



CORRELATION BETWEEN THE ANTHROPOMETRICS AND PHYSICAL FITNESS VARIABLES AMONG SCHOOL TALENTED UNTRAINED CHILDREN

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ABSTRACT

The purpose of the study was to examine the correlation between the anthropometrics and physical fitness variables among school talented untrained children. To achieve present study, under age of 14 years 100 men untrained school children were assigned from Jaffna central college. Their anthropometrics variables such as height (HE), weight (WE), body mass index (BMI) were recorded before fitness test of a day. Physical fitness test were conducted to measure speed (SP), leg power (LP), upper body strength (US), agility (AG) & aerobic power (EN). Pearson coefficient correlation was administered to find out correlation between anthropometric and physical fitness variables. Result revealed following pair of anthropometric and physical fitness variables correlated each other such as WE & AG ($r=0.365$), BMI & AG ($r=0.430$), BMI & US ($r=0.420$), WE & US ($r=0.397$), HE & US ($r=0.438$). Remaining variables were not correlated with any anthropometric variables. Results revealed that anthropometric variables determine the upper body strength besides agility ability depends on weight and body mass index. Result concluded that which sports demand high upper body strength and agility in selection of players need to consider the characters of anthropometric variables for excellent performance.

Keywords: anthropometrics, physical fitness, BMI, untrained school children, Men

1. INTRODUCTION

Physical fitness and anthropometric factors have been found as key variables in sports professional to prove their talent and performance through efficient targeting training programme (Mevaloo, et.al., 2008). In this connection that conducting physical fitness and anthropometry test is prevalence used for identifying the talent of sportsman. Many sports leading countries like USA, U.K, Germany, and China have operated the talent identification of children at the age of 10-14 years. Which countries measure the distinguishing features of anthropometric and physical fitness for optimal sports talent. However previous researchers have proved that sports talent not only determine by the anthropometric or fitness which also depend on some genetic, morphological, personal interest. Anthropometric variables character like height, weight and BMI which determine the structure of the body. Sports scientist and coaches recommend that body structure should be considered as variables when selecting sportsman for sports. This may be advantage for excellent skill and performance. Although physical fitness also good sign for evaluate the talent of players therefore based on anthropometric and physical fitness talent can predict the future performance.

Body weight is affected by bone, muscles density and fat. In this view excessive fat make inversely in performance, skill exercise, increase muscles fatigue, reduce the lean body mass tissue, lead to injury further it limit the muscles performance. Agility is multidirectional of movement, motion so the agility is highly coordinated with muscles characters and nerves impulse in certain time. During pre- adolescence period (10-14 years) that most of children are underweight and normal range which indicate the low level of fat which is highly contribute to agility ability. Moreover at the age of pre-adolescence that children body does not deposit the more fat in muscles. Therefore it will help to distinguishing muscles function, increase muscles contractile, myofibrils and sactroplasmic. However height indicates to produce greater force on throwing like medicine ball or shot put. It is a researcher observation that throwers are taller with greater body mass.

Anthropometric variables such as height, weight and body mass index are playing key role in various sports skill which enhances their performance thus it is considered as important parameters in sports. It is ensured in certain sports such basketball and volleyball, for this sports, the sports man is elected based on anthropometric parameters because anthropometrics play key role in sports skill and performance. Body height have been used as an index for identification of sports performance(Costa et al. (2006). Result revealed that there is no correlation between anthropometric variables and performance among various games of sportsmen. Another study selected 263 competitive swimmers from both sexes(12-14 years old) found the negative correlation between anthropometric variables and physical conditioning and performance in a 100M free style race(Geladas et al. (2005). The similar result secured in another study that examined relationship between some anthropometric characteristics and aerobic power among physical education students the result showed that there is no significant relationship between anthropometric variables and aerobic power (Kabiri, (2008). Some of sports leading countries such as America, UK, China, Russia and Germany are utilizing well developed scientific system for identify the talent of children. They measured physical fitness and anthropometrics as key parameters to identify the talent of children.

Distinguish anthropometrics may be advantage to enhance skills and physical fitness. In contrast anthropometric variables don't influence on physical fitness or performance because physical fitness is developed by training but not by anthropometric. Thus it is big debate among scholar whether anthropometrics has correlation with physical fitness. Therefore present study examined correlation between the anthropometrics and physical fitness variables among school talented untrained children.

2. METHODOLOGY

2.1 Selection of Subjects

According to instruction of ministry of education and sports, under 14 year's children of Jaffna Central College have been randomly assigned for this study. Prior to test sufficient instructions were given to all the subjects regarding trails of test, purpose, and all the procedures. All the subjects were volunteers to participate in this study and consents collected from parents. Initially 164 subjects have been recruited for study. Their anthropometric variables collected based on the data whom are stunting, wasting, abnormality they have been eliminated from the study. Finally 100 subjects assigned for this study.

2.2 Test Protocol

Selected subjected have followed 15 minutes similar warmed up and stretching exercise before commencing the physical test. Anthropometric variables were measured before a day of physical test. Following anthropometric variables were taken to account such as height, weight & body mass index. Physical fitness test conducted in following order such as speed, leg power, upper body strength, agility and endurance. Speed Test- 30M sprint was conducted to measure speed, subjects started sprint from standing start and completed maximum intensity time was recorded in seconds. At the time 3 subject's speed were measured. Leg power- Standing long jump conducted in long jump pitch to measure leg power, a subject made attempt with maximal force and succeed jump recorded in meter, three trails was given in this best was recorded. Upper body muscular strength- Medicine ball throw used to measure upper body muscular strength. Subjects throw the medicine ball by both hands from kneeling and putting distance recorded in meter three trails was given in this best was recorded. Agility test- in 10M distance 2 corns placed, when the signal given a subjects started to touch the line alternative. 4 times completed timing recorded as data. Aerobic power test- the subjects have to complete the 600M. This test conducted in standard athletic track. Successfully completed subjects of timing recorded in minutes.

3. RESULTS

To find out the correlation between anthropometrics and physical fitness variables we have administered Pearson coefficient correlation. Level of significant correlation was fixed at 0.05 levels. The P value is at 0.000 levels which indicate the significant correlation.

We evaluated the correlation between the anthropometrics, physical fitness variables among school talented untrained children. Which results displayed in Table-I that showed leg power did not correlate with any anthropometric variables such as height($r = -0.085$, $P > 0.05$), weight($r = -0.40$, $P > 0.05$) & BMI($r = 0.88$, $P > 0.05$), Moreover speed has not been correlated with anthropometrics variables like height($r = -0.007$, $P > 0.05$), weight($r = 0.220$, $P > 0.05$) & BMI($r = 0.279$, $P > 0.05$). Although upper body strength was positively correlated with all the anthropometrics such as height($r = 0.438$, $P < 0.05$),

weight($r=0.397$, $P<0.05$)& BMI($r=0.420$, $P<0.05$). Agility did not correlate with height($r=0.131$, $P>0.05$), but agility positively correlated with weight($r=0.365$, $P<0.05$) & BMI($r=0.430$, $P<0.05$). In contrast height($r=0.192$, $P>0.05$), weight($r=0.173$, $P>0.05$), BMI($r=0.220$) did not correlate with endurance.

Table-I
PHYSICAL FITNESS AND ANTHROPOMETRICS CORRELATION VALUES OF SCHOOL CHILDREN ARE SHOWN IN TABLE I

Variables	Speed(SP)		Leg power (LS)		Upper body Strength(US)		Agility (AG)		Aerobic power (EN)	
	R	P	R	P	R	P	R	P	R	P
Height	-0.007	0.864	-0.085	0.402	0.438	0.000	0.131	0.193	0.192	0.058
Weight	0.220	0.028	-0.40	0.275	0.397	0.000	0.365	0.000	0.173	0.089
BMI	0.279	0.005	0.88	0.385	0.420	0.000	0.430	0.000	0.220	0.029

4. DISCUSSION

Several research studies conducted to evaluate the correlation between anthropometric and physical fitness. It contributes adequate information regarding role of this anthropometric and physical fitness to enhance the sports performance. Previous studies indicated that significant difference has been observed between anthropometric and physical fitness variables among various levels of athletes such as young athletes of different levels or elite and non-elite athletes of soccer (Janssens et al., 2000; Reilly et al., 2000), handball (Zapartidis et al., 2009), hockey (Elferink-Gemser et al., 2004), and volleyball (Gabet and Georgieff, 2007; Smith et al., 1992; Thissen-Milder and Mayhew, 1991). Therefore depend on requirement of sports or game that anthropometric variables are considered.

Peak sports performance can be obtained from potentials anthropometric and physical fitness possess sports man. It ensures that an outstanding sportsman may have extraordinary physical characters and anthropometrics measurement which leads to improve sports performance and adopt to training load without disputes. Several explore studies conducted among various age, ethnic and sex regarding relationship between anthropometric and physical fitness variables. Majority of studies agreed that there are relationships between anthropometric and physical fitness. On other hand present study revealed that there are no correlation between anthropometric variables and leg explosive power. It is unclear and no previous study supported to present study therefore it is big debate among researchers.

Speed can be enhanced through improving muscles characters and which may be improved by proper training although some of them muscle characters have not increased through the sports training. Previous research studies highlighted the role of muscles characters on speed, the result revealed that speed is associated with genetic, morphological characters. Another concluded that genetics and training are equally important components for athlete achievements (Epstein, 2013) but not height, weight, it is ensured in present study. Therefore correlation may be impossible between anthropometric variables and speed. On other hand speed is depend on nature and nurture components for success in athletic ((Epstein, 2013). Moreover speed may be determined by body fat. Approximate level of body fat can be assessed by body mass index. Body mass

index play a vital role in physical fitness because weight gained has a negative impact on athletic performance without disputes. In contrast reducing weight can ensure the improvements of athletic performance (Wilmore, & Wilmore, 1992). Another study showed that increasing the fat mass has negative impact on sports performance (Rickenlund & Linden Hirschberg, 2004).

Upper body strength is a key component that contributes optimal athletic performance. Greater upper body strength may be interaction on height, weight and body mass index. It was confirmed in this study. Agility is one of the crucial variables that may be associated with greater or frequent of movement. This movement can be done with less weight because increasing the body mass index affect the movement of the body therefore agility has relationship with weight and body mass index. Further aerobic power is having interrelationship with lungs and cardio respiratory fitness. Increasing the cardiovascular capacity may upgrade the endurance performance therefore present anthropometric variables don't have interrelationship with endurance capacity. It was confirmed in present study.

5. CONCLUSION

Participants are talented physical quality based on anthropometric measurement. It clearly highlight that greater or distinguishing anthropometric characters based the sportsman should be elected for particular sports. In this view which sports highly demand upper body strength coaches should concern the anthropometric features in selection. Further which sports require more agility ability that sportsman should be recommend with less fat proportion. Therefore present study concluded that which sports demand high upper body strength and agility in selection of players need to consider the characters of anthropometric variables for excellent performance.

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EFFECT OF UPPER EXTREMITY PROPRIOCEPTIVE NEUROMUSCULAR FACILITATION COMBINED WITH MANUAL RESISTANCE ON RESPIRATORY FUNCTION.

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ABSTRACT

Respiratory muscle training, which applies linear resistance pressures during spontaneous breathing, has had significant effects on respiratory function and endurance. Aim of study was to evaluate the effect of Proprioceptive neuromuscular facilitation with manual resistance in upper extremity with respiratory function. Total 45 Patients referred to medicine Physiotherapy department with cardiopulmonary conditions were screened for inclusion criteria among which 30 subjects were selected. Subjects were selected of 18 years and above with mean age group 48.600 ± 18.005 . Participants were evaluated pre intervention with international physical activity questionnaire (IPAQ), pre and post intervention using peak flow meter for analysis of pulmonary function test. Treatment was carried out for 4 weeks. The pre mean and SD of peak flow meter was 222.76 (70.21), post mean was 226.61(61.65) with mean difference -3.855 and P value was <0.0001 which was considered extremely significant. The study concluded that PNF with manual resistance for Upper extremity, is significantly effective in improving the respiratory conditions.

Keywords: proprioceptive neuromuscular facilitation, respiratory condition, manual resistance ,upper extremity.

1. INTRODUCTION

Resistance exercise training produces several changes in muscle, such as hypertrophy, increased oxidative capacity, and changes in muscle fibre type^{1,2}. These physiological adaptations are accomplished to increase muscle force, endurance, and functional exercise capacity, which are reflected in improved quality of life and independence in activities of daily living. Therefore, several applications of this type of training exist in various areas of rehabilitation, including the orthopedic and cardio-respiratory fields.

The goal of breathing exercise interventions is to minimize disabilities resulting from diseases and to prevent recurrence, rather than complete recovery from disease, developing and applying diverse programs that can prevent decreases in respiratory activities and promote the functional performance of breathing is very important. Respiratory muscle strength and endurance can be improved by various breathing exercises which can consequently improve respiratory functions. Breathing exercises using direct interventions that improve respiratory functions have been performed by diverse subjects. Many studies have been conducted, including studies of vital capacity using high frequency inspiratory muscle training for normal persons, respiratory muscle training for normal persons, pursed-lip breathing exercises performed by COPD patients, exercises combining diaphragmatic breathing exercises and pursed-lip breathing exercises, diaphragmatic breathing exercises performed by PMD patients, respiratory muscle strengthening exercises performed by inspiratory muscle weakness patients, breathing exercises using pursed-lip breathing exercises and diaphragmatic breathing exercises performed by stroke patients, forced breathing exercises, and chest expanding exercises. Although many studies have conducted respiratory muscle training based on the theory that pulmonary functions are improved through direct respiratory function strength training, it is true that these studies comprise simple self-breathing exercises or one-dimensional basic resistive breathing exercises. A study conducted by Dietz indicated that muscle strength can be improved through three dimensional spiral large scale resistive exercises using proprioceptive neuromuscular facilitation (PNF). Therefore this study examined the improvement of respiratory functions induced by direct respiratory muscle resistive exercises through the PNF respiration pattern. Although this study was limited in that the experimental subjects were normal persons, clinical grounds for actual implementation of the exercises will be prepared based on its results.

improvement in muscle strength is often a desired outcome of patient rehabilitation. To this end, therapists have a variety of training modes available. Isotonic, isokinetic, and isometric exercise represent the major classifications of strengthening exercise. Isotonic exercise requires that a segment move a constant weight through a range of motion. Isokinetic exercise is performed whereby joint motion occurs at a preset ' speed or under a controlled velocity. During isokinetic exercise, varied resistance is encountered throughout the joint range of motion. Isometric exercise uses a sub maximal or maximal muscle effort with no joint motion occurring. The choice of exercise appears to influence the amount and rate of strength gain and the adaptations that occur in skeletal muscle. However, regardless of the choice of exercise, the resistance must be progressive for the most rapid strength gains to occur." The training method usually depends on the patient's type of injury, stage of recovery, and ability." Resistance training using elastic tubing seems to fall into a distinct

category. Unlike traditional resistance exercise methods, use of elastic tubing relies on the tensile properties of latex or other elastic polymers as a form of resistance. The level of resistance varies according to rate and elongation of stretch of the material. The resistance properties of tubing are often compared to the dynamics of a spring, whereby the change in length (applied force), type of material (modulus of elasticity), and cross-sectional area dictate the magnitude of resistance and the amount of potential energy stored. Since the resistance is not constant, elastic exercise is not formally considered isotonic exercise. In addition, the rate of stretch may be non-uniform, and this prohibits elastic tubing exercise from being categorized as a form of isokinetic exercise. Despite this categorical dilemma, elastic tubing exercise is commonly used for therapeutic exercise because of its low cost, simplicity, portability, versatility, and non-reliance on gravity for resistance. Elastic tubing exercise seems especially popular for shoulder rehabilitation, specific protocols and methods have been described that advocate exclusive use of elastic bands in strengthening the rotator cuff muscles. When the respiratory muscles are activated, they change the thoracic volume by providing movement of joints in the thorax thereby improving the chest wall mobility and exercise capacity in COPD patients¹²

1.1 PNF TECHNIQUES

PNF technique has develop muscular strength and endurance , joint stability, and mobility, neuromuscular control and co-ordination- all of which are aimed at improving the overall functional ability of patients. Analysis of functional development motor control, motor learning and neurophysiology .Irradiation is when maximal contractions of muscle recruits the help of additional muscle flexibility.



FIG A:D1flexion with elastic resistance.



Fig B:D2 flexion with elastic resistance.



Fig a: D1 extension with elastic resistance band.



Fig b: D2 extension with elastic resistance band.

1.1.1 Pulmonary Function Test

Pulmonary function tests (PFT's) are breathing tests to find out how well you move air in and out of your lungs and how well oxygen enters your body. The most common PFT's are spirometer (spy-RAH-me-tree), diffusion studies and body plethysmography. Sometimes only one test is done, other times all tests will be scheduled, often on the same day.

An individual's lung and airway function can be assessed by using a hand held peak flow meter. These measurement is often used to diagnose and monitor asthma and other respiratory conditions. A peak flow meter is a small instrument that an individual blows into. It measures the fastest rate of air flow that they can blow out of their lungs. The air flow is recorded in liters/ min .

The normal peak flow reading will vary depending upon an individual's age, size, and sex, even the time of the day. In healthy individuals peak flow readings will vary slightly e.g. in the morning the reading will tend to be higher than in the evening. In general peak flow readings are higher in men than women due to their physical size and because they are more muscular. The taller a person is the higher their peak flow. The highest peak flow reading for an individual occurs between the age of 30-40 years. A reading of 400-600 l/min is considered normal. An individual suffering with respiratory condition would have a lower reading of 200-400 l/min.

Exercise can increase an individual's peak flow readings. This is because exercise makes the lungs stronger and this increases the lungs ability to take in oxygen.

1.2 Normal values of peak flow :

Green- the green zone is 80-100 % of your highest peak flow reading. Air is moving well through the large airways in your lungs. It means that you can do your usual activities and go to sleep without trouble.

Yellow -Lung function tests can be used to: Compare your lung function with known standards that show how well your lungs should be working. Measure the effect of chronic diseases like asthma, chronic obstructive lung disease (COPD), or cystic fibrosis on lung function. Identify early changes in lung function that might show a need for a change in treatment. Detect narrowing in the airways. Decide if a medicine (such as a

bronchodilator) could be helpful to use. Show whether exposure to substances in your home or work place have harmed your lungs. Determine your ability to tolerate surgery and medical procedures.

The aim of the study was to evaluate the effect of Pro-prioceptive neuromuscular facilitation with manual resistance in upper extremity with respiratory function.

2. METHODOLOGY

2.1 Study Setting :Hospital Setup

2.2 Study Duration: 6 months.

2.3 Sample Size :30

2.4 Inclusion criteria : age group between 18 years old and above. history of cardiopulmonary conditions.

2.5 Exclusion criteria :Any orthopedic and neurological condition.

2.6 Materials required :Pen, Notebook, Elastic Resistance Band.

2.7 Outcome measure :International Physical Activity Questionnaire , Peak-flow meter.

2.8 Procedure:

Initially, Synopsis was presented and approval from ethical committee was obtained. Hospitals were approached and permission for data collection was taken. Total 45 patients referred to the medicine Department with cardiopulmonary conditions were screened and 30 patients satisfying inclusion and exclusion criteria were recruited. Prior to participation, subjects were informed about study protocol and written informed consent was taken from all subjects. The International Physical Activity Questionnaire (IPAQ) was taken to interpret the physical activity of patient. The pulmonary function was measured by peak flow meter pre-study. The lighter resistance of Elastic Band was used, based on The calculation of the percentage of elongation was as follows: % elongation = $[(\text{final length} - \text{initial length}) / (\text{initial length})] \times 100$. Elongation percentage was obtained through the values at each load produced in a specific colour range.¹The pattern will be used as flexion – abduction – external rotation with the elbow extended and extension – adduction – internal rotation with the elbow extended, using the reversal of antagonists as a specific technique.¹ The training protocol consisted of 3 sets of ten repetitions, with a 60-second rest interval between sets. The training protocol consisted of 3 sessions per week for 4 weeks. Sessions were held in the late afternoon and in the early evening. Total lung capacity measure using peak-flow meter pre and post exercises.

3. RESULTS:

To evaluate the effect of Pro-prioceptive neuromuscular facilitation with manual resistance in upper extremity with respiratory function, percentage, mean and standard deviation were computed and data pertaining to this has been presented in table 1 to 4 and depicted in graph 1 & 2.

TABLE 1
DISTRIBUTION OF PERCENTAGE INDICATION OF SAMPLE OF SIX AGE GROUPS

S.NO.	Age Group	Sample	%
1	25-34	10	34
2	35-44	03	10
3	45-54	03	10
4	55-64	07	23
5	65-74	04	13
6.	75-94	03	10
	Total	30	100

GRAPH- 1

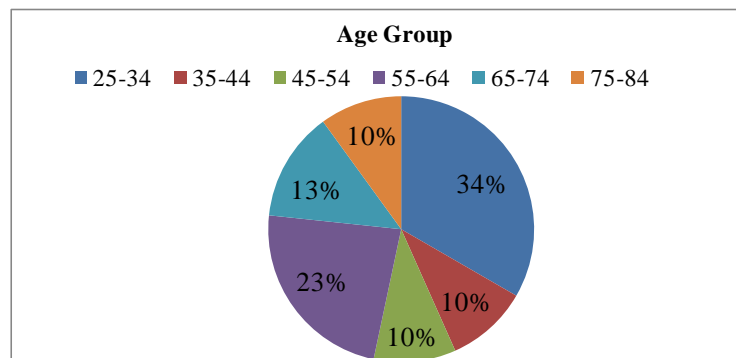


TABLE 2
MEAN AND STANDARD DEVIATION OF TOTAL SAMPLE OF PATIENTS IN DIFFERENT AGE GROUPS

Age Groups	Total Subjects	Mean	SD
06	30	48.60	18.005

Interpretation: The total sample size is 30, the mean value 48.600 ± 18.005 .

TABLE 3
DISTRIBUTION OF PRE-TEST AND POST-TEST SAMPLE ON THE BASIS OF PULMONARY FUNCTION TEST VALUES

S.NO.	Pulmonary Function Test (PFT)	Pre-test	Post-test
1	100-149	3	2
2	150-199	7	9
3	200-249	9	7
4	250-299	4	7
5	300-349	2	3
6	350-399	0	2
	Total	25	30

TABLE 4
DIFFERENCE BETWEEN PRE-TEST AND POST-TEST MEAN ON PULMONARY FUNCTION TEST OF SELECTED PATIENTS

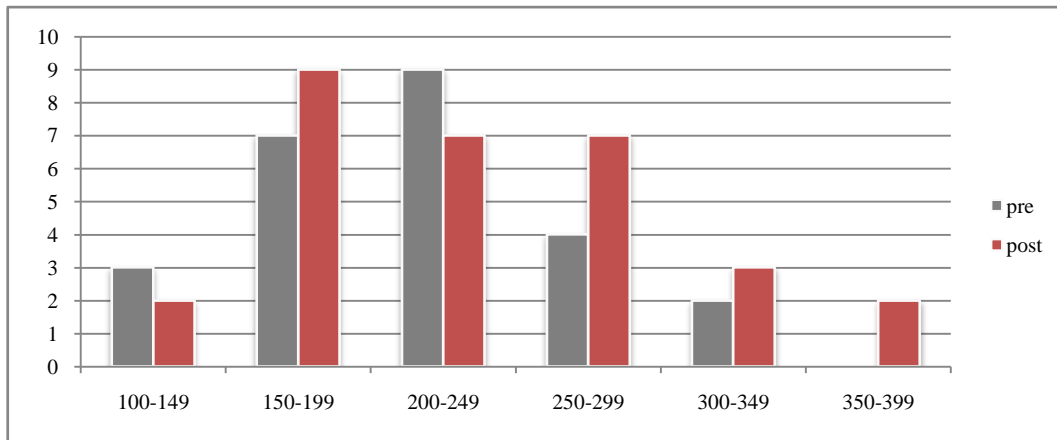
Test	Mean	SD	MD	P-value
Pre-test	222.76	70.21	3.85	<0.0001
Post-test	226.61	61.65		

Table 1 to 4 indicates that the pre mean and SD of peak flow meter was 222.76 (70.21), post mean was 226.61(61.65) with mean difference 3.855 and P value was <0.0001 which was considered extremely significant.

But according to international physical activity questionnaire. physical activity in last 7 days as per IPAQ scorings. We found that there were 17 subjects as minimally active

amongst 30 subjects, and heap active were 9 subject out of 30 samples and the inactive subjects were the remaining 4 subjects in the study. The study shows the significant improvement in the respiratory conditions.

GRAPH-2



4. DISCUSSION

This study was to aimed to evaluate the effect of proprioceptive neuromuscular facilitation with combined elastic resistance band in upper extremity with respiratory muscle strength, where a randomized control trail was taken, initially the synopsis was approved by the ethical committee and permission for data collection was received from the hospitals in Mumbai.

In the study 30 patients with age group of 18 and above years with cardiopulmonary conditions were selected according to inculsion and exculsion criteria. The international physical activity questionnaire (IPAQ) will be taken to interpret the physical activity of patients and peak flow meter to evaluate pulmonary function pre and post sessions. Treatment was given for 3 sessions per week for 4 weeks. Pre interventions reading of pulmonary function test were analysed where we found the p value is <0.001 with ore mean 222.76 ± 70.21 and the data collection we found the p value 226.61 ± 61.65 with mean difference of 3.855. after the evaluation we found that there was significant improvement in the upper extremity in respiratory conditions. Statistical analysis was done under 95% confidence interval.

Similar results were found by Guilherme P. T. Areas and colleagues in their study which showed that PNF combined with ERB showed significant increases in MIP and MEP ($p < 0.05$). In addition, there were significant differences between the TG and CG regarding ΔMIP ($p = 0.01$) and ΔMEP ($p = 0.04$).they concluded that PNF combined with ERB can have a positive impact on respiratory muscle strength. These results may be useful with respect to cardiopulmonary chronic diseases that are associated with reduced respiratory muscle strength. PNF is an approach to exercise therapy that uses specific movement patterns in diagonal and spiral directions together with specific techniques that facilitate the increase in strength and muscle function.¹⁰ In these study which were evaluated the effects of PNF alone on respiratory muscle force amongst 7 healthy subjects , the study found that there was increase in inspiratory and expiratory muscle strength had a very similar magnitude with similar sample.

Based on these studies, it can be inferred that the beneficial physiological muscle response of increase in respiratory muscle strength is related to changes in muscle fiber type associated with two muscle resistance training techniques. However, future research in this area is needed to address these issues and more firmly establish the relationship between the changes in the type of muscle fibers of respiratory muscles and the combination of PNF and ERB training. Moreno et al.⁹ reported that PNF possibly stimulates the main respiratory muscles (diaphragm and inter-costal), as well as other accessory muscles (neck muscles, chest wall, and upper limbs). Although the pattern used in the current study did not directly influence the muscles mentioned above, it is known that PNF operates indirectly from the main muscles trained¹⁰. It is known that various respiratory diseases produce changes in both respiratory function and respiratory muscle function⁷⁻⁹ and that the use of neuromuscular facilitation for the treatment of disorders combined with elastic bands would help the treatment of these patients, as it is of great importance in clinical practice due to the ease of use of these modalities in physical rehabilitation.

ERB are inexpensive, require no complicated installation, and can be used both at home and in the clinical environment, in contrast to pulleys as proposed by Voss et al.¹⁰ and Moreno et al.⁹. However, future studies should focus on the comparison between PNF combined with pulleys and PNF combined with elastic bands in the clinical improvement of respiratory disorders.

A different study by KyoChulSeo and their colleagues The purpose of this study was to determine whether proprioceptive neuromuscular facilitation (PNF) respiration exercise increases the pulmonary function of normal adults. Twenty eight normal adults in their 20s were randomly assigned to an experimental group (n=14) or control group (n=14). Over the course of four weeks, the experimental group participated in PNF respiration pattern exercises for 30 minutes three times per week. Subjects were assessed pre-test and post-test by measurement of pulmonary function (tidal volume, inspiratory reserve volume, expiratory reserve volume, Inspiratory capacity, and vital capacity). result showed that Our findings show that the experimental group had significant improvements in expiratory reserve volume and vital capacity. In the comparison of the two groups, the experimental group had higher pulmonary function than the control group In this study, they concluded the experimental group showed greater improvement in pulmonary function than the control group, which indicates that the PNF respiration exercise is effective at increasing the pulmonary function of normal adults. The experimental group showed significant differences in TV, ERV, and VC ($p < 0.05$), but did not show any significant difference in IRV and IC ($p > 0.05$).

The control group did not show any significant difference in any of the measured items ($p > 0.05$). Pulmonary function tests were conducted after four weeks of intervention. The experimental group showed significant increases in TV, ERV, and VC after the intervention compared to measurements taken prior the intervention, but they did not show significant increases in IRV or IC. COPD patients saw significant increases in ventilator and inspiratory threshold load and expiratory pressure, and Satori et al.²⁶) observed that feedback breathing exercises significantly increased fibrous cyst patients' forced expiratory volume in 1 second. In previous studies, pulmonary functions were improved by diverse exercises aimed at improving the respiratory activities of normal persons, lung disease patients, and nervous system disease patients. PNF breathing

exercises showed similar effects to those of direct breathing exercises, for normal persons. PNF

Breathing exercises, the mobility of the subjects' chest walls increased, which led to improvements in pulmonary function.

Breathing physical therapy has not yet been universalized in rehabilitation centers in Korea. The experimental group showed a 67% change in vital capacity, while the control group showed a 27% change. Jones et al.7) reported that respiration volume per

Breath cycle at normal times were increased by diaphragmatic breathing exercises performed by COPD patients, and that increases in final inspiration volumes and momentary amounts of ventilation appeared in COPD patients after pursed-lip breathing exercises.

M. Paul Raj et al found that PNF of respiration to improve the exercise capacity in patients with COPD was effective. Chronic Obstructive Pulmonary Disease (COPD) is described by persistent breathing symptoms and airflow restriction that is due to respiratory system abnormalities usually caused by substantial contact with harmful particles or gasses. This usually leads to increased breathlessness, frequent coughing with or without sputum, wheezing and tightness in the chest and reduced endurance. Limited research has been done on the effects of PNF of Respiration. The present study was a randomized controlled pilot trial that aimed to evaluate if the addition of PNF of Respiration to pursed lip breathing exercise would enhance the treatment effects when compared to the effects of Pursed lip breathing exercise alone in the management of COPD. Fourteen subjects (9 males, 5 females; mean age, 48.3 years; age range, 40–60 years) diagnosed with COPD were recruited from a local thoracic medicine out patient department. Subjects were randomly allocated to receive either PNF of respiration and pursed lip breathing exercise (Group A) or pursed lip breathing exercise alone (Group B). Outcome measures were distance covered in the six minute walk distance test and Modified Rate of Perceived Exertion (MRPE) during the 6 minute walk test. Between the group analysis showed that the results of Group A was statistically more significant than Group B for both the outcome measures (distance covered in 6min walk test (t value - 13.62, p value <0.001) and MRPE (t value - 2.95, p value <0.01). Hence, this study concluded that the PNF of respiration was more effective and can be useful therapy in improving exercise capacity in patients with COPD.

Therefore, our study concluded that PNF with manual resistance for Upper extremity is significantly effective in improving the respiratory conditions.

5. CONCLUSION

The study concluded that PNF with manual resistance for Upper extremity, is significantly effective in improving the respiratory conditions significantly effective in improvement of respiratory function and pulmonary conditions which was assessed through outcome measures like international physical activity questionnaire.

6. LIMITATIONS

- Limited age group can be taken for study sample.
- Outcome measure for measuring PFT can be alternate such as spirometer.
- Duration of time can be extended, week / sessions.

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EDUCATION PROBLEMS IN THE 21st CENTURY RELATED

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ABSTRACT

This thematic research article was prepared on the basis of evidences available in previous research works, literature published by Government of India and citations at internet by different educationist. This research was also based primary and secondary sources related to education problems faced by the students in 21st century in India.

In the present time, rational thinking needs to be done about the real problems and the role of education in modern life after understanding its basics, fundamentals and aims correctly. The requirement of a university degree as a Passport for starting nice and respectable career (white collard jobs) has made a mockery of higher education. Such an attitude has by-passed the need to “educate all”, resulted in negligence of primary and higher secondary education and in over-crowding the institutions of learning. The stress on quantitative increase has subverted all the attempts to improve the quality of teaching and learning. It has led to continuous fall in the academic standards and students’ discipline, regional imbalances in the growth of educational institutions and politics in the temples of learning.

In the modern era of neck to neck competition, one should continuously upgrade knowledge. It is the best way to create a larger base of skilled and trained manpower. Education should instill in students problem-solving attitude and develop the courage to meet the challenges of real life bravely. Instead of offering excuses or blaming others for one’s failures and dissatisfaction, it should inculcate in students the spirit to face the difficult situations in life and make efforts to change their destiny themselves. Education must teach people always try to have control over ones life’s situations and to stand up on his own feet rather than depending on others for moving forward. Success in life depends on developing capacity and courage to take right decisions at right time.

Keywords: Quality, Education, India, Problem, learning, Education all

1. INTRODUCTION

Long, long ago, Newton had said that he was 'like a child, who is picking pebbles at sea-shore while the great ocean of knowledge lies before me'. Since then, knowledge has grown enormously at a much faster speed than human ability to cope with it. Technological advancements of twentieth century, especially during post 1970's due to revolution in the field of information technology, have changed the whole scenario. Also it is equally important to upgrade knowledge continuously. As Alvin Toffler, renowned writer has said, "The illiterate of twenty-first century will not be those who can not read or write, but those who cannot learn, unlearn and relearn."

Unfortunately, meaning and purpose of literacy and education is misunderstood. Literacy does not merely mean the knowledge of three 'R's, nor does it mean only academic or theoretical studies/knowledge leading to award of degrees. Increasing knowledge-base through available information is also not the purpose of learning. Bookish-knowledge and award of degrees through formal education without effective training-systems neither serve any purpose nor lead the people to get employed gainfully.

The scope of education is much broader. It is a continuous process. It means complete up-bringing of the individual starting from the childhood till end. In its wider sense, literacy and education embraces within itself reading, observation, thought and its application in real life situations. Within its jurisdiction, also comes formation of habits, manners, character, attitude and aptitude along with imparting knowledge. Learning at each and every stage of life increases knowledge-base, understanding and attitudes of a person.

A well-planned and sound system of education inspires human beings to control their senses, mind and intellect, so that they could be adjusted better in real life's environment. It guides people to achieve their goals within time and cost parameters and to channelize their efforts towards desired direction. In short, a sound education system imparts knowledge, shapes attitudes, cultivates skills and builds work habits of the people

Knowledge has been considered essential for the purpose of giving activities, their due meaning and value. According to Hindu philosophy even a wise man may get puzzled without knowledge about do's and don'ts. It is only after the acquisition of knowledge, that a person understands the real nature of work and could distinguish correctly between action, forbidden action and in-action.

2. INDIA AND ITS EDUCATION SYSTEM

2.1 High regard for knowledge

India has always given importance to and showed a high regards for knowledge, wisdom, virtues, characters and will power. According to Indian philosophy, 'Wealth of knowledge is supreme among all forms of wealth'. (Vidya dhanam sarvadhana pradhanam). Therefore, knowledge is the greatest thing to be sought after. A human being is human because he has the organic capacity to think and seek knowledge.

2.2 More importance to knowledge than wealth

Unlike India, in Western countries, more importance is being given to creation of wealth. Wealth is the ultimate aim of the people, yardstick of success and a status symbol. Traditional India was not so materialistic. Its systems had separated pursuit and achievement in knowledge from temptations of worldly comforts, wealth or power-politics. According to Indian philosophy, when a person runs blindly after money and forgets about

the real purpose of knowledge, both wealth and knowledge vanishes from their lives. The only judicious way to generate wealth and gain power goes via the path of true knowledge.

2.3 Knowledge as the base of ranking

Earlier the greatness of a person, institution or a nation was judged on the basis of the degree of righteousness and justice. Greatness of a nation was judged with which its administration governed lives of the common men or their character. It was not on the basis of the size of a state, its military power or its treasury/bank-balance. Similarly, in the society, a person or a caste was ranked on the basis of knowledge, discipline and moral standards, and not on the basis of material success, muscle or money power or of having controlling power over the destiny of common man.

2.4 Respect for knowledgeable persons

In ancient India, apart from Brahmins, others were also paid respect by the society for their learning, character, spirituality and ability to guide general masses. The system was quite liberal in this matter. It gracefully accepted the right and opportunity to get to the top from the humblest origin and earn the respect of the whole society. For example, Vashishtha, the principal of the conservative school of Brahmanism, was the son of Uravshi, a prostitute. Vishwamitra, the maker of the very Gayatri Mantra, the quintessence of the Vedic Brahmanism, was a Kshatriya. Aitreya, after whom the sacramental part of Rig-Veda is named as Aitreya Brahamana, was the son from a non-Aryan wife of a Brahman sage. Vyasa of Mahabharata fame was the son of a fish-woman (belonging to Mahr community – Dalit according to present standards and to which Dr Ambedkar, the messiah of Dalits belonged). Balmiki, an untouchable according to present standards, the original author of Ramayana, is highly respected all over India. None of them were not ashamed of their origin. They still hold a very high position in general public minds.

2.5 Close connection between Knowledge and hard work

For acquiring knowledge, training mind in a scientific manner and concentrating energies of mind, one has to struggle, work hard, make sincere efforts and face many challenges in life. Now-a-days, courage to struggle or work hard is missing except in a few students, who still keep the fire of seeking knowledge burning all the time. Without hard-work, search for knowledge remains incomplete and superficial.

In ancient India sages (Rishi-Munies) had worked day and night to acquire true knowledge. The love for knowledge inspired many students to walk from different parts of the country to centers of learning at that time like Taxila or Nalanda. A powerful Emperor, like Ashoka the great, thought it his duty, to bow before the monks “as a mark of my deep respect for their learning, wisdom and sacrifice. What matters in life, are not a person’s status or position, but his virtues and wisdom. Only when you have raised yourself up from ignorance, can you recognize the greatness of a few in a sea of humanity. They had sacrificed their time (for about two centuries), energies and comforts in search of knowledge. Then only they could develop great modern scientific knowledge, technique and wealth.

3. EDUCATION IN MODERN INDIA

Sixty four years after independence and self-rule, illiteracy-rate has gone up to 74% from 65%. For males it has risen to 82% from 75%, for females to 65% from 54%. In absolute number, the figure is alarming. No nation can afford to have a large number of its population to remain illiterate, ignorant and unskilled.

3.1 Constraints

Sixty four years after independence and self-rule, literacy-rate has gone up to 74% from 65%. For males it has risen to 82% from 75%, for females to 65% from 54%. In absolute number, the figure is alarming. No nation can afford to have a large number of its population to remain illiterate, ignorant and unskilled.

That all is not well in education system in India – has been noted by distinguished academicians, policy-makers, political leaders, other eminent persons, commissions and committees. Now and then, they have pointed out its failures in one area or another. It has always been felt that Modern education has become increasingly unrelated to national needs and aspirations, insufficient, wasteful and dysfunctional. The constraints have already been existing in the education system, many more external and internal problems, paradoxes and constraints have cropped up.

In addition to what constraints that have already been existing in the education system, many more external and internal problems, paradoxes and constraints have cropped up. Some defects in modern education based on colonised British Grammer School type education, were pointed out by Gandhiji like –

- It is based upon foreign culture to the almost entire exclusion of the indigenous culture.
- It ignores the culture of heart and hand and confines itself simply to head
- Real education is impossible through foreign medium

3.1.1 External Constraints

Externally, socio-economic and political pressures have violated its identity and autonomy. Some changes have taken place in the recent past in the character, role and inter-relationship of these main constituent of the national elites – the political executive, the legislators, the businessmen, the media persons, the organized workers, the surplus farmers and the bureaucrats. It brought into the forefront some undesirable social changes and political turmoil. It has affected adversely the whole atmosphere in the field of education as well.

Population explosion has put a heavy pressure on present education system and its available infrastructure. Narrow loyalties, sectional interests and sub-cultures like – favoritism, nepotism and corruption have fast become an accepted way of life. Result is that communal, regional and caste conflicts and unhealthy competition between different powerful lobbies are increasing every day to have their exclusive hold on scarce resources available in the field of education or for power and pelf.

Few persons and groups, who have the power in their hands, control almost every walk of national life and are working to deny justice to common men. The reflection of all these social evils is found in the educational system as well.

3.1.2 Internal Constraints

Internally the system has been fractured along the lines of discipline deteriorating standard of education in general and student sub-culture. Slowly but steadily, the education system lost its capacity to equip the younger generation with relevant knowledge and skills for enabling them to get gainfully employed and to perform their jobs with a sense of responsibility. It has failed to produce much-needed dynamism in youth as well. Now people have started questioning the legitimacy of a modern education system itself.

3.2 Deteriorating standards

After independence, India is facing a rapid deterioration in standards of education. In the past, though education was thinly spread, it had maintained some standard. Now in an attempt to do quantitative expansion of education, quality of education suffered a lot. Standard of general education has deteriorated considerably and suffers from grave errors. In addition to it, there is lot of interference and control of the government at every stage of the educational process.

3.3 English medium

English medium puts extra strain upon the nerves of students and makes them crammers, imitators and unfit for original work and thought.

3.4 Higher secondary, the weakest link in Indian education system

Higher secondary education is considered to be insufficient and a weakest link in Indian education system. It needs sincere efforts to improve the Academic standards, curricula and methods of teaching at higher secondary level. In western countries the standard of higher secondary education is sufficiently high to ensure recruits of higher intellectual attainment to join various jobs at this stage.

3.5 Degree-oriented

The whole system of education and employment is degree oriented. Degree is the master-key to a nice and respectable career giving status, authority and final reprieve from manual work. Such a narrow mind-set has put tremendous pressure on higher education system.

3.6 Indiscipline

In the student community, discipline and observance of rules are supposed to be unnecessary and irrational. They have no respect for rules/discipline/morality or for elders, teachers or authority. Their interests lie in all that is sensuous, in material gains and in enjoying pleasures in life.

3.7 Employability

One of the major aims of education is to make youth employable. At present it is difficult to find out and recruit well qualified persons for various jobs in government, public or private sectors.

3.8 Unrealistic Manpower Assessment

Assessment of manpower requirement for economic growth is not done rationally according to national needs by the Government, but they have created large number of professional institutions in these areas without assessing the needs of the nation. It resulted in educated unemployment.

3.9 Role of Teacher

Teacher is the very leader of the society. He is actually the creator of the future of his country. The youth are more influenced with the impressive personality and right attitude of their teachers than any film star or model. A good teacher with his good behavior and personality traits can motivate, inspire and make the students almost indulged in his teaching. That is why a Guru is equated to God in our most adorable Vedas and Upanishads (Guru is none other than the creator, Lord Brahma, he verily is Lord Vishnu, the preserver and he truly is Maheshvara, the destroyer. He is supreme Brahma himself. To such a guru I offer my salutations).

3.10 Corruption among Teachers

But this has become the biggest challenge in this modern sophisticated and inescapable materialistic world where the creators themselves are lost in the transient and momentarily luxuries and joys. Their soul is shackled completely in the materialistic thoughts and actions. Name, Fame and money have replaced completely the internal peace and satisfaction and thus the eternal bliss has lost its valuable significance in this petty materialism. This is the world of selfishness and practical wisdom where the perishable wisdom has empowered completely the spiritual enlightenment and our education has failed completely to fulfill this primary goal. It is producing never tiring machines that need the petrol of money to run forever. But actually nothing is permanent except the character, the moral and ethical values, purity and piousness.

For all these lacunas, students blame teachers, teachers blame students. Both together try to blame educationists. They, in turn, attack social system. The present system of education can not be changed or improved overnight. It needs concentrated efforts of all – students, teachers and the society. Then only a larger base of skilled and trained manpower could be created.

4. REVIEW RELATED LITERATURE

Krishna (1997) stated that mankind is caught in a great illusion. It thinks it can solve its problems through legislation, through political and social reform, through scientific and technological progress, through greater knowledge, greater wealth, greater power and greater control. It may solve some problems with all this, but those are all trivial problems and temporary cures. Education in the 21st Century must therefore concern itself not with greater 'progress' but with the inner transformation of the human consciousness. It is not that this has not been pointed out before. The Buddha, Socrates, Christ and innumerable other sages in all cultures have pointed this out long ago. The twenty-first century demands a total change in our outlook on life and our vision of education.

A recently published study by Sarangapani (2003) on how knowledge is constructed in a rural elementary school in India makes a seminal observation in this regard. She says that 'in the school there are normative, structural hierarchies and value congruences not all of which can be derived from the framework provided by the school as a 'modern' institution' (Sarangapani, 2003; p247).

Harish (2011) suggested that the education must have to shift itself from mere imparting information to the knowledge empowerment and inculcation and development of values which will enable the students to find their problems and get the relevant solutions of them respectively and thus enable to make a more healthier, happier and benevolent society that could contribute respectively to the global growth and development.

Oza & Parab (2011) stated that if we yearn to enhance quality of management Education, the first we need to do to commit ourselves. It would require effort from one and all to achieve and maintain the desired standards in management education. As we know, the word improvement starts with 'I', so if everyone initiates self improvement, there would definitely be quality improvement in management education. This article attempts to identify the characteristics, challenges and elements which are required to deliver the quality management education in India and to find out the ways for total quality management in the present management education system.

Mishra (2010) revealed that in the 21st century's global economy, the new challenges facing the engineering profession have arrived, confirming the need to restructure engineering curricula, teaching and learning practices, and processes, including assessment. Possessing merely technical knowledge no longer guarantees an engineering graduate a successful career. And while all countries are facing this dilemma, India is struggling the most. It has been argued that most Indian engineering educational institutions struggle with the systemic problem of centralization coupled with an archaic examination system that is detrimental to student learning. This article examines some internationally renowned educational institutions that are embracing the growing importance of non-technical subjects and soft skills in 21st century engineering curricula. It will then examine the problems that India faces in doing the same.

Geske & Ozola (2008) find out the reasons behind the low level of reading literacy among primary school students. The data from IEA (International Association for the Evaluation of Educational Achievement) Progress in International Reading Literacy Study (PIRLS) 2001 are analyzed. And the main conclusions are drawn that the socioeconomic situation of the family has a great impact on students reading literacy as well as parents' education and reading aloud to a child at the preschool age. Students high achieving in reading literacy usually like reading for their own enjoyment and come from families where parents spend a lot of time on reading.

Ruprecht (2007) indicated that quality has become a key word. Self-assessments and peer reviews, quality management and student polls have become ubiquitous. With all these bustling activities the main element in education, the personal quality of the teacher somehow got lost. If we want to discuss real quality in education, we must first ask what the teacher's position is. This paper is going to discuss what conditions the teacher must fulfill in order to be a good teacher: what are his demands on himself, what he must he demand from the students? The society also part of this: What must a teacher expect from society in order to be a good teacher? The answers are, briefly: the teacher must be very exacting towards him/herself; he must constantly improve his personal and scientific qualifications. The teacher must not be soft towards his/her students. Society must provide him freedom, independence and respect. Yet these are only the prerequisites of quality in education.

There are three main lessons we can learn from India's experience over the last half-century. One is the challenge of mainstreaming innovative practices. The two experiments discussed earlier in this paper remind us the potential the system has for reforming itself. These projects also highlight the significance of the clarity of aims and assumptions as guiding principles for any quality-improvement programme. Apparently, policy-level learning from innovative experiences, and the mainstreaming of new ideas and practices have been neglected; and India may not be unique in this respect. The second lesson is that the issue of quality cannot be seen in isolation from the socio-cultural context of education. Any attempt to reform education, whether in a developed or a developing society, ultimately addresses our perspective on modernity, more specifically, on how the project of modernization is doing in the early 21st century, where it is heading, and what correctives it requires. Ever since the idea of mass education became an assumed goal of state policy, the role of the school has been to spread the culture of reason. Such a culture necessarily carries a transformative responsibility towards the milieu, and it is in the

fulfilling of that responsibility that the system has performed less than satisfactorily (Kumar, 2004).

Education is just like a torch that enlightens the way of human beings by not only imparting knowledge in the relevant field but also inculcating moral values, spiritual attitude, and the righteousness in character, the forever existing and never stolen treasure of goodness, piety and purity. The cardinal motive of education is the all round development of an individual. It functions like a magic trick that transforms an illiterate and uncivilized animal to a literate and civilized man. But, in today's so called ultra modern & highly sophisticated society, education has lost its actual existence somewhere. The modern & sophisticated youth of today's totally materialistic and high-tech society finds little interest in the prevailing education. He gets high degrees & certificates with high percentage but fails to achieve the primary goal of education. He knows the things theoretically but is not able to prove the facts practically. The major flaw in the education field is caused by corruption that has successfully spread itself as a giant epidemic disease especially in India and also has played a major role to bring idleness among the youth. No doubt, we enjoy luxuries & facilities but have lost our confidence, right attitude, mental peace and satisfaction, our conscience and even our identity as a human being and the respective qualities. In the context of such a concern, the education must have to shift itself from mere imparting information to the knowledge empowerment and inculcation and development of values which will enable the students to find their problems and get the relevant solutions of them respectively and thus enable to make a more healthier, happier and benevolent society and must contribute to the global growth.

"A child's legs, arms and body are made stronger by healthful play. We can deduce the mind with its organic counterpart – part, the nervous system, improves and becomes better equipped because of use and exercise in the form of reading, calculating, memorizing, speaking, imagining and other mental activities."(Sorenson 1948). This is education that is responsible for the all round development of human beings.

5. CONCLUSION

Rational thinking needs to be done about the real problems and the role of education in modern life after understanding its basics, fundamentals and aims correctly.

The requirement of a university degree as a Passport for starting nice and respectable career (white collar jobs) has made a mockery of higher education. Such an attitude has by-passed the need to "educate all", resulted in negligence of primary and higher secondary education and in over-crowding the institutions of learning. The stress on quantitative increase has subverted all the attempts to improve the quality of teaching and learning. It has led to continuous fall in the academic standards and students' discipline, regional imbalances in the growth of educational institutions and politics in the temples of learning.

In the present times of neck to neck competition, one should continuously upgrade knowledge. It is the best way to create a larger base of skilled and trained manpower. Education should instill in students problem-solving attitude and develop the courage to meet the challenges of real life bravely. Instead of offering excuses or blaming others for one's failures and dissatisfaction, it should inculcate in students the spirit to face the difficult situations in life and make efforts to change their destiny themselves. Education must teach people always try to have control over one's life's situations and to stand up on

his own feet rather than depending on others for moving forward. Success in life depends on developing capacity and courage to take right decisions at right time.

Only sound system of education and training can provide a lasting solution for various problems, people are facing today. It can lead the youth towards rational, positive and creative thinking. It would make youth capable to make right decision at right time, plan rationally about their career that would suit to their attitude and aptitude and to shoulder their responsibilities properly. It would enable them to act judiciously and promptly, give them courage to avoid out-dated traditions and dogmatic ways of doing things, courage to face realities and challenges.

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EFFICACY OF HYDROTHERAPY VERSUS HOME BASED EXERCISES IN KNEE OA.

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ABSTRACT

Background : Several studies have studied the effect of TENS , manual therapy, home based exercise program and hydrotherapy on knee OA . However combined effect of hydrotherapy with TENS have not been reported so far. Objective : To compare the efficacy of Hydrotherapy and TENS with that of TENS and home based exercise in subjects with knee osteoarthritis Study Design : Experimental study. Methodology : 30 patients with knee OA (Grade I to 3) aged between 45 to 70 years (female, male) fulfilling the inclusion and exclusion criteria were recruited which were randomly allocated in two groups . Group A subjects were given with hydrotherapy and TENS and group B subjects were given TENS and home based exercise program. Pain , stiffness and functional ability were depicted by WOMAC index along with knee joint ROM .Data Analysis : was done by using SPSS version 16. Anova, T test and Turkey's method was used for comparison Result :. Significant change were seen Between and within both groups for WOMAC, NPRS and Knee Flexion ROM . The significance for P value was <0.001. Conclusion: This study proves that hydrotherapy improves pain, functional skill and range of motion in patients with knee osteoarthritis.

Keywords : Hydrotherapy, NPRS WOMAC, TENS, OA knee.

1. INTRODUCTION

Osteoarthritis (OA) is chronic joint disorder in which there is a progressive softening and disintegration of articular cartilage accompanied by new growth of cartilage and bone at joint margins (osteophytes) and capsular fibrosis.¹

As per a recent report published in the Times of India (2010) regarding OA, over 40% of the Indian population in the age group of 70 years or above suffer from OA. Nearly 2% of these undergo severe knee pain and disability. As per a recent statement quoted by Piramal Healthcare Limited in a nationwide campaign against chronic diseases, "India is expected to be the chronic disease capital, with 60 million people with arthritis, by 2025"²

Osteoarthritis (OA) is a chronic disease characterized mainly by complex, multifactorial joint degeneration. The prevalence of OA increases with age and eventually leads to joint stiffness, progressive deformity, and functional impairment, which, in turn, negatively affect the individual's quality of life. In recent years, the increase in the elderly population has been accompanied by a proportional increase in the number of people with OA.³

Being a chronic degenerative disorder of multifactorial etiology characterized by loss of articular cartilage and periarticular bone remodelling, it causes joint pain, typically worse with weight-bearing and activity as well as can manifest with stiffness after inactivity. It can present as localized, generalized or as erosive osteoarthritis. Primary osteoarthritis is mostly related to aging, whereas, secondary osteoarthritis is caused by another disease or condition.⁴

Radiographic OA of the knee joints is believed to be the most common manifestation of pathology in this joint and different grading systems have been used, for example, the Kellgren & Lawrence system and the Ahlbäck classification. Depending on the populations studied and the epidemiological techniques used, the prevalence figures for radiographic OA of the knees (with or without symptoms) vary between 14 and 30% (over the age of 45 years).⁵

Radiological osteoarthritis was assessed by means of the grading system proposed by Kellgren et al. There was no written indication of sex or age on the film. A subject was considered to have radiological osteoarthritis if the Kellgren score at the left or right side, or both, was greater or equal to two.⁶

Treatment of OA focuses on clinical, functional and mechanical joints improvement. The approach must be multidisciplinary and rely on pharmacological and non-pharmacological measures. Therapeutic exercises and sports activities guided by a qualified professional should be prescribed and encouraged. Physical activity is recommended for patients with knee OA as one of the most effective non-pharmacological therapies and may improve range of motion, stiffness, pain and quality of life. Among the activities listed the exercises in the water, in form of hydrotherapy shown to be effective in controlling pain and function such as walking and climbing stairs. in patients with OA⁷

Transcutaneous electrical nerve stimulation (TENS) is widely used in the management of chronic pain. The use of conventional (high-frequency) TENS was originally based on the gate-control theory of pain, which suggested that counter stimulation of the nervous system could modify the perception of pain. Studies suggested that with low-frequency, high-amplitude ("acupuncture-like") stimulation, TENS could also raise endorphin levels in the spinal fluid.⁸

The use of tens to relieve knee pain in osteoarthritis of the knee (OAK) is recommended in various clinical guidelines as a conservative treatment to relieve knee pain⁹

Exercise plays an important role in the management of this chronic disabling disease (Zhang et al 2008). An overview of systematic reviews reported that there is high-quality evidence that exercise reduces pain and improves physical function in patients with osteoarthritis of the knee (Jamtved et al 2008). Recently, evidence for a positive effect of exercise therapy was provided in a systematic review (Fransen and McConnell 2008). Exercise is a broad concept that may include strength training, range of motion exercises, and aerobic activity. Education and home exercises are also often part of an exercise intervention. Fransen and McConnell (2008) analysed the effects of these various treatment methods, studying subgroup effects for simple quadriceps strengthening, lower limb muscle strengthening, strengthening together with an aerobic component, walking program only, and other treatment content. However, they were unable to demonstrate any significant difference in effect size between these subgroups for either pain or physical function.¹⁰

Moderate exercise is effective in reducing pain and improving function in knee and hip OA. However, exercise is underutilized as a therapy for OA, and more than 60% of US adults with arthritis do not satisfy the recommendations for physical activity.¹¹

The aim of the study was to compare the efficacy of Hydrotherapy and TENS with that of TENS and home based exercise in subjects with knee osteoarthritis

2. METHODOLOGY

Study Design- Experimental, Study Setting - home based, Population –Manali and sub areas, Sampling method: Convenient sampling . Samples size: 30

2.1 Inclusion Criteria

- Patients with knee pain (due to OA) for more than 3 months.
- Age range 45 to 70 years.
- Patient having mild to moderate pain level on 5 point likert scale (Womac Index)
- Both the genders are included.
- Patients having grade 1 to 3 knee osteoarthritis according to Kellgren-Lawrence radiographic grading scale

2.2 Exclusion Criteria

- Traumatic cases of lower extremity such as fractures.
- Patients suffering from severe cardio-pulmonary disease.
- Patients suffering from sciatica or any other neurological deficit of lower extremity.
- Patients suffering from any other lower limb joint pathology other than OA knee.

2.3 Instruments and Tools for Data Collection

- Womac Index
- Numerical Pain Rating Scale
- Universal Goniometer

3. PROCEDURE

The subjects who fulfil the inclusion and exclusion criteria were included in the study by taking the written consent of them. Orthopaedic assessment and womac scale assessment done for each patient was done. Subjects were conveniently divided into two groups named group A

and group B. Group A- In this group, subjects received Hydrotherapy exercises and TENS
Group B - In this group, subjects received Home based exercises and TENS.

3.1 Hydrotherapy exercises

The hydrotherapy exercise group underwent exercises sessions in a 32 degree c pool (80cm) deep. The exercises used for the group include stretching and strengthening of quadriceps and hamstring muscles. Hydrotherapy group had 30 minute training session 3 times a week for 4 weeks. Two repetitions of each exercise were performed per muscle group, with each repetition contractions maintained for 6 seconds

3.1.1 In a sitting position

Straighten the knee with the foot in dorsiflexion and bend the knees with the foot in plantar flexion while moving forward in the pool and straighten the knee with the foot in plantar flexion and bend the knees with the foot in dorsiflexion while moving backward in the pool

3.1.2 In high sitting

With back against the side of the pool, ross one leg over the other and place one hand on the top of foot to grasp the toes and hold for 6 seconds and straighten knee using a band to raise the foot in dorsiflexion and hold for 6 sec

3.1.3 In standing position,

Holding onto the edge of the pool, bend one knee (heel up toward buttocks), hold the raised foot with one hand, and gradually push the pelvis, holding for 6sec. In the same position in front of the wall, hold the wall with your hands, lift the leg backward to a comfortable height; return and repeat with the other leg. In a standing position, with your back against the side of the Pool, slowly lift the leg straight forward to a comfortable Height; return and repeat with the other leg.

3.2 Home based exercises

3.2.1 Isometric quadriceps contraction in full extension held for five seconds (subjects sits on the floor with back supported and legs extended, with rolled towel under the knee and contracts quadriceps by pushing into the floor against towel.

3.2.2 Isotonic quadriceps contraction held in mid flexion for five seconds (subjects sits in a chair, lifts lower leg to partially extended position and hold)

3.2.3 Isotonic hamstring contraction -Subjects lies on front or side and bends knee bringing foot towards body.

3.2.4 Dynamic stepping exercises -walking up and down on stair.

If subjects were experiencing increased pain due to the exercises, the intensity of the exercise programme was reduced.



TENS

The TENS (electronic TENS by medi-pulse professional health care product NSIC) TENS was applied using a frequency of 100 Hz, pulse width of 50 μ s, intensity (mA) set at the individual subject's sensorial threshold 20 minutes three times a week for 4 weeks . Four surface electrodes (5 \times 5cm) were placed over the painful area in the knee



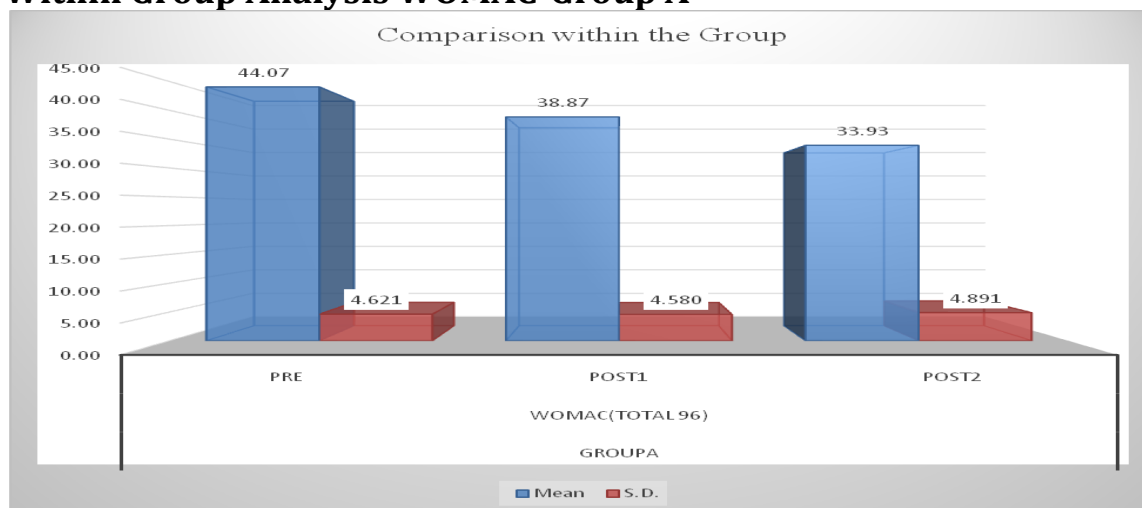
4. RESULTS

Data analysis was carried out after collecting the data for the three outcome measures of the patients in both the groups. The comparison was to be done between the NPRS, WOMAC disability index, KNEE FLEXION ROM of patients of the group A and patients of the group B. As the comparison was done within and between the two groups, the sample size was small (n=15 group A and n=15 group B) so ANOVA/paired, unpaired t-test and Turkey’s method for Pair wise comparison was used.

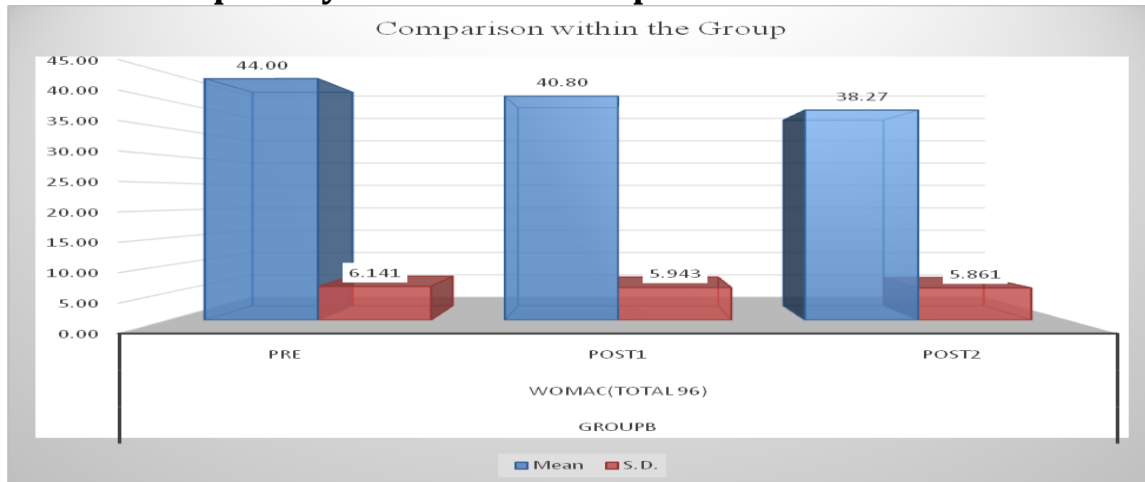
TABLE 1

Frequency (%)	Gender	
	Group A	Group B
Male%	53.3	46.7
Female%	46.7	53.3
Male	8.00	7.00
Female	7.00	8.00

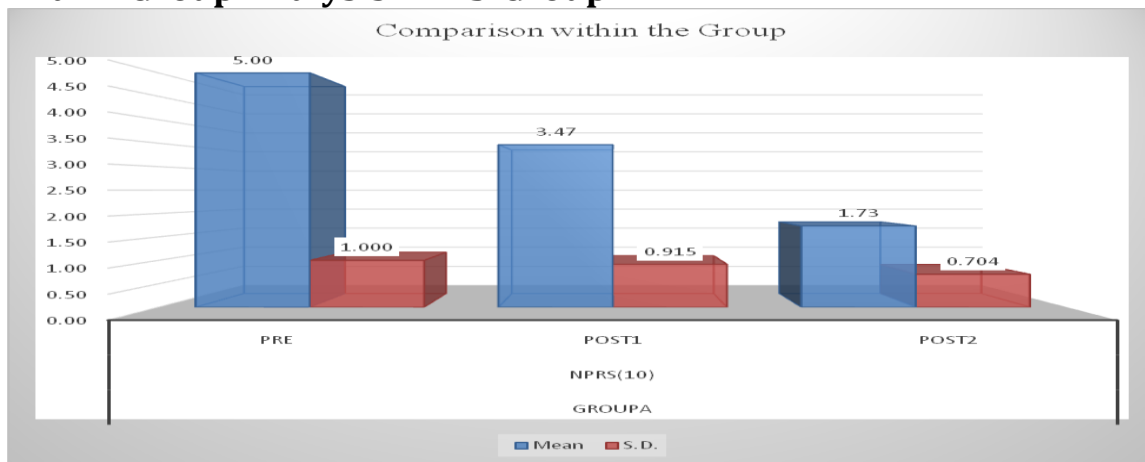
Within Group Analysis WOMAC-Group A



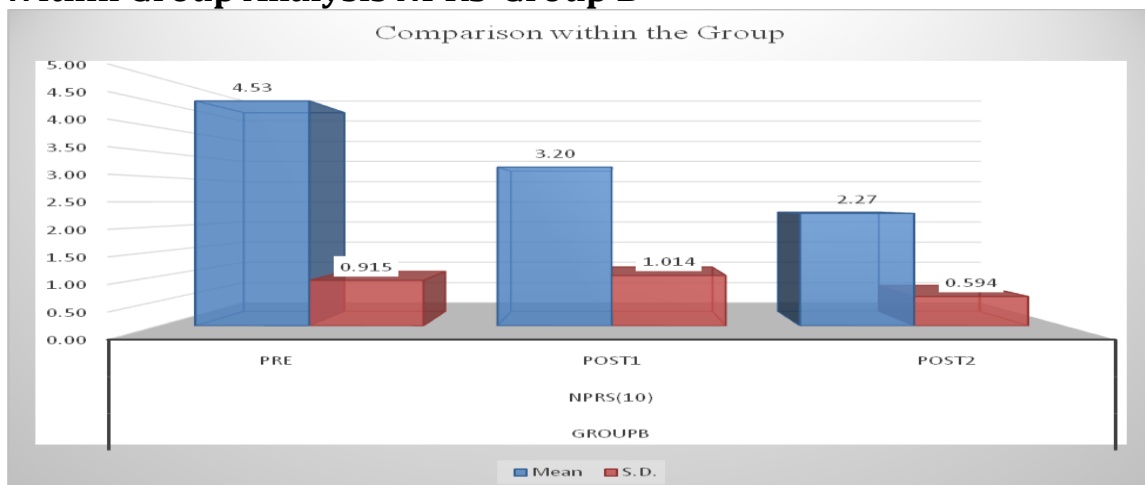
Within Group Analysis WOMAC-Group B



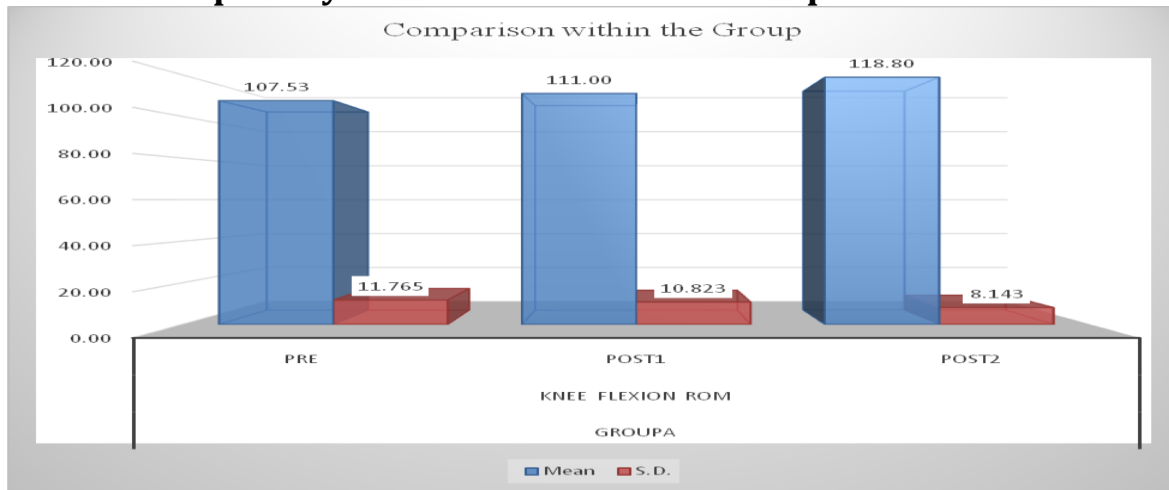
Within Group Analysis NPRS-Group A



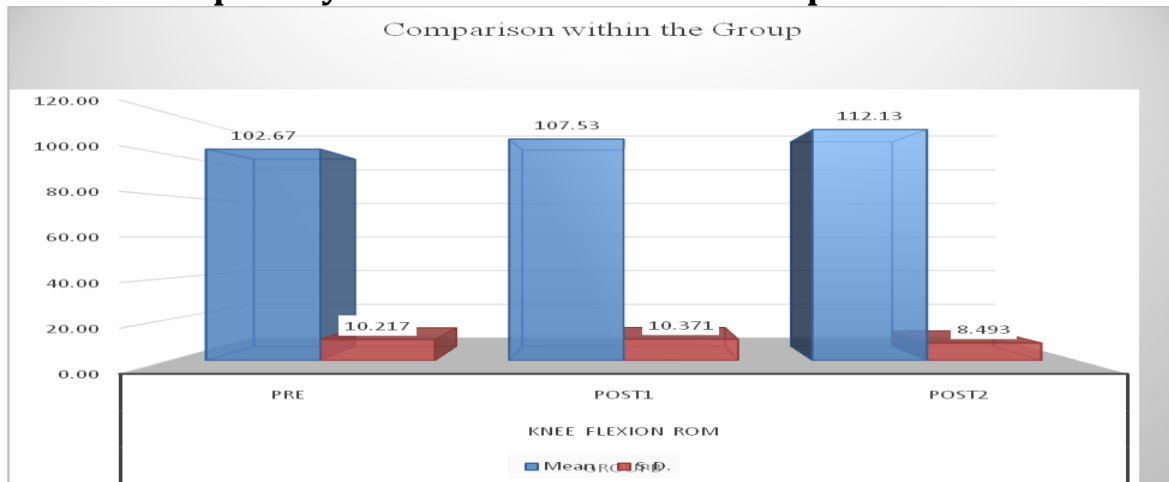
Within Group Analysis NPRS-Group B



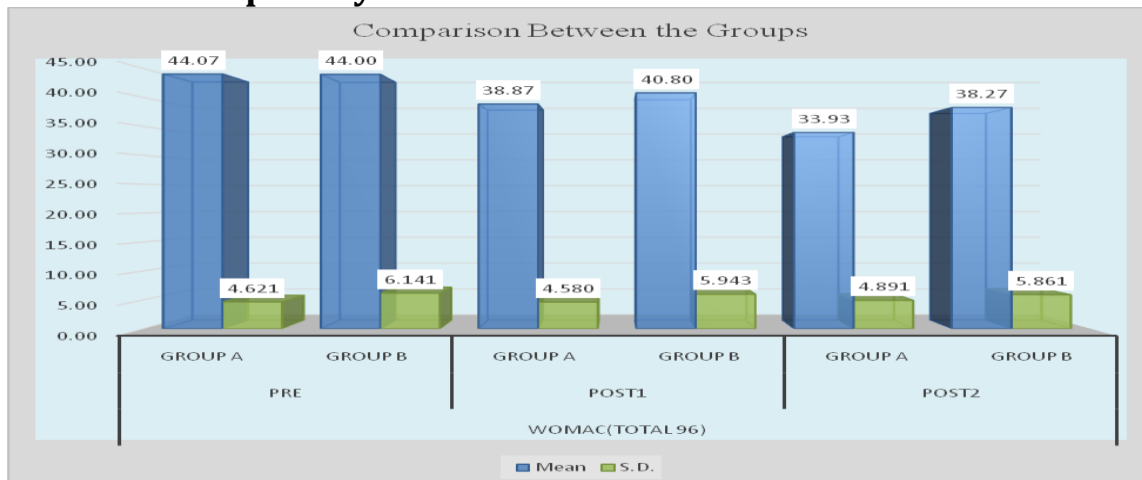
Within Group Analysis Knee Flexion ROM-Group A



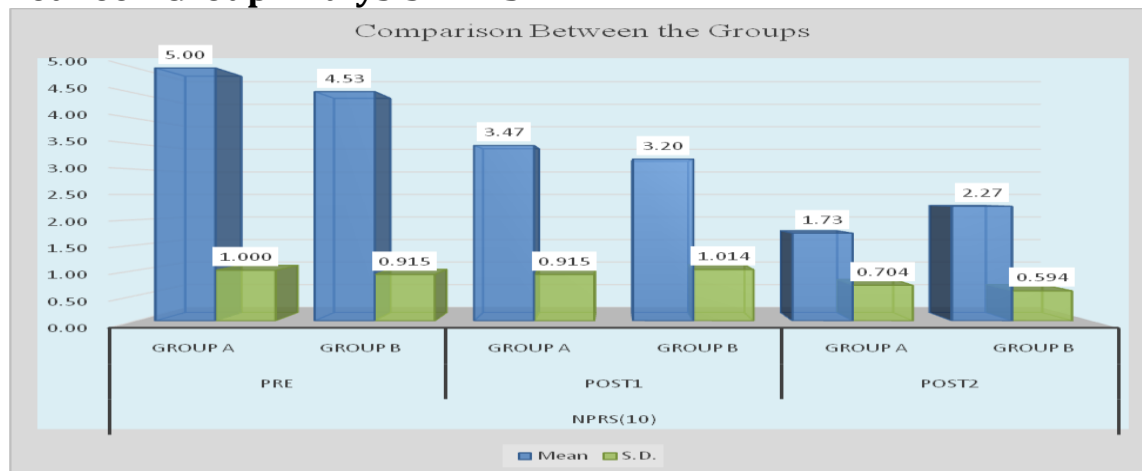
Within Group Analysis Knee Flexion ROM-Group B



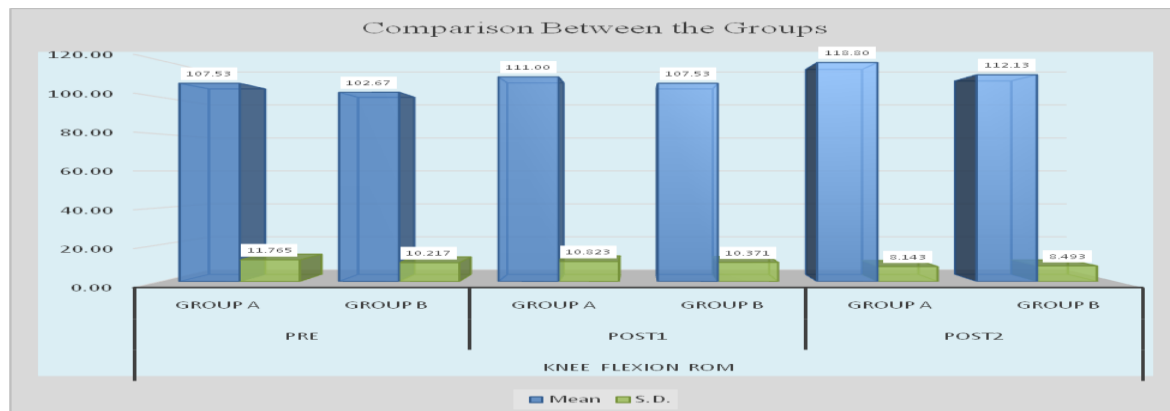
Between Group Analysis WOMAC



Between Group Analysis NPRS



Between Group Analysis KNEE FLEXION ROM



Between GROUP A and GROUP B mean values for WOMAC, NPRS and Knee Flexion ROM shows that there were significant changes. Pre and Post values within both GROUP A and GROUP B s for WOMAC,NPRS and Knee Flexion ROM also shows significant changes. The significance for P value was <math><0.001</math>.

5. DISCUSSION

Disability and Function

In the present study, general disability reduced and hence, knee function improved in both the groups as measured by the Womac index. It could be because with the exercise the extensibility of the muscle will be enhanced, improvement in muscle strength and increase in joint range of motion. As pain is also decreased so the functional outcome improves as supported by Hinman et al 2006 which claims that water environment of hydrotherapy pool may encourage muscle relaxation, thus reducing muscle guarding around joints and enhancing movement and physical function. While on the other side our findings are opposed by Lund h et al (2008) which claims that comparing aquatic exercises with land based exercises in which they observed no improvement in Knee pain, Koos score and strength of muscles.¹²

Pain -Pain improved in group A significantly. As HALL 2007 supported that hydrotherapy reduces pain significantly as buoyancy of water may block nociception by acting on thermal and mechanoreceptors, thus influencing spinal segmental mechanisms in his study. Ann E Rehmann (2010)the compressive effects of hydrostatic pressure in combination with the circulatory changes that occur with immersion reduce swelling and allowing greater movement to reduce joint and soft tissue stiffness therefore improves range of motion in affected joint¹³

Frank ET al 2001 conducted a study to see effects of aquatic and traditional exercises on knee OA subject .pre and post measurements for knee ROM shows that there were no significant difference between aquatic exercises and land based exercises.¹⁴

6. CONCLUSION

This study proves that hydrotherapy improves pain, functional skill and range of motion in patients with knee osteoarthritis.

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COMPARISON OF AEROBIC AND ANAEROBIC CAPACITY OF SPRINTERS, JUMPERS AND THROWERS

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ABSTRACT

The study was to compare the aerobic and anaerobic capacity of sprinter, jumper and throwers. Therefore, N=30 male athletes with mean age of 21+/-1.25 year were selected as the subjects. These athletes were further, divided into three groups of sprinters (SP), jumpers (JP) and throwers (TR) respectively. Each groups were consists of 10 athletes in the group. The variables of the studies were aerobic capacity (ABC) and anaerobic capacity (ANBC). The 12 minute Cooper run & walk test was used for testing the aerobic capacity (ABC) and 50 meter sprint was used for testing the anaerobic capacity (ANBC) of the selected athletes for three groups. To compare the selected athletes of intervention groups on aerobic capacity (ABC) and anaerobic capacity (ANBC) analysis of variance (ANOVA) was used as statistical procedure with the level of significance at 0.05. The results of the study revealed that there were insignificance difference was found among the selected groups on aerobic capacity. There were significance difference was found among the selected groups on anaerobic capacity. The post hoc test showed that Sprinters followed by Jumpers had high anaerobic capacity.

Keywords:-aerobic capacity (ABC), anaerobic capacity (ANBC)

1. INTRODUCTION

Aerobic capacity is the ability to mobilize energy for continuous performance of specific movement for prolonged time i.e. capacity for prolonged physiological functioning under continuous supply of required oxygen under conditions of required oxygen completely available. The glucose molecule is completely broken down to CO₂ and H₂O, and energy is made available as needed (Astrand O Rodhal. (1970). Anaerobic capacity is the ability to mobilize energy during activities of intensive nature i.e. executing intensive work with explosive action in short duration of time, such as, kicking the football faster and for explosive take off in jumps, maximum rate for about two to three minutes under water swimming (Coleman A. (1974).

Both Aerobic and Anaerobic capacities play an important role in influencing the performance in various games and sports. In activities which involve working with maximal intensity for shorter period of time, such as, Sprinting, Weight lifting, kicking of Football fast, explosive jumping etc. anaerobic capacity can play an important role. In games and sports where a sportsman has to resist fatigue relatively for longer period without effecting skill proficiency, for example, long distance running, swimming, cycling, rowing and even some team sports such as football and hockey, Aerobic capacity of individual plays an important role (Schreiber Mary. (1993).).

2. METHODOLOGY

For the purpose of this study researcher had selected the subjects from all India inter university athletic championship. The mean age of selected subjects was 21+/-1.25 year with well-equipped experience of interuniversity level. There were 30 (N=30) male athletes which were further divided into three group consist of n=10 athletes in each group of sprinters (SP), jumpers (JP) and throwers (TR) respectively. The variables of the studies were aerobic capacity (ABC) and anaerobic capacity (ANBC). The 12 minute Cooper run & walk test was used for testing the aerobic capacity (ABC) and 50 meter sprint was used for testing the anaerobic capacity (ANBC) of the selected athletes for three groups. The data was collected during the peak performance of the selected athletes at LNIPE athletic track. To compare the selected athletes of intervention groups on aerobic capacity (ABC) and anaerobic capacity (ANBC) analysis of variance (ANOVA) was used as statistical procedure with the level of significance at 0.05.

3. RESULTS

The collected data on aerobic capacity (ABC) and anaerobic capacity (ANBC) of three groups consists of sprinters (SP), jumpers (JP) and throwers (TR) were analysis and presented in table-I to III.

Table-I
Statistical significance difference Among Sprinters, Jumpers & Throwers on Aerobic Capacity

Source of treatments	Df	Sum of squares	Mean squares	f- ratio
Between group	2	232666.7	116333.3	1.61
Within group	27	1953500	72351.85	

Significant at 0.05 level of confidence, F 0.05 (2, 27) = 3.54

The table-1 depicts, that the calculated F ration value for sprinters (SP), jumpers (JP) and throwers (TR) was 1.61 which was statistically insignificance as the tabulated value was F

0.05 (2,27) = 3.54 which is less here, hence there were insignificance difference was found among the selected groups on aerobic capacity.

Table-II
Statistical significance difference Among Sprinters, Jumpers & Throwers on Anaerobic Capacity

Source of treatments	Df	Sum of squares	Mean squares	f- ratio
Between group	2	2.80	1.40	8.14
Within group	27	4.65	0.17	

Significant at 0.05 level of confidence, F 0.05 (2, 27) = 3.54

The table-2 depicts, that the calculated F ration value for sprinters (SP), jumpers (JP) and throwers (TR) was 1.61 which was statistically significance as the tabulated value was F 0.05 (2,27) = 8.14 which is higher here, hence there were significance difference was found among the selected groups on anaerobic capacity.

Further, to find out the mean statistical significant difference among the selected sprinters (SP), jumpers (JP) and throwers (TR) Post Hoc test was applied.

Table-III
Post Hoc test for statistically mean difference Among Sprinters, Jumpers & Throwers on Anaerobic Capacity

Mean of different groups			Mean difference	Critical difference
Sprinters	Jumpers	Throwers		
6.27sec.	6.49sec.		0.22	0.38
6.27sec.		7.00sec.	0.73	
	6.49sec.	7.00sec.	0.51	

Above table-III, indicates that there were no statistical significant difference between sprinters and jumpers as mean difference 0.22 is less than critical difference 0.38. However, there were statistical significant differences between Jumpers and Throwers as mean difference 0.51 is higher than critical difference 0.38. Sprinters and Jumpers have high anaerobic capacity and sprinters have got the highest among all.

4. DISCUSSION

The study was a noble piece of work for comparison of three different athletics groups consists of sprinters (SP), jumpers (JP) and throwers (TR) on two selected physiological variables .i.e. aerobic and anaerobic capacity. The results of the study revealed that in term of aerobic capacity there were insignificance difference was found, where ales there was contra results was found in anaerobic capacity as there were statistically significance difference was observed. The aerobic and anaerobic capacity was two different physiological conditions in sports training which was opposite to each other in aerobic capacity an individual can perform the activities for longer period of time on other side in anaerobic capacity an individual can perform for very short period of time.

The selected subjects for this study were from three different events of athletics which were totally different in term of execution. The sprinters run with their maximum

ability and cover short distance in minimum time. Jumpers covers maximum distance with achieving high speed in short distance where as, the throwers throw maximum distance with achieving high momentum in shorts duration. In nut and shell the selected subjects were belong to anaerobic capacity activities. This might be reason for finding the statistical difference among the subjects in term of anaerobic capacity.

The similar results were found in researches Manju Chahal (2015) conducted on Sprinters =30, Jumpers =30 and Throwers =30. This is also supported with studies of Pawan Gusain (2013) on similar subjects of inter college level. Sanesh Kumari & Navin Kumar (2015) performed the same results on similar subjects.

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**EFFECT OF CORE STRENGTHENING ON DYNAMIC BALANCE AND AGILITY
IN BADMINTON PLAYERS**

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ABSTRACT

Badminton is the most popular sport in world. However, badminton players require repetitive movements, like jumping, squatting, changing in position. This repetitive movement can affect lower limb injury. Balance is a major factor to prevent injury. To find out the effect of core strengthening on dynamic balance and agility in badminton players. 30 badminton players between the age 10-19 years (mean age 14+) were selected and informed consent was taken. Subjects filled Questionnaire, and modified star excursion tests for dynamic balance and core strengthening program were done, data was collected and analysed & treated. Total 4 weeks 5 times in week of exercise protocol given. Modified star excursion scale used for dynamic balance pre and post of training period. Illinois t-test used for assess the agility pre and post of training period. The result showed that there is significant effect of core strengthening on dynamic balance and agility. The result showed increased distance in all three directions on modified star excursion scale and increased agility on t test. The p values of anterior, posteromedial, lateral distance are 0.0655, >0.10, >0.10 that is significant. The p value of agility score is 0.02 that is significant. There is effect of core strengthening on dynamic balance and agility in badminton players.

Keywords : Badminton, dynamic balance, agility, core strength

1. INTRODUCTION

Badminton is a racquet sport played using racquets to hit a shuttlecock across a net. There is high level skill required to play badminton at the elite level, though to be a successful player they also need good reflexes and be quick and agile around the court. The important factors for badminton players are muscle strength, muscular endurance, power, speed, agility, flexibility, balance and coordination. Functional movements are highly dependent on this part of the body, and lack of core muscular development can result in predisposition of injury [1].

Core muscles includes transverse abdominal muscle, abdominal external oblique muscle, multifidus muscles, abdominal internal oblique, psoas major muscle. A core muscle is used to stabilize the thorax and the pelvis during dynamic movement and it also provides internal pressure to expel substances. Static core functionally is the ability of one's core to align the skeleton to resist a force that does not change. The core strength training plays an important role in reducing and preventing lower and knee joint injuries [2].

Badminton players need to conduct various movement patterns during the game including specialized twists, jumps, footwork, and swings to strike the shuttlecock and keep it moving back and forth on the court. Thus, the game is characterized by a changing actions of short period and high or intensity coupled with a short resting times [3].

It appears that repeated activation of core musculature along with extremity movements helps to improve postural control. During performance of sports skills, a stable core provides a foundation upon which the muscles of the upper and lower extremities can accelerate body segments and transfer force between distal and proximal body segments [4].

The core muscle strengthening may help to improve dynamic balance and muscle coordination between lower and upper extremities, as well as reducing injury risk and muscle imbalance. Thus, the purpose of this study to find out the effect of core strengthening on dynamic balance and agility in badminton players.

The aim of the study was to find out the effect of core strengthening on dynamic balance and agility in badminton players.

To find out the effect of core strength on agility by using Illinois t test for agility.

2. MATERIAL AND METHOD

Study setting: ground and badminton court. Study design: experimental study

Target population: badminton players. Sample size: 30 Sampling method: convenient

Material: Star excursion balance test Illinois test for agility.

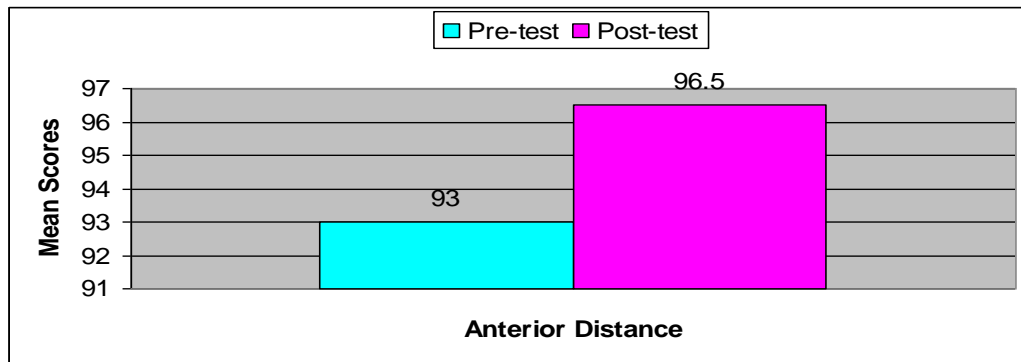
3. PROCEDURE

Informed Consent form was taken. All procedure explained to them. All subjects were tested to assess agility dynamic balance test before and after four weeks of training period. Samples completed their training five times in a week for four weeks. Agility performance was evaluated by using the t test. Dynamic balance was evaluated by using the modified star excursion test. Data was documented and analyzed and subjected for statistical analyzed.

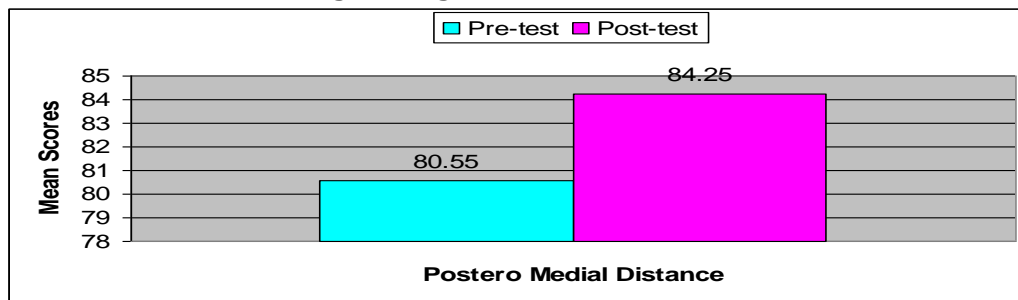
3. RESULTS

Modified star excursion scale: The mean value of anterior distance pre and post is 93 and 96.5 respectively. The mean value of postero medial distance pre and post is 80.55 and 84.25 respectively. The mean value of lateral distance pre and post is 70.1 and 74.16

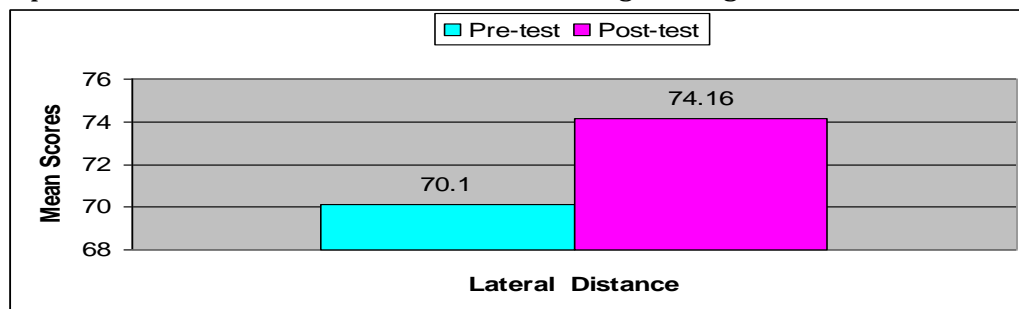
respectively. Agility test: Mean value of agility test pre and post is 12.5 and 12.13 respectively.



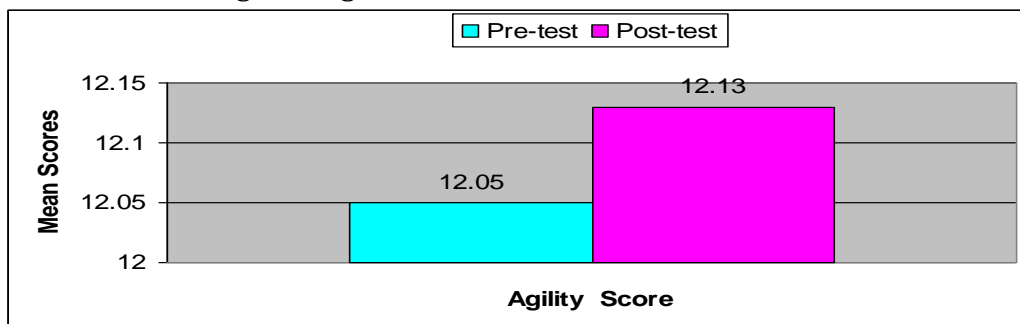
Interpretation-Graph no 1 showed that there is increased anterior distance after the core strengthening.



Interpretation: Graph no 2 showed that there is increased posteromedial distance after the core strengthening.



Interpretation: Graph no 3 showed that there is increased lateral distance after the core strengthening.



Interpretation: Graph no 4 showed that there is slight increase in score of agility.

5. DISCUSSION

The purpose of the current study was to examine the effect of core strengthening on dynamic balance and agility in badminton players. We hypothesized that balance would improve in badminton players after 6 weeks of core strengthening program. The result of this study showed that there is effect of core strengthening on dynamic balance and agility. The study was included 30 sample size. The value of anterior distance is 0.0655 that is significant. The p value of posteromedial distance is >0.10 that is significant. The p value of lateral distance >0.1 that is significant. The p value of agility score is 0.02 that is significant. The result indicated that all the three direction of modified star excursion score is increased direction. Modified star excursion scale (0.99 reliability) was used to access the dynamic balance. T- test of agility (0.98 reliability) was used to access the agility. According to all the evaluation we tried to find out the effect of core strengthening on dynamic balance and agility.

Core muscles are located in the vertebral column and around abdominal cavity. Depending on the role and properties of the core muscles it can be divided into deep and shallow core muscles, the former covering the transverse abdominis and multifidus muscle, while the latter contains the rectus abdominis, abdominal oblique muscle, external oblique, and lumbar Para spinal muscles. Strengthening the core muscle could have resulted in a smaller displacement in the mediolateral centre of pressure and also, in the centre of mass. This means that, the motion at the level of the trunk and hip is properly controlled, resulting in the significant dynamic balance improvement that has been recorded in the previous study (5).

The core muscles after four weeks of strengthening will respond like any other skeletal muscle, to training, thereby improving the ability of the neuromuscular system to perform dynamic, eccentric, isometric stabilization contractions in response to gravity and momentum. Higher core stability performance might lead to improved synchronization of motor units and lowering of neural inhibitory reflexes (6).

It is well known that position of the spine significantly determines the position of the body's COG and compensatory muscle synergy/strategy to counteract the perturbations, to maintain the body's equilibrium state and to regulate body's postural control. Higher core stability performances allow optimal and long sustained contraction of the deeper spinal stabilizer muscles. These stabilizer muscles due to their close proximity with the spine are responsible for better control of the inter-segment motion of the spine and thus a better control of the body's COG.

Study also indicated that core training not only improve the core muscle strength, but also improve the stability of the body movement during the LOS test which requires the well coordination of the upper and lower extremity limb, because a recent study also indicated that pilates training can enhances the control of trunk movement, and improves the neuromuscular coordination of movements (7).

Dynamic balance refers to the capability of having suitable reactions regarding the motor system, in order to be able to cope up with the requirements needed for the quick alterations of position in the tarso, while performing activities that add stress on the knee joint. Operationally, the dynamic stability may be defined as the ability of the body to maintain position or intended trajectory after internal or external disturbances. (8,9).

A stable erect body posture, or any specific joint, is controlled by the neuromuscular system in relation to the shift in the involved parts at the time of action including the core. (10). Pain may also affect dynamic balance in individuals with PFPS (11).

Deficiency in the control of the neuromuscular system of the body's trunk or core may affect the dynamic stability of the lower extremity, which can lead to the tibiofemoral or patellofemoral joints (6).

The current study used a variety of core strengthening methods using stable surface, using limb movement to challenge the postural control system, and performing some exercises in weight bearing position thereby contributing to improved balance scores. The exercises included prone bridging (20secs. hold with 20 reps.), supine bridging (20secs. hold with 20 reps.), sideline bridging (20secs. hold with 20 reps.), quadruped alternate arm leg raise (20reps.), crossover crunch (20 reps.), supine bridge with alternate leg extension (20 reps.)

The finding of this study showed significant improvement in the overall performance of modified star excursion scale. In next study we can concentrate on particular one direction after same program. We can specifically evaluate the anterior distance, postero medial and lateral distance. However, the result of this study showed there is effect of core strengthening on dynamic balance and agility in badminton players.

6. CONCLUSION

From the above study we can conclude that there is effect of core strengthening on dynamic balance and agility in badminton players.

7. LIMITATION

Less study duration. Less sample size.

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EFFECT OF MODEL PHYSICAL EDUCATION CURRICULUM ON SELECTED SPEED PARAMETERS OF DEXETROUS PREADOLESCENTS.

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ABSTRACT

The purpose of the study was to find out the effect of model physical education curriculum on selected strength parameters of dexterous preadolescents. For that purpose 40 right handed dominance preadolescent students from Smart Mission high school Anantnag Jammu and Kashmir India were selected as subjects. The age ranges between 10-13 years. The subjects were divided into two groups (n=20), the experimental group and control group. The model physical education curriculum was implemented on the experimental group. The curriculum contains three parts A (the physical exercises), B (the yogic asnas), C (the recreational part). The experimental group underwent training for 15 weeks, 4 days a week and 45 minutes per class including warming-up and cooling down exercises. The speed on left and right hand were selected as dependable variables and tested before and after experimental period. The collected data was analyzed by using ANCOVA. Further independent 't' was calculated to find out the difference between left and right hand and the percentage was also calculated to find out the level of improvement on dexterous. Level of confidence was fixed at 0.05. The result of the study shows that the model physical education on curriculum improves the strength of selected subjects (experimental group). As compared to control group.

Keywords: Physical education curriculum, Dexterous, speed.

1. INTRODUCTION

Physical training has been shown to be an effective way to improve the force-producing capacity of hand muscles and to partially reverse the changes observed in the muscle architecture (Izquierdo M, 2003). Mysterious reasons, the right hand significantly gains on the left hand, it is many times superior in accuracy, facility to dominate coordination. Trough dexterity testing is usually provided the result that shows the both quickness and accuracy of the subject in performing any kind of dexterity tasks. Dexterity testing products examine a person's motor skills with regards to the fingers, hands, and arms Bernstein N.A (1991).

Curriculum is a comprehensive plan for an educational training program course to offer new improved work force to fulfill the rising needs of a dynamic society. The physical education curriculum framework is structured to ensure that students can enjoy an open, flexible and balanced program featuring a variety of movement experiences.

For elementary and middle school curriculum include activities that help kids obtain and improve skills, such as running, catching, throwing and striking, applicable to sports such as base ball, volleyball or karate. Balancing skills could be applied to dance or gymnastics. High school curriculum should focus on life time sports skills like tennis or aerobic dance, with a secondary emphasis on team sports. High school curriculum prepares students to become highly proficient in one or more sports or fitness activity of their choice. The health and physical education curriculum also promotes important educational values and goals such as, tolerance, understanding excellence and good health. These values are reinforced in other curriculum areas, as well as, in society itself.

Dexterous refers to the skill and grace in physical movement, especially in the use of the hands; adroitness. In other words, ability to manipulate fine objects with the hands. Handedness is the preferred use of the right hand, the left hand, or one or the other depending on the task. Handedness is the natural or biological preference for using one hand more than the other in performing special tasks depending on which hemisphere is dominant for the task (Rice, 1998).

The adaptive response by the physiological system of the body to physical training, including the neuromuscular system is directly related to the training stimulus. The physical training involves prolonged muscular work increases physical capacity such as strength, endurance, flexibility, co-ordination and so on. The abilities that involve the use of hands develop over time, starting with primitive gestures such as grabbing at objects to more precise activities that involve precise hand coordination. Fine motor skills, are skills that involve a refined use of the small muscles controlling the hand, fingers, and thumb. The controversial idea, people are not either left-handed or right-handed but "strong-handed" or "mixed-handed" (Guiard, Y. 1987).

Handedness is a better(faster or more precise) performance or individual preference for use of a hand, known as the dominant hand, the less capable or less preferred hand is called the non dominant hand(Holder 2012).

Fine motor skills include the ability to manipulate small objects, transfer objects from hand to hand, and various eye-hand coordination tasks. The training through physical education curriculum is an effective means of training people to develop the ability to control the movements of their eyes. The exercise helps in the development of hand-eye coordination. The physical education curriculum can help in improving the fine motor skills

of the hands' grasping power and finger flexibility. Physical training using varying softness and hardness being on a continuous basis can build the hand grip. It also makes the hands and fingers stronger (Kabbash, P, 1994). These physical training methods to develop fine motor skills and improve hand-eye coordination. It also improves visual skills by showing how to distinguish and associate between dexterous and motor co-ordination.

2. METHODOLOGY

2.1 Selection of Subject

For that purpose 40 right handed dominant preadolescent students from Smart mission high school Anantnag Jammu and Kashmir India were taken as subjects. The age ranges between 10-13 years. The subjects were divided into two groups (n=20), the experimental group and control group. The model physical education curriculum was implemented on the experimental group. The curriculum contains three parts 'A' (the physical exercises), 'B' (the yogic asana), 'C' (the recreational part).

2.2 Training Procedure

The physical exercises contain the simple exercises and some special exercises like Bouncing the basketball (right and left hand alternatively), Wall catching (right and left hand alternatively), Ball juggling (both right and left hand). The yogic part includes the exercises like Dhanoor asana, Bhujang asana, Ananda Bal asana etc. The part 'c' that is the recreational part includes the recreational activities which helps to refresh the students after the finish of the above two parts, the main reason to include the recreational part in curriculum is that the children can feel the curriculum easy and can enjoy it and also prepare them to get ready for next work. Every three weeks the load and intensity of exercises was increased by 5%; so that the physiological will adopt by the model physical education curriculum on strength development among Dextrous Pre adolescents.

2.3 Training Program

The model physical educational curriculum was implemented on the experimental group for 15 weeks, 4 days a week and 45 minutes per class including warming-up and cooling down exercises. The speed were selected as criterion variable.

2.4 Tool Used

The hand reaction reaction timer (chronometer) was selected as testing tool. The subjects were tested for speed of left and right hand with the help of chronometer.

2.5 Statistical Analysis

The data was collected from two groups left and right hand was statically examined by applying ANCOVA to find out significant difference. Further independent "t" was calculated to find out the difference between left and right hand and also percentage was also calculated to find out the level of improvement on dexterous. Level of confidence was fixed at 0.05.

3. RESULTS

To find out the significant difference between left and right hand group on dexterous, Mean, SD, t-ratio and ANCOVA were calculated. Percentage was also calculated to find out the level of improvement on dexterous and data pertaining to this has been presented in Table and 2.

TABLE 1
ANCOVA FOR HAND SPEED

VARIABLES	DEXTEROUS	Adjusted Post Test Mean		SOV	Sum of Squares	df	Mean Squares	'F' Ratio	
		Physical Training Group	Control Group						
SPEED	Right Hand	39.08	43.66	B	207.49	1	207.49	80.84*	
				W	94.97	37	2.57		
	Left Hand				B	318.25	1	318.25	
			39.07	44.87	W	213.62	37	5.77	55.12*
					W	24.17	37	0.65	

(SOV - Source of Variance, B -Between, W - With-in, df - Degree of Freedom)

* Significant at .05 level

F.05 (1,37)=4.11

Table 1 indicates the significance difference between right and left hand speed among preadolscence student of an institution, as the obtained f-ratios of 80.84 and 55.12 respectively were higher than the required F.05 (1, 37)=4.11

TABLE 2
DEXTEROUS 't' VALUE AND MAGNITUDE OF IMPROVEMENT

VARIABLES	DEXTEROUS	Mean	SD	't' Value	Magnitude of Improvement In %
HAND SPEED	Right Hand	4.01	1.90	2.37*	10.43 %
	Left Hand	6.36	3.98		15.71 %

*Significant at .05 level

t.05 (38)=2.03

Table 2 shows the significant difference between right hand and left hand Speed of pre-adolscence studentsa of an institute, as the obtained t-ratio of 2.37 was high than the required t.05 (38)=2.03. Due to selected physical training. The magnitude of improvement was higher for left hand when compared to right hand on hand Speed. Hence it was concluded that the selected physical training improves the dexterous level.

It indicates the significant difference between right hand and left hand Speed due to selected physical training. The magnitude of improvement was higher for left hand when compared to right hand on hand Speed. Hence it was concluded that the selected physical training improves the dexterous level.

4. DISCUSSION

The findings confirm that model physical education curriculum which includes the part A (Physical Exercises) Part B (Yogic Asana) Part C (The Recreational Part) epically the physical exercises and yogic part has made a significant effect on speed.All these parts have a good impact on the neuromuscular system of the body which helps in the improvement of dexterous among school pre-adolescent school boys. The following findings of different researchers were in conformity with this study.

5. CONCLUSION

It was concluded that the model physical education curriculum which includes a set of exercises programs helps in improving the speed of dexterous hands. Hence the dominant hand shows better improvement on speed. The non-dominant hand has also improves speed when compared to base level.

6. IMPLICATION

The results of the study give an idea about the physical training through curriculum on dexterity. If an individual is heaving better dexterity, they can able to do any sort of work with both hands simultaneously without getting tired. The findings of the study are helpful for physical educationists and coaches to enhance the dexterity of players who involved in various sports activities. The players can use their dominant and non-dominant hands effectively while performing any kind of physical activity. Being ambidextrous (using both hands) in sports activity is especially helpful during the competition.

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DIFFERENCES IN BALANCE ABILITY BETWEEN SPORTSPERSONS BELONGING TO INDIGENOUS AND NON-INDIGENOUS SPORTS

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ABSTRACT

Balance is a fundamental ability of human movement. It is the most inherent human function for producing and continuing movement patterns. The assessment and the periodic monitoring of static and dynamic balance in athletes can be an important mechanism. Balance is an important component of skill related physical fitness aiding in prevention of injury as well as skill development. The objective of the present investigation was to examine the differences in balance ability between sportspersons in indigenous and non-indigenous sports. The subjects in the indigenous (N=119) sports were from Kabaddi and Kho Kho; whereas in non-indigenous (N=199) sports were from Handball, Football and Volleyball. Sportspersons representing Bangalore, Mangalore, Mysore, Karnatak University and Kuvempu University were selected through purposive random sampling technique. The unilateral and bilateral Romberg's test was used in the present investigation to assess balance of sportspersons. The necessary data was collected by the investigator with the help of a trained helper during coaching camps for inter University level competitions. Apart from descriptive statistics, independent sample 't' test was employed to examine the differences in balance ability. The results revealed that the sportspersons from indigenous sports have high Unilateral as well as bilateral balance as compared to their counterparts in non-indigenous sports. The results are discussed in light of past research findings and conclusion drawn.

Key words: Balance, Indigenous, Non-Indigenous, Sports, Physical fitness.

1. INTRODUCTION

Balance is the most inherent human function for producing and continuing movement patterns. The application of principles of balance and stability when performing specific sports skills is indispensable to success. Further, balance is considered as a limiting factor for performance in sports (Zemkova, 2014). Balance is the ability to counteract forces that would interrupt equilibrium. Balance is a fundamental ability of human movement. Maintaining balance during anti-gravitational activities as well as proper body posture represent a ground-stone for the execution of other secondary movements. These are used to propel body through space or manipulate with the surrounding environment (Winter, 1995).

The relationship between balance ability and sport injury risk has been established in many cases (Hrysonmallis, 2007), but the relationship between balance ability and athletic performance is less clear. Based on the available data from cross-sectional studies, gymnasts tended to have the best balance ability, followed by soccer players, swimmers, active control subjects and then basketball players. There were some sports, such as rifle shooting, soccer and golf, where elite athletes were found to have superior balance ability compared with their less proficient counterparts, but this was not found to be the case for alpine skiing, surfing and judo (Hrysonmallis, 2011).

The assessment and the periodic monitoring of static and dynamic balance in athletes can be an important mechanism in order to correctly define and change training programs, taking into account the sport practiced, the rate of improvement in balance scores over time and the athlete's age. This would allow to maximize, in each period of the athlete's body development, the harmonic creation and optimization of a wide set of fundamental motor abilities (Ricotti, 2011).

Balance is an important component of skill related physical fitness aiding in prevention of injury as well as skill development. A study on balance ability is essential on sportspersons in the Indian context. Indigenous games like Kabaddi and Kho Kho have unique characteristics altogether. Their values in development of physical fitness cannot be undermined. An attempt has been made here to analyze the uniqueness of balance ability in sportspersons participating in indigenous sports at inter University level. The objective of the present investigation was to examine the differences in balance ability between sportspersons in indigenous and non-indigenous sports.

2. METHODOLOGY

2.1 Selection of Subjects

The subjects for the study were inter-University level sportspersons participating in indigenous (N=119) and Non-Indigenous sports (N=199). The subjects in the indigenous sports were from Kabaddi and Kho Kho; whereas in non-indigenous sports were from Handball, Football and Volleyball. Sportspersons representing Bangalore, Mangalore, Mysore, Karnatak University and Kuvempu University were selected through purposive random sampling technique.

2.2 Instrumentation

The unilateral and bilateral Romberg's test was used in the present investigation to assess balance of sportspersons (Sekir and Gur, 2009). It is a commonly performed balance test which was first described by Moritz Heinrich von Romberg in the early 19th century (Le & Kapoula, 2008; Longridge & Mallinson, 2010; Ma et al., 2009). It is a test of the body's

sense of positioning (proprioception), which requires healthy functioning of the dorsal columns of the spinal cord (Khasnis & Gokula, 2003).

2.3 Data Collection

The necessary data was collected by the investigator with the help of a trained helper during coaching camps for inter University level competitions. Apart from descriptive statistics, independent sample 't' test was employed to examine the differences in balance ability.

3. RESULTS

Analysis of raw data on balance ability through Unilateral and bilateral Romberg's test was carried out. The results are provided in table 1.

	Groups	N	Mean	Std. Deviation
Bilateral balance	Indigenous sports	119	4.3826	2.23
	Non indigenous sports	199	5.8508	3.76
Unilateral balance	Indigenous sports	119	8.4303	4.22
	Non indigenous sports	199	9.6193	5.81

The results in table 1 makes it clear that the scores on balance ability are normally distributed and homogeneity is acceptable. The results on 't' test for independent variables was employed and the results are provided in table 2.

	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Bilateral balance	-3.873	316	.000	-1.46815	.37910
Unilateral balance	-1.947	316	.052	-1.18896	.61070

From table 2 it is evident that there exists significant difference in balance ability between sportspersons in indigenous and non-indigenous sports. It can be inferred that the sportspersons from indigenous sports have high Unilateral as well as bilateral balance as compared to their counterparts in non-indigenous sports.

4. DISCUSSION

Inter University level sportspersons participating in Indigenous sports have higher balance than the sportspersons participating in non-indigenous sports. Playing barefoot may be one of the probable reasons for this differences. Although mat has been extensively used in indigenous sports, players in sports like Kabaddi and Kho Kho play barefooted. This opens avenues for future research on footwear and its influence on balance ability. Contrary to present findings Bisht, Singh and Mardikar (2017) did not find any significant difference in Balance Ability among the sportspersons of Contact, Semi-contact and Non-Contact Sports.

According to Hrysomallis (2011) balance training may lead to task-specific neural adaptations at the spinal and supra-spinal levels. It may suppress spinal reflex excitability, such as the muscle stretch reflex during postural tasks, which leads to less destabilizing movements and improved balance ability. There were significant relationships between balance ability and a number of performance measures. In spite of this, only few authors concentrated on the possible strategies to improve static and dynamic balance, and on the influence that different sport activities have on postural strategies (Ricotti, 2011).

5. CONCLUSION

Inter University level sportspersons participating in indigenous sports have higher balance ability than those participating in non-indigenous sports.

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RELATIONSHIP BETWEEN SELECTED MOTOR FITNESS VARIABLES AND SERVICE ABILITY OF INTER-COLLEGIATE VOLLEYBALL MEN PLAYERS

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ABSTRACT

The purpose of the study was to know the Relationship between selected motor fitness variables and serving ability of intercollegiate volleyball men players. Methodology: In order to achieve the purpose of the study forty (40) inter-collegiate volleyball men players were selected as the subjects. During inter collegiate tournament of Visvesvaraya technological University from the data pertaining to the motor performances such as flexibility was assessed with the help of modified sit and reach test, speed was assessed with the help of 50 meter dash test, endurance was assessed with the help 600 yard run are walk test, shoulder strength was assessed with the help of medicine ball throw test, leg explosive strength was assessed with the help of standing broad jump, skill performance was assessed with serving ability test. Statistical Analysis the collected data was tested with coefficient of correlation statistical technique to test the Relationship between selected motor fitness variables and service ability of intercollegiate volleyball men players. Results: The statistical analysis shows coefficient of correlation in the Relationship between selected motor fitness variables and service ability of intercollegiate volleyball men players. Conclusion: The analysis of the study revealed that there was significant Relationship between selected motor fitness variables such as flexibility and shoulder strength and service ability of intercollegiate volleyball men players. and no significant relationship between selected motor fitness variables such as speed, endurance and leg explosive strength and service ability of intercollegiate volleyball men players.

Keywords: Volleyball, Service, flexibility, speed, endurance, shoulder strength, leg explosive power.

1. INTRODUCTION

Millions of people play volleyball across the world. In many countries, it has been ranked as one of the top level competitive sport. During a volleyball match players are involved in various performance movements such as; defensive and offensive jumps, blocks, spikes and sprints where power, strength, agility, and speed are required (Gabbett & Georgieff, 2006). Volleyball is a team sport which requires intermittent bouts of high intensity exercise, followed by periods of low intensity activity (i.e. walking or standing) (Marques et al., 2006). These high-intensity bouts include both horizontal approach movements (spike jumps) and movements without an approach i.e. jump setting, jousts, blocking (Sheppard et al., 2008). Nowadays, elite volleyball players are quicker, stronger and in better physical condition than before, which could be a result of year-round scientific training and developing skills that added strength, power and fitness specific to their sport (Scates & Linn, 2003).

The performance of volleyball players is influenced by many factors such as physical, physiological and psychological variables, technique, tactics, physique, body size, body composition and application of biomechanical principles. It has been well established that special physical characteristics indicates whether the player would be suitable for the competition at the highest level in a specific sport (Slater et al., 2005). No doubt the performance of player influenced by many factors but still physical fitness components of a specific game is the primary factor among those entire factors (Lidor & Ziv, 2010). Thakur and Sinha, (2010) pointed out that, “world’s topmost sporting nations are very much conscious on fitness factors which are supposed to play a dominant role in its future performance in sports and games”. During the course of game, players are required to serve, pass, set, attack, block and dig the ball. Playing volleyball requires strength, power, agility, flexibility, balance, speed and cardiovascular endurance along with performance related factors likes body composition, physiological and mechanical aspects as well as skills in order to be played effectively.

Talent identification and its development has become an important area of research in sports. In performance sports due to rapidly increasing participation and performance density, only persons who have talent are having the chance of winning medal in an international competition. In prediction results are anticipated beforehand. Usually the anticipated results are not chance of guesses, but are based upon some known facts of relationship or carefully conceived beliefs (Clarke and Clarke, 1972). Prediction is based on constant and vigil observation, experience and scientific analysis. It is the results of intelligent association of facts and discovering of patterns. Successful sporting performance at elite levels of competition often depends heavily on the explosive leg power of the athletes involved. In many individual sports such as Track and Field events, Gymnastics and Diving the ability to use high levels of strength as quickly and as explosively as possible is essential to perform at elite levels. Many team sports also require high levels of explosive

power, such as Basketball, Volleyball, Netball, Rugby and Football codes for success at elite levels of competition.

Volleyball game is an excellent all-around team sports, has been widely accepted as a highly competitive as well as recreational game all over the world. Now, it is a game of power and tactics and is played at a faster pace and this calls sharper thinking, high standard of skills and technical application. There are very fast action and accuracy in performance to technique, and tactics, optimal physique is apparently an advantage to volleyball performance. Only when a volleyball team is collectively equipped with all the ideal anthropometric characteristics can the team win the dominance in a game. Present-day volleyball requires from players quick reaction to changing situations in the game and accurate and precise movement for handling the ball.

Volleyball service is a skill commonly described as the first element of the defense, essential in preventing a team from siding out. Since the introduction of the rally point system by the F.I.V.B. in 1998, the service has become an even more important skill in the game. Basically, a good service in combination with an efficient defensive strategy neutralizes the opponent's opportunity of creating a point. On the other hand, a mistake while serving leads to an error and consequently to a point, not just to a side-out as it used to be with the traditional scoring system.

So, this present study was undertaken to measure the serving ability with motor fitness variables like, speed, endurance, leg explosive power, flexibility, and shoulder strength.

The main purpose of the study was to know the Relationship between selected motor fitness variables and serving ability of intercollegiate volleyball men players.

2. METHODOLOGY

2.1 Selection of Subjects

In order to achieve the purpose of the study, forty (40) inter-collegiate male volleyball players were selected as the subjects from Visvesvaraya technological University.

2.2 Administration of Tests

The flexibility was assessed with the help of modified sit and reach test, speed was assessed with the help of 50 meter dash test, endurance was assessed with the help 600 yard run are walk test, shoulder strength was assessed with the help of medicine ball throw test, leg explosive strength was assessed with the help of standing broad jump, skill performance was assessed with serving ability test.

2.3 Statistical Analysis

The collected data was tested with coefficient of correlation statistical technique to test the Relationship between selected motor fitness variables and service ability of intercollegiate volleyball men players.

3. RESULTS

To establish the relationship between selected motor fitness variables and service ability of intercollegiate volleyball male players, Pearson Moment Coefficient Correlation (r) was computed and data pertaining to this, has been presented in Table 1.

TABLE 1
RELATIONSHIP BETWEEN SELECTED MOTOR FITNESS VARIABLES AND SERVING ABILITY OF INTERCOLLEGIATE MALE VOLLEYBALL PLAYERS.

S. No	Variables	Correlation coefficient
1	Speed And intercollegiate volleyball men players Serving Ability	0.04
2	Endurance And intercollegiate volleyball men players Serving Ability	0.02
3	Leg Explosive Strength And intercollegiate volleyball men players Serving Ability	0.08
4	Flexibility And intercollegiate volleyball men players Serving Ability	0.40*
5	Shoulder Strength And intercollegiate volleyball men players Serving Ability	0.44*

*Significant at 0.05 level.

The above table no. 1 shows the relationship between selected motor fitness variables and serving ability of intercollegiate volleyball men players. There is a significant relationship between flexibility ($r = 0.40$), shoulder strength ($r = 0.44$), and Serving ability of volleyball players, There is no significant relationship between speed ($r = 0.04$), endurance ($r = 0.02$), strength ($r = 0.08$) and Serving ability of volleyball players.

4. DISCUSSION

The findings with regard to Relationship between selected motor fitness variables and serving ability of intercollegiate volleyball men players. There was a significant relationship found between the selected motor fitness components such as flexibility and shoulder strength. Flexibility is the ability of an individual to move the body and its parts through as wide range of motion as possible without undue strain to the articulations and muscular attachments. Flexibility provides another dimension in performance that allows a higher degree of freedom and ease of movement coupled with some important implications for greater safety from injury. In volleyball, the players have to move suddenly in forward direction, sideways or downward directions, so flexibility of hip and back is of utmost importance. So, the research scholar has decided to go with Sit and Reach test. Strength: The competitive volleyball is techno-tactical sport. The requirement of the performance in this sport is the development of a high degree of conditional and coordinative abilities. Therefore, the physical fitness indicators like strength, speed, power, agility, flexibility and muscular endurance which determine performance in this sport must be measured. Muscular strength especially of legs, arms, abdomen and fingers are the important requirement of a volleyball player. Spiking contributes 44% of the game which is the outcome of muscular strength and power of legs and arms. Strength of arms muscles for

diving, rolling, blocking and even in serving plays a dominant part in the volleyball game (Horak, J. 1978). So, the research scholar has decided to go with medicine ball throw test In this study. the result was shows that flexibility ($r = 0.40^*$), and shoulder strength ($r = 0.44^*$), As in study of Lee E.J. et al have found significant correlation between vertical jump and hip flexion. His findings have supported the assumption that greater flexibility is related to greater skilled performance. Thus, he has concluded that greater hip flexibility may benefit the jumping ability and one more study was conducted by Devi (1985) evaluated twenty-four volleyball players to find out the relationship of selected strength and flexibility measures to playing ability in volleyball. The findings of her study concluded that arm strength was significantly related to playing ability in volleyball. Trunk flexibility showed negative but insignificant correlation to playing ability in volleyball and another one study conducted by Singh (2000) conducted a study to know the relationship between physical characteristics, motor ability and motor skill variables of male volleyball players. He concluded that the flexibility, main contributor for the volleyball playing ability. The results depict that flexibility and shoulder strength playing an important role for volleyball serving ability.

5. CONCLUSION

On the basis of findings of the present study, the following conclusions wear drawn;

1. There was a significant relationship found between the selected motor fitness components such as flexibility and shoulder Strength
2. There was a no significant relationship found between the selected motor fitness components such as Speed, Endurance and leg explosive strength.

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IMPACT OF POSITIONAL PLAY ON SELECT PSYCHOMOTOR AND SKILL PERFORMANCE VARIABLES AMONG FOOTBALL PLAYERS

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ABSTRACT

Psychomotor is an ability requires for the fine movement skills in sports. In sport, psychomotor plays very crucial role since it determine the effort of players' response to complex stimuli specifically in the unprecedented situations during the completion. The degree of its influence may be differing based on the nature of sport and nature of positions within the sport. With this perspective to study its influence in football the present study has been carried out titled "Study on Psychomotor Abilities and Skill Performance Variables of Football Players. To achieve purpose of present study, as samples for players for each position namely defense, midfielder, offensive ten players were selected randomly. Thus the total samples for the present study was thirty. The selected samples were hailed from various social economic conditions. As variables the psychomotor abilities such as leg eye coordination and depth perception and as skill variables such as dribbling, passing and shooting were selected based on their positions. Using standardized test samples were tested on depth perception and leg and eye coordination and skill variables. The collected data were tested by one way analysis of variance to test the significance of mean difference if any on the variables among the defensive, mid filed and offensive football players.

Key words: Psychomotor, eye leg coordination, depth perception, dribbling, passing and shooting

1. INTRODUCTION

Psychomotor is a science deals with the concurrent function of both body and mind in physical activities. As a muscular activity psychomotor associated with mental processes. According to The American Heritage Dictionary, "Psych" for mind, and "motor" for the motor neuronal system in brain and spinal cord. Hebb (1980) "broadly speaking, the mind is that which controls behavior". In sports and games, the need of psychomotor abilities is very essential for execution of skills especially for complex skills. The value of individual physical training in sports and games is determined by his psychomotor abilities. In games, the very basic required components are physical and motor components; but that it is not sufficient for getting the success in sport since psychomotor abilities (coordination and perception) also served as deterministic factor for the players to successfully complete the complex task. According to Schur (1980) co-ordination is "the ability to integrate muscle movements into an efficient pattern of movement" and "the use of muscles in such a manner that they work together smoothly and effectively rather than hinder one another". Co-ordination makes the difference between good performance and poor performance. Hunter (1966). Co-ordination is the ability to perform complex motor skills in sport. ". Wilmore (1977) opined that neuromuscular co-ordination reflects the ability of athletes to perform their sports activities or events with a smooth, balanced, and fluid motion. Besides the success of coordination movement takes place based on the abilities of individual perception as how he perceives the given situation. Perception is the organization, identification and interpretation of sensory information in order to represent and understand the environment (Schacter, Daniel, 2011). . All perception involves signals in the nervous system, which in turn result from physical stimulation of the sense organs. In perception, depth perception is one of the most widely used in the game where the player has to track the object in the very short distance. Depth perception is the visual ability to perceive the world in three dimensions. It allows the player to be hold accurately gauge the distance to an object. Depth perception does indeed rely primarily on binocular vision, but it also uses many other monocular cues to form the final integrated perception.

The present study is mainly focused on the game of football. In football the skills such as dribbling, passing, kicking, heading and throw in are underlie the simultaneous functions of body and mind and for it is efficient functioning particularly in the execution of passing and receiving the ball during the competitive situations the players have to perform well in psychomotor ability. Besides in the game of football successive utilization of physical and motor fitness components is absolutely because of the abilities of psychomotor. Having the higher level of visual acuity and coordination player in the game of football can execute the skills successfully. Such a psychomotor ability is differing in sport by its nature since its degree of influence is varied in fundamental and advanced skills as the players of this game positionally classified as offensive, midfield and defensive. Each of these has its own entity in nature.

With this assumption, the present study was carried out with the objectives of 1. Identify the status of leg and eye coordination and depth perception of football players, 2. To compare the psychomotor abilities(leg and eye coordination and depth perception) and skill performance variables(dribbling, passing and kicking) among the various positions of defensive, midfield and offensive football players. Based on the objectives the formulated hypotheses are: 1. Significant mean difference may exist among the defensive, midfield and offensive football players on depth perception and leg and eye coordination, and 2. Significant mean difference may exist among the defensive, midfield and offensive football players on skill performance variables namely dribbling, passing and kicking..

2. METHODOLOGY

2.1 Selection of Sample

To achieve purpose of present study, as samples ten football players of each position were selected randomly for each position namely defense, midfielder, and offensive. Thus the total samples for the present study was thirty. The age of the subjects was fixed in the range of 18-25. In the level of participant at inter collegiate. The selected samples were hailed from various social economic conditions. In the performance of football, the role of perceiving position of fellow players, position of opponents,. and position of the ball is very important one. The level of players' perception is one of the major deciding factors in the skills that are requiring coordinative abilities.

2.2 Selection of Vatiabels

Having this concept to study the player psychomotor abilities such as leg eye coordination and depth perception were taken as variables. Besides as skill performance variables, the fundamental skills namely dribbling, passing and kicking were selected.

2.3 Test Used

The samples were tested on depth perception and leg and eye coordination and skill performance variables using the standardized tests(Mor,S And Christian,V,1979).

Before the test, the samples on variables used in the study were explained clearly about the purpose of the study to ensure the quality of data. Thus the data for the present study were collected.

2.4 Statistical Analysis

To test the formulated objectives, the collected data were tested by one way analysis of variance to test the significance of mean difference if any on the variables used in the study among the defensive, mid filed and offensive football players. To test the results obtained on variables used in the study among the defensive, midfield, and offensive football players 0.05 level was chosen and considered as sufficient for the present study.

3. RESULTS

The results obtained from the one way analysis on psychomotor abilities and skill variables are presented in Tables1 and 2 with interpretations.

TABLE 1
DESCRIPTIVE MEASURES OF VARIABLES PSYCHOMOTOR ABILITIES AND SKILL VARIABLES

Variables	Positional play	N	Mean	Std. Deviation	Minimum	Maximum
Depth Perception	Defensive	10.00	5.34	4.74	0.40	14.70
	Midfield	10.00	5.14	4.12	1.20	13.20
	Offensive	10.00	4.26	2.61	1.80	9.00
	Total	30.00	4.91	3.82	0.40	14.70
Leg eye coordination	Defensive	10.00	67.80	13.31	52.00	85.00
	Midfield	10.00	71.30	11.61	59.00	86.00
	Offensive	10.00	66.50	10.02	51.00	80.00
	Total	30.00	68.53	11.50	51.00	86.00
Dribbling	Defensive	10.00	5.87	0.93	5.00	7.30
	Midfield	10.00	6.32	0.93	5.30	8.00
	Offensive	10.00	6.17	1.02	5.30	8.00
	Total	30.00	6.12	0.94	5.00	8.00
Passing	Defensive	10.00	5.90	0.94	4.60	7.30
	Midfield	10.00	6.00	1.05	4.60	7.60
	Offensive	10.00	6.30	0.95	5.00	7.60
	Total	30.00	6.07	0.96	4.60	7.60
Kicking	Defensive	10.00	6.40	1.26	5.00	8.00
	Midfield	10.00	6.46	1.01	5.00	8.00
	Offensive	10.00	6.20	0.95	5.00	7.60
	Total	30.00	6.35	1.05	5.00	8.00

TABLE 2
ANALYSIS OF VARIANCE ON PSYCHOMOTOR ABILITIES AND SKILL PERFORMANCE VARIABLES AMONG THE DEFENSIVE, MIDFIELD AND OFFENSIVE FOOTBALL PLAYERS

Variables	Source of Variance	Sum of Squares	Df	Mean Square	F-ratio	Sig.
Depth Perception	Between Groups	6.60	2.00	3.30	0.21	0.81
	Within Groups	415.91	27.00	15.40		
	Total	422.51	29.00			
Leg Eye Co-ordination	Between Groups	123.27	2.00	61.63	0.45	0.64
	Within Groups	3710.20	27.00	137.41		
	Total	3833.47	29.00			
Dribbling	Between Groups	1.05	2.00	0.53	0.57	0.57
	Within Groups	24.84	27.00	0.92		
	Total	25.89	29.00			
Passing	Between Groups	0.87	2.00	0.43	0.45	0.64
	Within Groups	25.88	27.00	0.96		
	Total	26.75	29.00			
Kicking	Between Groups	0.37	2.00	0.19	0.16	0.85
	Within Groups	31.50	27.00	1.17		
	Total	31.87	29.00			

Table 2 reveals that the F values are: 0.21(depth perception), 0.45(leg eye coordination), 0.57(dribbling) 0.45(passing) and 0.45(kicking). To be significant at 0.05 level for degree of freedom 2, 27, the required critical values was 3.35. Here the observed 'F' values of above are found to be less than the required critical value (3.35). Hence it was concluded that the mean difference among the defensive, midfield and offensive football players on selected psychomotor abilities(depth perception, leg eye coordination) and skill variables(dribbling, passing and kicking) was statistically not significant. From this, it was inferred that players of varied positions such as defensive, midfield and offensive are all appeared to similar in the performance of psychomotor abilities and skill variables.

3.1 Testing Hypotheses

Based on the result the formulated hypothesized are tested.

Hypothesis .1 explained that the positional influence may be significant on psychomotor ability among the defensive, midfield, offensive football players. But from the result, no difference was observed on the psychomotor among the defensive, midfield, offensive football players. The formulated hypothesized no.1 was rejected. By these it was inferred the positional wise players are equal on psychomotor ability (depth perception and leg-eye coordination)

Hypothesis 2 stated that players may be differed significantly on skill performance variables based on their playing positions. But based on the results the formulated hypothesis was rejected since no significant mean difference was observed among the players of varied positions on skill performance variables.

4. DISCUSSION

The present study was aimed at to study the positional influence on psychomotor ability such as leg-eye coordination and depth perception. Results of one way analysis variance confirmed that players belong to various positions such as offensive, midfield, defensive football players were similar in the performance and psychomotor abilities and skill performance variables. The sources for such as similarity exist among the about three position on psychomotor ability can be accounted into following aspects.

In the discussion of psychomotor abilities and its need in the game of football, leg eye coordination is in need for dribbling, passing and receiving the ball to the opponent, dropping the ball from height and kicking the ball to the place where they wanted to send. In the above said cases the body part used only is leg. Skills in football allow players to make pinpoint passes, free kick with precision, fake out the defense and dribble the ball. For these player has to excel in coordinative abilities between and eye and foot. Foot-eye coordination also allows a player to stop a soccer ball with his foot and make adjustments to intercept the ball(McClendon 2009). The development of foot-eye coordination allows a player to keep his head up during ball. Having the leg movement only a player has to survive during the match for an hour long play. The success of leg movement at every step, is not because of his physical and physiological aspects, besides the coordinative abilities also have specific role. Singer (1968). Opined that player requires attention to the feel of the ball movement and concentration on the direction and point of application of force that he has applied. Such type of coordinated functional aspects between leg and eye only are termed as leg eye coordination. Leg eye coordination is an instrumental in the successful execution of skills namely passing, kicking and dropping since vision controls and the movement of the leg in determining the application of force, direction of force, action line and point of application of force. It has been substantiated by the research done Research

done at the Institute for Neurology in London confirms vision controls the movement of the foot(<http://www.livestrong.com>).

Field players require excellent eye-foot coordination to accurately kick the ball to the right direction as the eyes provide their sense of direction and their feet move to follow that projected route. In this game the skill of passing handling the ball and kicking is used by all players irrespective of their field play. Thus the major component of vision is so common for all the players to function successfully. According to Hollands and Marple-Horvat, (2001) vision is used as a feed forward control where the eyes fixate on the target position and interacts with the locomotors system to plan the next movement and produce a coordinated activity. Though the position of players are varied in nature, now days because of the complete pressure and the nature of all games such as long duration, players in variably their position are need to have high performance in psychomotor ability. Because in game of football all players they have move here and there with restless, where in some situation they have to move faster. Such a nature the might have been the sources for getting the similarity on psychomotor ability and skill variables among the defensive, midfield, offensive football players

5. CONCLUSION

From the results it was observed that no significant mean difference was found on psychomotor abilities (leg-eye coordination, depth perception) and skill variables (dribbling, passing and kicking) among the defensive, midfield offensive players. In the game of football, the skills used in the study are although varied in the amount of requirements among the players of varied, positions, basically every one must have some amount of proficiency in the skills of dribbling, passing and kicking so as to execute the fundamental and advanced skills. These skills in nature underlie the psychomotor abilities since it has functional association between the nature of movement of skills and psychomotor abilities. Such a unconditional nature of psychomotor abilities required for the players in football invariably players positional play. It may be a significant source for the results derived in the present study Thus the obtained results in the present study lead to conclude that players are having equal performance invariably by their positions as for as psychomotor abilities and skill variables concerned.

6. IMPLICATIONS

The present study significant can be implicated in the following aspects:

1. To identify their level on psychomotor ability of leg and eye coordination and depth perception.
2. Formulate a training program to improve psychomotor ability.
3. Having the knowledge on performance of leg eye coordination the physical education teachers and coaches can change the player position based on their performance
4. Perception is one of the psychological aspects. Hence physical education teacher and coaches can identified their level psychology aspects in general.

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