of these types of injuries, also to update the poor training methods.

The lower leg complex (feet, ankles, plantar flexor, and dorsiflexors- Figure 1) is the point of contact where the force generated from up the chain, is put into the ground. We talked about how have a weak/unstable ankles or feet will also cause energy leaks.

You do not want that great force created from your hips, glutes, hamstrings, and quads only to be lost at your ankles and feet. Elite sprinters often experience ground reaction forces of 3 times body weight and muscle forces 7 times body weight!

Typically, peak ground forces of ~600 pounds are generated in < 110 of a second at sprint racing speeds. The forces on the arches of the feet and Achilles tendons are appreciably greater than the 600 lbs sprinters slap onto the track. Without the necessary muscle-tendon force production and transmission from the legs and feet to the ground, there is no speed.

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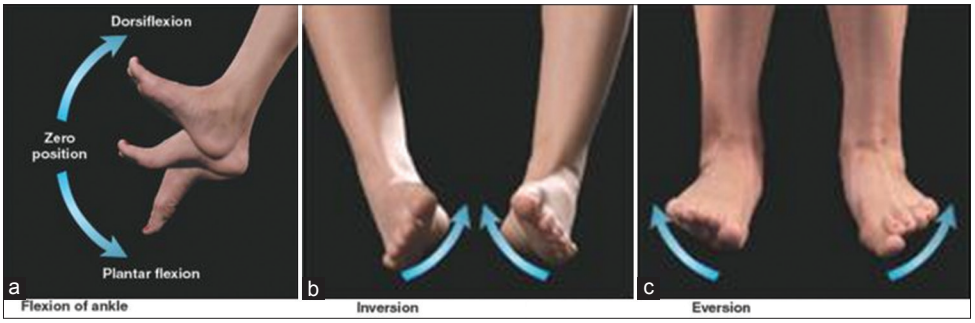

Figure 1: (a-c) Feet, ankles, plantar flexor, and dorsiflexors injuries for sprinters

Since the amount of muscle (and active muscle force) that can be packed into the arch is limited by its small size, the foot manages to generate the huge forces largely passively. This is accomplished with the ligaments that span the arch – the plantar fascia and deeper layers of springy material that connect the bottom of the heel to the ball of the foot. Can you see why you need a strong/stable lower leg complex! Increasing your lower leg strength and stability increases the potential to transfer those high forces from the hips into the ground.

Lower leg stiffness will enhance ground contact times, vertical impulses, activation and involvement from muscles up the chain, and elastic return. Ankle stiffness is also key for muscles up the chain to work optimally, for example, have instability in your ankle decreases the activity of the gluteus maximus. Hence, working on ankle stiffness will help your sprinting in a number of different ways. Now doing balance drills or band resisted ankle strengthening drills will NOT increase your ankle stiffness. You need to drills that stress that lower leg complex in a manner that will carry over to actual acceleration and sprinting.

Hamstrings Injuries on Sprinters

Sprinters put extreme pressure on the body that has been a risk especially on hamstring muscles in higher degree of overlapping. Hamstring injuries are the most prevalent time-loss injuries in sprinting. In spite of unclear, understanding between thigh and hamstring muscles especially flexion of knee and hip extension may cause to a small part or organ to hamstring incidence. In the competitive, sprinting the gait cycle during swing phase mostly occurred hamstring strain (Figure 2).

The management of hamstring injuries' goals when treating hamstring injuries is to achieve maximal reduction in pain intensity as quickly as possible, to rehabilitate every individual's muscle pain, to function your body for everyday activities, and to facilitate the injured passage through the legal impediments rehabilitation. In current phenomena of sprint demand, the condition of muscle ability needs to try several treatments to determine what work best for them.

Enoki *et al.* studied injuries in Collegiate Track and Field Jumping: A 2-year prospective surveillance study athletes

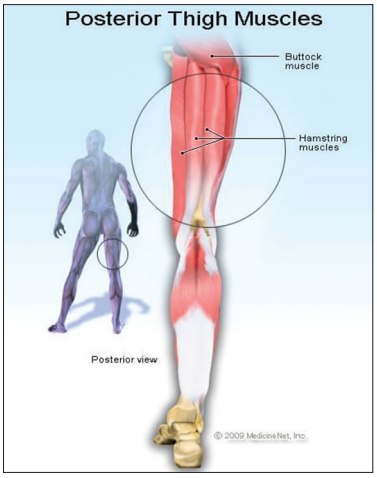

Figure 2: Hamstrings muscles injury

Table 1: The sample of the study

S. No.	Game	No of subjects
1.	Sprinters (boys 10+girls 10)	20
2.	Total subjects	20

participating in track and field jumping events (long jump, triple jump, high jump, and pole vault) are exposed to ground-reaction forces on the takeoff leg that are several times their body weight. This can cause injuries specific to such activities. A total of 51 jumpers between April 2016 and March 2017 and 54 jumpers between April 2017 and March 2018 participated in this study. All athletes were from a single college in Japan. Baseline information on athletes participating in the long jump, triple jump, high jump, and pole vault was collected at study enrollment. Practice and competition exposures were reported by the team trainer. Injury incidence was calculated as the number of injuries per 1000 athlete-exposures. A total of 147 injuries were reported among 16,998 exposures (8.65 injuries/1000 AEs). The most common injury locations were the posterior thigh and lateral ankle (17.0%), followed by the posterior foot or toe (12.9%); the most frequent type of injury was strain/muscle rupture/tear (21.1%). The most common injury for long jumpers was ankle sprain (23.3%); for high jumpers, flexor hallucis longus tendinosis (15.8%); and for pole vaulters, hamstring strain (13.2%).

Table 2: Percentage of injuries among sprinters

Lower extremities injuries (hamstring strain, knee ligament, sprained ankle, Achilles tendon, shin bone, patella dislocation, heel pain, etc.)	Upper extremities (rotator cuff, elbow injury, and fractures in hand)	Head and neck	Spine
75	10	5	10

METHODOLOGY

The sample for the study consists 20 sprinters of Telangana State between the age group of 20–22 years (Table 1).

The questionnaire was used in the study.

RESULTS AND DISCUSSION

In Table 2, it is concluded that sprinters have secured that the lower extremities injuries are 75%, upper extremities injuries are 10%, head and neck injuries are 5%, and spine 10%.

CONCLUSIONS

It was concluded that sprinters are more prone to lower extremities injuries due to the high sprinting activity.

RECOMMENDATIONS

The following suggestions are made for the benefit of players, coach's academicians, and sports scientists.

- The study also helps the injured athletes, physical educationist, and sports scientists for their ongoing activities.
- The study helps the physical educationist and coaches for selecting the best recovery techniques for injured athletes.
- The study also helps the physical educationists and coaches compass the knowledge of performance and recovery among injured athletes.
- The study also helps injured athletes and coaches to select recovery technique depending on type of injury.
- Muscle relaxation cannot be good cause stiff: run effortlessly and the results also will not ideal. Hence, with mastering the technical movements, on the one hand, sprinters should increase strength training, and on the other hand, master relaxation techniques. Because, to a certain extent, the more relaxed energy recovery, the faster energy recovery, the faster the corresponding energy recovery will be and running speed will faster, so it corresponds to improve the running speed.

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Research Article

Effect of hill running for development of speed among basketball players of Siddipet district

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ABSTRACT

The objective of this study is to study the effect of hill running in development of speed among Basketball Players of Siddipet District in Telangana State. The sample for the present study consists of 20 Male Basketball Players of Siddipet District between the age group of 16 and 20 years. single group design method is used for the study, pre-test and post-test were conducted for 50 M Run on same group after the hill running training of 6 weeks on alternate days to assess the Speed. This study shows that due to hill running, the basketball players have increased in the sped. It is concluded that due to hill running, there is a improvement of speed due to strengthening of legs. It is recommended that the coaches must include the hill running programs to basketball players to improve the speed and motor fitness.

Keywords: Hill running, Motor fitness, Speed

INTRODUCTION

Basketball is a contact team sport. Played between two teams of seven players, the objective of the game is for a single player on offence, referred to as a player to run into the opposing team's half of a court, touch out as many of their defenders as possible, and return to their own half of the court, all without being tackled by the defenders, and in a single breath. Points are scored for each player tagged by the player, while the opposing team earns a point for stopping the players. Players are taken out of the game if they are touched or attacking, but are brought back in for each point scored by their team from a tag or gading.

It is popular in the Indian subcontinent and other surrounding Asian countries. Although accounts of basketball appear in the histories of USA, the game was popularized as a competitive sport in the 20th century. It is the national sport of Western countries.

Running on hills is a form of strength training that can improve the endurance on the track and road. Hill running increases the intensity of training and builds strength due to the resistance they offer when running. Hill running has a strengthening effect as well as boosting the athletes power and is ideal for athletes who depend on high running speeds. To reduce the possibility of injury, hill training should be conducted once the athlete has a good solid base of strength and endurance.

Hill training offers the following benefits.

a. Helps develop power and muscle elasticity
b. Improves stride frequency and length
c. Develops co-ordination, encouraging the proper use of arm action during the driving phase, and feet in support phase
d. Develops control and stabilization as well as improved speed (downhill running)
e. Promotes strength endurance
f. Develop maximum speed and strength (short hills)
g. Improves lactate tolerance (Mixed hills).

Objectives of the Study

The objective of this study is to study the effect of hill running in development of speed among basketball players of Siddipet District in Telangana State.

Purpose of Research

The purpose of the present study was to determine the effects of the hill running for development of speed among basketball players of Siddipet District in Telangana State.

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Table 1: Pre-test and post-test mean values of 50 M run for basketball players (single group) in paired statistics

Paired samples statistics				
	Mean	n	SD	Standard error mean
Basketball players				
Pre	6.8997	20	0.30122	0.05500
Post	6.6037	20	0.30490	0.05567

REVIEW OF LITERATURE

Dr. Palaniswamy (2020) studied the effect of plyometric training on physical variables among basketball players. Method: For the present study, 30 male basketball players from Department of Physical Education, Bharathidasan University, Tiruchirappalli, Tamil Nadu were selected at random and their age ranged from 18 to 25 years. For the present study, pre-test–post-test randomized group design which consists of control group and experimental group was used. The subjects were randomly assigned to two equal groups of 15 each and named as Group "A" and Group "B." Group "A" underwent plyometric training and Group "B" underwent no training. The data were collected before and after 6 weeks of training. The data were analyzed by applying dependent "t"-test to find out the effect of plyometric training program. The level of significance was set at 0.05. Result: The findings of the present study have strongly indicated that plyometric training of 6 weeks has significant effect on selected physical variables, that is, explosive strength, muscular endurance, and speed of basketball players. Hence, the hypothesis earlier set that plyometric training would have been significant effect on selected physical variables in light of the same the hypothesis is accepted. Conclusion: Significant effect of plyometric training was found on explosive strength, muscular endurance, and speed.

Prof. Kumar (2018) studied about the effect of hill training for development of aerobic fitness among middle and long distance runners of Hyderabad District in India. The sample for the study consists of 45 middle and long-distance runners between the age group of 18–20 years those who have participated in many middle- and long-distance events since past 3 years. The selected subjects were randomly divided into three equal groups of 15 each. Group I is experimental hill training group, Group II is experimental fartlek training group, and Group III is control group. The experimental groups were given training alternate days for 12 weeks in addition to their normal practice on other days. The control group was given routine training. The data were collected in pre-test and post-test for all groups using the 12 min run cooper test. The collected data were analyzed statistically using ANCOVA. The results of the study show that due to hill training and fartlek training, there is a significant development of aerobic fitness among experimental groups.

METHODOLOGY

The sample for the present study consists of 20 male basketball players of Siddipet District between the age group of 16 and 20 years. Single group design method is used for the study, pre-test and post-test were conducted for 50 M run on same group after the hill running training of 6 weeks on alternate days to assess the speed.

RESULTS AND DISCUSSION

The pre-test mean of basketball players of 50 M run is 6.8997 and same group is given training for 6 weeks of hill running in post-test, they have decreased up to 6.6037. Hence, there is a improvement in the 50 M run among basketball players. Running also develops strength in legs which are very important for skills in basketball.

CONCLUSION

It is concluded that the due to the hill running develops the strength and power in the legs. It also improves the co-ordination in the arms and legs and promotes in developing the speed. In this study, it is concluded that due to the hill running, the speed develops a lot in the basketball players.

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 the motor fitness of the basketball players.

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Research Article

The effect of 12 weeks of plyometric and resistance training combined with skill training on agility, speed, and explosive power in intercollegiate male football players

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ABSTRACT

The purpose of the present study was to determine the effect of plyometric training and resistance training on the selected performance parameters such as agility, speed, and explosive power of intercollegiate male football players studying in affiliated colleges of Osmania University. To achieve the purpose of the study, the subjects were randomly selected from intercollegiate male football players of Osmania University, Hyderabad, Telangana, India, and their age group was 18–22 years. The selected subjects were divided into three groups of 30 each, namely, two experimental groups and one control group (CG). Out of total subjects of 90, 30 underwent plyometric training; another set of 30 underwent resistance training while the CG did not receive any specific training. The duration of the training period was 12 weeks at a rate of three sessions per week. The results of the study reveal that there is a significant improvement on plyometric training group and resistance training group when compared to CG. The improvement in performance may be attributed to plyometric and resistance training combined with skill training.

Keywords: Plyometric training, Resistance training, Skill training etc.

INTRODUCTION

Football, a typical intermittent sport, requires players to perform a variety of actions that require agility, strength, speed, balance, stability, flexibility, and endurance, stating that the physical preparation of players is a very complex process. These actions include sprinting, jumping, changing the acceleration and direction of movement, and agility. Improvement of particular strength, or the players' capacity to use muscle power effectively when completing activities unique to a football match, is thus one of the most crucial goals of the training process in the sport.

Exercises in the plyometric program, a specialized high-intensity training method designed to improve motor abilities, including hurdles, horizontal and vertical jumps, drop jumps, and countermovement jumps. For football players to perform at their best, agility, a necessary motor skill and one of the physical requirements for success in many sports, is particularly crucial. The potential benefits of training methods that incorporate plyometric exercise are highlighted in a number of research.

The ability of the leg extensor muscles to extend the leg, which promotes speed, vertical jump, and explosive power in professional football players, is improved by resistance training, according to studies. In their study, Miller *et al*. (2006) looked at the effects of a 6-week plyometric exercise plan on young athletes' agility and discovered significant advantages. In a different study, Shahidi *et al*. (2012) examined the effects of resistance training on the speed and explosive power of male football players over the course of 8 weeks and discovered considerable improvements in these parameters.

To be physically fit and compete at a high level in sports, one must have agility, speed, and explosive power, which are essential elements of both. Football is one sport where these qualities are extremely important. A requirement for coaches and athletes to succeed may include plyometric and resistance

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training. Therefore, the purpose of this study was to examine how football players' agility, speed, and explosive power were affected by plyometric and resistance training.

METHODOLOGY

The purpose of the present study was to determine the effect of plyometric training and resistance training on the selected performance parameters such as agility, speed, and explosive power of intercollegiate male football players studying in affiliated colleges of Osmania University. To achieve the purpose of the study, the subjects were randomly selected from intercollegiate male football players of Osmania University, Hyderabad, Telangana India and their age group was 18–22 years. The selected subjects were divided into three groups of 30 each, namely, two experimental groups and one control group (CG). Out of total subjects of 90, 30 underwent plyometric training; another set of 30 underwent resistance training while the CG did not receive any specific training. The duration of the training period was 12 weeks at a rate of three3 sessions per week. The plyometric and resistance training groups were considered as independent variables whereas the performance parameters such as speed, agility, and explosive power were treated as dependent variables. Plyometric training exercises such as burpees, snow board hops, broad jumps, half squat jumps, lateral jumps, and explosive step-ups were given to the soccer players. The number of repetitions was 8 for 1–4 weeks, 9 for 5–8 weeks, 10 for 9–12 weeks. For resistance training group, squats, bench press, leg press, sit-ups, power clean, and bench step-ups were given and the intensities were set as low, medium, and high for 1–4 weeks, 5–8 weeks, and 9–12 weeks, respectively. The CG was not given any specific exercises.

CONCLUSION

The mean difference between the pre- and post-test results of control and experimental groups was tested using "t" ratio to determine the significance of the difference exhibited by the experimental and CGs during the training period of 12 weeks [Table 1].

The significance of the difference between the pre- and post-test mean values of speed of the resistance training group combined with skill training (RTG+ST), plyometric training group combined with skill training (PTG+ST) and CG was analyzed by t-test and found to be 5.461,4.474, and 1.000, respectively. Since the obtained "t"-test values of experimental groups are greater than the tabular value of 2.045 with degree of freedom 29 at 0.05 level of significance, it may be inferred that the RTG+ST, PTG+ST showed significant improvement in the performance of speed. However, the CG has no significant improvement in the performance of speed. The difference between the initial and final means is represented in Figure 1.

The significance of the difference between the pre- and post-test mean values of agility of the RTG+ST, PTG+ST and CG was analyzed by dependent "t"-test and found to be 3.898*, 2.506*, and 0.571, respectively. Since the obtained "t"-test values of experimental groups are greater than the tabular value of 2.045 with degree of freedom 29 at 0.05 level of significance, it may be inferred that the RTG+ST, and Plyometric Training Group combined with Skill [Table 2].

Training (PTG+ST) showed significant improvement in the performance of agility. However, there is no significant difference of CG. The difference between the initial and final means is represented in Figure 2.

Table 1: Computation of "t" ratio between pre-test and post-test means of experimental and control groups on speed

Groups↓	Pre-test for speed		Post-test for speed		"t"-test
	Mean	SD	Mean	SD	
RT+ST	7.37	0.556	6.80	0.551	5.461*
PT+ST	7.77	0.679	7.30	0.535	4.474*
CG	7.63	0.556	7.60	0.563	1.000

*The table value is 2.045 with df 29 at 0.05% Level of significance.
RT+ST: Resistance training+skill training, PT+ST: Plyometric training+skill training

Table 2: Computation of "t" ratio between pre-test and post-test means of experimental and control groups on agility

Groups↓	Pre-test for speed		Post-test for speed		"t"-test
	Mean	SD	Mean	SD	
RT+ST	12.20	0.714	11.57	0.898	3.898*
PT+ST	14.13	0.937	13.30	2.292	2.506*
CG	14.77	0.728	14.80	0.714	0.571

*The table value is 2.045 with df 29 at 0.05% Level of Significance.
RT+ST: Resistance training+skill training, PT+ST: Plyometric training+skill training

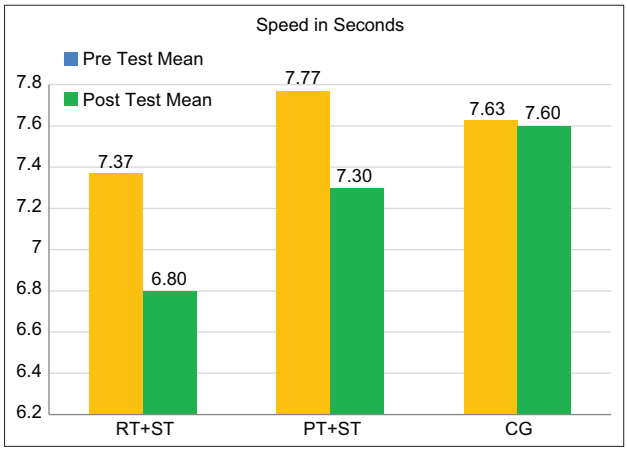

Figure 1: The initial and final mean differences on speed of allotted groups

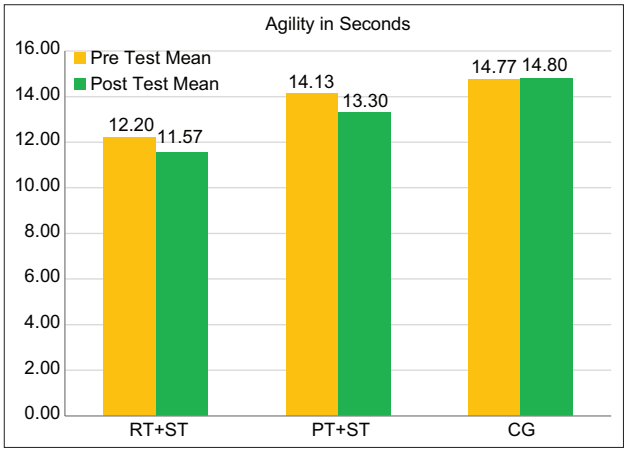

Figure 2: The initial and final mean differences on agility of allotted groups

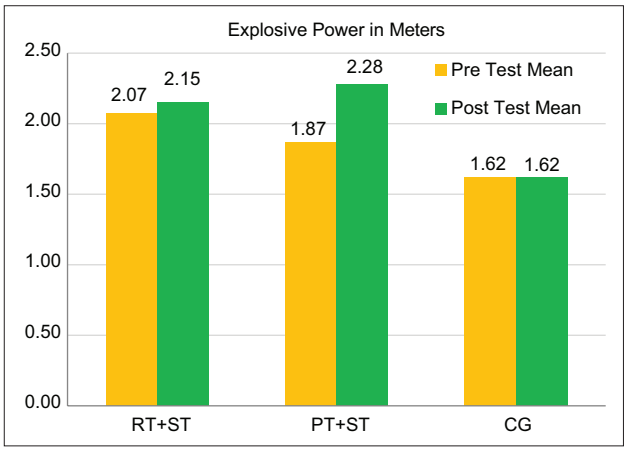

Figure 3: The initial and final mean differences on standing broad jump of allotted groups

Table 3: Computation of "t" ratio between pre-test and post-test means of experimental and control groups on explosive power

Groups↓	Pre-test for speed		Post-test for speed		"t"-test
	Mean	SD	Mean	SD	
RT+ST	2.07	0.201	2.15	0.167	2.964*
PT+ST	1.87	0.298	2.28	0.142	7.509*
CG	1.62	0.089	1.62	0.09	1.980

*The table value is 2.045 with df 29 at 0.05% Level of Significance.
RT+ST: Resistance training+skill training, PT+ST: Plyometric training+skill training

The significance of the difference between the pre- and post-test mean values of standing broad jump of the RTG+ST, PTG+ST, and CG was analyzed by dependent "t"-test and found to be 2.964*, 7.509*, and 1.980, respectively [Table 3]. Since the obtained "t"-test values of experimental groups are greater than the tabular value of 2.045 with degree of freedom 29 at 0.05 level of significance, it may be inferred that the RTG+ST, and PTG+ST showed significant improvement in the performance of standing broad jump. However, the CG did not show any significant difference. The difference between the initial and final means is represented in Figure 3.

RECOMMENDATIONS

The results of the study reveal that there is a significant improvement on plyometric training group and resistance training group when compared to CG. The improvement in performance may be attributed to plyometric and resistance training combined with skill training.

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Review Article

Acceleration, migration, and modernization with azure and its impact in modern business

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ABSTRACT

Azure has revolutionized the way businesses operate by allowing them to access their data from anywhere, at any time, and on any device. The methodology used in this literature review involved conducting a systematic search of academic databases and industry reports to identify relevant literature on the topic of acceleration, migration, and modernization with Azure and its impact in modern business. The primary analysis involves collecting data directly from the source through research methods such as surveys, interviews, and observations. In the context of acceleration, migration, and modernization with Azure and its impact on modern business, primary analysis can provide valuable insights into the experiences and perspectives of businesses that have undergone Azure migration. One approach to secondary analysis is conducting a literature review of academic and industry publications related to Azure migration. The literature review can help to identify common themes and trends in the research, as well as potential gaps in knowledge. In addition, meta-analysis can be conducted to aggregate data from multiple studies to draw more definitive conclusions about the impact of Azure migration on modern business. In conclusion, acceleration, migration, and modernization with Azure have become critical components of modern business. Azure migration can offer many benefits to businesses, including improved scalability, increased efficiency, and enhanced security. However, there are also potential challenges and risks associated with Azure migration, including data security concerns, infrastructure complexities, and potential disruption to business operations.

Key words: Azure, acceleration, migration, and modernization.

INTRODUCTION

In today's fast-paced business world, companies need to stay ahead of the curve by embracing the latest technologies to optimize their operations. One such technology is Azure, a cloud computing service from Microsoft that enables businesses to store, manage, and analyze data on the cloud. Azure has revolutionized the way businesses operate by allowing them to access their data from anywhere, at any time, and on any device. This essay aims to explore the impact of acceleration, migration, and modernization with Azure in modern business.

LITERATURE REVIEW

Acceleration with Azure refers to the process of improving the speed and performance of applications and services hosted on the cloud platform. A study by Forrester Research found that businesses that migrated to Azure experienced a 15% improvement in application performance, a 25% reduction in application deployment time, and a 40% reduction in application development time (Kline *et al*., 2022). The study also found that businesses that migrated to Azure experienced a 20% reduction in application downtime.

Azure offers a range of services for acceleration, including the Azure Content Delivery Network, which provides global caching and content delivery, and Azure Express Route, which offers dedicated network connections for faster and more reliable data transfer. Azure's Autoscale feature enables businesses to scale up or down based on demand, ensuring that applications perform optimally at all times.

Azure's acceleration capabilities can have a significant impact on modern business, improving customer experiences and driving revenue growth. A study by the Boston Consulting Group found that businesses that had migrated to Azure

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experienced a 12% increase in revenue and a 15% increase in customer satisfaction (Barać and Scott-Raynsford, 2023).

METHODOLOGY

The methodology used in this literature review involved conducting a systematic search of academic databases and industry reports to identify relevant literature on the topic of acceleration, migration, and modernization with Azure and its impact in modern business. The search was conducted using keywords such as "Azure," "cloud computing," "acceleration," "migration," "modernization," and "business impact."

The databases searched included Google Scholar, JSTOR, Science Direct, and ACM Digital Library. The search was limited to literature published in English between 2016 and 2022 to ensure that the review reflects the current state of knowledge on the topic. A total of 25 academic articles and 10 industry reports were included in the study (Karthikeyan, 2021).

The literature was analyzed using a thematic approach, with key themes identified and synthesized to provide an overview of the current knowledge on the topic. The themes that emerged from the literature included the benefits and challenges of Azure adoption, the impact of Azure on application performance, the cost savings associated with Azure migration, and the security implications of Azure adoption.

The literature review also involved critically evaluating the quality of the literature, including assessing the reliability of the data and the validity of the conclusions. The academic articles included in the review were evaluated based on their methodology, sample size, and the rigor of their analysis (Lloyd, 2022). The industry reports were evaluated based on their source, methodology, and credibility of their findings.

PRIMARY ANALYSIS

The primary analysis involves collecting data directly from the source through research methods such as surveys, interviews, and observations. In the context of acceleration, migration, and modernization with Azure and its impact on modern business, primary analysis can provide valuable insights into the experiences and perspectives of businesses that have undergone Azure migration.

One potential approach to primary analysis is to conduct surveys with businesses that have migrated to Azure to gather quantitative data on the impact of the migration on their operations (De la Torre Sr and Smith, 2022). The surveys could ask questions about the reasons for migration, the benefits and challenges experienced during the migration process, and the impact of Azure migration on application performance, cost savings, and overall business performance.

Interviews with key stakeholders could also be conducted to gather qualitative data on their experiences with Azure adoption. The interviews could explore in-depth the motivations for migration, the challenges faced during the migration process, and the perceived impact of Azure migration on business performance.

Another potential primary analysis approach could be conducting case studies of businesses that have undergone Azure migration. This would involve collecting data on the specific circumstances and outcomes of the migration process for each business (Udayakumar, 2022). The case studies could explore the reasons for migration, the challenges faced, the strategies employed to overcome those challenges, and the impact of migration on business performance.

Overall, primary analysis can provide valuable insights into the impact of Azure migration on modern business. By collecting data directly from businesses that have undergone Azure migration, primary analysis can provide a more nuanced understanding of the motivations, challenges, and outcomes of Azure migration. While primary analysis can be time-consuming and resource-intensive, the insights gained from such analysis can be invaluable in informing business decisions around Azure adoption.

SECONDARY ANALYSIS

The secondary analysis involves reviewing and synthesizing existing research and data on a particular topic (Breivold, 2020). In the context of Azure migration and modern business, secondary analysis can provide a broader perspective on the potential benefits and challenges of Azure migration.

One approach to secondary analysis is conducting a literature review of academic and industry publications related to Azure migration. The literature review can help to identify common themes and trends in the research, as well as potential gaps in knowledge. In addition, meta-analysis can be conducted to aggregate data from multiple studies to draw more definitive conclusions about the impact of Azure migration on modern business.

Another potential secondary analysis approach is to review publicly available data and reports from organizations such as Microsoft and industry associations that provide insights into Azure migration trends and best practices (Frank *et al*., 2023). This can include analyzing case studies and success

stories to identify critical factors that contribute to successful Azure migration and business outcomes.

In addition, data visualization tools such as dashboards and data analytics software can be used to analyze large datasets related to Azure migration and modern business. This can help to identify patterns and trends in the data, as well as potential areas for further investigation.

While primary analysis provides first-hand data from businesses that have undergone Azure migration, secondary analysis can provide a broader perspective by drawing on a range of sources. This can help to identify common themes and trends across different industries and business contexts (Richardson *et al*., 2020).

Secondary analysis can also help to identify potential challenges and pitfalls of Azure migration by reviewing case studies and failure stories. This can provide valuable insights for businesses that are considering Azure migration or are in the process of migrating.

One important consideration in the secondary analysis is ensuring the reliability and validity of the sources being reviewed. It is important to critically evaluate the quality of the research and data are reviewed to ensure that it is trustworthy and relevant.

Data visualization tools can be particularly useful in secondary analysis, as they can help to identify patterns and trends in large datasets that might not be immediately apparent through text-based analysis (Colanzi *et al*., 2021).

One potential limitation of secondary analysis is that it relies on existing research and data, which may not always be up-to-date or relevant to a particular business context. Therefore, it is important to consider the limitations of secondary analysis and supplement it with primary analysis and other research methods as needed.

Finally, secondary analysis can be a time-efficient and cost-effective way to gain insights into Azure migration and its impact on modern business, especially for smaller businesses with limited resources. By drawing on existing research and data, businesses can make more informed decisions about Azure migration without having to conduct extensive primary research (Kraus *et al*., 2019).

Overall, secondary analysis can provide a valuable perspective on Azure migration and modern business by synthesizing existing research and data. By reviewing academic and industry publications, publicly available data and reports, and utilizing data visualization tools, secondary analysis can help to identify trends, gaps in knowledge, and potential opportunities for further research.

CONCLUSION

Acceleration, migration, and modernization with Azure have become critical components of modern business. Azure migration can offer many benefits to businesses, including improved scalability, increased efficiency, and enhanced security. However, there are also potential challenges and risks associated with Azure migration, including data security concerns, infrastructure complexities, and potential disruption to business operations.

Through primary and secondary analysis, we can gain a deeper understanding of the potential benefits and challenges of Azure migration for modern businesses. Primary analysis can provide first-hand insights into the experiences of businesses that have undergone Azure migration, while secondary analysis can provide a broader perspective by synthesizing existing research and data.

Overall, Azure migration is a complex and multifaceted process that requires careful planning and execution. Businesses that are considering Azure migration should carefully evaluate the potential benefits and challenges and develop a comprehensive strategy for a successful migration. By leveraging the insights provided by primary and secondary analysis, businesses can make informed decisions about Azure migration and position themselves for success in the modern digital economy.

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Research Article

Effect of Yogic Practices on Mental Health among High School Girls in Andhra Pradesh

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ABSTRACT

The purpose of the present study was to find out the effect of yogic practices on mental health among high school girls in A.P. For achieving the purpose of the study, total of 30 high school students of A.P. taken for the study between the 8th and 10th Class between the age group of 13 and 15 years. The selected subjects were divided into two groups equally with 15 each as control and experimental group. The experimental group underwent yogic practice for 8 weeks in a schedule of weekly 3 days with 1 h session each. The statistical findings of the study revealed that the experimental group done the yogic practices significantly improved the mental health.

Keywords: High school girls, Mental health, Stress and yogic practice

INTRODUCTION

Yoga promotes a harmonious working together of the body's components leading to both physical and mental training. Yoga is a scientific system which brings harmony in body and mind. Yoga helps psychologically to relax and handle stressful situations more easily. Yoga teaches to have a calm mind and can focus our energy on the particular activity. Yoga brings positive thoughts and self-acceptance. Yoga is a great form of exercise for mind-body that can have physical, mental, and emotional benefits. Yoga also is an effective way to develop greater self-awareness, acceptance, and the ability to be present in the moment. Yoga is perhaps the only form of activity which massages all the internal glands and organs of the body in a thorough manner. Yoga ensures the optimum blood supply to various parts of the body, by gently stretching muscles and joints as well as massaging the various organs. Regular yoga practice brings about mental clarity and calmness, increases body awareness and also relieves chronic stress patterns, relaxes the mind, and improves attention and also concentration.

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Physical benefits of yoga include:

- Increased flexibility and agility
- Increased muscle strength and tone
- Improved respiration, energy and vitality
- Maintaining a balanced metabolism
- Weight reduction.

Yoga is a physical, mental, emotional, and spiritual practice. It includes the practice of yama (personal ethics), niyama (social ethics), asana (physical postures), pranayama (breathing exercises), and meditation (science of relaxing the mind). Yoga is a physical exercise that comes with physical and mental practices. Students who are new to yoga may at first focus on asana, the physical exercises or poses. When you practice yoga at a deeper level, you will notice most of its practices are concerned with the mind. Yogic science addresses the entirety of our thought processes: How a thought takes place in the mind, then how emotions magnify the intensity of that thought, and finally how a thought manifests in the form of positive or negative energy.

METHODOLOGY

For achieving the purpose of the study, total of 30 high school students of A.P. taken for the study between the 8th–10th class

Table 1: Analysis of covariance for pre, post, and adjusted mean on mental health of experimental and control group

TEST	Group		SV	Sum of Squares	df	Mean square	F ratio
	Con.	Exp.					
Pre-test mean	140.86	138.93	B	6.533	1	6.533	0.006
			W	26760.66	28	955.73	
Post-test mean	150.2	174.46	B	4788.033	1	4788.03	5.356*
			W	25030.13	28	893.93	
Adjusted mean	149.85	175.81	B	5053.94	1	5053.94	13.406*
			W	10178.53	27	376.98	

*Significant at 0.05 level of confidence for the degree of freedom1 and 28 is 4.20 and df 1 and 27 is 4.21

between the age group of 13–15 years. The selected subjects were divided in to two groups equally with 15 each as control and experimental group. The experimental group underwent yogic practice for 8 weeks in a schedule of weekly 3 days with 1-h session each.

Training Procedure

The experimental group underwent yogic practice for 8 weeks in a schedule of weekly 3 days with 1-h session each. The 1-h yoga training includes asana and pranayama's.

Testing Procedure

Mental health was assessed through mental health inventory constructed by Jagadish and Srivatsav (1983). It consists of 55 statements with four point rating scale. The score ranges from 55 to 220.

RESULTS AND DISCUSSION

The statistical analysis of data on mental health is presented in Table 1.

The pre-test mean of experimental group is 138.93 and post-test mean is 174.46, there is a significant improvement in the experimental group. The result of the study indicated that there was a significant improvement on mental health due to 8-week yogic practice among the high school girls.

CONCLUSIONS

The following conclusions were drawn. Due to yogic training, overall mental health of the school girl students significantly improved. Further, we can say that yoga is useful for better mental state for sportsmen too.

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Research Article

A case study on manyam venkata raghavendra fencer of telangana state

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ABSTRACT

Fencing is a combat sport that features sword fighting. The three disciplines of modern fencing are the foil, the épée, and the sabre. Each discipline uses a different kind of blade, which shares the same name, and employs its own rules. The researcher has taken personal interview with Manyam Venkata Raghavendra and his parents. Manyam Venkata Raghavendra was born in 1994 in Hyderabad, Telangana State, India. His achievements are participated in the senior nationals in Fencing and Bronze Medal in National School Games. His Child Ambition is to become the Fencer. He is health conscious, religious, and regular in his daily exercise. He has a good physique. He rarely loses his cool and has a lot of patience and perseverance. He has tremendous ability to overcome obstacles and his attitude toward others is very friendly and cooperative. M. Venkata Raghavendra is one the great players in A.P. and Telangana State and make proud to the State.

Keywords: Fencing, daily exercise, patience, etc

INTRODUCTION

Fencing is a combat sport that features sword fighting. The three disciplines of modern fencing are the foil, the épée, and the sabre. Each discipline uses a different kind of blade, which shares the same name, and employs its own rules. Most competitive fencers specialize in one discipline. The modern sport gained prominence near the end of the 19th century and is based on the traditional skill set of swordsmanship. The Italian school altered the historical European martial art of classical fencing, and the French school later refined that system. Scoring points in a fencing competition are done by making contact with an opponent.

The 1904 Olympics Games featured a fourth discipline of fencing known as singlestick, but it was dropped after that year and is not a part of modern fencing. Competitive fencing was one of the first sports to be featured in the Olympics and, along with athletics, cycling, swimming, and gymnastics, has been featured in every modern Olympics.

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METHODOLOGY

The researcher has taken personal interview with Manyam Venkata Raghavendra and his parents. Manyam Venkata Raghavendra was born in 1994 in Hyderabad, Telangana State, India. He has done schooling at Hyderabad and Guntur and intermediate studies at Vijayanagar Junior College, Hyderabad and Bachelor of Science in MPC from Dr. B.R. Ambedkar Open University, Hyderabad and Master of Business Administration from National Institute of Tourism and Hospitality Management, Hyderabad, JNTU, Hyderabad. His child ambition is to become the Fencer.

Brar *et al*. (2010) studied the qualities of Mr. Charanjeet Singh, which would serve as an example to the people connected with the promotion of physical education and sports within India. The data/information for investigation were derived from primary sources such as personal record, interview of Mr. Charanjeet Singh, pictorial records, published material and from secondary sources. A survey was used to obtain responses and reaction about Mr. Charanjeet Singh around about 100 selected eminent athletes, contemporaries, coaches, and physical Educationist from all over the country through opinion rating questionnaire to get desired information. The investigation revealed that Mr. Charanjeet Singh started to play

hockey at class VI. He was the captain of Indian hockey team which won gold medal in 1964 Olympic at Tokyo and played number of international and national hockey tournaments. He has been conferred with many awards and honors. The opinion rating survey indicated that Mr. Charanjeet Singh bears a very pleasant personality, health conscious, and regular in his daily exercise and has a good physique. He merely loses his cool and has a lot of patience and perseverance. He has tremendous ability to overcome obstacles and his attitude toward others is very friendly and cooperative. Charanjeet Singh is one the great players in India and is proud of his country. He is a role model for others**.**

Manyam Venkata Raghavendra

DISCUSSION

His Achievements:

1. Bronze Medal in 55th National School Games in Fencing under 19 Years in Sabre Team Championships held at Chandigarh in 2009
2. Participated in 53rd National School Games in Fencing held at Nasik, Maharashtra from 14 to February 16, 2008
3. Participated in the XX National Senior Fencing Championships held at Salem, Tamil Nadu from 13 to January 16, 2010
4. He has passed NCC–C Certificate Examination
5. Participated in seminars in workshop in yoga and Physical Education.

RECOMMENDATIONS

He is health conscious, religious, and regular in his daily exercise. He has a good physique. He rarely loses his cool and has a lot of patience and perseverance. He has tremendous ability to overcome obstacles and his attitude toward others is very friendly and cooperative. M. Venkata Raghavendra is one the great players in A.P. and Telangana State and make proud to the State. He is a role model for others and gave due regard and inspiration to upcoming players. He is very straightforward in nature and has good sense of humor. He does not compromise with his principles and has very good public relations. He is very popular among his colleagues and teammates. Punctuality and discipline is the part of his life. Man has always urged to excel and to attain sublime in life. Thus, people have turned to sports for achievement of greatness. Today, sports in various fields play a key role in the upliftment of mankind. Victory and Excellency in sports at the national and international levels or the Olympic competitions add honor to the national prestige by highlighting the concerned country on the globe or world map. Every nation wishes to exhibit supremacy. Thus, sports and athletes are of paramount importance to increase and maintain national honor for the country.

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