शरीरमाद्यम

International Journal of

Physical Education and Applied Exercise Sciences

(IJPEAES)

Volume 3 Number 1 February 2017 ISSN: 2394-9953

Publishing Consultancy

LNIPE, NERC, Guwahati-782402

for

LAKSHMIBAI NATIONAL INSTITUTE OF PHYSICAL EDUCATION
NERC, Sonapur, Guwahati, Assam-782402 (INDIA)
Tel: +91-7896008382 (M)
Editioral Board: journals@lnipeassam.edu.in
Editor-in-Chief: journals@lnipeassam.edu.in

Typeset by
LNIPE,NERC, Sonapur, Guwahati–782402
E-mail: journals@lnipeassam.edu.in

Printed by
LNIPE,NERC, Sonapur, Guwahati–782402
E-mail: journals@lnipeassam.edu.in

शरीरमाद्यम

INTERNATIONAL JOURNAL OF
PHYSICAL EDUCATION AND APPLIED EXERCISE SCIENCES

Guidelines for Authors

International Journal of Physical Education and Applied Exercise Sciences **(IJPEAES)** is a peer-reviewed journal established in **India.** The journal welcomes researchers to submit their original and unpublished full papers for intended publication in IJPEAES. Authors are invited to contribute to this journal by submitting articles that illustrate research results, projects, and practical experiences that describe significant advances in Physical Education and Applied Exercise Sciences. The submitted works should not be under review in any other journal. IJPEAES publishes papers from a variety of areas in Physical Education and Applied Exercise Sciences. Both printed and online versions of IJPEAES are available.

IJPEAES Highlights

- Country of Publication: India

Publisher: Lakshmibai National Institute of Physical Education, North East Regional Centre, Guwahati
ISSN: 2394-9953
POD: LNIPE, NERC, Guwahati- 782402
Frequency: Bi-Annual
Publication Dates: February and November
Language: English & Hindi
Format: Print & Online
Scope: Physical Education and Applied Exercise Sciences
Author Fees: No (Subject to change)
Open Access: Yes
Refereed: Yes
Abstracted: Yes
Indexed: Yes
Policy: Peer-reviewed
Paper Acceptance Rate: 53%
Peer Review Time: 20–35 Days
Submission E-mail: journals@lnipeassam.edu.in

Scope & Topics

IJPEAES publishes papers in issues related to Physical Education and Applied Exercise Science, including:

- Kinesiology Assessment
- Motor Control and Learning
- Sports Biomechanics
- Fitness and Health
- Physical Activity of Elderly
- Physical Cultural Studies
- Applied Exercise Physiology
- Exercise Physiology
- Physical Education
- Physical Therapy
- Sport and Disability
- Sport and Physical Activity Philosophy
- Sports for Special Population
- Sports Injuries
- Sports Management
- Sports Medicine and Rehabilitation
- Sports Nutrition
- Sports Psychology
- Sports Society
- Sports Technology
- Training Theory

IJPEAES publishes original papers, review papers, conceptual framework, analytical and simulation models, case studies, empirical research, technical notes, and book reviews.

Peer Review Process

IJPEAES uses double-blind system: the reviewers' identities remain anonymous to authors. The paper will be peer-reviewed by three experts; one is editor-in-chief and the other two are internal editors and external reviewers.

Ethical Guidelines for Authors

Fabrication/ Falsification of Data: Making up data or results and recording or reporting them is fabrication of data. Falsification of data is manipulating research materials, omitting/deletion/suppression of conflicting data without justification and this would cause mistrust and disgrace to scientific community.

Plagiarism: Using another person's ideas, language, graphs, pictures, results and experiments without giving credit to them. Without citing the source, copying even a single sentence from your own or another person's research paper leaded to plagiarism.

Unacceptable Author Contribution: Including authors who have not contributed to the research in the manuscript and excluding authors who have contributed to the research is unacceptable author contribution.

Citation Manipulation: Citing irrelevant articles that don't contribute to content of manuscript is a kind of scientific misconduct.

Concurrent Submissions: It is submitting the same manuscript to more than one journal at the same time. It is a waste of time of editors and peer reviewers, and can also damage the reputation of journals if published in more than place.

Redundant Publications: It primarily refers to publishing the same material/experiments more than once. Accountability-All authors whose names appear on the manuscript are equally held accountable for the content of a submitted manuscript or published paper.

Ethical Responsibility for Peer Review/ the Reviewers

As an editor or a reviewer you are requested to find out about the originality of the manuscript you are urged to review. Therefore, it is recommended that you also see the Author Guidelines and Polices page so that authors should take into consideration prior to submission of their papers for the publication.

Although reviewed articles are treated confidentially, reviewers' judgments should be objective. Reviewers should have no conflict of interest with respect to the research, the authors and/or the research funders, and reviewers should point out relevant published work which is not yet cited.

Ethical Guidelines for Editors-in-Chief/ Editorial Board Member

The Editor-in-Chief makes the final decision to publish the manuscript in the journal based on peer-reviewers comments. It is expected that Editors during the review process should be principled, prompt, act with confidence, contribution to the final decision, acknowledge source, and stick to objectives and guidelines mentioned below:

- Editors should understand that the peer review process is confidential. The review process should not be shared with anyone outside the peer review process.
- Editors clearly understand that review process should be unbiased and author deserves full credit for their work.
- Editor-in-Chief should discuss all matter regarding publication with the Editorial board members before making a final decision.
- Editors should automatically reject manuscript that are inappropriate or out of scope of the journal.

Editors must investigate if they receive information that a manuscript is plagiarized, under consideration elsewhere or has already been published. If there is evidence that the manuscript has been plagiarized, under consideration elsewhere or has already been published, then the Editor-in-Chief should issue an erratum.

Prohibited Author's List (PAL)

If there is a violation of any of the above said policies in the IJPEAES, the manuscript will be rejected or removed. The author will be entered in the PAL database and prohibited to contribute for the next 3 years.

Scientific Advisory Board

Patrons/संरक्षक

Prof. Vivek Pandey, Ph.D
Vice Chancellor (Officiating),
LNIPE, Ministry of Youth Affairs & Sports, Gwalior
Government of India (India)
E-mail: vc@lnipe.edu.in

Editor/संपादक

Dr. Shankar Basumatary, Ph.D.
North East Regional Center, LNIPE
Guwahati Assam (India)
E-mail: *shankarjyoti.basumatary@lnipeassam.edu.in*

Associate Editor/सहसंपादक

Dr. Krishnakant Sahu
IQAC, HEAD
Lakshmibai National Institute of Physical Education,
Gwalior (India)
E-mail: directoriqac@lnipe.edu.in

Managing Editor/ प्रबंध संपादक

Dr. Malkhan Singh, Ph.D.
Assistant Professor,
Bharatiya Bhasha Kendra, JNU, New Delhi
(India)

Consultant Editor/सहायक

Dr. Ramesh Chand Yadav, Ph.D.
Assistant Professor,
Lakshmibai National Institute of Physical Education,
Assam (India)
E-mail: *rameshchand.yadav@lnipeassam.edu.in*

Correspondence Editor (Singapore)

Prof. Michael Chai, Ph.D
National Institute of Education
Singapore
E-mail: *michael.chia@nie.edu.sg*

Editor-in-Chief/ प्रधानसंपादक

Dr. Satpal Yadav, Ph.D.

North East Regional Center,
LNIPE, Guwahati, Assam (India)
E-mail: *satpal.yadav@lnipeassam.edu.in*

Executive Editor/कार्यकारीसंपादक

Dr. Shailesh Kumar Singh,
Lakshmibai National Institute of Physical Education,
Guwahati, Assam (India)
E-mail: *shaileshkumar.singh@lnipeassam.edu.in*

Technical Editor/तकनीकी संपादक

Mr. Thepfukolie Punyu
Assistant Professor,
Lakshmibai National Institute of Physical Education,
Assam (India)
E-mail: *thepfukolie.punyu@lnipeassam.edu.in*

Advisory Editor

Dr. Sujay Bisht, Ph.D.
Assistant Professor,
Lakshmibai National Institute of Physical Education,
Assam (India)
E-mail: sujay.bisht@lnipeassam.edu.in

Section Editor/अनुभागसंपादक

Dr. Suman Adhikari, Ph.D
Govt. Degree College, Dharmanagar
Tripura (India)
E-mail: *sumanadhi@gmail.com*

I J P E A E S

INTERNATIONAL JOURNAL OF PHYSICAL EDUCATION AND APPLIED EXERCISE SCIENCES

Volume 3 | Number 1 | January 2017 | ISSN: 2394-9953

Contents

INTERNATIONAL JOURNAL OF PHYSICAL EDUCATION AND APPLIED EXERCISE SCIENCES
ISSN: 2394-9953
VOLUME 3, NUMBER 1, JANUARY 2017

INTERNATIONAL JOURNAL OF PHYSICAL EDUCATION AND APPLIED EXERCISE SCIENCES

Blood Glucose Level for School Hockey Players before and after Competitive Match

Shiv Kumar Diswar[1], Dr. Sentu Mitra[2] and Mohit Kumar[3]

[1]*Research Scholar, Deptt. of Physical Education, Visva-Bharati, Vinaya-Bhavana*
[2]*Assistant Professor, Deptt. of Physical Education, Visva-Bharati, Vinaya-Bhavana*
[3]*Physical Education Teacher in Ganga International School, Delhi*
e-mail: [1]shiv.p.weight@gmail.com

Abstract

The purpose of the study was to compare blood glucose level of school hockey players before and after competitive match. Eighteen male school hockey players between 12 to 16 years of age from Ganga International School Delhi were randomly selected as subjects for the study. The criterion measure chosen for testing was the status of glucose level before and after the competitive match in the blood. In order to compare the glucose level of the individuals, pre-test and post-test data was collected. Comparison was done by the means of paired 't'-test. Significance difference was found at 0.05level of significance.

Keywords

Blood Glucose Level, School Players, Hockey, Competitive Match

1. INTRODUCTION

Hockey is an intermittent sport with high intensity skating shifts followed by brief rest intervals. The main fuel used by hockey players is carbohydrate (i.e., blood glucose, muscle and liver glycogen). Hockey players generally fatigue because of depleted carbohydrate-energy stores, dehydration and build-up of lactic acid (muscle burn). Carbohydrates are the body's primary source of energy. Carbohydrates when used in the body as a source of energy are broken down into glucose, which is a type of sugar. There are four different types of sugars that are found in carbohydrates that the body will use as energy. Glucose is blood sugar. Fructose is sugar that the body gets from fruit, lactose is sugar from milk, and maltose is sugar from starch foods. The primary reason why carbohydrates are so important is they affect directly on the brain's activity level and response time (Blake, 2010). The body will draw from its energy from a good working correlation between the anaerobic and aerobic energy systems. During short burst of energy, the body will use the anaerobic energy system, within this structure, the body use adenosine triphosphate (ATP) in the form of glucose (sugar), which helps in the body in the form of carbohydrates (Bonci, 2009). As early as 1925, Gordon *et al.* reported that ingestion of candy by runners during a marathon prevented hypoglycemia and improved race times compared with when no candy (sugar) was consumed. In intermittent sports, similar work was pioneered by Cade *et al.* in the early 1970s in 1971, Cade and colleagues reported the effects of exercise on blood glucose changes in four players of the University of Florida football team during a vigorous 2 h practice session with no food or fluid intake. The football players' blood glucose concentration decreased progressively throughout practice. This work was followed by a study in 1972 to determine whether carbohydrate replacement could prevent the disturbances in blood glucose concentration. Cade *et al.* found that performance during a standardized walk-run test (7 mile course) was significantly improved when ~1 L of a 3% glucose-electrolyte solution was consumed compared with when the athletes drank the same volume of water. Whereas subjects' blood glucose concentration decreased during the water intake trials (by 1.3 mmol/L), it increased (by 1.0 mmol/L) while drinking the 3% glucose-electrolyte solution. Here, in present study the researcher has made an attempt to know the amount of depletion in blood glucose after playing a competitive match by school hockey players.

2. PROCEDURE AND METHODOLOGY

A sample of eighteen subjects were randomly selected, age ranging from 12-16 years from Ganga international School Delhi, India. The minimum training age of the players was two years. For the purpose of the study, blood glucose level was selected as a dependent variable which was measured with a valid and reliable test. In this study, total 18 male school hockey players from Ganga International School Delhi, India having average 14.60 age/ year constitute the material of the research. Subjects were made aware of the study, equipment and procedure to perform. Bloodglucose samples of school hockey players before and after the intense competitive match, was taken. The tools: blood glucometer, gluco-test strip, lancets, lancing device and cotton were used during data collection. For the present study, the selected school hockey players were tested before the match with the help of glucometer. The data for the post test was done immediately after the competition. Total duration of the game was of 60 minute (15 min-2min-15min-8min-15min-2min-15 min) the game was played in 4 quarters and recovery periods were given inbetween for 2 min-8min-2min respectively. The glucose level measurement was done in milligram per decilitre. The data was analyzed by employing paired t-test at 0.05 level of significance. The SPSS statistical software was used for statistical calculation.

3. RESULT

The data was collected by and analyzed in order to draw a conclusion or to compare the pre-and post-status of blood glucose level of school hockey players.

The descriptive statistics for the data on blood glucose levels before and after the match has been presented in the table underneath.

Table 1: Mean Standard Deviation of Comparison of Blood Glucose Level of School Hockey Players

Variable		No. of Subjects	Mean	Std. Deviation
Blood Glucose Level	Pre-test	18	82.35	12.703
	Post-test	18	101.50	18.875

Table revels that means and standard deviation of pre-test glucose level of school hockey players was 82.35 ± 12.703 and post test glucose level was 101.50 ± 18.975.

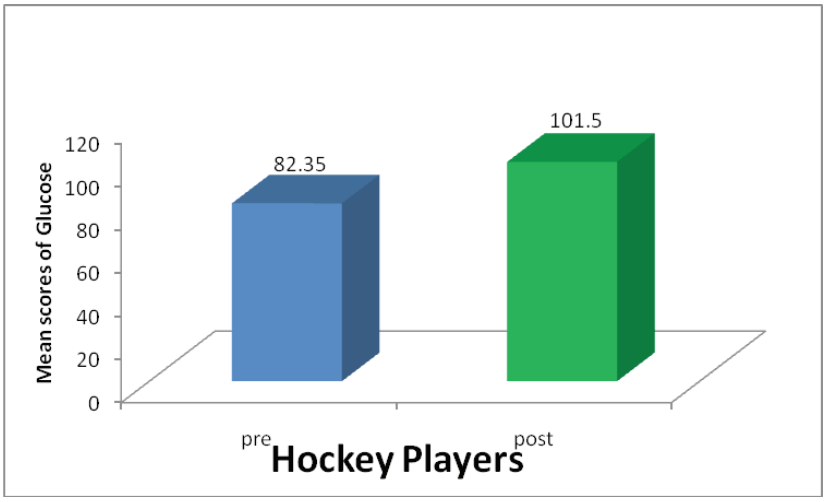


Fig. 1

The comparison of mean difference of pre-test glucose level and post-test glucose level of school hockey player is presented in Table 2.

Table 2: Paired T-test between Pre and Post-test Blood Glucose Levels

Variable	Mean Difference	Standard Deviation	T- value	df	Sig
Blood glucose level (pre-test and post-test)	17.100	21.40	-3.742	18	.001

4. DISCUSSION

Hockey is a sport that consists of a variety of exercise intensities ranging from sprinting to standing still. Fuel for burst of intense activity is provided predominantly by carbohydrate and fat used during the less intense parts of the game. Fatigue in hockey is often caused by a depletion of muscle glycogen (the carbohydrate stored in the muscle). Also, if blood glucose levels drop during a game, this may lead to loss of concentration and tactical skills. This is why carbohydrates are so important for hockey players.

The result indicates that hockey players have higher blood glucose level after the game compared with pre-game blood glucose level; this may be attributed to following reasons: blood sugar level may fall during workouts and raise after exercise as the body works to return level to normal (Karen and Gaskell, 2011) and another reason is that if our blood sugar is high when we begin to exercise, it can climb higher. This is because body does not recognize the glucose in blood and cell for liver to release more glycogen. The activity of insulin in the body is low and it is not regulating the sugar. If blood sugar is high before exercise, we should wait until it is within normal range before we exercise (Johns Hopkins). As early as in 1925, Gordon *et al.* reported that ingestion of candy by runners during a marathon prevented hypoglycemia and improved race times compared with when no candy (sugar) was consumed. In intermittent sports, similar work was pioneered by Cade *et al.* in the early 1970s. In 1971, Cade and colleagues reported the effects of exercise on blood glucose changes in four players of the University of Florida football team during a vigorous 2 h practice session with no food or fluid intake. The football players' blood glucose concentration decreased progressively throughout practice. This work was followed by a study in 1972 to determine whether carbohydrate replacement could prevent the disturbances in blood glucose concentration Cade *et al.* found that performance during a standardized walk-run test (7 mile course) was significantly improved when ~1 L of a 3% glucose-electrolyte solution was consumed compared with when the athletes drank the same volume of water. Whereas subjects' blood glucose concentration decreased during the water intake trials (by 1.3 mmol/L), it increased (by 1.0 mmol/L) while drinking the 3% glucose-electrolyte solution.

5. CONCLUSION

Within the limitation of the study, it may be concluded that the blood glucose level of school hockey players gets raised after the competition.

REFERENCES

Welsh, R., Davis, M. and Burke, J. *et al.* (2002), "Carbohydrates and Physical/Mental Performance During Intermittent Exercise to Fatigue", *Med. Sci. Sports Exerc.*, Vol. 34, pp. 723–731, doi: 10.1097/00005768-200204000-00025.

Winnick, J., Davis, J. and Welsh, R. *et al.* (2005), "Carbohydrate Feedings During Team Sport Exercise Preserve Physical and CNS Function", *Med. Sci. Sports Exerc.*, Vol. 37, pp. 306–315, doi: 10.1249/01.MSS.0000152803.35130.A4.

Afman, G., Garside, R. and Dinan, N. *et al.* (2014), "Effect of Carbohydrate or Sodium Bicarbonate Ingestion on Performance During a Validated Basketball Simulation Test", *Int. J. Sport Nutr.Exerc.Metab,* Vol. 24, pp. 632–644, doi: 10.1123/ijsnem.2013-0168.

Roberts, S., Stokes, K. and Weston, L. *et al.* (2010), "The Bath University Rugby Shuttle Test (BURST); A Pilot Study", In *J. Sport Nutr.Exerc.Metab,* Vol. 5, pp. 64–74.

Ali, A., Foskett, A. and Gant, N. (2014), "Measuring Intermittent Exercise Performance using Shuttle Running", *J. Sports Sci*., Vol. 32, pp. 601–609, doi: 10.1080/02640414.2013.847276.

Rollo, I., Homewood, G., Williams, C., Carter, J. and Goosey-Tolfrey, V. (2015), "The Influence of Carbohydrate Mouth-rinse on Self-selected Intermittent Running Performance", *Int. J. Sport Nutr.Exerc.Metabol*. (in press).

Russell, M., Rees, G. and Benton, D. *et al*. (2011), "An Exercise Protocol that Replicates Soccer Match-play", *Int. J. Sports Med*., Vol. 32, pp. 511–518, doi: 10.1055/s-0031-1273742.

Currell, K., Conway, S. and Jeukendrup, A. (2009), "Carbohydrate Ingestion Improves Performance of a New Reliable Test of Soccer Performance", *Int. J. Sport Nutr.Exerc.Metab*., Vol. 19, pp. 34–46.

Ali, A., Nicholas, C. and Brooks, J. *et al*. (2002), "The Influence of Carbohydrate-electrolyte Ingestion on Soccer Skill Performance", *Med. Sci. Sports Exerc*., Vol. 34, p. 5, doi: 10.1097/00005768-200205001-00013.

Kingsley, M., Penas-Reiz, C. and Terry, C. *et al*. (2014), "Effects of Carbohydrate-hydration Strategies on Glucose Metabolism, Sprint Performance and Hydration during a Soccer Match Simulation in Recreational Players", *J. Sci. Med. Sport*., Vol. 17, pp. 239–243, doi: 10.1016/j.jsams.2013.04.010.

Bendiksen, M., Bischoff, R. and Randers, M. *et al*. (2012), "The Copenhagen Soccer Test: Physiological Response and Fatigue Development", *Med. Sci. Sports Exerc*., Vol. 44, pp. 1595–1603, doi: 10.1249/MSS.0b013e31824cc23b.

Roberts, S., Stokes, K. and Trewartha, G. *et al*. (2010), "Effects of Carbohydrate and Caffeine Ingestion on Performance during a Rugby Union Simulation Protocol", *J. Sports Sci*., Vol. 28, pp. 833–842, doi: 10.1080/02640414.2010.484069.

Nicholas, C., Williams, C. and Boobis, L. *et al*. (1999), "Effect of Ingesting a Carbohydrate-electrolyte Beverage on Muscle Glycogen Utilisation During High Intensity, Intermittent Shuttle Running", *Med. Sci. Sport Exerc*., Vol. 31, pp. 1280–1286, doi: 10.1097/00005768-199909000-00008.

Saltin, B. (1973), "Metabolic Fundamentals of Exercise", *Med. Sci. Sports Exerc*., Vol. 15, pp. 366–369.

Bangsbo, J., Mohr, M. and Krustrup, P. (2006), "Physical and Metabolic Demands of Training and Match Play in the Elite Player", *J. Sports Sci*., Vol. 24, pp. 665–674, doi: 10.1080/02640410500482529.

VanBeekvelt, M.C., Borghuis, M.S. and van Engelen, B.G. *et al*. (2001), "Adipose Tissue Thickness Affects in Vivo Quantitative Near-IR Spectroscopy in Human Skeletal Muscle", *Clin.Sci. (Lond),* Vol. 101, pp. 21–28.

Kennedy, M.D., Haykowsky, M.J. and Boliek, C.A. *et al*. (2006), "Regional Muscle Oxygenation Differences in Vastuslateralis During Different Modes of Incremental Exercise", *Dyn. Med.,* Vol. 5, p. 8.

Muthalib, M., Lee, H. and Millet, G.Y. *et al*. (2010), "Comparison between Maximal Lengthening and Shortening Contractions for Biceps Brachii Muscle Oxygenation and Hemodynamics", *J. Appl.Physiol.,* Vol. 109, pp. 710–720.

Chance, B., Dait, M.T. and Zhang, C. *et al*. (1992), "Recovery from Exercise-induced Desaturation in the Quadriceps Muscles of Elite Competitive Rowers", *Am. J. Physiol.,* Vol. 262, pp. C766–C775.

Vaile, J., Halson, S. and Gill, N. *et al*. (2008), "Effect of Hydrotherapy on the Signs and Symptoms of Delayed Onset Muscle Soreness", *Eur. J. Appl.Physiol.,* Vol. 102, pp. 447–455.

Rezaee, Z., Esfarjani, F. and Marandi, S.M. (2012), "Which Temperature during the Water Immersion Recovery is Best After a Sprint Swimming?", *World Appl.Sci. J.,* Vol. 16, pp. 1403–1408.

Swenson, C., Sward, L. and Karlsson, J. (1996), "Cryotherapy in Sports Medicine", *Scand. J. Med. Sci. Sports,* Vol. 6, pp. 193–200.

Vaile, J., O'Hagan, C. and Stefanovic, B. *et al*. (2011), "Effect of Cold Water Immersion on Repeated Cycling Performance and Limb Blood Flow", *Br. J. Sports Med.,* Vol. 45, pp. 825–829.

Buchheit, M., Ufland, P. and Haydar, B. *et al*. (2011), "Reproducibility and Sensitivity of Muscle Reoxygenation and Oxygen Uptake Recovery Kinetics Following Running Exercise in the Field", *Clin.Physiol.Funct. Imaging,* Vol. 31, pp. 337–346.

Ichimura, S., Murase, N. and Osada, T. *et al*. (2006), "Age and Activity Status Affect Muscle Reoxygenation Time After Maximal Cycling Exercise", *Med. Sci. Sports Exerc.,* Vol. 38, pp. 1277–1281.

Shiv Kumar Diswar

Research Scholar, Deptt. of Physical Education
Visva-Bharati, Vinaya-Bhavana, B-Block, Vikaspuri, New Delhi

Dr. Sentu Mitra

Assistant Professor, Deptt. of Physical Education
Visva-Bharati, Vinaya-Bhavana

Mohit Kumar

Physical Education Teacher, Ganga International School, Delhi

INTERNATIONAL JOURNAL OF PHYSICAL EDUCATION AND APPLIED EXERCISE SCIENCES
ISSN: 2394-9953
VOLUME 3, NUMBER 1, JANUARY 2017

INTERNATIONAL JOURNAL OF PHYSICAL EDUCATION AND APPLIED EXERCISE SCIENCES

Prediction of Goal Keeper Performance on the Basis of Coordinative Abilities

Rakesh Kumar Patel[1] and Dr. Rajeev Choudhary[2]

[1]*Research Scholar, School of Studies in Physical Education, Pt. RavishankarShukla University, Raipur (C.G.)*
[2]*Professor& Head, School of Studies in Physical Education, Pt. RavishankarShukla University, Raipur (C.G.)*

Abstract

The objective of the present study was to estimate goal keeper performance on the basis of selected coordinative abilities. A total of ten handball male players were selected who played goal keeper position of handball game. All the selected handball players were from different universities of the country who participated in All India Intervarsity Handball Championship. All the players' age was ranging from 16 to 24 years. The study was conducted by taking five coordinative abilities (Orientation ability, Differentiation ability, Reaction ability, Balance ability and Rhythmic ability) which were selected independent variables and only one goalkeeper performance was selected for dependent variable. To estimate goalkeeper performance on the basis of selected coordinative abilities, multiple regression analysis was used. Two regression models were established. Established regression models are: Model-I Goalkeepers Performance = 71.839 – 6.979 X Orientation Ability and Model-II Goalkeepers Performance = 46.058 – 4.679 X Orientation Ability + 0.816 X Differentiation Ability.

Keywords

Coordinative Abilities and Goalkeeper Performance

1. INTRODUCTION

Coordination is considered as an important factor which is closely related to performance, especially with high complex movements. It is the ability of integrating different types of movements in specific patterns. Different activities have different demands of coordination. Coordination cannot be measured in isolation because it is interrelated with other factors. (Bhat, A.H., 2010). In the field of exercise science, coordination is recognized as the ability of the body to organize two or more patterns to achieve a specific movement goal. Coordination involves an intricate and complex sequence of activities. In simple words, these activities encompass reacting to sensory input (stimulus), choosing and processing the proper motor program from learned skills (motor learning), and finally, executing the action. Information is sent to the brain for prediction, evaluation and adjustment. The entire process occurs in fractions of milliseconds. (Foran, B., 2001)

2. OBJECTIVE OF THE STUDY

The objective of the present study was to estimate goal keeper performance on the basis of selected coordinative abilities.

3. METHODOLOGY

3.1. Subjects

A total of ten handball male players were selected who played goalkeeper position of handball game. All the selected handball players were from different universities of the country who participated in All India Intervarsity Handball Championship. All the players' age were ranging from 16 to 24 years.

3.2. Variables

The study was conducted by taking five coordinative abilities (Orientation ability, Differentiation ability, Reaction ability, Balance ability and Rhythmic ability) which were selected independent variables and only one goalkeeper performance was selected for dependent variable.

3.2. Statistical Analysis

To estimate goalkeeper performance on the basis of selected coordinative abilities, multiple regression analysis was used.

Findings and results of the study related to goalkeepers

Testing assumptions to apply multiple linear regression model

All the assumptions are based on residuals. Number of residuals are same as number of subjects. It is the difference between two values i.e., one is observed value and another is fitted value of regression line.

In this study there are ten residual points.

There are four assumptions which should be fulfilled before applying multiple linear regression model.

(i) There should be no outliers of the residuals.

(ii) Data points should be independent in nature.

(iii) The residual's distribution should have constant variance.

(iv) Residual's distribution should be normal having mean = 0 and standard deviation = 1.

4. ASSUMPTION I: THE CHECKING OF OUTLIERS OF RESIDUALS

Table 1: Residuals Statistics Related to Goalkeepers

		Value (Predicted)	Residual	Value (Standardized Predicted)	Residual (Standardized)
Measures	Minimum value	15.80	-1.93	-1.60	-1.12
	Maximum value	27.04	1.95	1.80	1.13
	Mean value	21.10	.00	.00	.00
	Value of SD	3.30	1.52	1.00	.88
Variable (Dependent): Goalkeepers Performance					

Outliers are checked by standardized residuals. This value should not exceed ± 3. If the value exceeds that means there are outliers.

Table 1 shows the residuals statistics related to goalkeepers. In this table the minimum value of standardized residual is -1.120 and on the other hand maximum value of standardized residual is 1.135. This value lies in the expected range of ± 3.

This shows that the first assumption related to outliers of residuals has been fulfilled.

5. ASSUMPTION II: THE CHECKING OF INDEPENDENCE OF RESIDUALS

Table 2: Durbin-Watson Value Related to Goalkeepers

Durbin-Watson Value	1.841

The Durbin-Watson estimate or value is used to check the independence of residuals. The value of Durbin-Watson test ranges from 0 to 4. The interpretations are: if the value is near to 0 that shows strong positive correlation and on the other hand if the value is near to 4, it indicates strong negative correlation.

Here Table 2 shows the Durbin-Watson value of 1.841. This value is near to 2 and away from 0 and 4. This shows that the assumption related to independence of residual is fulfilled i.e., neither strong positive correlations are found and nor strong negative correlations are found.

This shows that second assumption of independence of residuals has been fulfilled.

6. ASSUMPTION III: THE CHECKING OF ASSUMPTION RELATED TO CONSTANT VARIANCE

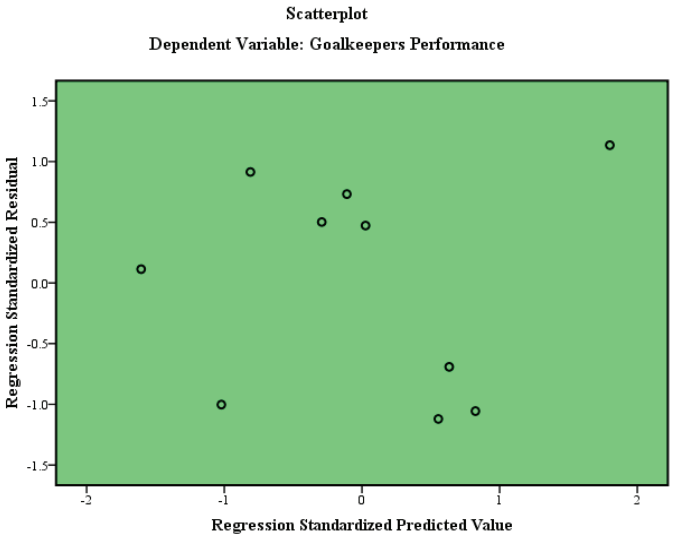


Fig. 1: Figure Shows Scatter Plot of Standardized Residual versus Standardized Predicted Value

In relation to checking of the assumption of constant variance, there should not be any clear pattern.

Figure 1 of scatter plot shows that there is no clear pattern. On the basis of that it may be concluded that the variance is constant and third assumption of constant variance is fulfilled.

7. ASSUMPTION IV: THE CHECKING OF ASSUMPTION RELATED TO NORMALITY OF

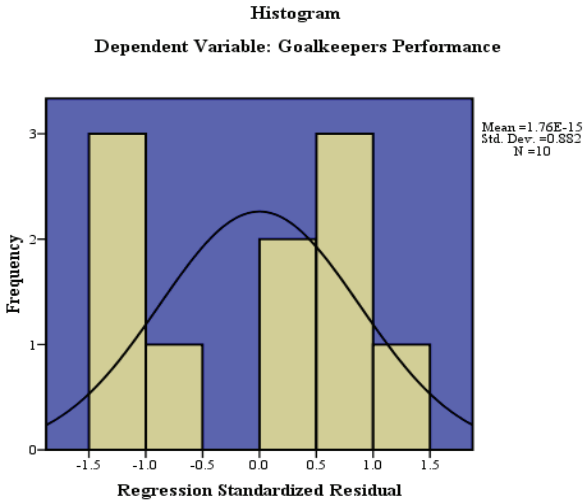


Fig. 2: Histogram with Normality Plots in Relation to Residuals Distribution of Goalkeepers

Figure 2 shows the histogram with normality plots of residuals distribution pertaining to goalkeepers along with mean and standard deviation.

Figure shows that distribution of residuals fulfilled assumptions of the normality.

Figure 2 also shows that the mean of residuals distribution is near to 1 and standard deviation is near to 0.

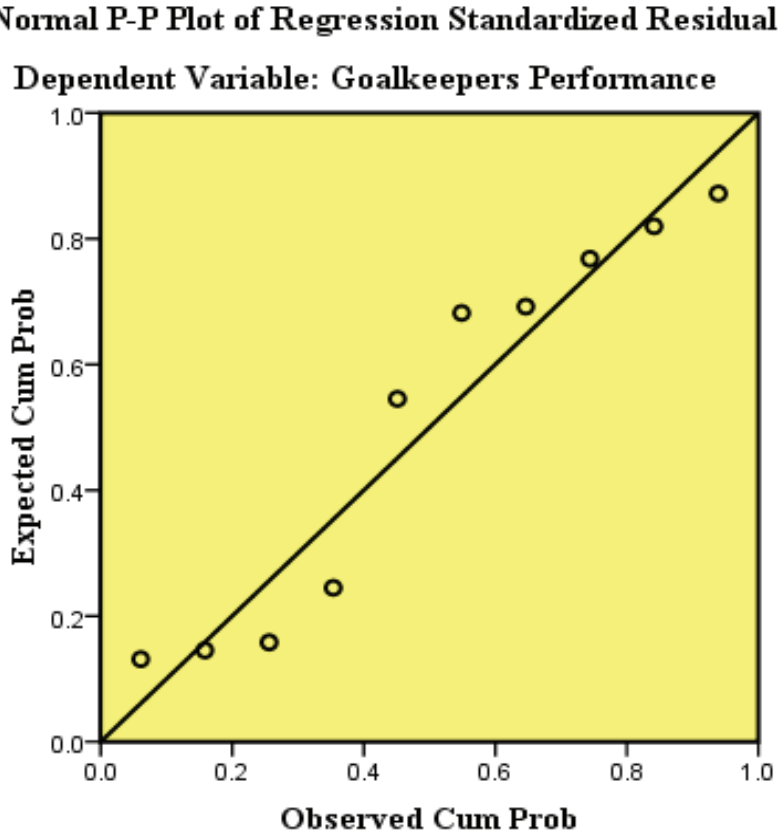


Fig. 3: Plot of Normal Probability in Relation to Residuals Distribution of Goalkeepers

Figure 3 shows Q-Q Plots to compare the quantiles of a data distribution with the quantiles of standardized theoretical distribution in relation to residuals distribution of goalkeepers.

For normal distributions, points should be along with the line. In Figure 3 all the points are more or less near to standardized line.

From Figures 2 and 3 it may be concluded that assumption related to the checking of normality of residuals distribution has been fulfilled.

Since all the assumptions have been fulfilled, multiple regression analysis was applied to estimate goalkeepers performance on the basis of selected coordinative abilities.

Multiple regression analysis (Estimation of goalkeepers performance on the basis of selected coordinative abilities)

Table 3: Model Summary Related to Estimation of Goalkeepers Performance on the Basis of Selected Coordinative Abilities

Established Model	Value of R	Value of R Square	Value of Adjusted R Square	Value of Standard Error of the Estimate
1	.81[a]	.66	.62	2.21
2	.90[b]	.82	.77	1.72
Constant: (Predictors): Orientation Ability				
Constant: (Predictors): Orientation Ability, Differentiation				
Variable: (Dependent): Goalkeepers Performance				

Table 3 reveals that two models are established to estimate goalkeepers performance on the basis of selected coordinative abilities.

First model is established on the basis of only one independent variable (orientation ability).

Second model is established on the basis of two independent variables (orientation ability and differentiation ability).

In case of first model, R of .818 is the value of Pearson moment correlation (between goalkeepers performance and orientation ability). R Square of 0.669 shows that 66.9% of goalkeepers performance is explained by orientation ability. Value of Adjusted R Square is ignored since only one independent variable is included.

In case of second model R of 0.908 is the value of multiple correlation between dependent variable (goalkeepers performance) and independent variables (orientation ability and differentiation ability). Value of R is ignored since two independent variables are included. Value of Adjusted R Square (0.775) shows that 77.5% goalkeepers performance is explained by orientation ability and differentiation ability.

Table 4: ANOVA Table Related to Estimation of Goalkeepers Performance on the Basis of Selected Coordinative Abilities

Established Model		SS (Sum of Squares)	df (Degree of Freedom)	MS (Mean Square)	F-value	Significance Value
1	Reg.(Regression)	79.49	1	79.49	16.13	.004[a]
	Res. (Residual)	39.40	8	4.92		
	Total	118.90	9			
2	Reg.(Regression)	98.09	2	49.04	16.50	.002[b]
	Res. (Residual)	20.80	7	2.97		
	Total	118.90	9			
Constant: (Predictors): Orientation Ability						
Constant: (Predictors): Orientation Ability, Differentiation Ability						
Variable (Dependent): Goalkeepers Performance						

The analysis of variables tells about the usefulness of two regression models for estimating goalkeepers performance on the basis of selected coordinative abilities.

In the first model, F value of 16.138 is significant ($p < 0.05$). This shows that established model is useful and may be used for estimating goalkeepers performance on the basis of orientation ability.

In the second model, the F value of 16.503 shows that this established model is also useful and may be used for estimating goalkeepers performance on the basis of orientation ability and differentiation ability.

Table 5: Coefficients Related to Estimation of Goalkeepers Performance on the Basis of Selected Coordinative Abilities

Established Model		Coefficients (Non -unstandardized)		Coefficients (Standardized)	Value of t	Sig.	Confidence Interval (95%) for B		Statistics for Collinearity	
		B	Standard Error	Beta			Value of Lower Bound	Value of Upper Bound	Tolerance Value	VIF value
1	Value of Constant	71.83	12.65		5.67	.000	42.66	101.00		
	Orientation ability	-6.97	1.73	-.81	-4.01	.004	-10.98	-2.97	1.00	1.00
2	Value of Constant	46.05	14.23		3.23	.014	12.39	79.72		
	Orientation Ability	-4.67	1.63	-.54	-2.86	.024	-8.54	-.81	.68	1.46
	Differentia--tion Ability	.81	.32	.47	2.50	.041	.04	1.58	.68	1.46
Variable (Dependent): Goalkeepers Performance										

Model one in Table 5 tells the quantification about the relationship between goalkeepers performance and orientation ability. The constant of 71.839 has no practical meaning. This value of goalkeepers performance, when the orientation ability of goalkeepers is 0. This shows that with decrease of every one unit of orientation ability (on an average), the playing ability of goalkeepers increases by 6.979.

Model two in Table 5 tells the quantification about relationship of goalkeepers performance with orientation ability and differentiation ability. The constant of 46.058 has no practical meaning. This is the value of goalkeepers performance, when orientation ability and differentiation ability are 0. This shows that with the decrease of one unit of orientation ability (on an average), the playing ability of goalkeepers increase by 4.679. With the increase of every unit of differentiation ability (on an average) the playing ability of goalkeepers increases by 0.816.

Table 6: Excluded Variables Related to Estimation of Goalkeepers Performance on the Basis of Selected Coordinative Abilities

Established Model		Value of Beta In	Value of t	Sig.	Value of Partial Correlation	Collinearity Statistics		
						Tolerance Value	VIF Value	Minimum Tolerance Value
1	Differentiation ability	.47[a]	2.50	.041	.68	.68	1.46	.68
	Reaction ability	.17[a]	.38	.711	.14	.23	4.31	.23
	Balance ability	-.30[a]	-.62	.549	-.23	.19	5.21	.19
	Rhythm ability	-.40[a]	-.66	.531	-.24	.11	8.42	.11
2	Reaction ability	-.03[b]	-.09	.92	-.04	.21	4.60	.17
	Balance ability	-.44[b]	-1.28	.24	-.46	.18	5.33	.16
	Rhythm ability	-.23[b]	-.48	.64	-.19	.11	8.61	.11
a. Predictors in the Model: (Constant), Orientation Ability								
b. Predictors in the Model: (Constant), Orientation Ability, Differentiation Ability								
b. Dependent Variable: Goalkeepers Performance								

Table 6 shows that the excluded independent variables in relation to both the established models. In the first model excluded independent variables are differentiation ability, reaction ability, balance ability & rhythm ability. In the second model excluded independent variables are reaction ability, balance ability and rhythmic ability.

Models to predict performance of goalkeepers:

Model 1:

Goalkeepers Performance = 71.839– 6.979 X Orientation Ability

Model 2:

Goalkeepers Performance = 46.058 – 4.679 X Orientation Ability + 0.816 X differentiation ability

REFERENCES

Best, J.W. (1963), *Research in Education,* U.S.A.: Prentice Hall.
Bhat, A.H. (2010), *Test and Measurements in Physical Education,* New Delhi: Sports Publication.
Chan, Y.H. (2003), "Biostatistics 101: Data Presentation", *Singapore Medicine Journal*, Vol. 44(6), pp. 280–285.
Chan, Y.H. (2003), "Biostatistics 201: Linear Regression Analysis", *Singapore Medicine Journal*, Vol. 45(2), pp. 55–61.
Clark, H.H. and Clark, D.H. (1975), *Research Process in Physical Education,* Englewood Cliffs, New Jersey: Prentice Hall, Inc.
Field, A. (2009), *Discovering Statistics using SPSS,* London: SAGE Publications Ltd.
Gay, L.R. (2000), *Educational Research,* U.S.A: Prentice Hall.
Gupta, S.L. and Gupta, H. (2011), *SPSS for Researchers,* New Delhi: International Book House Pvt. Ltd.
Verma, J.P. (2000), *A Text Book on Sports Statistics,* Gwalior: Venus Publications.

Rakesh Kumar Patel

Research Scholar, School of Studies in Physical Education,
Pt. RavishankarShukla University, Raipur (C.G.)

Dr. Rajeev Choudhary

Professor& Head, School of Studies in Physical Education,
Pt. RavishankarShukla University, Raipur (C.G.)

INTERNATIONAL JOURNAL OF PHYSICAL EDUCATION AND APPLIED EXERCISE SCIENCES
ISSN: 2394-9953
VOLUME 3, NUMBER 1, JANUARY 2017

Continuous Rope Skipping Enhances the Cardiovascular Fitness

Mr. Pankaj Kitukale[1] and Dr. Dileep Tirkey[2]

[1]*Vice Principal, Central India Academy, Dewas (M.P.)*
[2]*Asstt. Professor, L.N.I.P.E., Gwalior, (M.P.)*

Abstract

The present investigation was conducted to determine the effect of Continuous Rope Skipping on Cardiovascular Fitness. Forty male and female students from athletics specialization were selected as subjects for the present study. They were classified into two groups, group 'A' was designated as an experimental group, while 'B' was designated as a control group. While 25 students acted as an experimental group, 15 acted as a control group. The training was assigned to experimental group only. The training was given for three months, five days a week, to the experimental group. The volume of the work was gradually increased from 2 minutes to 20 minutes. Data were taken at the beginning and at the conclusions of an experimental period of three months. Paired 't' test was applied between pre-test and post-test means of both group in order to find out group improvement in experimental and control group. The level of significance was set at 0.05 levels. It is concluded that continuous rope skipping enhances the cardiovascular fitness.

Keywords

Cardiovascular Fitness, Rope Skipping, Physical Fitness, Cardio-Respiratory Efficiency

1. INTRODUCTION

Modern day physical education is concerned with the development of the individual to assure his innate motor potentialities as possible. Many physical educators also consider the development of desired characteristics of individual personality structure as an important outcome of physical education. The relationship of selected factors of personality to levels of motor ability should be great importance to the profession. Regular training without having any break is always emphasized as an essential ingredient for the athletes. One of the basic laws of biology is that the fundamental efficiency of an organism improves when it is used and regressed with disuse. Accordingly, it follows that if the human machine is to be kept in good working order, some regular exercise is necessary.

To be a good sportsman one has to develop various qualities within him. A sportsman should have speed, strength, stability, suppleness, endurance and skill (personal skill, rhythm handling object etc.). There are various ways to develop each and every component separately at all levels. This proneness can be developed up to the optional level through planned systemic and continuous training programmes. Cardio-vascular fitness is one of the most important aspects of physical fitness.

Cardio vascular Fitness is frequently considered the most important aspects of physical fitness because who posses it are likely to decrease their risk of coronary heart disease. Cardiovascular Fitness is also referred to as cardiovascular endurance, cardio-respiratory capacity and circulatory fitness. Regardless of the work used to describe it, cardiovascular fitness is complex because it requires fitness of several body systems, because of its importance to a healthy life; cardiovascular fitness is one of the most significant aspects of physical fitness. This is

the quality that enables one to continue engaging in reasonable vigorous physical activities for extended period of time and where the required cardio-respiratory adjustment to the activity is built up.

The cardiovascular fitness is an important aspect of physical fitness which is dependent on the efficient working of circulo-respiratory system supplying an adequate amount of oxygen based on the exercise demands. Circulo-respiratory system includes the blood, blood vessels, heart and lungs. It is concerned with the transport of oxygen to the working muscles. The heart provides the means for oxygen and nutrition transport through blood vessels and the heart acts as a pump which decides the force and rate of movements of blood through blood vessels. The lungs supply the required amount of oxygen depending upon the bodily needs.

Skipping with rope provides a good means for exercising the whole body and thus promoting general fitness of the body. In addition to strengthen leg and arm muscles, skipping also helps in improving cardio-respiratory efficiency. Rope jumping is aerobic if done at a slow or moderate pace, but is anaerobic if done vigorously. One study shows that typical exercises jumps very briskly and for this reason, cannot maintain the jumping continuously. Even those who are highly trained or who jumps at a moderate pace find it difficult to continue this exercise long enough to build cardiovascular fitness because of leg fatigue, high hart rate, or loss of interest in the activity. To be most effective, a continuous routine involving several different jump steps should be used in combination with other forms of exercise, for e.g. rope jumping could be a part of a continuous callisthenic program or a dance aerobic routine.

Out of the available literature it is evident that there are so many methods for improving cardiovascular fitness and general fitness. Each method has their merits and demerits. Rope skipping is also one of the methods which will be helpful for the improvement of cardiovascular fitness. It requires fewer places and people can do it in privacy, it will be helpful for sportsmen and general people.

2. MATERIALS AND METHODS

2.1. Selection of Subjects

40 male and female students of School of Studies in Physical Education, D.A.V.V. Indore served as subject for the study. The age of the subjects ranged between 18–25 years. The subjects were divided into two groups, 15 acted as a control group and 25 subjects acted as an experimental group.

2.2. Administration of the Test

2.2.1. Six Hundred Meters Run/Walk Test

Objective: To measure cardiovascular efficiency.

Sex and Age: Male and Female of 18–25 years.

Reliability: A coefficient of 0.92 was obtained for both boys and girls at the Junior High School level.

Objectivity: None reported, although obviously an objective measure.

Validity: Validity coefficient of 0.96, 0.88 and 0.76 were found by Biasiotto and Cotton for third, fifth and seventh grade boys, respectively.

Equipment: A stopwatch and a track.

The inside circumference of a 400 metres track was used for this test.

3. DIRECTIONS

It is possible to have as a dozen runners at a time in this event. Each runner is assigned a spotter. The subject uses a standing start. The tester gives the commands "Ready-Go". Spotter will be appointed at the finishing line for lap scoring.

3.1. Scoring

The time in minutes and $1/10^{th}$ of a second is recorded as the score.

Additional Pointers:

a. The same partners should not score each other.

b. Some practice in spotting should be given.

c. The timer must guard against the tendency to stop the watch as soon as the first runner finishes.

d. Each runner should be instructed to listen for his own time as a safeguard against the first runner finishes.

3.2. Adminstration of the Training Programme and Collection of Data

To know the effect of continuous rope skipping on cardiovascular fitness of professional students of physical education, the training imparted to all the students by researcher himself. The training was given five days in a week for the experimental group and no training was given to control group. The pre-and post-test data was collected by the research scholar at the beginning and end of the training programme respectively. In training of rope skipping group were asked to do the skipping with different exercise for e.g. with two legs simple jump, alternate leg jumping, high knee action jumping with slow and fast combination. The time-period of rope skipping was gradually increased with rest time in first month and then continuously rope skipping for 20 minutes every day without any rest.

In order to find the effects of continuous rope skipping on cardiovascular fitness one-tailed 't'-test was applied. For testing hypothesis the level of significance was set at 0.05 level.

3.3. Result of the Study

In order to find the effects of continuous rope skipping on cardiovascular fitness one tailed 't'-test was applied at 0.05 level of significance.

The mean difference of Interval Group and Control Group and their values are presented in Table 1.

Table 1: One-tailed 't' Ratio of Experimental Control Group for 600 Metres Run/ Walk Test

Group	N	Pre-Test Mean	Post-Test Mean	DM	SE_D	't' Ratio
Experimental Group (A)	25	136.64	130.44	6.2	1.83	3.38 *
Control Group (B)	15	131.33.0	132.46	0.04	0.14	-0.43

*Significant at 0.05 level

't' value required to be significant at 24 df = 1.71 (for experimental group)

't' value required to be significant at 14 df = 1.76 (for control group)

Table 1 clearly revealed that experimental group improved significantly at 0.05 level yielding 't' values of 3.38. The needed 't' value for significance at 0.05 levels with 24 df for one tailed test is 1.71.

Table 1 also revealed that control group did not show any significant improvement in the test component of 600 metres run/walk test at 0.05 level yielding 't' values of-0.43. The needed 't' value for significance at 0.05 levels with 14 df for one tailed test is 1.76.

The graphical representation of pre and post test means of experimental and control group are presented in Fig. 1.

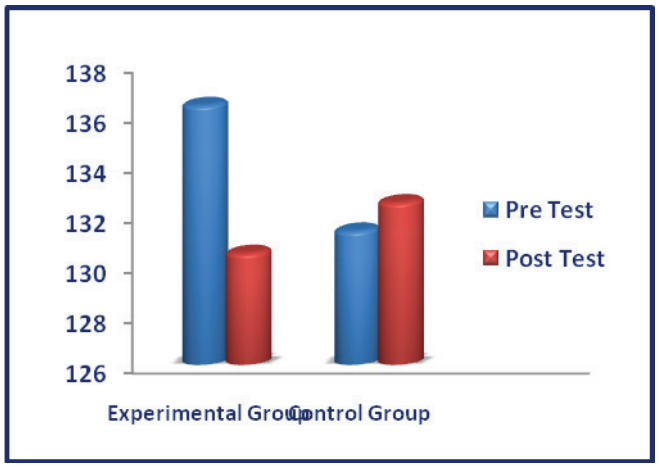


Fig. 1: Graphical Representation of 600 Meters Run/ Walk Test between Pre-and Post-Test Means among the Experimental and Control Groups

4. DISCUSSION OF FINDINGS

The analysis of data revealed that experimental group trained by rope skipping showed significant gains in cardiovascular fitness where control group did not showed significant improvement and it might be lacking of the specific training for the improvement of such variable by conditioning programme in physical education course.

The findings are supported by the study conducted by K. Bandopadhyay on effect of rope skipping on selected physical and physiological variables and the result showed that after an eight weeks training, the speed. Leg muscle, power, cardiovascular efficiency was significantly improved. Boucher studied the comparison of rope skipping and jogging as method of improving cardiovascular efficiency. The result showed that daily 10 minutes programme of rope skipping improved cardiovascular efficiency significantly than that of jogging. These all studies support the result of the present study.

5. CONCLUSION

In conclusion, result of the present study provides evidence that two months of continuous rope skipping enhances the cardiovascular fitness of the experimental group.

REFERENCES

Bandhopadhyay, K. (1983), "Effect of Rope Skipping on selected Physical and Physiological Variables", The Department of Research of H.V.P.M., *Research Biannual for Movement*, 26.

Boker, Louis R. (1976), "The Effect of the Physical Education Programme (Fitness for Life) on Body Composition and Cardio Vascular Endurance of College Students", *Dissertation Abstracts International*, pp. 36–37, 4323.

Carcnoce, Joseph A. (1965), "The Effects of a Programme of Progressive Rope Skipping on the Cardio Vascular Fitness of Adult Man", *Completed Reaearch in Health, Physical Education and Recreation*, Vol. 5, p. 101.

Corbin, Charles B. and Lindsey, Ruth (1988), *Concept of Physical Fitness with Laboratories Dubuque IOWA*: W.M.C. Brown Publishers.

John, Boucher (1984), "A Comparison of Rope Skipping and Jogging as Methods of Improving Cardiovascular Efficiency of College Mens", Washington, *Reasearch Quarterly,* Vol. 18.
Johnson, Barry L. and Nelson, Jack K. (1988), *Practical Measurement for Evaluation in Physical Education*, Delhi: Surjeet Publication.
Singh, Hardayal (1991), *Science of Sports Training*, New Delhi D.V.S. Publications.
Uppal, A.K. (1992), *Physical Fitness*, Delhi : Friends Publications.

Mr. Pankaj Kitukale

Vice Principal
Central India Academy, Dewas (M.P.)

Dr. Dileep Tirkey

Asstt. Professor
L.N.I.P.E., Gwalior, (M.P.)

INTERNATIONAL JOURNAL OF PHYSICAL EDUCATION AND APPLIED EXERCISE SCIENCES
ISSN: 2394-9953
VOLUME 3, NUMBER 1, JANUARY 2017

INTERNATIONAL JOURNAL OF PHYSICAL EDUCATION AND APPLIED EXERCISE SCIENCES

A Comparative Study of State Competitive Anxiety Inventory between Football and Hockey National Level Player of Gujarat State

Praveen Kumar Mishra

HOD of Physical Education, Swaminarayan Vidyapeeth, Anand (Gujarat)

Abstract

The study is to compare the Competitive Anxiety Inventory (CSAI-2) for male football and hockey game. The statistical technique used in this study contained football and hockey national level male players of Gujarat state. Samples were male players who had participated in the national level competition. The total number of subjects was 100 male players (50 football and 50 hockey). The age of the subjects ranged between 17-21 years. State Competitive Anxiety Inventory (CSAI-2) for football and hockey were administered to the subjects within 20 minutes prior to the start of the competition, each questionnaire took approximately 5 minutes to complete. To compare male Football and Hockey Game on their State Competitive Anxiety Inventory responses, one way Analysis of Variance Test was employed. Data were analyzed by using SPSS. (Statistical Package of Social Sciences). The selected variables between the football and hockey game players, which shows that there is a significant difference for the cognitive and somatic anxiety as the values are found to be 5.872 and 4.982 respectively, which are significant at 0.05 level, whereas no significant difference is found for the self-confidence.

1. INTRODUCTION

Multidimensional theory was developed by Martens and colleagues (1990a). The multidimensional theory proposed that anxiety has three sub-scales: cognitive anxiety, somatic anxiety and self-confidence. Cognitive anxiety is defined as "the mental component of anxiety and is caused by negative expectations about success or by negative self-evaluation" (Martens *et al.*, 1990a, p. 5). Second element of anxiety is somatic anxiety, that is defined by Martens *et al.* (1990a), which "refers to the physiological and affective elements of the anxiety experience which develop directly from autonomic arousal" (p. 5). Martens *et al.* (1990b) have suggested that somatic anxiety should affect performance in a curvilinear fashion, with both lower and higher levels of somatic anxiety being detrimental to performance. Therefore, somatic anxiety, due to its time course, is thought to have less of an influence on performance than does cognitive anxiety (Martens *et al.*, 1990b).

State anxiety is generally regarded as an unpleasant emotional reaction related to stressful situations, in which the arousal component is one inherent element (Woodman 2001). An important distinction between arousal and anxiety is that anxiety involves interpretation of the situation as threatening, whereas arousal is unrelated to any such interpretations ((Hammermeister, 2001). Moreover, anxiety has been suggested as a better predictor of the performance outcome than arousal when the tasks are of a more complex nature and load (Arent, 2002).

A third element of competitive state anxiety discussed by Martens *et al.* (1990b) is self-confidence. This encompasses the athlete's global perceptions of confidence. Although not originally proposed as a subcomponent of anxiety, Martens *et al.* have since included self-confidence in their study of the anxiety/performance relationship. They have proposed a positive linear relationship between self-confidence and performance.

Competitive anxiety is one of the most thoroughly examined topics in sport psychology literature. This is mainly due to the perceived detrimental effects anxiety has on performance, creating the negative view most individuals hold of this concept. Anxiety is defined as feelings of nervousness and tension caused by the environment or surrounding expectation that is related to 'arousal'. These demands are usually stressful, indicating to the athletes: a perception of imbalance between the demand given and their abilities to fulfill the demand (Gould, 2002). Dealing with competitive state anxiety is the main task for coaches because players and sport teams could not perform when they are under stress. Players could not perform at their best like they usually could because of anxiety. Consequently, their performance is affected during the competition and they seldom achieve victory (Patsiaouras, A. 2008).

The findings of various research works regarding competitive state anxiety in athletes have had contradictory results. Pigozzi (2008) showed that the skill level of athletes is an important factor for control of competitive state anxiety. The research conducted by Soltani *et al.* (2012) confirmed that elite athletes have lower levels of competitive state anxiety than non-elite athletes. The study of Joel *et al.* (2009) and Cristina (2004) showed that the kind of sport, nature of sport (individual sport or team sport) and gender of athletes are affecting factors on their performance.

According to Hanton, Abriyon and Malaliyo, anxiety levels before and during competition are not clear due to conflicting findings, various athletes have reported different levels of anxiety from much to low (Hanton, 2000; and Mellalieu, 2005). Behzadi (2012) and AdemCivan (2010) reported significant difference in levels of competitive state anxiety among team sports and individual sports athletes. On contrast, Passand (1997); Perry and Williams (1998) have not reported significant difference in high, moderate or low level of anxiety. It seems that the level of competitive state anxiety in team and individual sport athletes is not clear. With respect to the fact that every sport field has its own special nature, and also the results of most of the researches done are not in accordance with each other, therefore lack of a comprehensive theory in this field made the author to take action and compare competitive state anxiety among team sport and individual sport athletes in Iran.

Howard Zhenhao Zeng (2002) compared the levels of cognitive state anxiety, somatic state anxiety, and competitive trait anxiety for varsity athletes between team sports and individual sports. Results showed that competitive state anxiety scores for team sports was significantly higher than that of individual sport athletes. Mohsenpour (2002) studied state anxiety among male athletes of individual and team sports and concluded that there was no significant difference between somatic factor of group and individual examinable items but athletes of major group obtained lower cognitive grades than individual athletes (Mohsenpour, 2002).

2. METHODOLOGY

2.1. Objective of the Study

1. To assess the competitive anxiety of male football and hockey game.
2. To compare the cognitive anxiety between the male football and hockey game.
3. To compare the somatic anxiety between the male football and hockey game.
4. To compare the self confidence between the male football and hockey game.

2.2. Hypothesis

1. There would be no significant difference in the cognitive anxiety of male football and hockey game.
2. There would be no significant difference in the somatic anxiety of male football and hockey game.
3. There would be no significant difference in the self-confidence of male football and hockey game.

2.3. Subjects:

The statistical technique used in this study contained football and hockey national level male players of Gujarat State. Samples were male players who had participated in the national level competition. The total number of subjects was 100 male players (50 football and 50 hockey). The age of the subjects ranged between 17-21 years.

2.4. Questionnaire Used

State Competitive Anxiety Inventory (CSAI-2) for football and hockey were administered to the subjects within 20 minutes prior to the start of the competition, each questionnaire took approximately 5 minutes to complete.

2.5. Statistical Technique

To compare male Football and Hockey game on their State Competitive Anxiety Inventory responses, one way analysis of variance was employed. Data were analyzed by using SPSS (Statistical Package of Social Sciences).

Table 1: Comparison of Mean Score of State Competitive Anxiety Inventory Responses between Male Football and Hockey Game

S. No.	Variable	Group	N	Mean	Standard Deviation
1	Cognitive Anxiety	Football	50	15.98	4.01
		Hockey	50	15.08	2.88
2	Somatic Anxiety	Football	50	15.74	4.02
		Hockey	50	14.22	2.21
3	Self-Confidence	Football	50	25.12	2.98
		Hockey	50	25.89	2.22

Table 1 clearly depicts the values for one way analysis of variance for the selected variables between the football and hockey game players, which shows that there is a significant difference for the cognitive and somatic anxiety as the values are found to be 5.872 and 4.982 respectively, which are significant at 0.05 level, whereas no significant difference is found for the self-confidence.

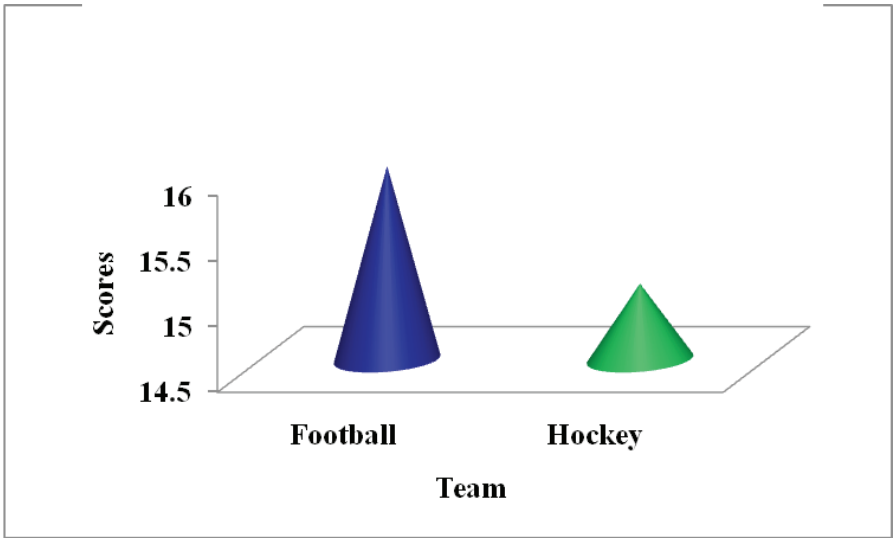


Fig. 1: Comparison of Mean Score of Cognitive Anxiety between Football and Hockey Players

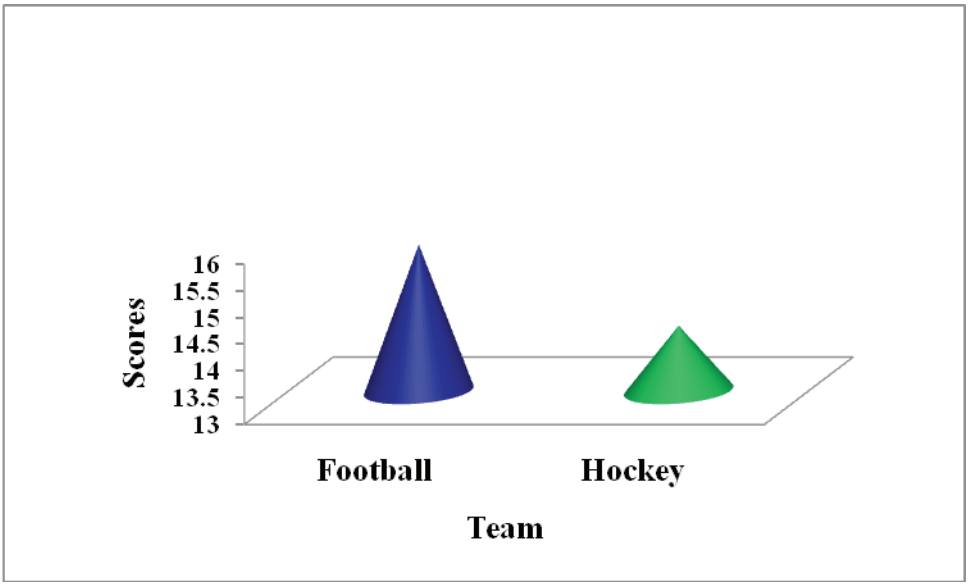


Fig. 2: Comparison of Mean Score of Somatic Anxiety between Football and Hockey Players

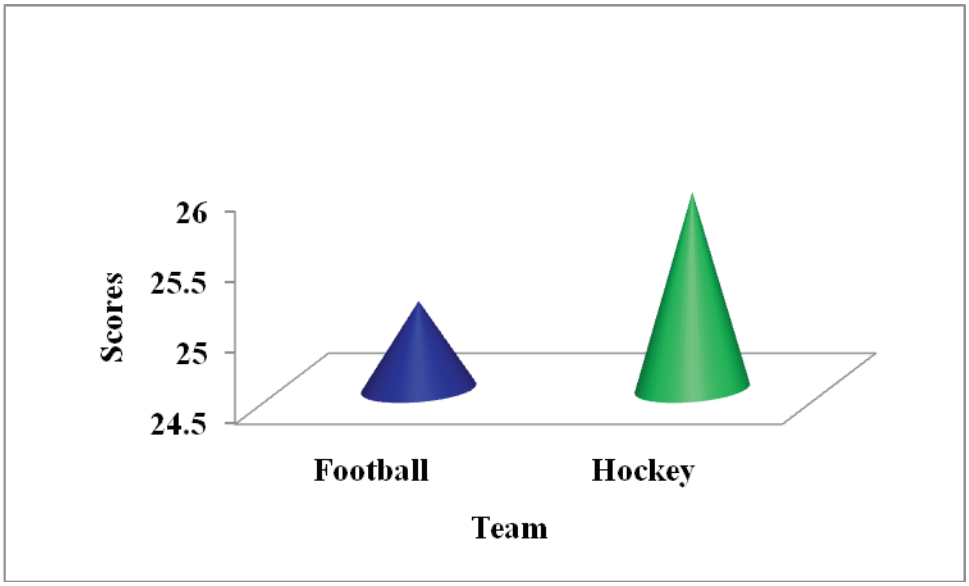


Fig. 3: Comparison of Mean Score of Self-Confidence between Football and Hockey Player

4. DISCUSSION OF FINDINGS

A significant difference in cognitive anxiety between football and hockey game players may be due to the fact that fear of failure is a stronger predictor of cognitive anxiety for football players than for hockey athletes given the potential accountability for failure placed on football athletes. Athletes who participate in football have also been found to experience more anxiety than those who play hockey sports (Flowers, 2002). For athletes in high-contact sports the possibility of getting hurt can also be a source of anxiety. It seems that in football sports, the athletes are more engaged in their own skills and abilities, while in hockey sports they are affected by their

hockey members and their performance will depend on the performance of the group. The role assigned to the athlete in hockey sports may not correspond to their inner role.

A significant difference in somatic anxiety between hockey sport players and football sport players, it seems that athletes who participate in football sports have been found to experience more anxiety than those who play hockey sports. Common sense suggests that being part of a hockey alleviates some of the pressure experienced by those who compete alone **(Arlin and Guide, 2010**). This finding is consistent with predictions that competitive situations elicit both cognitive and somatic anxiety.

Also Martin and Hall research demonstrated that Skaters experienced grater somatic and cognitive anxiety prior to an football competitive event than prior to a hockey competition. Maybe this is because of a diffusion of responsibility that occurs in the team framework but not in an individual framework (Shamshad, A., 2005).

REFERENCES

Gould, D., Greenleaf, C. and Krane, V. (2002), "Araousal-anxiety and Sport Behavior", In T.S. Horn (Ed.), *Advances in Sport Psychology* (2nd ed.) Champaign, IL: Human Kinetics, pp. 207–280.

Hammermeister, J. and Burton, D. (2001), "Stress, Appraisal and Coping Revisited: Ex a Mining the Antecedents of Competitive State Anxiety with Endurance Athletes", *The Sport Psychologist*, Vol. 15, pp. 55–90.

Howard, Z. and Zeng, H. (2002), "The Differences between Anxiety and self–confidence between Team and Individual Sports College Varsity Athletes", *International Sports Journal*/ Winter.

Praveen Kumar Mishra

HOD of Physical Education
Swaminarayan Vidyapith, Anand (Gujarat)

INTERNATIONAL JOURNAL OF PHYSICAL EDUCATION AND APPLIED EXERCISE SCIENCES
ISSN: 2394-9953
VOLUME 3, NUMBER 1, JANUARY 2017

Comparison of Selected Psychomotor Abilities Between Football and Hockey Male Players

Praveen Kumar Mishra[1] and Bhikhabhai Aberaj Bhai Chaudhari[2]

[1]HOD of Physical Education, Swaminarayan Vidyapeeth, Anand (Gujarat)
[2]Ph.D Scholar, Swaminarayan Vidyapeeth, Anand (Gujarat)

Abstract

The aim of this study was to investigate difference of psychomotor abilities between footballer and hockey male players. To attain this study, 30 (15 footballer and 15 hockey players) represented inter-university tournament with age ranging from 20 to 25 years were randomly selected from Lakshmibai National Institute of Physical Education, Gwalior. The statistical technique employed for this study was independent 't'-test at 0.05 level of significance. As per the statistical analysis, the Football and Hockey players in Visuo-Spatial Coordination Psychomotor Mobilization and Eye- Arm Coordination as the sig. value is less than the 0.05 and also shows the insignificant difference in Visuo-Motor Coordination as the sig. value is more than the 0.05.

1. INTRODUCTION

The application of the psychological principles to the improvement of performance in sports has now-a-days received greater attention. There are certain accepted psychological principles which have to be applied so that the athletes and players can maximize their performance. Coaches, physical educationists and sports scientists have always felt a great need to know about those psychological principles, which are helpful in improving the motor skills of the players. To understand and explain movement-oriented behavior, the identification of the factors that contribute to the successful motor performance is required. The future prospect of athletes definitely depends on their psychomotor endowment which can, of course, be groomed at the later stage by providing adequate and suitable environmental support.

The psychomotor domain is mainly concerned with bodily movements and their control. Such behaviors when performed in a general way represent a general movement pattern and when highly specific and task defined, indicate a skill or sequence of skills. They include the following kinds of behaviour which may take place in combination to each other or may become independent:

a. Controlling, manipulating or moving an object,

b. Controlling the body of objects as in balancing,

c. Moving and/or controlling the body or parts of the body in space with timing in a brief or long act or sequence under predictable and unpredictable situations.

Psychomotor domain of behaviour refers to motor patterns initiated by psychological backing to the entire movement sequence. Singer (1979) reported that activities which are primarily movement oriented and emphasis overt physical responses bear the label 'psychomotor'. They encompass controlling, manipulating and/or moving an object; controlling the body of the object such as balancing, moving and/or controlling the body or the part of the body in space with timing in a brief or long act or sequence under predictable and unpredictable situation.

2. PSYCHO-MOTOR ABILITIES

Various psychomotor parameters have been selected by the investigator in order to obtain the basic, general and global view of the psychomotor make-up of the subjects under investigation so that their comparative functional status in case of individual and team players can be ascertained to prepare their psychomotor profiles. This is the principal aim of the present study.

3. OBJECTIVE OF STUDY

The objective of the study was to compare psychomotor abilities between footballer and hockey male players.

3.1. Methodology

- Selection of Subjects

Thirty (15 footballer and 15 hockey) inter-university players from Lakshmibai National Institute of Physical Education Gwalior were selected as participant randomly. The age of the participant was range from 20 to 25 years.

- The psychomotor parameters researched in the study are described below:
  1. Visuo- Spatial Coordination
  2. Psychomotor- Mobilization
  3. Eye- Arm Coordination
  4. Visuo- Motor Coordination

4. METHODOLOGY

4.1. Design

Descriptive Survey Method was followed in the present study. The data was collected with help of different tests of Psychomotor Abilities. T-test technique was used to analyze the data.

5. SAMPLE

5.1. Selection of Subjects

Thirty (15 footballer and 15 hockey) inter-university players from Lakshmibai National Institute of Physical Education Gwalior were selected as participant randomly. The age of the participant ranged from 20 to 25 years.

5.2. Tools Used

Test/ Tool Motor Element Psychomotor Ability Tested

S. No.	Test / Tool	Psychomotor Ability Tested	Motor Element
1	Standing Broad Jump Test	Visuo-Spatial Coordination	Limb Coordination
2	Skipping Rope Jump Test	Psychomotor Mobilization	Hand-Leg Coordination
3	Basketball Wall Pass Test	Eye –Arm Coordination	Two –Arm Coordination
4	Volleyball Wall Volley Test	Visuo-Motor Coordination	Arm- Shoulder Coordination

5.3. Data Analysis

For data, an analysis response was express as mean and standard deviation. Independent test were performed for comparisons means between two group (football and hockey male players), $p<0.05$ was considered statistically significant. Data analysis performed using SPSS 20.0 software under windows.

5.4. Results

The minimum and maximum ages were similar in both the groups. The means and standard deviation (SD) of the psychomotor parameters, the means and standard deviations of the two groups has been present in Table 1. Further equality of variances (Levene´s test) along with independent´t´ test has been present in Table 2. The graphical representation of mean differences is shown in Fig. 1.

Table 1: Descriptive Statistics of the Groups

S. No.	Psychomotor Parameters	Groups	Mean	SD
1	Visuo-Spatial Coordination	Football	18.5520	1.02913
		Hockey	20.0353	1.08324
2	Psychomotor Mobilization	Football	7.5580	0.48177
		Hockey	8.5347	0.69953
3	Eye –Arm Coordination	Football	11.4440	0.91837
		Hockey	10.1213	0.70536
4	Visuo-Motor Coordination	Football	1.7827	0.18348
		Hockey	1.8507	0.15262

Table 1 shows the descriptive statistics of the Footballers and Hockey Players for Visuo-Spatial Coordination, Psychomotor Mobilization, Eye –Arm Coordination and Visuo-Motor Coordination. The Mean ±SD values of groups.

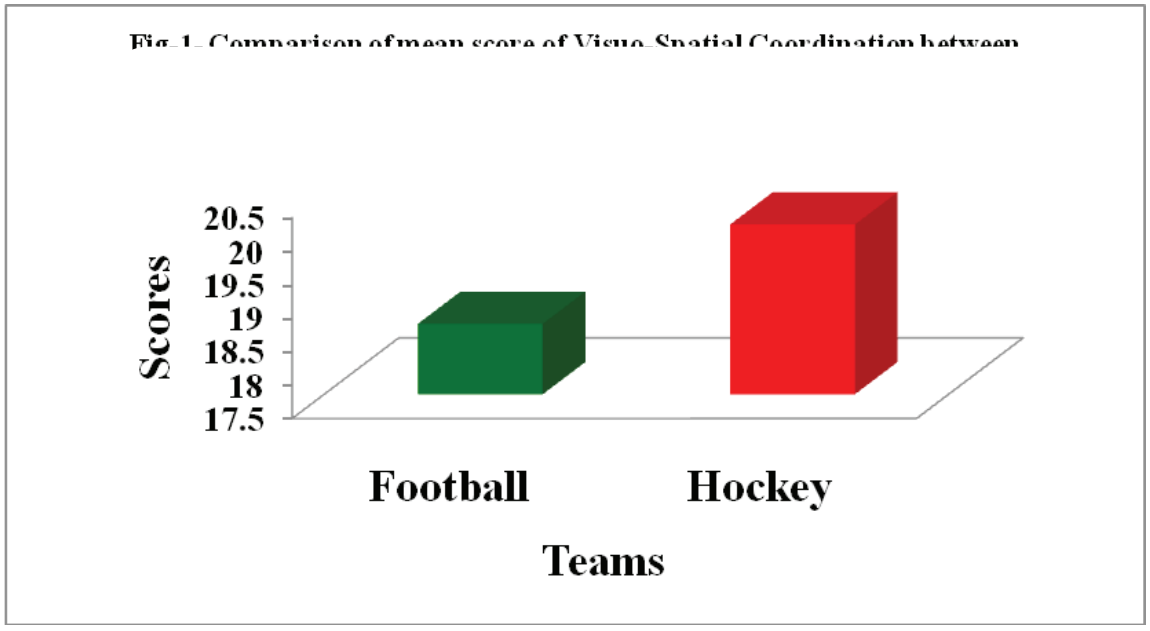


Fig. 1: Comparison of Mean Score of Visuo-Spatial Coordination between Football and Hockey Players

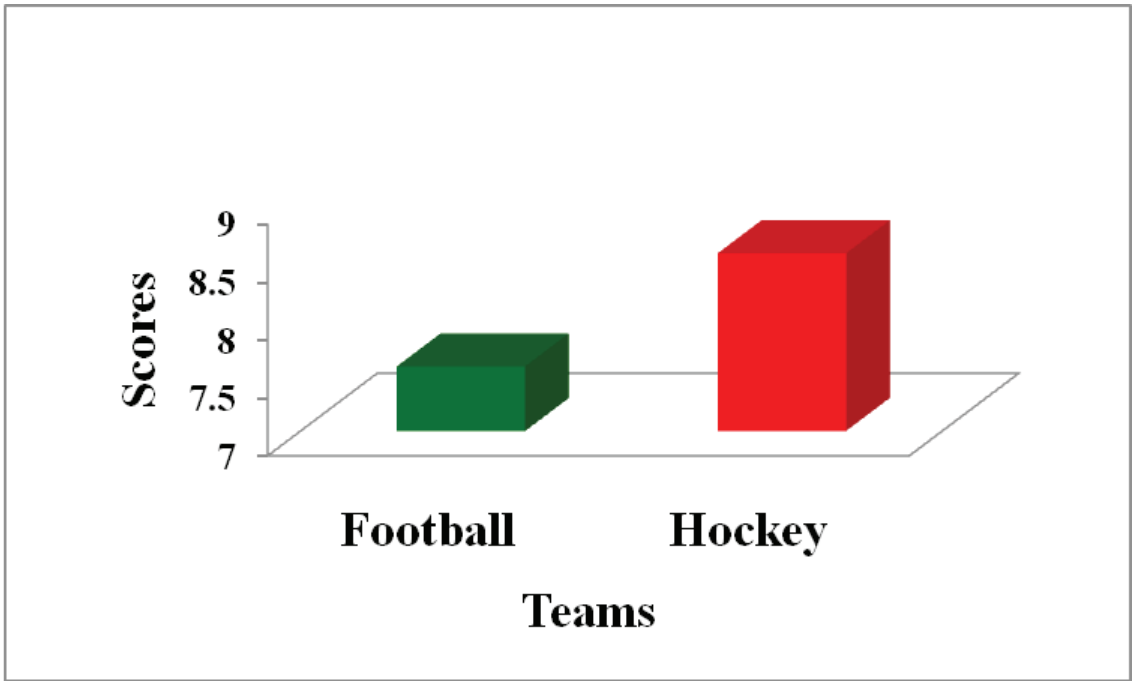


Fig. 2: Comparison of Mean Score of Psychomotor Mobilization between Football and Hockey Players

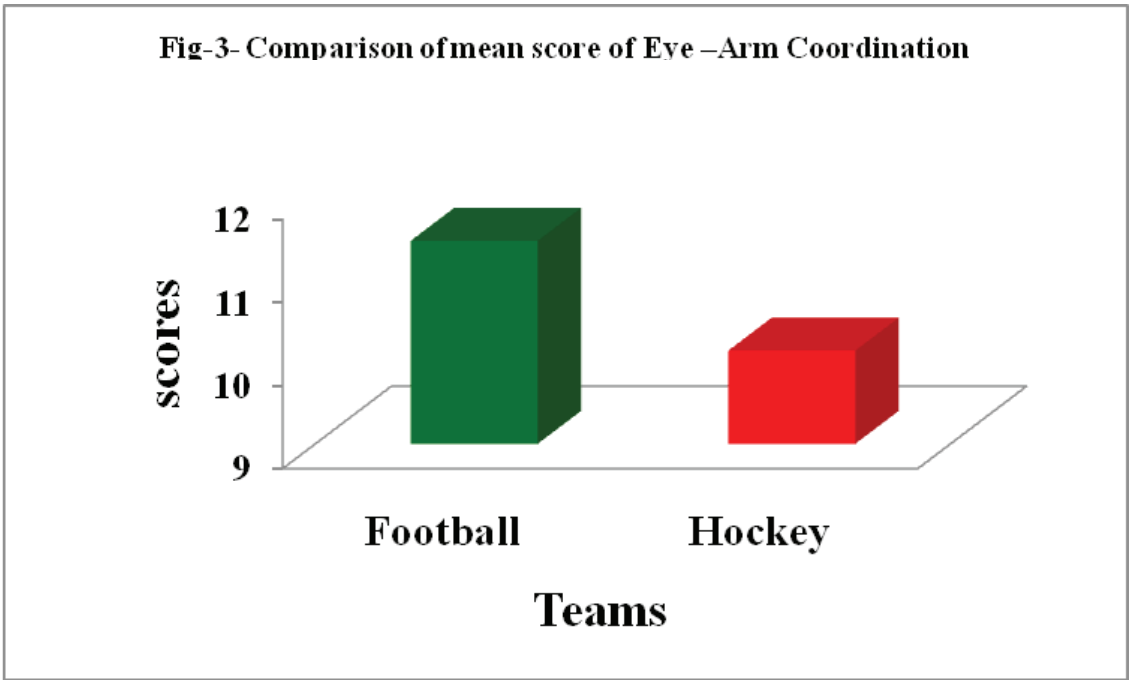


Fig. 3: Comparison of Mean Score of Eye –Arm Coordination between Football and Hockey Players

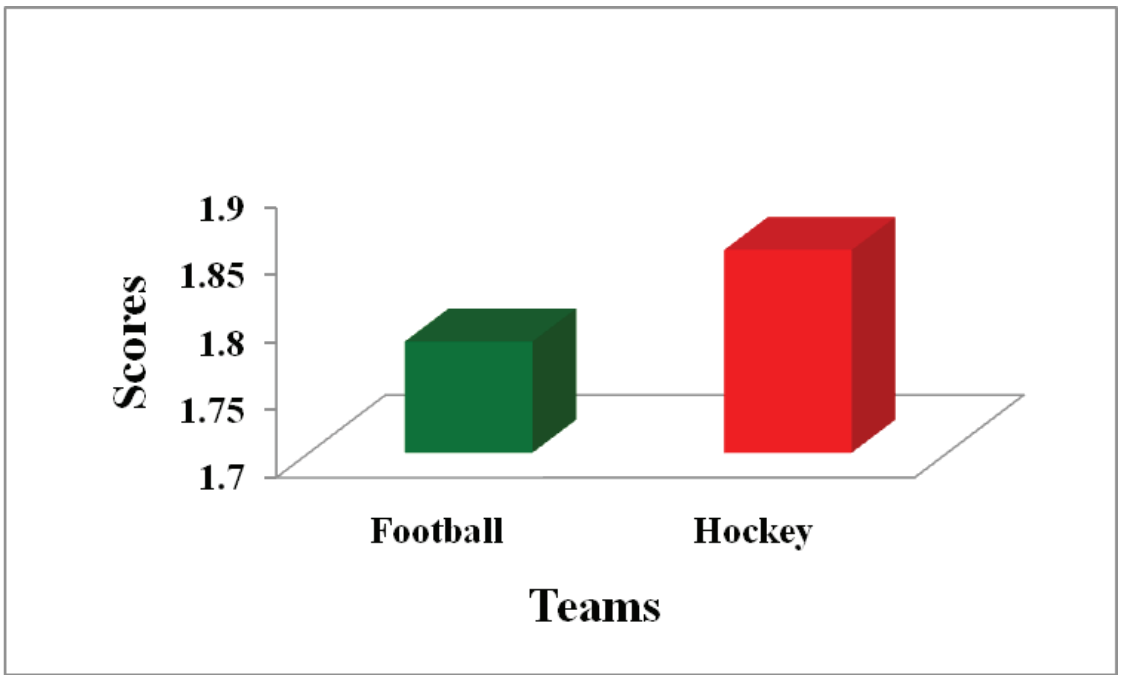


Fig. 4: Comparison of Mean Score of Visuo-Motor Coordination between Football and Hockey Players

Table 2: Significance Difference of Mean of Psychomotor Parameters Between Football and Hockey Players

		F	Sig.	t-value	Df	Mean Difference
Visuo-Spatial Coordination	Equal Variances Assumed	0.364	0.551	3.845*	28	1.48333
Psychomotor Mobilization	Equal Variances Assumed	0.846	0.366	4.453*	28	0.97667
Eye- Arm Coordination	Equal Variances Assumed	0.690	0.413	4.424*	28	1.3226
Visuo-Motor Coordination	Equal Variances Assumed	0.559	0.461	-1.104	28	-0.06800

*Value of "t" at the level of 0.05

Table 2 shows the significance difference in the Football and Hockey players in Visuo-Spatial Coordination Psychomotor Mobilization and Eye-Arm Coordination as the sig. value is less than the 0.05 and also shows the insignificant difference in Visuo-Motor Coordination as the sig. value is more than the 0.05.

6. RESULTS

The Football and Hockey players in Visuo-Spatial Coordination Psychomotor Mobilization and Eye-Arm Coordination as the sig. value is less than the 0.05 and also shows the insignificant difference in Visuo-Motor Coordination as the sig. value is more than the 0.05.

REFERENCES

Abreau, F. and Templer, D.I. (1990), "Schuyler, B.A. and Hutchison, H.T. Neuro-psychological Assessment of Soccer Players", *Int. Jr. Exp. Psy*., No. 3, pp. 176–180.

Ball, C. (1989), "The Linkage of Perception and Action in Sporting Skill", *Proceedings of 7th World Congress in Sports Psychology*, p. 55.

Bennett, S., Taylor, S. and Davids, K. (1993), "Vision and Motor Control during Weight Lifting", *Abstract*, *8th World Congress on Sports Psychology*, Lisbon, p. 13.

Cox, R.H. (1990), *Sports Psychology Concept and Applications,* W.M.C. Brown Publishers, Dubuque, IA, USA, pp. 49–85.

Donald, A. and Dicki, R.K. (1987), "Perceptual and Motor Practice and Choice Reaction Time", *Int. Jr. Sp. Psy*., Vol. 18(1), p. 40.

Fleishman, E.A. (1972), "Structure and Measurement of Psychomotor Abilities", In R.N. Singer (Ed.) *The Psychomotor Domain: Movement Behaviour*, Philadelphia, Lea Felinger,

Harword, S.A. (1954), "Comparative Study of Motor Fitness Test", *Research Quarterly*, Vol. 25(1), p. 8.

Keller, L.F. (1942), "The Relationship of Quickness of Body Movement to Success in Athletics", *Research Quarterly*, Vol. 13(2), pp. 147–154.

McGuigan, F.J. (1967), *Experimental Psychology: A Methodological Approach,* 1st Ed., Prentice Hall of IndiaPvt. Ltd., New Delhi.

Praveen Kumar Mishra

HOD of Physical Education
Swaminarayan Vidyapeeth, Anand (Gujarat)

Bhikhabhai Aberaj Bhai Chaudhari

Ph.D Scholar
Swaminarayan Vidyapeeth, Anand (Gujarat)

INTERNATIONAL JOURNAL OF PHYSICAL EDUCATION AND APPLIED EXERCISE SCIENCES
ISSN: 2394-9953
VOLUME 3, NUMBER 1, JANUARY 2017

INTERNATIONAL JOURNAL OF PHYSICAL EDUCATION AND APPLIED EXERCISE SCIENCES

A Comparative Study on Self-Concept of Runner, Thrower and Jumper for Effective Performance

Praveen Kumar Mishra

HOD of Physical Education,
Swaminarayan Vidyapeeth, Anand (Gujarat)

Abstract

The purpose of the study is to find out the Self Concept among Male Runner, Thrower and Jumper. The sample for the study consists of male 150 Runner, 150 Thrower and 150 Jumper those who have participated in the Inter State Athletics Competition of Gujarat state. Self-concept tests were administered of Dr. (Miss) Mukta Rani Rastogi. The test consisted of 51 items. The subjects were required to respond to each item in terms of 'Strongly Agree', 'Agree', 'Disagree' and 'Strongly Disagree'. Reliability of the scale by split-half method following Spearman Brown prophecy formula was found to be .87 and highly reliable in this test. To compare Male Runner, Thrower and Jumper on their Self-Concept, one way analysis of variance was employed. Data were analyzed by using SPSS (Statistical Package of Social Sciences). Mean of self-concept score of the Runner Mean is 153.38, Thrower Mean is 164.54 and Jumper mean is 173.82. The difference between the three means is highly significant ($F = 82.69$, $df = 449$, $P < 0.01$). It is clear that first result Thrower has significantly high self-concept than the Runner. Second Jumper has significantly high self-concept than the Runner. Third Jumper has significantly high self-concept than the Jumper. HSD (0.05) = 0.62; HSD(0.01)=0.77.

1. INTRODUCTION

Sport psychology is the scientific study of people and their behaviour in sports. The role of a sport psychologist is to recognize how participation in sport exercise and physical activity enhances a person's development. The term self-concept is a general term used to refer to how someone thinks about or perceives themselves. The self-concept is how we think about and evaluate ourselves. To be aware of oneself is to have a concept of oneself. He is the winners who have strong belief of success and who overcome psychological stress, fear, and feelings of restlessness, fatigue, concentration problems. Track and field dominated the ancient Greek athletic festivals, and was also popular in Rome, but declined during the Middle Age. In England track was revived sporadically between the 12th and 19th centuries. Track & field events are the main attraction in the modern Olympics which started in the year 1896.

Mohsenpour (2002) studied self-concept among male athletes of individual and team sports and concluded that there was no significant difference between somatic factor of group and individual examinable items but athletes of major group obtained lower cognitive grades than individual athletes (Mohsenpour, 2002).

In competitive sports, psychologist preparation of an athlete or a team is as much important as technique of the different skills of the game on a specific line. In modern competitive sports, the athletes and teams are prepared not only to play the game and for winning the game it is not only the proficiency in the skills, which bring victory but

more important is the mental preparation. The spirit and attitudes of the athletes with which they play and perform the best in the competition (Singh, 1992)

2. METHODOLOGY

2.1. Objective of the Study

The purpose of the study is to find out the Self-Concept among Male Runner, Thrower and Jumper.

2.2. Subjects

The sample for the study consists of male 150 Runner, 150 Thrower and 150 Jumper those who have participated in the Inter State Athletics Competition of Gujarat state.

2.3. Questionnaire Used

Self-concept test were administered of Dr. (Miss) Mukta Rani Rastogi. The test consisted of 51 items. The subjects were required to respond to each item in terms of 'Strongly Agree', 'Agree', 'Disagree' and 'Strongly Disagree'. Reliability of the scale by split-half method following Spearman Brown prophecy formula was found to be .87 and highly reliable in this test.

2.4. Statistical Technique

To compare Male Runner, Thrower and Jumper on their Self-Concept, one way analysis of variance was employed. Data were analyzed by using SPSS (Statistical Package of Social Sciences).

3. DISCUSSION

Table 1: Comparison of Mean Score of Runner, Thrower and Jumper of Self-Concept

Dimension	Group	Runner	Thrower	Jumper	Total
Self-Concept	Mean	153.38	164.54	173.82	163.91
	S.D.	20.50	11.05	5.25	16.09
	S.E	1.67	0.90	0.42	0.75
	N	150	150	150	450

Table 2: LSD Test for Mean Comparison on Self Concept among Runner, Thrower and Jumper

Source	Ss	df	MS	F	P
Between Groups	31424.13	2	15712.06	82.69	< .01
Error	84936.65	447	190.01		
Total	116360.79	449			

Based on the results above, we could report the results of the study as follows: from the one way anova summary and graph it is seen that mean of self-concept score of the Runner Mean is 153.38, Thrower Mean is 164.54 and Jumper mean is 173.82. The difference between the three means is highly significant ($F = 82.69$, $df = 449$, $P < 0.01$) It is clear that first result Thrower have significantly high self-concept than the Runner. Second Jumper have significantly high self-concept than the Runner. Third Jumper has significantly high self-concept than the Jumper, HSD (0.05) = 0.62; HSD (0.01)=0.77.

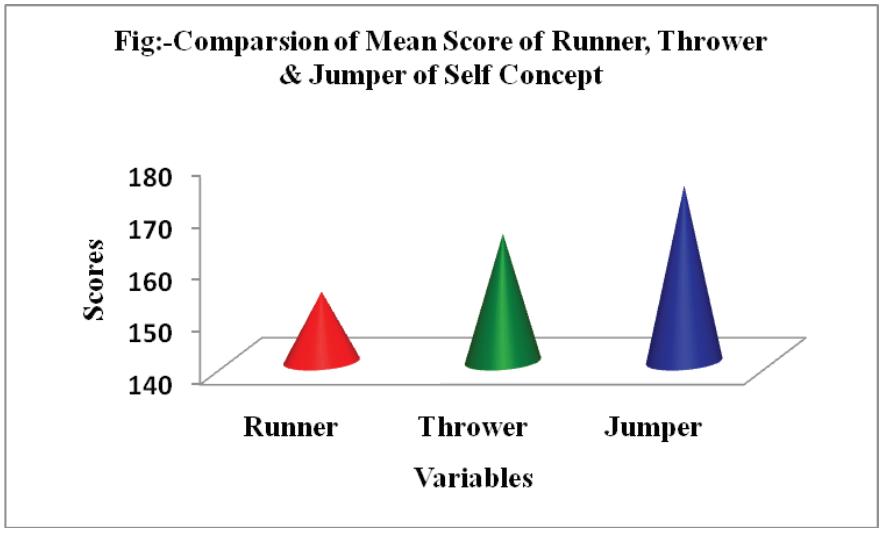


Fig. 1: Comparsion of Mean Score of Runner, Thrower & Jumper of Self Concept

4. CONCLUSION

1. Thrower has significantly high Self-Concept than the Runner.
2. Jumper has significantly high Self-Concept than the Runner.
3. Jumper has significantly high Self-Concept than the Thrower.

4. DISCUSSION OF FINDINGS

It is concluded Thrower are having comparatively high Self Concept than the Runner, Jumper have significantly high Self-Concept than the Runner and Thrower. Because they set goals and aims to give level best performance to win the competition, whereas the Runner concentrate on technique at the start and finish and muscle power to give the high level of performance. It is recommended that for all sports, persons must be trained to having Self-Concept to achieve high excellence in sports. The coaches must prepare the athletes to think about or perceive themselves positively before and during competition.

REFERENCES

Wikipaedia Sprints, Middle and Long Distance Running, Athletics.
Sinha's Comprehensive Anxiety Test (SCAT), Natuional Psychological Corporation, 1971.
Kinikema, K. and Harris, J. (1992), Sport and the Mass Media, Exercise and Sport Science Reviews, Vol. 20, pp. 127–159.
McEvoy, A. and Erikson, E. (1981), "Heroes and Villains: A Conceptual Strategy for Assessing their Influence", *Sociological Factors*, Vol. 14, pp. 111–122.
Gardner, Frank (2007), *The Psychology of Enhancing Human Performance,* Spring Publishing Co.

Praveen Kumar Mishra

HOD of Physical Education,
Swaminarayan Vidyapith, Anand (Gujarat)

INTERNATIONAL JOURNAL OF PHYSICAL EDUCATION AND APPLIED EXERCISE SCIENCES
ISSN: 2394-9953
VOLUME 3, NUMBER 1, JANUARY 2017

INTERNATIONAL JOURNAL OF PHYSICAL EDUCATION AND APPLIED EXERCISE SCIENCES

Impact of Different Regions on Anthropometric Characteristics

Deo Narayan[1] and Dr. Vivek Mishra[2]

[1]*Research Scholar, School of Studies in Physical Education, Pt. Ravi Shankar Shukla University, Raipur (C.G.)*
[2]*Principal, Netaji Subhash College, Abhanpur (C.G.)*

Abstract

The objective of the study was to characterize and to compare Anthropometric characteristics between urban and rural sports persons. Forty subjects (20 urban players, 20 rural players) were selected from Chhattisgarh state. Age of the subjects was ranging from 18–26 years. Anthropometric characteristics were considered as independent variables, and regions (urban and rural) were considered as dependent variables. Stadiometer, weighing machine, sliding calliper and measuring tape were used for collecting data. To characterize urban and rural players on their Anthropometric characteristics, descriptive statistics was used. To compare Anthropometric characteristics of urban and rural of sports persons, independent t-test was used at .05 level of significance. Results showed that significant difference was found between Rural and Urban subjects in mid-calf (p=0.35), arm girth (p=0.013) and calf girth (p=0.013). On the other hand insignificant difference was found between subjects in height (p=0.524), weight (p=0.171), triceps (p=0.553), sub-scapula (p=0.597), Supraspinal (p=0.900), humerus (p=0.771) and femur (p=0.575).

Keywords

Anthropometric Characteristics Kho-Kho Players

1. INTRODUCTION

Anthropometric characteristics of height, weight, arm and leg length and skinfold etc. are very significant indicators of health. These measurements indicate whether an individual's body measurement is proper for that individual's chronological age. For school going children, body measurementplotted on the growth chart can indicate when a child's growth is normal or delayed, whether a child is overweight or underweight. It can be said that anthropometric measurements enable us to know the physical growth and development, health problems such as overweight or underweight and nutritional status of children and adults. (Sharma, V.K., 2008).

Kho-Kho ranks as one of the most popular traditional sports in India. Kho-Kho is an extremely complicated and tactical sport. Kho-Kho is a tag sport played by teams of twelve players who try to avoidbeing touched by members of the opposing team. Only nine players of the team enter the field. It is one of the two most popular traditional game of South Asian, the other being Kabaddi. Apart from South Asia (mainly Bangladesh, India and Pakistan), it is also played in South Africa (Peter, A.H., 2010)

2. OBJECTIVE OF THE STUDY

The objective of the study was to characterize and tocompare anthropometriccharacteristics between urban and rural sports persons.

3. METHODOLOGY

3.1. Subjects

Forty subjects (20 urban players, 20 rural players) for this study were selected from Chhattisgarh state. Age of the subjects was ranging between 18–26 years.

3.2. Variables

Anthropometric characteristics were considered as independent variables, and region (urban and rural) were selected as dependent variables. Total 10 anthropometric characteristics were selected i.e. height, weight, triceps skinfold, sub-scapula skinfold, supra spinal skinfold, calf skinfold, humerus width, femur width, arm girth and mid-calf girth.

3.3. Tools

Stadiometer, weighing machine, skin fold calliper and measuring tape were used for collecting of data.

4. STATISTICAL TECHNIQUES USED

1. To characterize urban and rural players on their anthropometric characteristics, descriptive statistics was used.
2. To compare Anthropometric characteristics of urban and rural, independent t-test was used at .05 level of significance.

3. FINDINGS

Firstrow of Table 1 describes the descriptive statistics related to height. The row contains the descriptive statistics of rural as well as urban subjects. Mean, standard deviation, standard error, lower bound of 95% confidence interval for means and upper bound of 95% confidence interval for means of rural subjects are 162.25, 5.37, 1.20, 159.73 and 164.76 and forurban subjects are 163.35, 5.44, 1.21, 160.80 and 165.89 respectively.

Second row of Table 1 describes the descriptive statistics related to weight. The row containsthe descriptive statistics of rural as well as urban subjects. Mean, standard deviation, standard error, lower bound of 95% confidence interval for means and upper bound of 95% confidence interval for means of rural subjects are 50.01, 4.90, 1.09, 47.71, and 52.31 and forurban subjects are 52.42, 5.96, 1.33, 49.63 and 55.21 respectively.

Third row of Table 1 describes the descriptive statistics related to triceps. The row contains the descriptive statistics of rural as well as urban subjects. Mean, standard deviation, standard error, lower bound of 95% confidence interval for means and upper bound of 95% confidence interval for means of Rural subjects are 6.66, 1.86, .41, 5.78, 7.53 and for urban subjects are 6.30, 1.85, .41, 5.44 and 7.17 respectively.

Forth row of Table 1 describes the descriptive statistics related to sub-scapula. The row contains the descriptive statistics of rural as well as urban subjects. Mean, standard deviation, standard error, lower bound of 95% confidence interval for means and upper bound of 95% confidence interval for means of rural subjects are 7.77, 1.10, .24, 7.25, 8.28 and for urban subjects are 7.99, 1.50, .33, 7.28 and 8.69 respectively.

Fifth row of Table 1 describes the descriptive statistics related to supraspinal. The row contains the descriptive statistics of rural as well as urban subjects. Mean, standard deviation, standard error, lower bound of 95% confidence interval for means and upper bound of 95% confidence interval for means of rural subjects are 9.17, 3.76, .84, 7.41, 10.93 and for urban subjects are 9.31, 3.31, .74, 7.76 and 10.86 respectively.

Sixth row of Table 1 describes the descriptive statistics related to mid-calf. The row contains the descriptive statistics of rural as well as urban subjects. Mean, standard deviation, standard error, lower bound of 95% confidence interval for means and upper bound of 95% confidence interval for means of rural subjects are 5.22, 1.10, .24, 4.70, 5.73 and for urban subjects are 7.02, 3.52, .78, 5.37 and 8.66 respectively.

Seventh row of Table 1 describes the descriptive statistics related to humorous. The row contains the descriptive statistics of Rural as well as Urban subjects. Mean, standard deviation, standard error, lower bound of 95% confidence interval for means and upper bound of 95% confidence interval for means of rural subjects are 6.16, .36, .08, 5.98, 6.33 and for Urban subjects are 6.19, .41, .09, 6.00 and 6.39 respectively.

Eighth row of Table 1 describes the descriptive statistics related to femur. The row contains the descriptive statistics of Rural as well as Urban subjects. Mean, standard deviation, standard error, lower bound of 95% confidence interval for means and upper bound of 95% confidence interval for means of rural subjects are 8.60, .49, .10, 8.37, 8.82 and for urban subjects are 8.68, .40, .09, 8.49 and 8.86 respectively.

Ninth row of Table 1 describes the descriptive statistics related to arm girth. The row contains the descriptive statistics of Rural as well as Urban subjects. Mean, standard deviation, standard error, lower bound of 95% confidence interval for means and upper bound of 95% confidence interval for means of Rural subjects are 22.40, 1.46, .32, 21.71, 23.08 and for urban subjects are 25.00, 4.19, .93, 23.03 and 26.96 respectively.

Table 1: Descriptive Statistics belonging to Groups (Urban and Rural Players) in Relation to Anthropometric Characteristics

Anthropometric Characteristics	Group	N	Mean	Standard Deviation	Standard Error	95% Confidence Interval for Mean	
						Lower Bound	Upper Bound
Height (in centimetre)	Rural	20	162.25	5.37	1.20	159.73	164.76
	Urban	20	163.35	5.44	1.21	160.80	165.89
	Total	40	162.80	5.36	.84	161.08	164.51
Weight (in kg.)	Rural	20	50.01	4.90	1.09	47.71	52.31
	Urban	20	52.42	5.96	1.33	49.63	55.21
	Total	40	51.22	5.52	.87	49.45	52.98
Triceps skinfold (in m.m.)	Rural	20	6.66	1.86	.41	5.78	7.53
	Urban	20	6.30	1.85	.41	5.44	7.17
	Total	40	6.48	1.84	.29	5.89	7.07
Sub-Scapula skinfold (in m.m.)	Rural	20	7.77	1.10	.24	7.25	8.28
	Urban	20	7.99	1.50	.33	7.28	8.69
	Total	40	7.88	1.30	.20	7.46	8.29
Supraspinal skinfold (in m.m.)	Rural	20	9.17	3.76	.84	7.41	10.93
	Urban	20	9.31	3.31	.74	7.76	10.86
	Total	40	9.24	3.50	.55	8.12	10.36
Calf skinfold (in m.m.)	Rural	20	5.22	1.10	.24	4.70	5.73
	Urban	20	7.02	3.52	.78	5.37	8.66
	Total	40	6.12	2.73	.43	5.24	6.99
Humeruswidth (in centimetre)	Rural	20	6.16	.36	.08	5.98	6.33
	Urban	20	6.19	.41	.09	6.00	6.39
	Total	40	6.17	.38	.06	6.05	6.30
Femur width (in centimetre)	Rural	20	8.60	.49	.10	8.37	8.82
	Urban	20	8.68	.40	.09	8.49	8.86
	Total	40	8.64	.44	.07	8.49	8.78
Arm girth (in centimetre)	Rural	20	22.40	1.46	.32	21.71	23.08
	Urban	20	25.00	4.19	.93	23.03	26.96
	Total	40	23.70	3.36	.53	22.62	24.77
Mid-calf girth (in centimetre)	Rural	20	29.40	2.50	.55	28.22	30.57
	Urban	20	31.45	2.50	.55	30.27	32.62
	Total	40	30.42	2.67	.42	29.56	31.28

Tenth row of Table 1 describes the descriptive statistics related to calf girth. The row contains the descriptive statistics of Rural as well as Urban subjects. Mean, standard deviation, standard error, lower bound of 95% confidence interval for means and upper bound of 95% confidence interval for means of rural subjects are 29.40, 2.50, .55, 28.22 and 30.57; and for urban subjects are: 31.45, 2.50, .55, 30.27 and 32.62 respectively.

Table 2: Levene Statistics to Test the Homogeneity of Variances betweentwo Groups (Urban and Rural Players)

	Levene Statistic	df1	df2	Sig.
Height(in centimetre)	.005	1	38	.943
Weight (in kg.)	2.014	1	38	.164
Triceps skinfold	.167	1	38	.685
Sub-Scapula skinfold	1.380	1	38	.247
Supraspinal skinfold	.048	1	38	.828
Calf skinfold	26.309	1	38	.000
Humeruswidth	.396	1	38	.533
Femur width	.195	1	38	.661
Arm Girth	17.006	1	38	.000
Calf Girth	.790	1	38	.380

Table 2 shows the levene statistics to test the homogeneity of variances between two groups. The levene statistics of height (.005), weight (2.014), triceps skinfold (.167), sub-scapula skinfold (1.38), supra spinal skinfold (.048), humorous width (.396), femur width (.195), mid-calf girth (.790), are insignificant .05 level of significance. These shows that homogeneity of variance is found between two groups. The levene statistic of mid-calf 26.309 and armgirth 17.006 are significant .05 level of significance. This shows homogeneity of variance is not found between two groups.

Table 3: Independentt-test the Composition of Two Groups (Urban and Rural Players) in Anthropometric Characteristics

Variables	t-value	Df	Sig. (2-tailed)	Mean Difference	Standard Error Difference	95% Confidence Interval of the Difference	
						Lower	Upper
Height	-.64	38	.524	-1.10	1.71	-4.56	2.36
Weight	-1.39	38	.171	-2.41	1.72	-5.90	1.08
Triceps	.59	38	.553	.35	.58	-.83	1.53
Sub-scapula	-.53	38	.597	-.22	.41	-1.06	.62
Supraspinal	-.12	38	.900	-.14	1.12	-2.41	2.12
Mid-calf	-2.18	38	.035	-1.80	.82	-3.47	-.12
humerus	-.29	38	.771	-.03	.12	-.28	.21
Femur	-.56	38	.575	-.08	.14	-.36	.20
Armgirth	-2.61	38	.013	-2.60	.99	-4.61	-.58
Calfgirth	-2.59	38	.013	-2.05	.79	-3.65	-.44

Table 3 reveal that significant difference was found between Rural and Urban subjects in mid-calf (p=0.35), arm girth (p=0.013) and calf girth (p=0.013).

On the other hand insignificant difference was found between subjects in height (p=0.524), weight (p=0.171), triceps (p=0.553), sub-scapula (p=0.597), supraspinal (p=0.900), humerus (p=0.771) and femur (p=0.575).

4. DISCUSSION OF FINDINGS

Significant difference was found between urban and rural player in calf skinfold, arm girth, mid- calf girth. This might be due to involvement of different nature of activities and daily routine. Study was conducted by Biswas, M. & Halder, S. (2015) to compare Anthropometric Variables between selected Kho-Kho and Kabaddiplayers. Results of the study revealed that, no significant difference was found between Kabaddi & Kho-Kho players in all the selected variables. Results of the present study are contradictory to the above mentioned study. This might be due to the differential impact of regions and games.

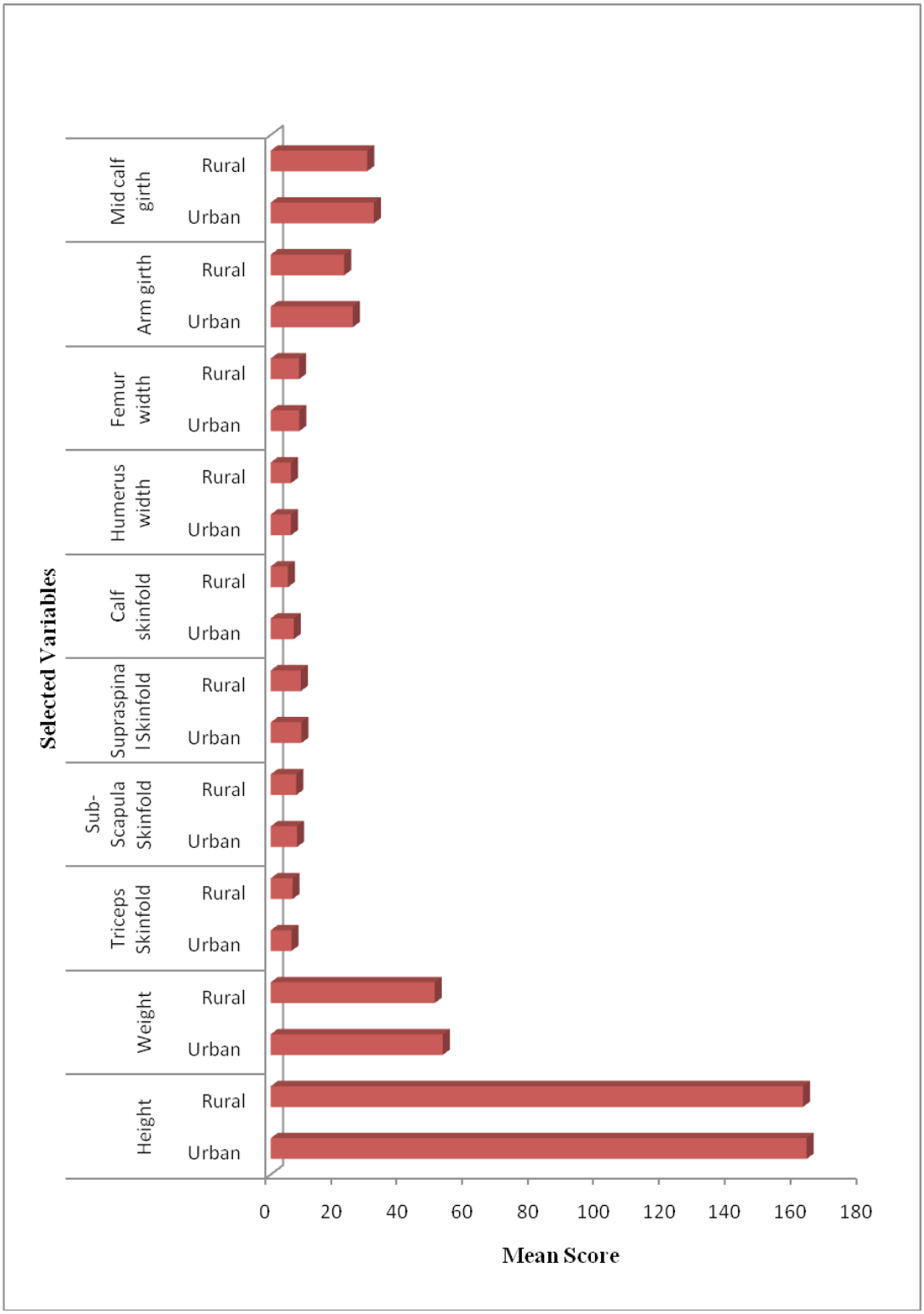


Fig. 1: Graphical Representation of the Comparison of Selected Variables between Rural and Urban Kho Kho Players

REFERENCES

Best, J.W. (1963), *Research in Education,* U.S.A.: Prentice Hall.

Biswas, M. and Halder, S. (2015), "A Comparative Study on Selected Anthropometric Variables and Motor Abilities Between Woman Kho-Kho and Kabaddi Players", *International Journal of Physical Education, Sports and Health,* Vol. 2(1) pp. 66–68.

Clark, H.H. and Clark, D.H. (1975), *Research Process in Physical Education,* Englewood Cliffs, New Jersey: Prentice Hall, Inc.

Gay, L.R. (2000), *Educational Research,* U.S.A: Prentice Hall.

Peter, A.H. (2010), "Student-Designed Games: Strategies for Promoting Creativity, Cooperation and Skill Development", *Human Kinetics*.

Sa, J.P.M.D. (2007), *Applied Statistics using SPSS, Statistical, Matlab and R*. New York: Library of Congress.

Sharma, V.K. (2008), *Health and Physical Education,* New Delhi: Saraswati House Pvt. Ltd.

Verma, J.P. (2000), *A Text Book on Sports Statistics,* Gwalior: Venus Publications.

Deo Narayan

Research Scholar, School of Studies in Physical Education
Pt. Ravi Shankar Shukla University, Raipur (C.G.)

Dr. Vivek Mishra

Principal, Netaji Subhash College, Abhanpur (C.G.)

INTERNATIONAL JOURNAL OF PHYSICAL EDUCATION AND APPLIED EXERCISE SCIENCES
ISSN: 2394-9953
VOLUME 3, NUMBER 1, JANUARY 2017

INTERNATIONAL JOURNAL OF PHYSICAL EDUCATION AND APPLIED EXERCISE SCIENCES

A Study of Stressors on Soccer Referees Officiating in 'I-League'

Dr. Ashish Phulkar[1] and Tejas Nagvenkar[2]

[1]*Dy. Director, Physical Education*
Symbiosis International University
[2]*M.PEd , I-League Referee, University of Pune*

Abstract

A soccer referee is the final arbiter of the game. The referee and match official make up a crucial element in the game of sports. The purpose of the study was to find out the stressors affecting the soccer referees officiating in the I-League for the season 2013-14. From all the soccer referees officiating in the I-league, 30 referees were selected using purposive sampling technique (referees officiated in at least 10 matches in season). To assess the stressors of referees' questionnaire was developed by researcher on the stressors factors which were identified by Taylor and Daniel in 1987. These 5 stressors were Performance concern, Fear of physical harm, Lack of recognition, Time pressure and Interpersonal conflict. The collected data was statistically analyzed and interpreted using descriptive statistics and multiple correlation using Pearson Product Moment Coefficient of Correlation. The mean score of Performance concern was 17.53 (±3.23), Fear of physical harm was 14.83 (±2.06), Lack of recognition was 25.90 (±2.70), Time pressure was 21.10 (±2.99) and Interpersonal conflict 14.90 (±1.74). The study concludes that lack of recognition was acting as the maximum stressor among the I – League referees followed by time pressure before the match. The correlation was seen in performance concern with fear of physical harm 0.663 and interpersonal conflict 0.424, in fear of physical harm with interpersonal conflict 0.434 and in lack of recognition with time pressure 0.524.

Keyword

Referee, I-League, Stressors

1. INTRODUCTION

Soccer is one of the most entertaining games in the world. It is the most popular sport in the world, being played in every nation without exception. The referee and match official make up a crucial element in the game of sports. Each match is controlled by a referee who has full authority to enforce the Laws of the Game in connection with the match. Referees are a crucial element to organize sports in the world. Without referees, we cannot conduct sport in a safe, controlled environment.

A soccer referee is the final arbiter of the game. The referee and match official make up a crucial element in the game of sports. Like them or not, it is through the diligence, professionalism and often hard work of these men and women, that sport in all fields across the globe can take place. However, the individuals who are match officials are often the target of unnecessary and unruly taunts and abuse, because of the job that they have offered to do. The two linesmen in 1996 were given correct abbreviation as assistant referee. The sole job of the referee is to make sure that a game is played fairly and that all of the players, coaches and associated personnel adhere to the rule of the game. The toughest job of referees and umpires is keeping players and coaches calm after a close call. While doing so they themselves must be cool and calm and must not have any stress on their mind.

Stress is the body's reaction to a change that requires a physical, mental or emotional adjustment or response. Stress can come from any situation or thoughts that make you feel frustrated, angry, nervous, or anxious. The readiness and training of match officials and referees also plays an important role in preparing them for the intensity and physiological stresses that are impacted on their bodies during a match. The stress experienced by sports officials could have a significant impact on the officials' mental health, attention focus, concentration, effort, arousal, performance, satisfaction with their profession and intention to quit officiating.

Stressors affect the decision making of soccer referees. Stressor is any agent that causes stress to an organism. Stressor is a stimulus causing stress. The stress experienced by sports officials could have a significant impact on the officials' mental health, attention focus, concentration, effort, arousal, performance, satisfaction with their profession and intention to quit officiating. Five sources of stress were identified in a factor analysis of the responses of soccer referees to the Soccer Officials' Stress Survey (SOSS). These sources were Fear of Failure, Fear of Physical Harm, Interpersonal Conflicts, Time Pressure and Peer Conflicts.

There are different types of stressors affecting the referees in match and he has to deal with it while giving decision and hence the researcher had taken up the study "A Study of stressors on soccer referees officiating in 'I–league'".

2. MATERIAL AND METHODS

In the present study to find out the stressors affecting the soccer referees officiating in the I–League Descriptive Survey Method was used.

Out of the 50 referees officiating in the I - League for the season 2013–2014, 30 referees were selected using purposive sampling technique as the sample (referees who have officiated in at least 10 matches in season).

Questionnaire was used to collect the data which was developed by the researcher based on the factors suggested by Taylor and Daniel in 1987. The questionnaire was divided into 5 factors and each factor consisted of 6 questions; all together 30 questions. It was a 5 point Likert scale questionnaire and the responses were a) Not at all b) a little c) moderately d) somewhat e) very much.

Table 1: Descriptive Statistics of Stressors

Factors	Mean	Std. Error	S.D.
Performance concern	17.53	.591	3.23
Fear of physical harm	14.83	.378	2.06
Lack of recognition	25.90	.494	2.70
Time pressure	21.10	.547	2.99
Interpersonal conflict	14.90	.319	1.74

"Referees Stressors Scale" was distributed to the Referees before the match and response were collected. Data was analyzed using Descriptive statistics and Pearson product moment method was used to see the Coefficient of Correlation between the factors.

3. RESULT

The collected data was analyzed using descriptive statistics and further Pearson product moment coefficient of correlation was used to study the relationship of one stressor with other**.**

After analyzing the data as shown in Table 1, it was observed that the mean score of lack of recognition was 25.90 with SD 2.70, followed by time pressure with mean score of 21.10 with SD 2.99, performance concern mean score was 17.53 with SD 3.23, interpersonal conflicts with mean score of 14.90 with SD 1.74, fear of physical harm mean

score was 14.83 with SD 2.06. this reveals that lack of recognition and time pressure were the two most affected stressors on I – League referees before the match as compared to other 3 factors.

Table 2: Pearson Correlation Coefficient of Stressors (n=30)

Factors		FOPH	LOR	T P	IPC
PC	Pearson Correlation	.663**	.132	.233	.424*
	Sig. (2-t)	.000	.486	.216	.019
FOPH	Pearson Correlation		.028	.236	.434*
	Sig. (2-t)		.885	.209	.017
LOR	Pearson Correlation			.524**	.187
	Sig. (2-t)			.003	.322
TP	Pearson Correlation				.140
	Sig. (2-t)				.460

PC = Performance concern, FOPH= Fear of Physical harm, LOR= Lack of recognition, TP= Time pressure, IPC= Interpersonal conflict

In Table 2, it shows the multiple correlations among the stressors. There was positive correlation among all the stressors. Performance concern has the maximum correlation of 0.663 with fear of physical harm and 0.424 with interpersonal conflict. Fear of physical harm also shows correlation of 0.434 with interpersonal conflicts. Lack of recognition also shows correlation of 0.524 with time pressure.

4. DISCUSSION

The findings of the study have indicated that the stressors exists on the referees in the pre match situation, thus it is clear that the referee and match officials are susceptible to pre-game stress. The researcher administered the questionnaire "Referees Stressors Scale" on the I-League referees. The similar study was conducted by Rainey (1995), Taylor and Daniel (1987) and Gold smith and William (1992) which shows similar findings. However in the present study lack of recognition emerged as most effective stressor amongst the I-League referees. Further the rating of all the 5 Stressors were:

1. Lack of Recognition
2. Time Pressure
3. Performance Concern
4. Interpersonal Conflicts
5. Fear of Physical Harm.

These results are fairly consistent with the past researches.

6. CONCLUSION

The observation of the survey data, with limitation of the present study the researcher concluded that out of 5 factors which were identified by the researcher, lack of recognition factor acts as the maximum stressor on the I-League referees before officiating the match followed by time pressure.

Further, Pearson correlation coefficient was seen in which we can see that there was high correlation of performance concern with fear of physical harm and interpersonal conflicts. Fear of physical harm shows correlation with interpersonal conflicts and lack of recognition also shows correlation with time pressure. Positive correlation was observed among all the stressors.

REFERENCES

Anshel, M.H. and Weinberg, R.S. (1995), "Sources of Acute Stress in American and Australian Basketball Referees", *Journal of Applied Sport Psychology*, Vol. 7, pp. 11–22.

Ankebé Kruger, Ridvan Ekmekci, Gert Strydom and Suria Ellis, "Stressors among South African Soccer Officials: A Profile Analysis.

Burke, K.L. and Miller, M. (1990), "Sports Officials: The Neglected Participants", Paper Presented at the *Fifth Annual Association for the Advancement of Applied Sport Psychology Conference*, San Antonio, Texas.

Christopher Francis Baldwin, Australian Catholic University (2008), You're Kidding Ref! Pre and Post Game Stress Levels Amongst Referees and Match Officials: An Australian Perspective.

Reiney, David W. (1995), Sources of Stress, Burnout and Intention to Terminate among Basket Ball Referees, John Caroll University.

Dr. Ashish Phulkar

Dy. Director Physical Education
Symbiosis International University

Tejas Nagvenkar

M.PEd , I-League Referee, University of Pune

INTERNATIONAL JOURNAL OF PHYSICAL EDUCATION AND APPLIED EXERCISE SCIENCES
ISSN: 2394-9953
VOLUME 3, NUMBER 1, JANUARY 2017

INTERNATIONAL JOURNAL OF PHYSICAL EDUCATION AND APPLIED EXERCISE SCIENCES

Kinematic Analysis of Take-off in Long Jump

Bhanu Pratap

Ph.D. Scholar, Lakshmibai National Institute of Physical Education, Gwalior (M.P.)

Abstract

The aim of the study was to investigate the relationship among the kinematic variables and take-off in long jump; to find out which kinematic variable was most contributing in the enhancement of the performance. For the of the study, 5 long jumper of age 17–25 year were purposely selected from Lakshmibai National Institute of Physical Education, Gwalior (M.P). The parameters examined Linear kinematic is Center of Gravity at the time of moment take-off, and angular kinematic are namely, angle at ankle joint (right, left), angle at knee joint (right, left), angle at hip joint (right, left), angle at shoulder joint (right, left), angle at elbow joint (right, left). The statistical analysis of the result and relationship, low and high performance of the kinematic parameters but the differences was not statistically significant. Linear kinematic is centre of gravity. Only showed a statistically significant difference the angular kinematic variables revealed that significant relationship of right knee angle and right elbow angle with the performance in long jump also provides further insight into long jump performance, although not all variables associated with real jumping performance. They found that jump performance was enhanced by a high approach speed, a high knee angle at touch-down and high (concentric and eccentric) muscle strength. Factors which did not have a great influence on jump distance were tendon compliance, muscle fibre contraction speed and some aspects of muscle architecture. Thus it appears that the important factors identified can also be clearly related to speed, technique and strength, and are closely related to those identified from the present regression analysis.

Keywords

Track and Field, Kinematics, Long Jump

1. INTRODUCTION

The world of Games and Sports has crossed many milestones as the result of different types of research and variety of scientific advancement in general and their application in the field of sports in particular. In the modern scientific era, athletes are being trained by highly sophisticated means for better achievement in their concerned sports and they are being exposed to the exercise and training methods which have proved beneficial for achieving higher standards. In the recent years, greater stress has been laid on quality rather than the quantity of training. The Basic technique used in long jumping has remained unchanged since the beginning of modern athletics in the mid-nineteenth century. The athlete sprints down a runway, jumps up from a wooden take-off board, and flies through the air before landing in a pit of sand. A successful long jumper must, therefore, be a fast sprinter, have strong legs for jumping, and be sufficiently coordinated to perform the moderately complex take-off, flight, and landing maneuvers. He analyzed data reported calculations included the relation between the release height and release angle, as well as between the release speed and release angle. (Langhorne Nicholas P. Brunel) The calculated optimum release angles for the athletes were in good agreement with their usual competition release angles (31°–35°). Each athlete had his own specific optimum release angle because of individual differences in the rate of decrease in release speed with increasing release angle. The method was evaluated using measurements of three experienced male long jumpers who performed maximum-effort with jumps over a wide range of take-off

angles. The optimum take-off angle of each jumper was calculated by combining the equation for the flight distance of a body in free flight with the measured relations between the take-off speed, the height difference between take-off and landing, and the take-off angle for the athlete. The calculated optimum take-off angle was then compared with the athlete's measured competition take-off angles. (Geoffry H.G.Dyson)

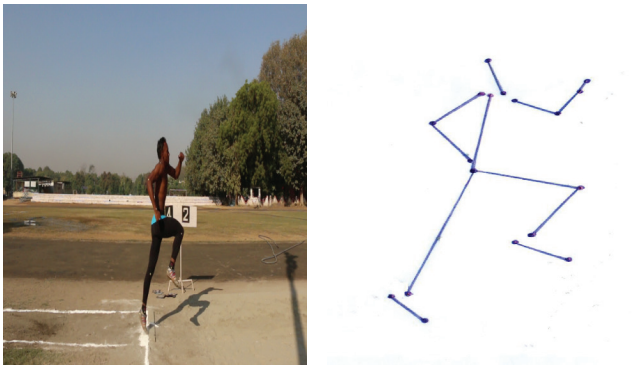
Therefore, the study was undertaken with the relationship among the kinematic variables and take-off in long jump.

2. METHODOLOGY

For the purpose of study five male LNIPE long jumper of All India Inter-university level of 17–25 years age group was selected as subjects for the study. It is assumed that they posses good level of technique. The purpose of the research was explained to the subject and subjects were motivated to put in their best, effort during each attempt. From researcher's own understanding of the problem and on the basis of discussion with experts, gleaned through the literature, the following kinematic variables (linear & angular) were selected, Linear kinematic variables, Height of center of gravity at the time of moment take-off (phase). Angular kinematic variables angle at Ankle joint (right & left), angle at knee joint (right & left), angle at hip joint (right & left), angle at shoulder joint (right & left), angle at elbow joint (right & left).

2.1. Administration of Tests

Three trials given to the performer and all the performance was measured by the qualified officials, and recorded the distance (in metres), measuring angle in nearest degree at selected joint at during take-off moment of Long jump. To obtain reliable measurement, standard and calibrated equipments like camera steel tape, hurdle were used the video graphs camera used in study was a Canon- 70D. The video graphs were taken by a professional photographer and various measurement values were obtained for this study and considered reliable. The performance of the subjects in the long jump, filming protocol and analysis are described as under: for the collection of data the 5 subjects were selected purposely among the long jumpers of Lakshmibai National Institute of Physical Education, Gwalior. Total observations and collection of the data was done in 6 days and two observations were recorded each day i.e. O-1 in morning session and O-2 in the evening session. The performance of the each subject was measured by using the standard procedures of IAAF, the horizontal distance covered by the subjects were considered as his performance or score and the horizontal distance was measured in meters. Three trials were given to each subject and the all attempt was considered. The video was taken by a professional photographer, who is considered to be an expert in this area. The subject was filmed only in saggital plane. The camera used for analysis was Canon- 70D. After taking the video, the photos were taken by pausing the video at the desired moment with the help of Kinovea software. For referencing purpose, the photo of hurdle was taken to find out the actual height of centre of gravity of each subject at selected moment. The horizontal distance of Hurdle was 1.22 metre and vertical height of the Hurdle was 1.067 metre, vertical height of the camera was 1.17 metre and horizontal distance of the camera was 5.00 metre. The subjects were filmed at Lakshmibai National institute of Physical Education, Gwalior. The vediography sequence was taken under controlled condition. The subject was performing the technique three times. On the basis of vediography obtained the scholar developed the stick figures in which data pertaining to various kinematic variables was taken. The stick figures were developed by using joint point method in which body projection and joint facing camera were consider to the measure various angle (Stick Figure-D). The inclination of torso was measured by the deviation of the torso from vertical axis. The center of gravity of the subject, at the moment take off was located by using segmentation method suggested by Hay (2005).



Centre of gravity of subject (d) at stick figure- subject (d)

The moment take - off in long jump

2.2. Statistical Technique

To find out the difference between selected kinematic variables of long jump t-test and regression analysis was used. For testing the hypothesis the level of significance was set at 0.05.

3. RESULTS

Descriptive analysis of the data was done by computing the statistics like mean, standard deviation:

Table 1: Mean and Standard Deviation Value of Linear & Angular Kinematic Analysis at the Moment Take-off in Long Jump

Descriptive Statistics			
Name of Variable	**Mean**	**Std. Deviation**	**N**
Performance	5.6247	.06937	15
Center of gravity	127.0087	14.09373	15
Right Ankle Joint	111.2667	13.80718	15
Left Ankle Joint	132.4667	16.59977	15
Right Hip Joint	118.8000	14.76579	15
Left Hip Joint	180.6667	4.02965	15
Right Knee Joint	78.4667	8.06993	15
Left Knee Joint	174.0000	4.84031	15
Right Shoulder Joint	59.4667	10.34316	15
Left Shoulder Joint	56.2667	21.42251	15
Right Elbow Joint	115.5333	46.62444	15
Left elbow Joint	70.7333	15.82253	15

The values of mean and standard deviation for the all variables are shown in Table 1. These values may be used for further analysis in the study.

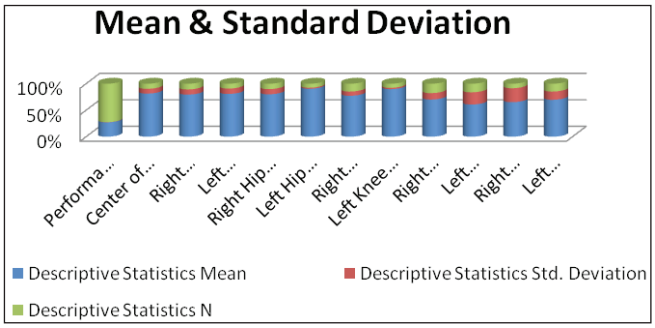


Fig. 3: Graphical Presentation Shows the Mean and Standard Deviation of the Kinematic Variable at Moment Take-off in Long Jump

Table 4: F and T-Table for Testing the Equality of Variance and Equality of Means of Linear & Angular Kinematic Analysis at the Moment of Take-off in Long Jump

		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	Mean Difference	t	df	Sig. (2-tailed)
Performance	Equal variances assumed	3.128	.127	.17	19.137	6	.000
Center of gravity	Equal variances assumed	.158	.705	-16.99	-2.260	6	.065
Right Ankle Joint	Equal variances assumed	.054	.824	19.50	1.747	6	.131
Left Ankle Joint	Equal variances assumed	2.220	.187	-7.50	-.524	6	.619
Right Hip Joint	Equal variances assumed	1.524	.263	-7.00	-.726	6	.495
Left Hip Joint	Equal variances assumed	1.076	.339	-2.25	-.744	6	.485
Right Knee Joint	Equal variances not assumed	58.548	.000	-15.00	-3.054	6	.049
Left Knee Joint	Equal variances assumed	.897	.380	2.00	.483	6	.646
Right Shoulder Joint	Equal variances assumed	1.701	.240	-13.75	-1.907	6	.105
Left Shoulder Joint	Equal variances assumed	2.647	.155	-10.00	-1.069	6	.326
Right Elbow Joint	Equal variances assumed	.049	.833	85.75	2.800	6	.031
Left elbow Joint	Equal variances assumed	.203	.668	-4.00	-.464	6	.659

The following interpretation can be made on the basis of the results shown in above output. the values of the mean, standard deviation and standard error of the mean for long jump and jumper is given in the Table 4 the mean of right elbow angle of the long jumper larger than that of the jumper However, whether this difference is significant or not has to be tested by using the two–sample t-test for unrelated groups. Once the condition for using t- ratio for unrelated group is that the variance of the two groups must be equal. To test of equality of variance, Levene's test was used. In the Table 4 F-value is .049 which is significant as the p- value is .833 which is more than 0.05.

Table 7: Regression Coefficient of Selected Variables in Different Model along with T-Value and Partial Correlation of Linear & Angular Kinematic Analysis at the Moment of Take-off in Long Jump

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	6.121	.127		48.034	.000
Right Knee Joint	-.006	.002	-.735	-3.911	.002
a. Dependent Variable: Performance					

The regression coefficient in the model has been shown in Table 7 In the one model t-value for one regression coefficient are significant as their significance values (P-value) are less than 0.05. Thus it may concluded that the variable Right Knee angle significantly explain the variation in the take off angle in long jump performance.

Regression equation Using regression coefficient (B) of the model shown in Table 7 the regression equation can be developed which is as follow: **Performance of long jump = 6.121–.006 x (Right knee angle)**

To conclude, it may be interpreted that the above regression equation is quite reliable as the value of R^2 is .541. In other words, the one variable selected in this regression equation explains 54.1% of the total variability in the Right Knee Angle which is quite good. Since F- value for this regression model is highly significant, reliable. At the same time regression coefficient in this model is highly significant and therefore it may be interpreted that the one variable selected in the model viz.: performance of long jump quite valid in estimating the Right Knee Angle of the long jumper.

4. DISCUSSION AND CONCLUSION

The purpose of the study was to find out kinematic analysis of take off in long jump and what is the contribution of different kinematic variables in long jump performance. The kinematic variables revealed that significant relationship of Right knee angle and Right Elbow angle with the performance in long jump also provides further insight into long jump performance, although not all variables associated with real jumping performance were

studied. **Alexander's (1990)**. They found that jump performance was enhanced by a high approach speed, a high knee angle at touch-down and high (concentric and eccentric) muscle strength. Factors which did not have a great influence on jump distance were tendon compliance, muscle fibre contraction speed and some aspects of muscle architecture. Thus it appears that the important factors identified can also be clearly related to speed, technique and strength, and are closely related to those identified from the present regression analysis. Knee extensors, Peak knee flexion velocity but also in the hip abductors and extensors. This insight will be of value to coaches who should ensure that as an athlete develops, attention is paid to not just the development of speed but also to the development of technique and strength **Seyfarth (2011).**

On the other hand other variable revealed the insignificant value obtained for all variables might be attributed to the improper technique of the subjects. Since the subjects chosen were of age range 17–25 college level, they were yet to require mastery of the skill in long jump. Some other causes of insignificant result of selected kinematic variables at moment of take off in long jump may be due to the different patterns adopted by the athlete during training of long jump technique, further Arm moment is not purely in saggital plane due to which, measured arm angle through 2D analysis might not be accurate. **Tiwari (2012).**

REFERENCES

Hay, James G. (1990), "Techniques used in the Transition from Approach to Takeoff in the Long Jump", *Int. J. Sport Biomech.*, Vol. 1, pp. 172–88.

Ralph, Mann (1983), "The Elite Athlete, Project Sprints and Hurdle", Track Technique 5 December, p. 2672.

Langhorne Nicholas P. Brunel (1997), "University, Uxbridge Biomechanics of the Long Jump Biomechanical Research Project Athen's", p. 344.

Philip Graham *et al*. (2007), "A Three-dimensional Kinematic Analysis of the Long Jump Take-off", *Journal of Sports Sciences*, Vol. 23, Issue 9, pp. 891–903.

Alexander, R.M.N. (1995), "Leg Design and Jumping Technique for Humans, Other Vertebrates and Insects", *Phil. Trans. R. Soc. Lond.*, Vol. B 347, pp. 235–248.

Vassilios Panoutsakopoulos and Georgios I. Papaiakovou , "Biomechanical Analysis of the Preparation of the Long Jump Take-Off" (New Studies in Athletics no. 1/2010, IAAF).

Stefanyshyn Darren J. and Nigg Benno M. (2010), "Contribution of the Lower Extremity Joints to Mechanical Energy in Running Vertical Jumps and Running Long Jumps", (Published online: 01 Dec).

Tiwari and Amar (2010), "Relationship of Selected Kinematics Variables with the Performance of Back Court Spike in Volleyball", *Br Journal Sports Medicine*, Vol. 44(1).

Bouchouras (2009), "Angular Momentum and Landing Efficiency in The Long Jump", *European Journal of Sport Science*, Vol. 9(1), pp. 53–59.

Bhanu Pratap

Ph.D. Scholar, Lakshmibai National Institute of Physical Education, Gwalior (M.P.)

INTERNATIONAL JOURNAL OF PHYSICAL EDUCATION AND APPLIED EXERCISE SCIENCES
ISSN: 2394-9953
VOLUME 3, NUMBER 1, JANUARY 2017

Self-Concept and Handball Players Performance: A Comparative Study

Pawan Gusain[1] and Dr. Joseph Singh[2]

[1]*Ph.D. Scholar, DAVV Indore (MP)*
[2]*H.N.B.G.U., Srinagar (U.K.)*

Abstract

The purpose of this study was to compare the self-concept of handball players of low and high performance. Sixty male handball players (thirty intercollegiate level and thirty intervarsity level) were randomly selected for this study. All the players aged ranged from 19–28 years. For measuring the self-concept, a questionnaire prepared by Dr. G.P. Sherry was used. To compare the self-concept of handball players "t-ratio" was employed and the level of significance was set at 0.05. On the basis of the results no significant difference was found among high and low performance pertaining to self-concept.

1. INTRODUCTION

Modern handball is played on a court 40 by 20 metres (131 by 66 ft), with a goal in the centre of each end. The goals are surrounded by a 6-metre zone where only the defending goalkeeper is allowed; goals must be scored by throwing the ball from outside the zone or while "jumping" into it. The game is fast and high-scoring: professional teams now typically score between 20 and 35 goals each, though lower scores were not uncommon until a few decades ago. Body contact is permitted, while defenders are trying to stop the attackers from approaching the goal.

The teams are prepared not only to play the game but to win the game and for winning the game it is not only the fitness which brings victory but more important is the psychological preparation and spirit of the players with which they play and perform their best in the competition.

Physical fitness at one hand and psychological at other are equally important to maintain the equilibrium of the individual. Success in competitive sports places high psychological demand on the participants. Self-concept is the most important single attribute and key to understand the behaviour of an individual, the importance and role of self-concept as a determinate of human behaviour and its acceptance as a critical factor of performance is increasingly realized.

2. METHOD

For the purpose of this study that is to compare the self-concept of handball players of low and high performance, the subject selected were sixty male handball players, thirty players of intercollegiate competition of H.N.B. Garhwal University, Srinagar Garhwal, Uttarakhand held at Paithani (U.K.) are considered as low performance players and thirty players of Uttarakhand from north zone intervarsity competition held at Ch. Ranbir Singh, Jind (Haryana) are considered as high performance players, who had participated recently in their respective competitions (2015–16) were randomly selected as subjects for this study. All the male handball players ranged between 19–28 years.

For finding the self-concept of handball players a questionnaire prepared by G.P. Sherry and others was used, which has 48 questions, each having 5 possible answers and corresponding scores. The scores made by subject on the 48 questions were added to obtain his final self-concept scores.

To compare the self-concept of handball players of low and high performance "t-ratio" was applied and the level of significance was set at 0.05 levels.

3. FINDINGS

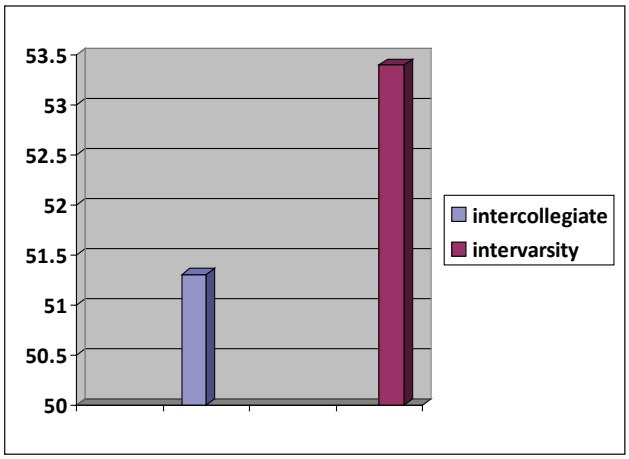


Fig. 1: Mean Value on Self-concept of Handball Players (Intercollegiate and Intervarsity)

Findings related to the self-concept of handball players of low and high performance are presented below.

Table 1: Significance Difference of Means of Handball Players in their Self-concept

Group	Mean	S.D.	Mean Difference	S.E.M.	"t' ratio
Low Level Players	51.3	4.68		0.8544	
			2.10		1.6337*
High level players	53.4	5.26		0.9603	

* Not significant at 0.05 level

N = 60

't' ratio needed to be significant at 0.05 level with 58 degrees of freedom is **2.0017.**

The analysis of data in Table 1 shows that there is no significant difference between high and low level handball players in their self-concept as obtained 't' ratio of **1.6337** is less than the required 't' value of **2.0017**.

4. DISCUSSIONS

Handball is an inexpensive game; it is mostly played by the players from low and middle class. As the players belong to almost same socio-economic status of the society, they acquire almost same or at par experience on and off the field of the handball, which are responsible for the development of self-concept of an individual. Hence, their way of thinking, attitudes and behaviour pattern develop in almost the same direction. This may be the reason for the insignificant difference in self-concept of high and low performance level handball players.

REFERENCES

Alderman, R.B. (1974), *Psychological Behaviour in Sports,* (Philadelphia: London, Saunders Company, 1974).
Bryant, Cratty J. (1965), *Psychology and Physical Activity,* (New Jersey: Englewood Cliffs, prentice Hall Inc., 1965).
Kamlesh, M.L. (1983), *Psychology of Physical Education and Sports* (New Delhi: Metropolitan Book Co. Pvt.Ltd., (1983).
Kane, J.E. (1972), *Psychological Aspect of Physical Education and Sports* (London, Boston : Routledge and Kegan Paul, 1972).
Sherry, G.P., Verma, R.P. and Goswami, P.K., *Manual for Swatwa Bodh Parikshan*, Agra: National Psychological Corporation.

Pawan Gusain
Ph.D. Scholar, DAVV Indore (MP)

Dr. Joseph Singh
H.N.B.G.U., Srinagar (U.K.)

INTERNATIONAL JOURNAL OF PHYSICAL EDUCATION AND APPLIED EXERCISE SCIENCES
ISSN: 2394-9953
VOLUME 3, NUMBER 1, JANUARY 2017

Study on Back Strength and its Association with Selected Anthropometric and Physical Fitness Variables in Bodo Tribal Women

Pulen Das[1] and Dr. Mahesh S. Khetmalis[2]

[1]Assistant Professor, Lakshmibai National Institute of Physical Education, Guwahati, India
[2]Associate Professor, Department of Physical Education, Visva Bharati University, India

Abstract

The purpose of the study was to measure back strength and its association with selected anthropometric and physical fitness variables in Bodo tribal woman of India. For the purpose of the study thirty five (35) college going Bodo Tribal female (Age ranging 18–24 years) were selected from Nalbari district of Assam India. As a criterion measure, back strength was measured by "isometric back strength test" (Nelson & Johnson 2007) To the nearest second. Anthropometrical characteristics such as the height was recorded by using stadiometer to the nearest 0.1 cm. Weight was measured by standard weighing machine to the nearest 0.1 kg BMI was calculated by using formula weight (kg)/ height^2(m^2). Hip circumference was measured by using flexible metallic steel tape in nearest cm. As a physical fitness variable hamstring muscle flexibility is measured by "sit & reach" test in nearest inch; and abdominal muscle endurance was recorded using 60 second sit up test in repetitions per minute (Nelson & Johnson 2007). To find out the significant relationship between back strength and selected anthropometric and physical fitness variables, standard descriptive statistics (Mean ± Standard deviation) and Pearson's Correlation Coefficient ("r") statistics was applied at 0.05 level of confidence. Result indicated that, there was significant relationship exist between back strength and height, BMI, hip circumference and abdominal muscle endurance where as no significant relationship was found between back strength and weight and hamstring muscle flexibility in Bodo tribal woman of India.

Keywords

Back Strength, Anthropometric, Physical Fitness, Bodo Tribal

1. INTRODUCTION

The back, the second biggest and the strongest muscles in our body, is often neglected. People focus so much on building the visual muscles; chest, biceps and abs but forget about the back, the key to many exercises that help to grow and support other target areas (HMSO 1994). A strong and healthy back is essential in developing a more functional strength and improving our physical capabilities. These muscles are key in strengthening our movements and important in preventing muscles imbalances which may result in injuries. It will help to improve our posture and prevent lower back pain as well (Biering, 1984). Throughout daily life and physical activities, the back is performing many complex movements involving the muscles in stomach, hip and low back. Therefore, building a strong back is crucial in establishing balance and ensuring longevity while training capoeria for the long haul. (www.rodamagazine.com). The strength of an individual muscle can be expected to depend on body size, shape, or more correctly muscle mass (Maughan *et al.* 1983) and possible gender and age (Edwards *et al.* 1977).

Thus normal value for strength must be evaluated with due to consideration of these parameters. For other muscle groups such as quadriceps, a good relationship between maximum strength output and body mass (or fat-free body mass) has been observed (Edwards *et al.,* 1977), suggesting that over all body mass may provide an adequate enough representation of the strength of individual muscle groups. To the author's knowledge, comparable data are not available for the back muscles, although they would be valuable in the assessment of physical capacity in low back pain patients.

The Bodos are an ethnic and linguistic community, early settlers of Assam in the North-East part of India. Bodos belong to a larger ethnic group called the Bodo-Kachari. The Bodos are recognized as a plains tribe in the Sixth Schedule of the Indian Constitution (Report on C.A. 2003). This study has been done on Bodo community boys of Assam. The Bodo people are more energetic and hard worker. They also recognized as son of land of Assam. They belong to Mongolian race, therefore their physical appearance is quite different than other Indian communities (satp.org/../NDFB_tl.htm). This community basically depends upon agriculture, home-made and natural product so that they have to work hard to collect their food and shelter; therefore they are very strong in nature.

Though the importance of studying back strength is immense, literature related to back strength on various communities' people is scantly; especially in Indian context, so present study was planned. The objective of the present study was to estimate the back strength and its association with anthropometric and physical fitness variables in Bodo tribal Woman.

2. METHOD AND MATERIALS

Subjects: In order to measure back strength and its association with selected anthropometric and physical fitness variables in Bodo tribal woman there were thirty five (35) college going Bodo tribal woman female (Age ranging 18–24 years) were selected from Nalbari district of Assam, India.

Back Strength Measurement: The back strength was measured by "isometric back strength" test to the nearest second. procedure of test is the subject must lie face down on a bench, with their upper body from the waist hanging over the end of the bench. The subject's feet must be held or stepped down, and the arms by their side or clasped behind the back, when ready, they must bring their body up to the horizontal position, and hold this for a set period. The amount of holding time is the score (www.topendsports.com).

Anthropometrical Measurements: Anthropometrical characteristics such as the height was recorded by using stadiometer to the nearest 0.1 cm. Weight was measured by standard weighing machine to the nearest 0.1 kg. BMI was calculated by using formula weight (kg)/height^2(m). Hip circumference was measured by using flexible metallic steel tape in nearest cm. (Nelson & Johnson 2007).

Physical Fitness Measurements: Physical fitness variable such as hamstring muscle flexibility is measured by "sit & reach" test in nearest inch and abdominal muscle endurance was recorded using 60 second sit-up test in repetitions per minute (Nelson & Johnson 2007).

3. STATISTICAL ANALYSIS

Standard descriptive statistics (Mean ± Standard deviation) and Pearson's Correlation Coefficient ("r") statistics was applied to investigate the back strength and its association with anthropometrical and physical fitness variables of Bodo tribal woman. The level of significant was set at 0.05 level of confidence.

4. FINDINGS OF THE STUDY

4.1. Mean, Standard Deviation & Coefficient of Correlation between Back Strength and Anthropometrical Physical Fitness Variables in Bodo Tribal Woman

Table 1

Variables	Mean	SD	"r"	Remarks
Back Strength(Sec.)	31.97	5.50	03.37*	
Height (c.m)	163.5	4.84		

*Significance at 0.05 level, Degree of freedom is $r_{05}(33) = 0.325$

Table 2

Variables	Mean	SD	"r"	Remarks
Back Strength	31.97	5.50	0.210	Insignificant
Weight (k.g)	61.71	6.96		

*Significance at 0.05 level, Degree of freedom is $r_{05}(33) = 0.325$

Table 3

Variables	Mean	SD	"r"	Remarks
Back Strength	31.97	5.50	0.560*	Significant
B.M.I. Kg/m^2	23.15	3.14		

*Significance at 0.05 level, Degree of freedom is $r_{05}(33) = 0.325$

Table 4

Variables	Mean	SD	"r"	Remarks
Back Strength	31.97	5.50	0.402*	Significant
Hip Circumference(c.m)	91.3	3.63		

*Significance at 0.05 level, Degree of freedom is $r_{05}(33) = 0.325$

Table 5

Variables	Mean	SD	"r"	Remarks
Back Strength	31.97	5.50	0.017	Insignificant
H.M. Flexibility (inch)	15.08	2.46		

*Significance at 0.05 level, Degree of freedom is $r_{05}(33) = 0.325$

Table 6

Variables	Mean	SD	"r"	Remarks
Back Strength	31.97	5.50	0.363*	Significant
Abdominal muscle endurance (rep.)	45.06	5.9		

*Significance at 0.05 level, Degree of freedom is $r_{05}(33) = 0.325$

5. DISCUSSION OF FINDING

According to findings of the study it is revealed that there was significant association between back strength and height, body mass index, hip circumference & abdominal muscle endurance (cal r_{05} 0.337,0.560,0.402,0.363 > tab r_{05}-0.325) whereas there was no significant association between back strength and weight & hamstring muscle flexibility (cal r_{05} 0.210,0.017< tab r_{05}-0.325) of Bodo tribal community boys.

Back muscle strength was measured by isometric strength test in a fix posture because the back muscles are most commonly used in this position during maximal labour (Dolan P. & Adams M.A. 1993), (Dolan P. *et al* 1994). Even

lifting with forward bent, the spine is frequently flexed by 70%–100%, presumably because; in such postures the stretched passive tissues of the spine can partially contribute to the extensor movement generated (Dolan P. *et al* 1991). At the low end of this range (70% flexion), tension in the inter vertebral discs and ligament in minimal (Dolan P. *et al* 1994) so most of the passive tension will be generated by stretching of muscle and facia. In this study subjects are generally considered above the average height. Height of a person can be both helpful and detrimental in not only sports person but also common people. Since above the average height people have more bone mass than shorter people (Flegal K.M. *et al* 2002) so they have posses strong back muscle and back muscle strength, therefore a strong relationship was exist between back strength and height of the subjects whereas taller peoples are gained less significant weight than the shorter people (Suzuki N. 1983). Strength has the significant relationship with body weight (Nishimura Y. *et al* 1995) but due to imbalance body weight of the subject there was no significant association between back strength and body weight. BMI and hip circumference are significantly related with back strength. Physical and physiological factors might be reason for these relations, where male people are taller and heavier also muscular due to presence of testosterone hormone in them (Mokha & Sidhu 1987). More musculature generates more force in their back region. Bodo peoples are hard worker and depend upon agriculture activity so they have good strength and endurance ((satp.org/../NDFB_tl.htm). Therefore significant association was exist between back strength and abdominal muscle endurance but due to less joint movement of their activity their flexibility was not significantly associated with back strength

In the present study, strong correlations of back strength with all anthropometric and physical fitness characteristics studied (except weight and flexibility), showed structural and physiological affinity towards the back strength. It was earlier reported too, that anthropometrical variables were strongly correlated with back strength in different populations (Roy & Pal 2001). In the present study those anthropometric variables were considered which were not reported earlier for the study of correlations with back strength. The data presented in present study carry immense practical applications and should be useful in future investigation on player selection & talent identification from the Bodo people of Assam. Researcher would like to suggest that more anthropometric and physical fitness variables should be taken into consideration for this purpose in future studies.

6. CONCLUSION

1. There was significant association between back strength and anthropometric variables (except weight of the subjects).
2. There was significant association between back strength and physical fitness variables (except flexibility of the subjects).

3. ACKNOWLEDGEMENT

The researcher extends his sincere thanks to all subjects who participated as a subject of the study. Researcher would like to thanks Dr. Gopal Ch. Saha for his great collaboration in to fulfillment of the present study and by the side of to all those peoples who helped me knowingly and unknowingly

REFERENCES

Sorensen, Biering F. (1984), "Physical Measurement at Risk Factors for Low Back Trouble Over a One Period", *Spine,* Vol. 9, pp. 106–19.

Clinical Standards Advisory Group, Back Pain London HMSO (1994).

Dolan, P. and Adams, M.A. (1993), "The Relationship Between EMG Activity and Extensor Movement Generation in the Erector Spine Muscles During Bending and Lifting Activities", *J. Biomechanics,* Vol. 24, pp. 513–22.

Dolan, P., Mannion, A.F. and Adams, M.A. (1994), "Passive Tissues Help the Back Muscles to Generated Extensor Moment During Lifting", *J. Biomechanics,* Vol. 27, pp. 1077–85.
Edwards, R.H.T., Young, A., Hos, King G.P. and Gones, D.A. (1977), "Human Skeletal Muscles Functions' Description of Tests and Normal Values", *Clin. Sci. Mol. Med.*, Vol. 52, Vol. 283–90.
Flegal, K.M., Carol, M.D., Ozden, C.L. and Johnson, C.L. (2002), "Prevalance and Trends in Obesity among US Adult", *JAMA,* Vol. 288, pp. 1723–1727.
Hundred Second Report on the Sixth Schedule to the Constitution Amendment Bill (2003).
Maughan, R.J., Watson, J.S. and Weir, J. (1983), "Relationship between Muscle Strength and Muscle Cross Sectional Area in Male Sprinters and Endurance Runners", *Eur. J. App. Physiology,* Vol. 540, pp. 319–18.
Mokha, R. and Sidhu, L.S. (1987), "Body Fat in Various Sportive Groups", *Journal of Sports Medicine and Fitness,* Vol. 27, pp. 376–379.
Nelson, Jack K. and Johnson, Barry L. (2007), "Practical Measurement for Evaluation in Physical Education", Surjeet Publication, p. 94, 120-121, 124, 201, Blication, Ludhiana,
Nishimura, Y., Tsutsumi, M., Nakata, H., Tsunenari, T., Maeda, H. and Yokoyama, M. (1995), "Relationship between Respiratory Muscle Strength and Lean Body Mass in Men with COPD", Department of Medicine, Takatsuki General Hospital, Japan, (1995) May, Vol. 107(5), pp. 1232–6.
Roy, S.K. and Pal, B. (2001), "Factor Influencing Back Strength and the Changes Due to Age of the Oraon Agriculture Labours of the Jalpaiguri Districts, West Bengal", *International Journal of Anthropology,* Vol. 16(4), pp. 263–273.
Suzuki, N. and Endo, S. (1989), "A Quantitative of Trunk Muscle Strength and Fatigability in the Low Back Pain", *Spine,* Vol. 14, pp. 992–1001.
(www.rodamagazine.com)
(www.satp.org/../NDFB_tl.htm)
(www.topendsports.com)

Pulen Das

Assistant Professor, Lakshmibai National Institute of Physical Educatio, Guwahati, India

Dr. Mahesh S. Khetmalis

Associate Professor, Department of Physical Education, Visva Bharati University, India

INTERNATIONAL JOURNAL OF PHYSICAL EDUCATION AND APPLIED EXERCISE SCIENCES
ISSN: 2394-9953
VOLUME 3, NUMBER 1, JANUARY 2017

INTERNATIONAL JOURNAL OF PHYSICAL EDUCATION AND APPLIED EXERCISE SCIENCES

Effect of S.A.Q. Exercises on Certain Physical Variables and Layup Shot in Basketball

Shiv Kumar Diswar[1], Vijay Chaudhary[2] and Swati Choudhary[3]

[1] *Research Scholar Deptt. of Physical Education, Visva-Bharati University*
[2] *Asst. Professor, Govt. PG College, Jalesar, UP*
[3] *Research Scholar, Department of Physical Education, Punjab University, Chandigarh*
E-mail: [1]shiv.p.weight@gmail.com

Abstract
The Aim of the study is establish if Speed, Agility, and Quickness is a system of training that enhances performance levels in all sports. Gradual and progressive use of the SAQ Training exercises, drills and methods leads to improvement in: Acceleration, Speed, Arm action, Footwork, Response time, Explosion. The main objective of this study was to investigate the efficacy of (speed, agility, and quickness; SAQ) method on layup shot and physical performance variables for youth basketball players. Twenty basketball youth players were divided into two groups: Experimental (n = 10) and Control (n = 10). Each group trained three times a week for ten weeks; all training modalities were performed during each session. Parameters assessed were height, weight, training experiences. The results revealed significant differences between pre- and post-measurements (speed-agilityand reactive agility tests). Our suggestion is that youth athletes can benefit by reinforcing muscles and improving the speed, agility and layup shot performance through SAQ exercises.

Keywords
SAQ exercises, layup shot, basketball.

1. INTRODUCTION

Basketball is becoming a game that revolves around athleticism, and if athletes of a team are not fit it is going to be difficult to get on the floor. Therefore athletes need to dedicate time and add speed and quickness workouts to basketball training. Basketball requires tremendousendurance, speed, agility, and power (Siegler *et al*., 2003). Basketball is an extremely dynamic sport that requires movements in multiple planes of motion as well as rapid transitions from jogging to sprinting to jumping. The ability to quickly elude defenders, rapidly decelerate to take a jump shot, or explosively jump up to grab a rebound are all skills required to effectively play the sport. It is equally important for the athlete to be able to perform these skills in a variety of directions and in a controlled manner to ensure injuries do not ensue (Young WB, 2001). In addition, refers Mario, *et al*. (2011) that the term SAQ is derived from the first letters of both of the transitional Speed, Agility and Quickness. Velmurugan & Palanisamy (2012) noted that SAQ exercises in modern training system produces integrated effects of many physical capacities within a single training program. Moreover, refers Remco, *et al*. (2009) that exercises SAQ integrated training system is designed to improve acceleration, compatibility between the eye and the hand, the explosive power, the speed of response. On the nature of the correlation between the three training elements (transitional speed agility and speed motor), shows Baechle, *et al*. (2000) that the transition speed is the player's ability to perform sequential

and similar movements in the shortest possible time, while it is agility to change the conditions in the air, and the ability of the motor speed is the maximum contraction or motor response to muscle in as little time as possible. And explains Vikram (2008) the difference between the transitional speed and speed motor that transition speed need time to reach the maximum speed of which must be incremental, and this is evident in the running races in which the player for a time sufficient needs to get from speed zero to maximum speed, while speed motor. They do not need to this time, but the maximum muscle contraction in the shortest possible time and appear in the explosive movements of some sports. Based on the foregoing, the researcher to conduct this study under the influence of SAQ agility drills on the reaction and the level of layup shot performance of the emerging basketball title.

2. PROCEDURE AND METHODOLOGY

A sample of Twenty basketball youth players were randomly selected, age ranging from 15–17 years from Simpkins School Agra, India. Subjects were divided into two groups: Experimental (n = 10) and Control (n = 10). Each group trained three times a week for ten weeks; all training modalities were performed during each session. Parameters assessed were height, weight, training experience. Physical tests: 1. Test the movement speed (30 m running from high start) 2. Reactive agility test (design researcher), 3. General coordination test (pass the tennisball on the wall) 4. Muscular power test (broad jump – throwing medical ball) Test skills1. Measuring the performance of the layup shot level. Determinants of SAQ training program:The number of training units: The number of weekly units (3) units weeklyat a rate of 3 × 8 weeks =24 units proposed program. Training method used:The researcher used the interval method ofhigh intensity, and Recurring training, training ring,in addition to the content of the exercises of a naturesimilar performance to performance in basketball.

3. STATISTICAL ANALYSIS

All statistical analyses were calculated by the SPSS statistical package. The results are reported as means and standard deviations (SD). Differences between two groups were reported as mean difference ±95% confidence intervals (meandiff ±95% CI).Student's t-test for independent samples was used to determine the differences in fitness parameters between the two groups. The $p<0.05$ wasconsidered as statistically significant.

4. RESULTS

Table 1: Age, Anthropometric Characteristics and Physical Variables of Experimental and Control Group

Variables	Mean	Standard Deviation	CoefficientofSkewness
Age (years)	12.10	1.21	1.05
Height (cm)	165.5	6.25	0.36
Weight (kg)	46.30	5.6	0.42
Training experience(years)	4.28	2.62	0.17

Table 1 shows the age, anthropometric characteristics and physical variables of the subjects. There were nosignificant differences were observed in the anthropometric characteristics and for the subjects in the groups.

It is clear from Table (2) the t-test showed statistically significant differences between the post measurementsfor the experimental and control groups in all variables of physical and layup shot Performance Level for theexperimental group except arm power.

Table 2: Physical Variables and Performance Level of Layup Shot in Basketball Between Experimental and Control Group

Variables	Mean & SD				Sig.
	Experimental Group		Control Group		
	Before	After	Before	After	
Coordination (freq.)	11.855 ±0.72	12.10 ±0.87	11.84±0.65	11.92 ±0.64	0.00
Agility (cm)	12.03 ±0.17	11.81±0.21	12.05 ±0.24	12.00 ±0.20	0.01
Movement speed (second)	6.21 ±0.1	6.12±0.09	6.22±0.2	6.18±0.18	0.00
Arm power(cm)	59.41±3.83	62.21±4.87	59.24±4. 25	60.72 ±4.38	0.06
Leg power (cm)	37.52 ±4.25*	45.21 ±3.78	38.04 ±4.36	40.30 ±3.27	0.02
Layup shot Performance Level (Degree)	0.62 ±0.08	0.51 ±0.05	0.61 ±0.08	0.58 ±0.06	0.01

The graphical representation of post means on selected variables between experimental and control group are presented in Figure 1.

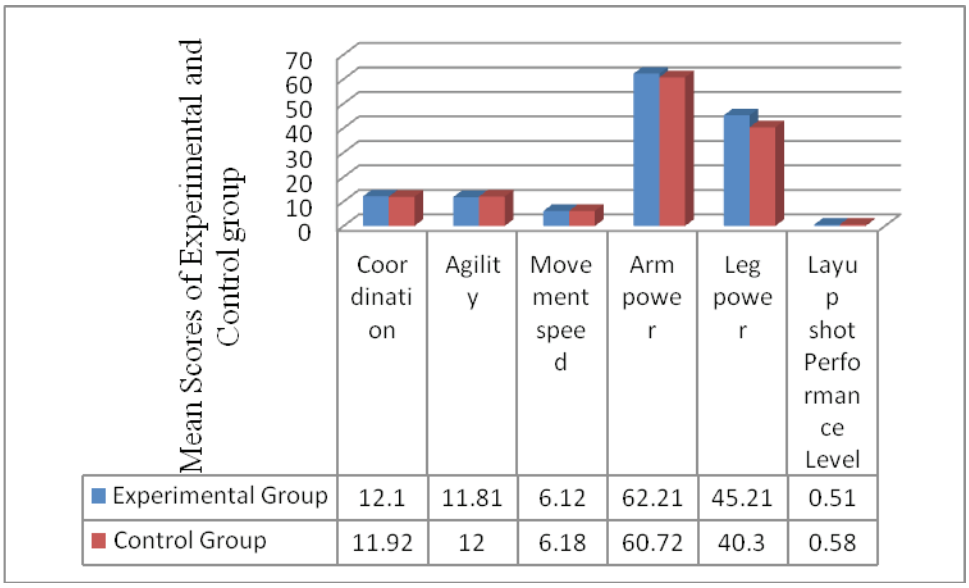


Figure 1: Graphical Comparison of Post Mean on Selected Variables between Experimental and Control Group

5. DISCUSSION

"Speed" is about maximum velocity or how fast youcan run. Generally, maximum speed development requires about 6-8 seconds at maximum or near maximum effort with afull rest recovery soyour heart rate is about normalbefore beginning the next exercise. SAQ is structured by a system a progressivesequence of training 'phases'. Called the 'Continuum 'it gives coaches a natural confidence in delivery. Players are guaranteed to see improvements in theirexplosive, multi-directional speed, agility andquickness, acceleration/ deceleration, quality andspeed of response control as they progress. A brief description follows: The results confirmed by Adams, *et al*. (1992) that the activity of reflection rubber allows excellent transport special force to the same speed and similar movements that require high capacity of the trunk and legs and show results when the performance of the broad jump. Velmurugan & Palanisamy (2012) of SAQ exercises confirm this that work to stimulate muscle spindles, resulting in high-voltage motor units in the liberal and raise other receptor is working to increase the number of active motor units, which are the cause of increasing the power generated. This is in line with what was said Zoran, *et al*. (2012) that SAQ

training is one of the training formsthat contribute to the improvement of some physical capabilities and that of the most important kinds of speed. The results of this study are consistent with the study of both Vikram, (2008), Remco *et al*. (2009), Mario, *et al*. (2011) in that SAQ exercises contribute to an improvement in acceleration and the ability of the two men muscle, agility and speedmotor time. This is confirmed by Louise (2011) that success in the performance of any skill development needs to contribute to the physical components of performance are perfect. This is in line with the findings of Marwan (2003) that the training on skill alone is not enough to improve this skill and get fruitful results, as it is next to the skill development to be the development of motor capabilities of the skill itself. And improved muscle strength link improved performance skill level confirms Enrique, *et al*. (2007) that the strong muscle necessarily fast muscles and the muscle power is of key physical elements which must work to develop even working to improve the speed motor

6. CONCLUSION

In light of the findings of the researcher of the research recommends the following results: Application SAQ exercises in basketball. Diversity in training SAQ between the upper end and the lower taking into account the gradient in intensity and taking into account individual differences and motivation for each individual Further, similar studies to determine the role of SAQ exercises to improve the morphological and physiological variables for players in different sports

REFERENCES

Adams, K., O'Shea, J.P. and O'Shea, K.L. (1992), "The Effects of Six Weeks of Squat Plyometric and Squatplyometric Training on Power Production, *Journal of Applied Sport Sciences,* Vol. 61, pp. 36–41.

Akhil, M., Vikram, S., Shyam, L.M.N. and Rai (2011), "Effectof Six Weeks S.A.Q. Drills Training Programmeon Selected Anthropometrical Variables", *Indian Journal of Movement Education and Exercises Sciences*, Vol. I, No. 1, pp. 121–129.

Amr, H. (2012), *Effect of Complex Training on Certain Physical Variables for Young Fencers*, Ph.D. Dissertation, Zagazig University.

Baechle, T., Earle, R. and Wathen, D. (2000), *Essentials of Strength Training and Conditioning*, Second Edition, China: Human Kinetics.

Enrique, L., Francisco, S. and Enrique, N. (2007), "Analysis of the Fencing Lunge Flight Phase in EPEE", 12th Annual Congress of the ECSS, 11–14 July, Jyväskylä, Finland.

Jon L., Oliver and Robert W., Meyers (2009), "Reliability and Generality of Measures ofAcceleration, Planned Agility and ReactiveAgility", *International Journal of Sports Physiology and Performance*, Vol. 4, pp. 345–354.

Louise, E. (2011), "Sport-specific Video-based Reactive Agility Training in Rugby Union Players", Thesispresented in Partial Fulfillment of the Requirements for the Degree Master of Sport Science at Stellenbosch University.

Mario, J., Goran, S., Darija, O. and Fredi, F. (2011), "Effects of Speed, Agility, Quickness-training Method on Power Performance in Elite Soccer Players", *Journal of Strength and Conditioning Research*, Vol. 255, pp. 1285–1292.

Marwan, A. (2003), *Handball*, Arabian Publish, Egypt Neitzke, H., Miller, M., Cheatham, C., O'Donoghue, J. (2010), "Preplanned and Reactive Agility Training influence on Agility Test Performance in Male Adolescents", *Journal of Strength & Conditioning Research,* January, Vol. 24, Issue 1.

Remco, P., Jonathan, B. and Andrew, E. (2009), "Effects of SAQ Training and Small-Sided Games on Neuromuscular Functioning in Untrained Subjects", *International Journal of Sports Physiology and Performance*, Vol. 4, pp. 494–505.

Sheppard, J.M. and Young, W.B. (2006), "Agility Literature Review: Classifications, Training and Testing", *Journal of Sports Sciences*, September, Vol. 249, pp. 919–932.

Tim, G. and Dean, B. (2009), "Reactive Agility of Rugby League Players", *Journal of Science and Medicine in Sport*, Vol. 12, pp. 212—214.

Velmurugan, G. and Palanisamy, A. (2012), "Effects of SAQ Training and Plyometric Training on Speed Among College Men Kabaddi Players", *Indian Journal of Applied Research*, Vol. 3, Issue 11, p. 432.

Vikram, S. (2008), "Effect of S.A.Q. Drills on Skills of Volleyball Players", *Thesis*, Submitted to the Lakshmibai National Institute of Physical Education, Gwalior.

Mr. Shiv Kumar

Research Scholar, Deptt.of Physical Education,Visva-Bharati University

Dr. Vijay Chaudhary

Asst. Professor, Govt. PG College, Jalesar, UP

Ms. Swati Choudhary

Research Scholar, Department of Physical Education, Punjab University, Chandigarh

INTERNATIONAL JOURNAL OF PHYSICAL EDUCATION AND APPLIED EXERCISE SCIENCES
ISSN: 2394-9953
VOLUME 3, NUMBER 1, JANUARY 2017

INTERNATIONAL JOURNAL OF PHYSICAL EDUCATION AND APPLIED EXERCISE SCIENCES

Effect of Selected Yogic Asana on Body Mass Index

Dr. Deba Prashad Sahu[1] and Dr. Aloke Sen Borman[2]

[1]HOD, Department of Physical Education, Mahishadal Girls' College, Mahishadal, Purba Medinipur, West Bengal, India
[2]Assistant Professor, Department of Physical Education, Seva bharati Mahavidyalaya, Kapgari, Paschim Medinipur, West Bengal, India
E-mail: [1]debaprasadsahu10@gmail.com, [2]dralokesenborman@gmail.com

Abstract

Background: It is already established that multiple intervention of yogic technique may improve physical fitness.1,2,3,4,5,6,7,8 But there was no such randomized control trail on the effect of yogic asana alone and its impact on Body Mass Index. Aim: The aim of this study was to determine the effect of regular practice of yogic asana on Body Mass Index. Materials and Methods: Total 48 residential male students (12 + 1 years) were participated in this study. It was randomized into two equal groups as yoga group (n=24) and waitlist control group (n=24). Yoga group was regularly practiced only yogic asana for 1 to 1.5 hour per day, 6 days per week, for 12 weeks with a progressive training load method. The body mass index was assessed by measuring standing height and body weight. In the present study all the measurements were done at the baseline (before onset of training) after 6 and 12 weeks of asana practices. A repeated measure of ANOVA was used for analyzing the data. Simple percentage also calculated from the mean value to see the quantitative changes of the asana training. Results: After 12 weeks, yoga group showed a significant improvement in body mass index (7.01%) which may be due to increase in body weight. Conclusion: Yogic asana alone may elicit a positive improvement in the body mass index.

Keywords

Yogic asana-body mass index

1. INTRODUCTION

Evidence already established that multiple intervention of yoga can improved physical fitness components such as speed,[1,2,3] agility,[4,5] coordination, [6,7,8] balance,[9,10] power and reaction time.[11,12] But there is no such randomized control trail on effect of only yogic posture on body mass index. With this background, the aim of the present study was to determine whether the regular practice of yogic postures alone can improve body mass index.

2. MATERIALS AND METHODS

2.1. Subjects

2.1.1. Inclusion Criteria

11 to 13 years male generally healthy similar socio-economic background oriented and not specially acquainted with any yoga training residential students were included for this study.

2.1.2. Exclusion Criteria

Chronic ailments and major injury were excluding criteria.

2.1.3. Ethical Consideration

In this study the researcher took:

1. Institutional permission (Visva-Bharati University) for this noninvasive experimental research.
2. Collected signed informed consent from the Headmaster and Hostel Super of Daronda Chandimata Vidyalaya before pilot final and study.

2.1.4. Design of the Study

An experimental study was done for 12 weeks on randomly selected residential male school students. Before going to take the final experiment the researcher did a pilot study with the same age group in the same school but with the other students these who are not participating in the final experiment. There were two group namely yogic asana group (experimental) and waitlist control group in the final study. In the time of experiment the control group was maintained normal life and observed all the practice of yoga asana group in the practice time.

3. METHODS

3.1. Sampling

Forty eight residential 11 to 13 years (mean = 12 + 1 years) age male students of Daronda Chandrimata Vidyalaya, Bolpur, West Bengal, India were participated in this study. Randomization: 48 participants were randomized through *www.randomizer.com* into two groups (yoga group and waitlist control group). Design: All the measurements of yoga group (n = 24) and waitlist control group (n = 24) were taken at the baseline, after 6 weeks and after completion of 12 weeks yogic asana practice.

3.2. Procedure

Body Mass Index is derived mathematically by using the following formula. (Kansal, 1996)

Body Mass Index = (Standing height in Mt.)2 / Body weight in Kg.

3.3. Practice Protocol

The yoga asana group had an hour practice of suryanamaskar and 16 yogic asana (posture) in the initial day but it was increased to 1.5 hour gradually by increasing repetition and duration of the yogic asanas in a progressive load training method. They underwent 6 days per week practice for total 12 weeks in the common room of the school hostel. The waitlist control group was maintained normal life and observed all the practice of yoga asana group in the practice time. In the end of the study 6 students from waitlist control group and 4 students from the yoga group were dropped out. The yogic posture training was given by an instructor who was a disciple of Yogachariya B.K.S. Iyanger and two yoga assistants were with him. Suryanamaskar, Uttita padmasana, salvasana, utkatasana, baisistasana, janusirasana, ardha chakrasana, dandasana, dhanurasana, padahastasana, mayurasana, ardha masyendrasana, birvadrasana, bagrasana, natarajasana, and solvasana were practiced with maintaining a order and time elapsed. **Assessment criteria:** For body mass index detection standing height was measured by Rod Campus and body weight was measured by weighting machine. **Statistical analysis:** Repeated measures analyses of variance (ANOVA) were used for analyzing data with one between subjects' factor and other within subjects factors were used for analyzing all the data. Also t-test was used. The level of significance was set at .05 levels.

4. RESULTS

There was no significant difference in the base level data between yoga asana group and wait list control group. Yoga group showed a significant improvement after 12 weeks yogic posture body mass index. (Table 2)

5. DISCUSSION

In the present study body weight was measured three times (pre, mid and post test) in the experimental (YSG) and control (WCG) group. It was observed that after 6 weeks of yogasana practice the body weight was increased by 31.1% and after 12 weeks it was increased by 5.16% and the improvement was statistically significant (fig. no.1 and Table 1).

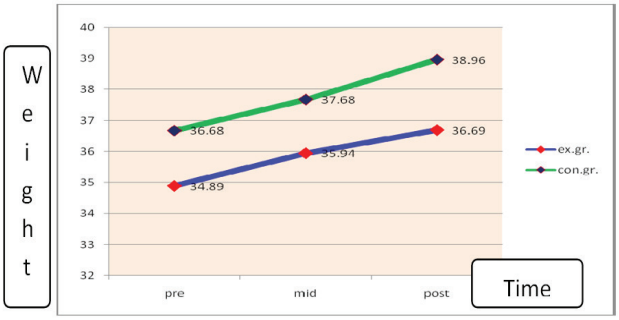


Fig. 1: Body Weight

Table 1: Body Weight

Group	Pre Test Mean and S.D. in Kg.	Mid Test Mean and S.D. in Kg.	Post Test Mean and S.D. in Kg.
Ex. Gr. (YSG)	34.89 + 10.14	35.94* + 10.14	36.69** + 10.14
Con. Gr. (WCG)	36.68 + 10.14	37.68* + 10.14	38.96*** + 10.14

The increase of body weight may be attributed to the decrease of body fat and increase of body mass. The data about this matter was incorporated in the health related physical fitness area of this work. Very similar result was found by the other researchers (Kristal, 2005, and Chen, 2009). The body mass index was calculated from the body weight and height. It was observed that the BMI was improved significantly (P<0.001). The BMI was increased by 3.31% after 6 weeks and 7.08% after 12 weeks, whereas there were very slight changes in the control group in the time of experiment (Figure no. 2 and Table no. 2).

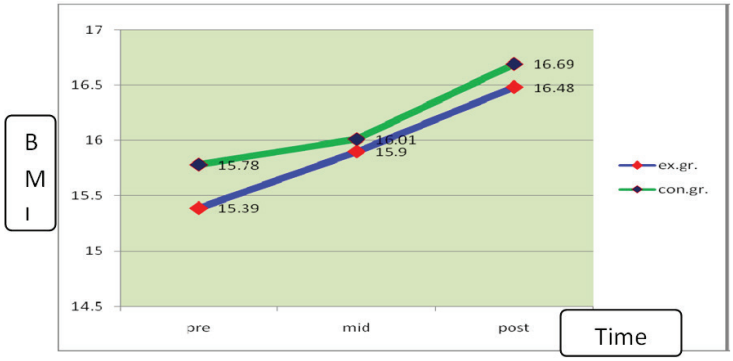


Fig. 2: Body Mass Index

Table 2: Body Mass Index

Group	Pre Test mean and S.D. in Kg.	Mid Test Mean and S.D. in Kg.	Post Test Mean and S.D. in Kg.
Ex. Gr. (YSG)			
Con. Gr. (WCG)			

BMI is the calculation of height and body weight ratio. In this study the standing height of the subject was not changed but the body weight was increased significantly that may influence the improvement of BMI in this study. Chen et.al. (2009) reported that BMI improved after yogic training, whereas Siasankaran et. al. (2006), Mclver et.al. (2009), Kosuri et.al. (2009), Telles et.al. (2010) observed the decreased of BMI. Also, some other group Carei et.al. (2010) reported no change in BMI after the practice of yoga. From the above discussion it may found that there are three types of report increase, decrease and no change of BMI after yogic practice. But in this study only yogasana is the intervention improved body mass. The age group of the study was 11 to 13 years. This age is a growing age. The yogasana activity may improve anabolism of the various cells of the body which may improve cell volume.

6. CONCLUSION

From the present study, it may be concluded that yogic asana alone bring a positive improvement in the body mass index.

REFERENCES

Ades, P.A., Savage, P.D., Brochu, M., Tischler, M.D., Lee, N.M. and Pochlman, E.T. (2004), "Resistance Training Increases Total Daily Energy Expenditure in Disabled Older Women with Coronary Heart Disease", *J. Appl. Physiol*., Vol. 98, pp. 1280–1285.

Balasubramanian, B. and Pansare, M.S. (1991), "Effect of Yoga on Aerobic and Anaerobic Power of Muscles", *Indian J. Physiol Pharmacol*., Vol. 35(4), pp. 281–2.

Bastille, J.V. and Gill-Body, K.M. (2004), "A Yoga-based Exercise Program for People with Chronic Poststroke Hemiparesis", *Phys Ther*., Vol. 84(1), pp. 33–48.

Benavides, S. and Caballero, J. (2009), "Ashtanga Yoga for Children and Adolescents for Weight Management and Psychological Well Being: An Uncontrolled Open Pilot Study", *Complement Ther Clin Pract*., Vol. 15(2), pp. 110–4.

Bera, T.K. and Rajapurkar, M.V. (1993), "Body Composition, Cardiovascular Endurance and Anaerobic Power of Yogic Practitioner", *Indian J. Physiol Pharmacol*., Vol. 37(3), pp. 225–8.

Berger, D.L., Silver, E.J. and Stein, R.E. (2009), "Effects of Yoga on Inner-city Children's Well-being: A Pilot Study", *Altern Ther Health Med*., Vol. 15(5), pp. 36–4.

Bharshankar, J.R., Bharshankar, R.N., Deshpande, V.N., Kaore, S.B. and Gosavi, G.B. (2003), "Effect of Yoga on Cardiovascular System in Subjects above 40 Years", *Indian J. Physiol Pharmacol*., Vol. 47(2), pp. 202–6.

Bhavanani, A.B., Madanmohan and Udupa, K. (2003), "Acute Effect of Much Bhastrika (A Yogic Bellours Type Breathing) on Reaction Time", *Indian J. Physiol Pharmacol*., Vol. 47(3), pp. 297–300.

Bhutkar, P.M., Bhutkar, M.V., Taware, G.B., Doijad, V. and Doddamani, B.R. (2008), "Effect of Suryanamaskar Practice on Cardio-respiratory Fitness Parameters: A Pilot Study", *Al Ameen J. Med. Sci*., Vol. 1(2), pp. 126–129.

Borker, A.S. and Pednekar, J.R. (2003), "Effect of Pranayam an Visual and Auditory Reaction Time", *Indian J. Physisol Pharmacol*., Vol. 47(1), pp. 229–230.

Bosch, P.R., Traustadóttir, T., Howard, P. and Matt, K.S. (2009), "Functional and Physiological Effects of Yoga in Women with Rheumatoid Arthritis: A Pilot Study", *Altern Ther Health Med*., Vol. 15(4), pp. 24–31.

Carei, T.R., Fyfe-Johnson, A.L., Breuner, C.C. and Brown, M.A. (2010), "Randomized Controlled Clinical Trial of Yoga in the Treatment of Eating Disorders", *J. Adolesc Health,* Vol. 46(4), pp. 346–51.

Chaya, M.S., Kurpad, A.V., Nagendra, H.R. and Nagavathna, R. (2006), "The Effect of Long Term Combined Yoga Practice on the Basal Metabolic Rate of Healthy Adults", *BMC Complementary and Alternative Medicine,* Vol. 6:28.

Chen, K.M., Chen, M.H., Hong, S.M., Chao, H.C., Lin, H.S. and Li, C.H. (2008), "Physical Fitness of Older Adults in Senior Activity Centres After 24-week Silver Yoga Exercises", *J. Clin. Nurs*., Vol. 17(19), pp. 2634–46.

Chen, K.M., Fan, J.T., Wang, H.H., Wu, S.J., Li, C.H. and Lin, H.S. (2010), "Silver Yoga Exercises Improved Physical Fitness of Transitional Frail Elders", *Nurs. Res*., Vol. 59(5), pp. 364–70.

Chen, T.L., Mao, H.C., Lai, C.H., Li, C.Y. and Kuo, C.H. (2009), "The Effect of Yoga Exercise Intervention on Health Related Physical Fitness in School-age Asthmatic Children", *Hu Li Za Zhi*., Vol. 56(2), pp. 42–52.

Cowen, V.S. (2010), "Functional Fitness Improvements after a Worksite-based Yoga Initiative", *J. Bodyw Mov. Ther*., Vol. 14(1), pp. 50–4.

Dash, M. and Telles, S. (2001), "Improvement in Hand Grip Strength in Normal Volunteers and Rheumatoid Arthritis Patients Following Yoga Training", *Indian J. Physiol Pharmacol*., Vol. 45(3), pp. 355–60.
Dash, M. and Telles, S. (1999), "Yoga Training and Motor Speed Based on a Finger Tapping Task", *Indian J. Physiol Pharmacol*., Vol. 43(4), pp. 458–62.
De Godoy, D.V., Bringhenti, R.L., Severa, A., de Gasperi, R. and Poli, L.V. (2006), "Yoga Versus Aerobic Activity: Effects on Spirometry Results and Maximal Inspiratory Pressure", *J. Bras Pneumol*., Vol. 32(2), pp. 130–5.
Dhume, R.R. and Dhume, R.A. (1991), "A Comparative Study of the Driving Effects of Dextroamphetamine and Yogic Meditation on Muscle Control for the Performance of Balance on Balance Board", *Indian J. Physiol Pharmacol*., Vol. 35(3), pp. 191–4.
DiBenedetto, M., Innes, K.E., Taylor, A.G., Rodeheaver, P.F., Boxer, J.A., Wright, H.J. and Kerrigan, D.C. (2005), "Effect of a Gentle Iyengar Yoga Program on Gait in the Elderly: An Exploratory Study", *Arch. Phys. Med. Rehabil*., Vol. 86(9), pp. 1830–7.
Dvivedi, J., Dvivedi, S., Mahajan, K.K., Mittal, S. and Singhal, A. (2008), "Effect of '61-points Relaxation Technique' on Stress Parameters in Premenstrual Syndrome", *Indian J. Physiol Pharmacol*., Vol. 52(1), pp. 69–76.
Elavsky, S. and McAuley, E. (2009), "Personality, Menopausal Symptoms and Physical Activity Outcomes in Middle-Aged Women", *Pers Individ Dif*., Vol. 46(2), pp. 123–128.
Flegal, K.E., Kishiyama, S., Zajdel, D., Haos, M. and Oken, B.S. (2007), "Adherence to Yoga and Exercise Interventions in a 6-month Clinical Trail", *BMC Complementary and Alterative Medicine,* Vol. 7, p. 37.
Galantino, M.L., Bzdewka, T.M., Eissler-Russo, J.L., Holbrook, M.L., Mogck, E.P., Geigle, P. and Farrar, J.T. (2004), "The Impact of Modified Hatha Yoga on Chronic Low Back Pain: A Pilot Study", *Altern Ther Health Med*., Vol. 10(2), pp. 56–9.
Greendale, G.A., McDivit, A., Carpenter, A., Seeger, L. and Huang, M.H. (2002), "Yoga for Women with Hyperkyphosis: Results of a Pilot Study", *American Journal of Public Health,* Vol. 92(10).
Hagins, M., Moore, W. and Rundle, A. (2007), "Does Practicing Hatha Yoga Satisfy Recommendations for Intensity of Physical Activity Which Improves and Maintains Health and Cardiovascular Fitness?", *BMC Complementary and Alternative Medicine,* Vol. 7, p. 40.
Hart, C.E. and Tracy, B.L. (2008), "Yoga as Steadiness Training: Effects on Motor Variability in Young Adults", *J. Strength Cond Res*., Vol. 22(5), pp. 1659–69.
Hill, K., Smith, R., Fearn, M., Rydberg, M. and Oliphant, R. (2007), "Physical and Psychological Outcomes of a Supported Physical Activity Program for Older Carers", *J. Aging Phys Act*., Vol. 15(3), pp. 257–71.
Tran, M.D., Holly, R.G., Lashbrook, J. and Amsterdam, E.A. (2001), "Effects of Hatha Yoga Practice on the Health-Related Aspects of Physical Fitness", *Prev Cardiol*., Vol. 4(4), pp. 165–170.
Tuzun, S., Aktas, I., Akarirmak, U., Sipahi, S. and Tuzun, F. (2010), "Yoga Might be an Alternative Training for the Quality of Life and Balance in Postmenopausal Osteoporosis", *Eur. J. Phys. Rehabil. Med*., Vol. 46, pp. 69–72.
Ulger, O. and Yağlı, N.V. (2011), "Effects of Yoga on Balance and Gait Properties in Women with Musculoskeletal Problems: A Pilot Study", *Complement Ther Clin Pract*., Vol. 17(1), pp. 13–5.
Vani, P.R., Nagarathna, R., Nagendra, H.R. and Telles, S. (1997), "Progressive Increase in Critical Flicker Fusion Frequency Following Yoga Training", *Indian J. Physiol Pharmacol*., Vol. 41(1), pp. 71–74.
Vempati, R.P. and Telles, S. (2002), "Yoga based Guided Relaxation Reduces Sysmathetic Activity Judged from Baseline Levels, *Psychol Rep*., Vol. 90(2), pp. 487–94.
Vijayalakshmi, P., Madanmohan, Bhavanani A.B., Patil, A. and Babu, K. (2004), "Modulation of Stress Induced by Isometric Handgrip Test in Hypertensive Patients Following Yogic Relaxation Training", *Indian J Physiol Pharmacol*., Vol. 48(1), pp. 59–64.
Yadav, R.K. and Das, S. (2001), "Effect of Yogic Practice on Pulmonary Functions in Young Females", *Indian J. Physiol Pharmacol*., Vol. 45(4), pp. 493–6.

Dr. Deba Prashad

HOD, Department of Physical Education, Mahishadal Girls' College, Mahishadal, Purba Medinipur, West Bengal, India

Dr. Aloke Sen Borman

Assistant Professor, Department of Physical Education, Seva bharati Mahavidyalaya, Kapgari, Paschim Medinipur, West Bengal, India

INTERNATIONAL JOURNAL OF PHYSICAL EDUCATION AND APPLIED EXERCISE SCIENCES
ISSN: 2394-9953
VOLUME 3, NUMBER 1, JANUARY 2017

INTERNATIONAL JOURNAL OF PHYSICAL EDUCATION AND APPLIED EXERCISE SCIENCES

Comparative Study of Football Players With Reference to Arm Length and Leg Length of Different Playing Positions and Regions

Dr. Rajeev Choudhary[1] and Lamlun Buhril[2]

[1]Professor, School of Studies in Physical Education
Pt. Ravishankar Shukla University, Raipur, CG
[2]Assistant Professor, SAI, LNCPE, Trivandrum, Kerala

Abstract

Objectives: First objective of the study was to find out the significant difference between different regions in relation to Arm Length and Leg Length. Second objective of the study was to find out the significant difference between different Playing Positions in relation to Arm Length and Leg Length. Third objective of the study was to find out the interaction effect between different playing positions and different regions in relation to Arm Length and Leg Length.

Methodology: Selection of Subjects: A total of 72 Intervarsity Football Players were selected, 12 from each playing position (Defenders, Mid-fielders, and Attackers), from East and South zones.

Variables: In this study, selected zones (East and South) and Different Playing Positions (Defenders, Mid-fielders, and Attackers) were considered as independent variables and Arm Length and Leg Length was considered as dependent variable.

Measures: Arm Length was measured with the flexible steel tape from the point just above the shoulder joint to the tip of the middle finger and was recorded to the nearest half centimetre. Leg length was taken with the flexible steel tape from the greater trochanter to the floor and recorded to the nearest half centimetre.

Design of the Study: 3 x 2 factorial design was used for the study. Total of 3 Playing Positions were selected at two levels (Zones) i.e. East and South Zone.

Statistical Analysis: To find out the significant difference between South and East Zone in relation to Arm Length and Leg Length (1), to find out the significant difference between different Playing positions in relation to Arm Length and Leg Length (2) and to find out the interaction effect between different Playing Position and Zones in relation to Arm Length and Leg Length (3), Two Way Analysis of Variance was Used at .05 level of Significance.

Findings and Conclusions: Insignificant difference was found among different playing positions in Arm Length and Leg Length. Insignificant difference was found between South and East zone footballers in Arm Length and Leg Length. Insignificant interaction was found between columns (different playing positions) and rows (South and east Zone Footballers) in Arm Length and Leg Length.

1. INTRODUCTION

There is nothing more exhilarating than a player who explodes through a defensive gap, checks, turns and side steps to avoid desperate, defensive lunges, and fires the ball home. Or when a centre-half defies gravity by jumping into the air, hanging there long enough to intercept a crossed ball with his head before directing it to a supporting midfielder's feet for a swift, decisive counter attack. Soccer is the greatest game in the world. These wonderful acts of speed, agility and quickness are what make the difference between winning and losing. Often thought to be 'God

given' gifts, and therefore neglected on the training field, they are admired and believed to be essential for success within the game by players, managers, coaches and trainers. (Alan Pearson, 2001).

Forwards, or strikers, are positioned furthest forward on the team, nearest to the opponent's goal. These players come in all shapes and sizes, from small and agile to large and powerful, but they all have one essential job–to score goals. As the principal goal-scorers, forwards are often a team's most celebrated and expensive players. As well as taking advantage of goal-scoring opportunities, forwards are also expected to set up goals for other forwards and sometimes for attacking midfielders and playmakers. Forwards may also aim to keep possession of the ball until other players can move forward and join the attack. There are many different ways to score a goal and, consequently, many different types of forward. However, certain mental and physical characteristics are common for all. Forwards must have pace (at least for short distance), show great courage, and have an instinctive eye for goals. Excellent shooting ability is a pre-requisite, but heading, crossing, and passing skills are also vital in order to engineer goal-scoring opportunities and our-maneuver defenders while advancing up the field. (Danny Mielke, (2003).

Human performance is a composition of many variables such as structure of the body, the specific measurements of the limbs, circumferences, breadth and body build. Since motor performance is an outcome of various variables, there may be direct relationship between certain specific measurements and motor performance. The type of individual's structure is an essential factor in his motor performance. Evidence of this is quite common: observe the well proportionate physique of boxers and gymnasts, the super structure of great basketball players, the muscularity of top class football players, the wiriness of champion distance runners and the massive built of shot-put and discus throwers. Therefore, anthropometric measurements of an individual player play a dominant role in high level sport performance. (Earle F. Ziegler, 1970).

2. OBJECTIVES

1. First objective of the study was to find out the significant difference between different regions in relation to Arm Length and Leg Length.
2. Second objective of the study was to find out the significant difference between different Playing Positions in relation to Arm Length and Leg Length.
3. Third objective of the study was to find out the interaction effect between different Playing positions and different regions in relation to Arm Length and Leg Length.

4. METHODOLOGY

6.1. Selection of Subjects

A total of 72 Intervarsity Football Players were selected 12 from each playing position (Defenders, Mid-fielders, and Attackers), from selected zones (East and South). Age of the subjects was ranging from 17 to 27 years.

6.2. Selection of Variables

In this study, selected zones (East and South) and Different Playing Positions (Defenders, Mid-fielders, and Attackers) were considered as independent variables and Arm Length and Leg Length was considered as dependent variable.

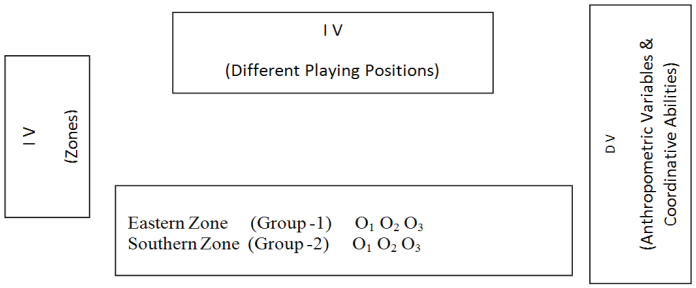
6.3. Measures

Leg Length was taken with the flexible steel tape from the greater trochanter to the floor and was recorded to the nearest half centimetre

Arm Length was measured with the flexible steel tape and recorded to the nearest half centimetre.

5. DESIGN OF THE STUDY

3 x 2 factorial design was used for the study. Total 03 Playing Positions were selected at two levels (Zones) i.e. East and South Zone.



7.1. Statistical Technique for Analysis of Data

To find out the significant difference between South and East Zone in relation to Arm Length and Leg Length(1), to find out the significant difference between different Playing positions in relation to Arm Length and Leg Length(2) and to find out the interaction effect between different Playing Position and Zones in relation to Arm Length and Leg Length(3), Two Way Analysis of Variance was Used at .05 level of Significance.

Table 1: Descriptive Statistics of South and East Footballers of Different Playing Positions in Relation to Arm Length

Playing Positions	Zones	Mean	Std. Deviation	N
Defenders	South Zone	74.3333	3.60135	12
	East Zone	74.5833	3.72847	12
	Total	74.4583	3.58717	24
Mid Fielders	South Zone	77.6667	7.36495	12
	East Zone	75.5000	7.52571	12
	Total	76.5833	7.36571	24
Attackers	South Zone	72.9167	2.81096	12
	East Zone	71.5833	2.67848	12
	Total	72.2500	2.77018	24
Total	South Zone	74.9722	5.26165	36
	East Zone	73.8889	5.22509	36
	Total	74.4306	5.23484	72

Table 2: Two Way Analysis of Variance for the Comparison of Arm Length among Columns (Different Playing Positions) and Rows (South and East Zones) and their Interaction

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	264.569[a]	5	52.914	2.077	.079
Intercept	398873.347	1	398873.347	1.566E4	.000
Playing Positions	225.361	2	112.681	4.424	.016
Zones	21.125	1	21.125	.829	.366
Playing Positions * Zones	18.083	2	9.042	.355	.703
Error	1681.083	66	25.471		
Total	400819.000	72			
Corrected Total	1945.653	71			
a. R Squared = .136 (Adjusted R Squared = .071)					

*Significant at .05 level

F-Value required to be significant at 2, 66 df = 3.135 & 1, 66 df = 3.986

Table 8 revealed that insignificant difference was found among different playing positions in arm length since calculated f value of 4.424 was found higher than the required value of 3.135 at 2, 66 df.

Table 8 further revealed that insignificant difference was found between South and East zone footballers since calculated f value of .829 was found lower than the required value of 3.986 at 1, 66 df.

Insignificant interaction was found between columns (different playing positions) and rows (South and east Zone Footballers) since calculated f value of .355 was found lower than the required value of 3.135 at 2,66 df.

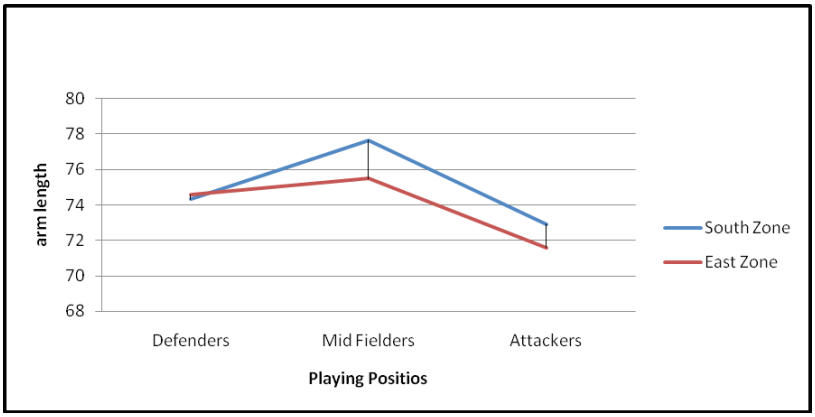


Fig. 1: Graphical Representation of Arm Length Between Regions, Playing Positions and Their Interaction of Footballers

Table 3: Descriptive Statistics of South and East Footballers of Different Playing Positions in Relation to Leg Length

Playing Positions	Zones	Mean	Std. Deviation	N
Defenders	South Zone	90.0000	4.95434	12
	East Zone	79.4167	6.40253	12
	Total	84.7083	7.78225	24
Mid Fielders	South Zone	92.1667	3.56328	12
	East Zone	86.8333	3.61395	12
	Total	89.5000	4.44287	24
Attackers	South Zone	89.9167	4.14418	12
	East Zone	90.5833	3.98767	12
	Total	90.2500	3.99184	24
Total	South Zone	90.6944	4.26828	36
	East Zone	85.6111	6.64305	36
	Total	88.1528	6.10624	**72**

Table 4: Two Way Analysis of Variance for the Comparison of Leg Length among Columns (Different Playing Positions) and Rows (South and East Zones) and their Interaction

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	1279.236[a]	5	255.847	12.343	.000
Intercept	559505.681	1	559505.681	2.699E4	.000
Playing Positions	433.861	2	216.931	10.465	.000
Zones	465.125	1	465.125	22.439	.000
Playing Positions * Zones	380.250	2	190.125	9.172	.000
Error	1368.083	66	20.729		
Total	562153.000	72			
Corrected Total	2647.319	71			
a. R Squared = .483 (Adjusted R Squared = .444)					

*Significant at .05 level

F-Value required to be significant at 2, 66 df = 3.135 & 1, 66 df = 3.986

Table 6 revealed that insignificant difference was found among different playing positions in leg length since calculated f value of 10.465 was found higher than the required value of 3.135 at 2, 66 df.

Table 6 further revealed that insignificant difference was found between South and East zone footballers since calculated f value of 22.439 was found higher than the required value of 3.986 at 1, 66 df.

Insignificant interaction was found between columns (different playing positions) and rows (South and east Zone Footballers) since calculated f value of 9.172 was found higher than the required value of 3.135 at 2,66 df.

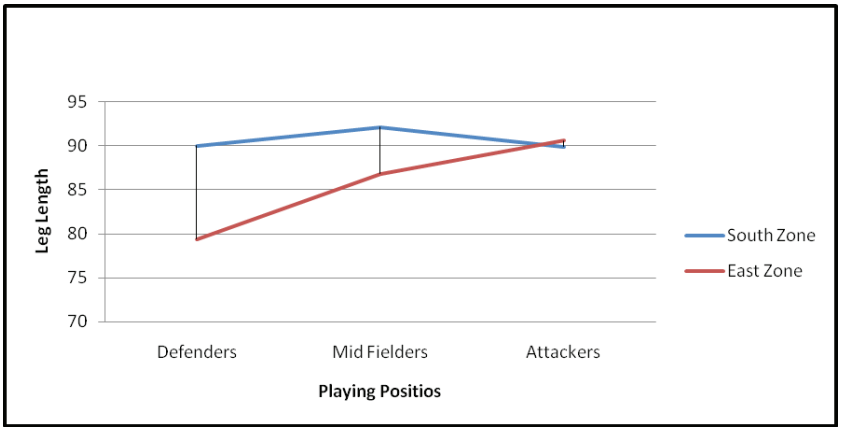


Fig. 2 Graphical Representation of Leg Length Between Regions, Playing Positions and Their Interaction of Footballers

6. CONCLUSION

1. Insignificant (F= 10.465, P>.05) difference was found among different playing positions in leg length.
2. Insignificant (F= 22.439, P>.05) difference was found between South and East zone footballers in relation of leg length.
3. Insignificant (F= 9.172, P>.05) interaction was found between columns (different playing positions) and rows (South and East Zone Footballers) in relation to leg length.
4. Insignificant (F= 4.424, P>.05) difference was found among different playing positions in arm length.
5. Insignificant (F= .829, P>.05) difference was found between South and East zone footballers in relation to arm length.
6. Insignificant (F= .355, P>.05) interaction was found between columns (different playing positions) and rows (South and East Zone Footballers) in relation to arm length.

9. DISCUSSIONS

The conclusion on the study was that, insignificant differences were shown between different regions and playing positions of footballers. Also, insignificant interactional effect was found of regions and playing position on limb lengths i.e. legs length and arms length of footballers. This may be due to the fact that the limb lengths were genetic factor.

The nature and nurture system of the footballers of different regions that hardly gave much important to the development of the leg and limb lengths from the very young age could also be another factor that leads to the insignificant difference among footballers.

Footballer's training if at all introduced in India followed whole method for all types of footballers in the selected regions, this could also be one important factor that leads to insignificant difference between different regions and playing positions of footballers.

Another important factor may be the total neglect of proper grassroot developmental program in football that could be responsible for insignificant differences in the outcome of the study.

Insignificant differences in the result may also be due to lack of knowledge and exposure to scientific testing method adopted for the study.

REFERENCES

Mielke, D. (2003), *Soccer Fundamentals.* New York: Human Kinetics Publishers Inc.
Pearson, A. (2001), *Speed Agility & Quickness in Soccer,* London: SAQ International Ltd.
Reilly, T. and Korkusuz, F. (2009), *Science and Football VI,* London & New York: Routledge, Taylor & Francis Group Publication.
Ziegler, E.F. (1970), *Physical Education and Sports: An Introduction,* Philadelphia: Lea and Febiger.
Knudson, D.V. and Morrison, C.S. (2008), *Qualitative Analysis of Human Movement,* U.S.A. Human Kinetics Publication.
Verma, J.P. (2000), *A Text Book on Sports Statistics*, Gwalior: Venus Publication.

Dr. Rajeev Choudhary

Professor, School of Studies in Physical Education
Pt. RavishankarShukla University, Raipur, CG

Lamlun Buhril

Assistant Professor, SAI, LNCPE, Trivandrum, Kerala

INTERNATIONAL JOURNAL OF PHYSICAL EDUCATION AND APPLIED EXERCISE SCIENCES
ISSN: 2394-9953
VOLUME 3, NUMBER 1, JANUARY 2017

INTERNATIONAL JOURNAL OF PHYSICAL EDUCATION AND APPLIED EXERCISE SCIENCES

Effect of *Surya Namaskara* on Selected Physiological Parameters of College Male Kabaddi Players

Swati Choudhary[1], Vijay Chaudhary[2] and GyanPrakash Arjeria[3]

[1]*Research Scholar, Department of Physical Education, Punjab University, Chandigarh*
[2]*Asst. Professor, Govt. PG College, Jalesar, UP*
[3]*Asst. Prodessor, M.D. Institute of Physical Education, Bundelkhand University*
E-mail: [1]swatic046@gmail.com

Abstract

The purpose of the present study was to investigate the effect of Surya-namaskara on selected physiological parameters of college male Kabaddi players. To achieve the purpose of the study thirty male Kabaddi players were selected from Govt. PG College, Jalesar, UP. The subject's age ranges from 17 to 22 years. The selected players were divided into two equal groups consist of 15 men Kabaddi players each namely experimental group and control group. The experimental group underwent *Surya-namaskara* practices for eight weeks. The control group was not taking part in any training during the course of the study. Pretest was taken before the exercise period and post test was measured immediately after the eight weeks exercise period. Statistical technique 't' ratio was used to analyze the means of the pretest and the post test data of experimental group and control group. The result revealed that there was a significant difference found on the criterion parameters. The difference found is due to *Surya-namaskara* given to the experimental group on resting heart rate and breathe holding time when compare to control group.

Keywords

Surya namaskara, Resting Heart Rate and Breathe Holding Time

1. INTRODUCTION

Kabaddi is primarily an Indian game, not much is known about the origin of this game. There is, however, concrete evidence, that the game is 4,000 years old. It is a team sport, which requires both skill & power, and combines the characteristics of wrestling and rugby. It was originally meant to develop self-defense, in addition to responses to attack and reflexes of counter attack by individuals and by groups or teams. It is a rather simple and inexpensive game, and neither requires a massive playing area, nor any expensive equipment. This explains the popularity of the game in rural India. Kabaddi is played all over Asia with minor variations. Kabaddi is known by various names viz. Chedugudu or Hu-Tu-Tu in southern parts of India, Hadudu (Men) and Chu it-Kit (women) in eastern India, and Kabaddi in northern India. The sport is also popular in Nepal, Bangladesh, Sri Lanka, Japan and Pakistan.

Human life focuses on physical, mental, social and spiritual aspects. Human health is divided into physical mental and social dimension. The Sanskrit name Surya (sun) here refers to the sun and Namaskara means 'Salutations'. *Surya namaskara* has been handed down from the enlightened sages of the Vedic age. The sun symbolizes spiritual consciousness and, in ancient times, was worshipped on a daily basis. The basic translation of *Surya namaskara* is salutations to the sun. It is very ancient tradition which has been in existence since the Vedic period. The physical basis of practice links together twelve asana in dynamically perfomed in a series. The ideal time to practice

Surya namaskara is at sunrise, the most peaceful time of the day. Whenever possible practice in the open air, facing the rising sun. Sun set is also a good time to practice as it stimulates the digestive fire. Each cycle of *Surya namaskara* is sequence of certain *'asana'* perform along with *'pranayama'*. The sequence of *asana* is such that each *asana* is complimentary to the next. During *Surya namaskara*, muscles of the entire body experience stretch and pressure alternately and therefore it is said to give more benefits with less expenditure of time. Krishnan (1991) conducted a study on the effect of exercises and yogic exercises on physiological variables among school boys. In this study 90 students were selected from Thirumayam. Three groups were randomly selected of which one served as control group and other two served as experimental groups with *Bharathiyam* and *Yogasana* respectively. They were measured for selected physiological variables like pulse rate, breath holding time, cardiovascular efficiency and vital capacity before training as well as immediately after six weeks of training. The significance of the difference among the means of control group, *Bharathiyam* group and *Yogasana* group, pre test and post test were determined by 't' - ratio. Through analysis of covariance, Bharathiyam and yogic group significantly improved the pulse rate, breath holding time, cardiovascular efficiency and vital capacity. Rajakumar J. (2010), done a research on "The Impact of Yogic Practices and Physical Exercises on Selected Physical Variables among Inter-Collegiate Soccer Players". The study contains the following. The purpose of the study is to analyze the impact of yogic practices and physical exercises on selected physical variables among intercollegiate soccer players. The subjects of all the three groupswere tested using standardized tests and procedures on the selected physical variables before and after the training period to find out the training effects using the following test items: 50 meters. Run to measure speed, shuttle run to measure agility, sit and reach to measure flexibility. The yogic practice group showed significant improvement on flexibility. The physical exercises group showed significant improvement on speed, agility, then the other two groups after 12 weeks of training.

2. METHODOLOGY

Thirty (30) college level Kabaddi players aged between 17–22 years will randomly be selected from Govt. PG College, Jalesar, UP. The subjects were randomly divided in two equal groups of fifteen subject each, such as *Surya namaskara* (experimental group) and control group After the pre-test with physiological parameters Experiment Group underwent *Surya namaskara* practics whereas the Control group did not participate in any training program apart from their regular physical activity as per their curriculum. Experiment Group has gone under *Surya namaskara* practices three times a week except Sunday for duration of 8 weeks. Post-data was collected after 8 weeks of experimental period. The following criterion measures were chosen for testing hypothesis. Stethoscope was used for measuring resting heart rate of subjects and performance was recorded in beats/ Minutes, breath holding time was measured by using nose clip method unit of measurement in second. The following statistical procedure were used. The "t" ratio was calculated to find out the significance of difference between the mean of the initial and final test of the experimental group.

3. RESULTS

The significance of the difference among the means of experimental group was found bye pre-test. The data were analyzed and dependent 't' test was used with 0.05 levels as confidence.

Table 1: Analysis of 't' Ratio for the Pre and Post Test of Experimental and Control Group on Resting Heart Rate

Groups	Pre Mean	Post Mean	Difference	S.D.	SEM	t-Ratio
Experimental	33.66	34.86	1.21	1.51	0.38	3.05*
Control	33.21	32.72	0.46	1.67	.42	1.41

The Table 1 shows that the mean values of pretest and post test of control group on resting heart rate were 69.05 and 69.31 respectively. The obtained 't' ratio was 1.28, since the obtained 't' ratio was less than the required table value of 2.14 for the significant at 0.05 level with 14 degrees of freedom it was found to be statistically insignificant. The mean value of pretest and post-test of experimental group on resting heart-rate were 76.05 and 67.85 respectively. The obtained 't' ratio was 3.28* since the obtained 't' ratio was greater than the required table value of 2.14 for significance at 0.05 level with 14 degrees of freedom it was found to be statistically significant. The result of study showed that there was a significant difference between control group and experimental group in resting heart-rate. It may be concluding from the result of the study, experimental group improve in resting heart-rate due to 8 weeks of *Surya namaskara* practice.

Table 2: Analysis of 't' Ratio for the Pre and Post Test of Experimental and Control Group on Breath Holding Time

Groups	Pre Mean	Post Mean	Difference	S.D.	SEM	t-Ratio
Experimental	33.66	34.86	1.21	1.51	0.38	3.05*
Control	33.21	32.72	0.46	1.67	.42	1.41

The Table 2 shows that the mean values of pretest and post test of control group on breath holding time were 33.21 and 32.72 respectively. The obtained 't' ratio was 1.41, since the obtained 't' ratio was less than the required table value of 2.14 for the significant at 0.05 level with 14 degrees of freedom it was found to be statistically insignificant. The mean value of pretest and post-test of experimental group on breath holding time were 33.66 and 34.86 respectively. The obtained 't' ratio was 3.05* since the obtained 't' ratio was greater than the required table value of 2.14 for significance at 0.05 level with 14 degrees of freedom it was found to be statistically significant. The result of study showed that there was a significant difference between control group and experimental group in breath holding time. It may be conclude from the result of the study experimental group improve in breath holding time due to 8 weeks of *Surya namaskara* practice.

The graphical representation of adjusted post-group means of experimental groups and control group for fitness variables are presented in Fig. 1.

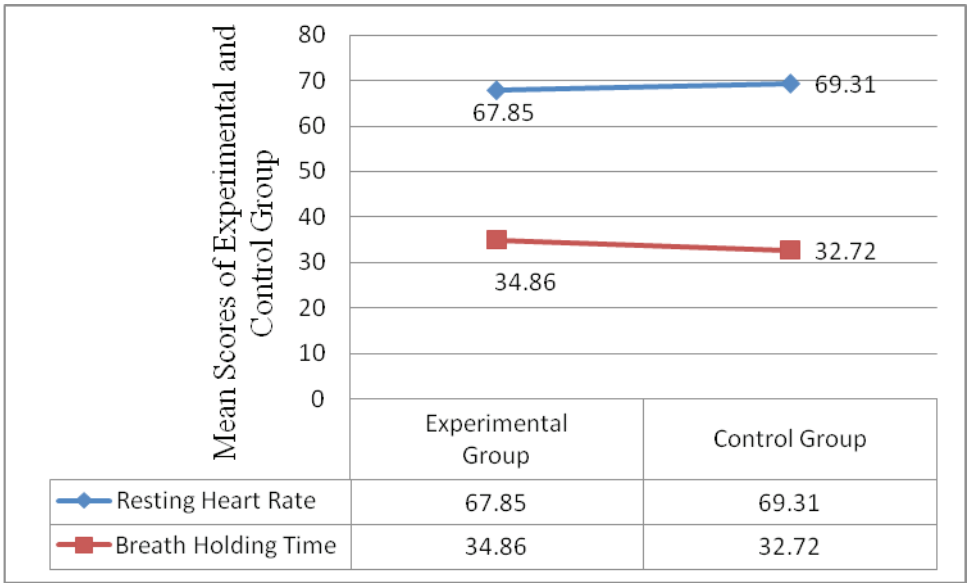


Fig. 1: Graphical Comparison of Post Mean on Resting Heart Rate and Breath Holding Time Between Experimental and Control Group

4. DISCUSSIONS ON FINDINGS

The result of the study indicates that the experimental group namely *Surya namaskara* practice group had significantly improved the selected dependent parameters namely resting heart-rate and breathe holding time, when compare to the control group. It is also found that the improvement caused by *Surya namaskara* practice when compare to the control group.

5. CONCLUSION

1. There was a significant difference between experimental and control group on physiological parameters after the *Surya namaskara* practice period.
2. There was a significant improvement in resting heart rate and breathe holding time. However the improvement was in favour of experimental group due to eight weeks of *Surya-namskara* practice.

REFERENCES

Choudhary, R. and KryzstofStec (2011), "The Effect of Dynamic *Surya namaskar* on Flexibility of University Students", Department of Physical Education BHU, Varanasi.

Halder, Shantanu and Saha, Gopal Chandra (2012), "The Effect of *Surya namaskara* on Resting HeartRate, Blood Pressure, Flexibility and Muscular Endurance of School Going Children", *Akash Journal,* Published By Akash Society, Noida, pp. 10–12.

Kristine, M. Fondran (1992), *The Effects of Surya namaskara Yoga Practice on Resting Heart Rate and Blood Pressure, Flexibility, Muscular Endurance and Perceived Well-being in Healthy Adults,* Clevel and University.

Bhutkar, Pratima M. *et al.* (2008), "Effect of Surya Namaskar Practice on Cardio Respiratory Fitness Parameters", *Al Ame en J. Med. Sci.,* Vol. 1(2), pp. 126–129.

Kumar, Sasi A. *et al.* (2011), "Effects of Surya Namaskar on Cardiovascular and Respiratory Parameters in School Students", *Recent Research in Science and Technology*, Vol. 3(10), pp. 19–24.

Shaver, Larry G. (1982), *Essential of Exercise Physiology,* Delhi: Surjeet Publication

Culos-Reed, S.N., Carlson, L.E., Daroux, L.M. and Hately-Aldous, S. (2005), "A Pilot Study of Yoga for Breast Cancer Survivors: Physical and Physiological Benefits", *Psycho-Oncology,* Epublished Ahead of Print on December, 23, 2005.

Kristine, Fondran M. (2008), *The Effect of Surya namaskara Yoga Practice on Resting Heart Rate and Blood Pressure, Flexibility, Upper Body Muscle Endurance and Perceived Well-being in Healthy Adults*, Unpublished Master's Thesis, Cleveland State University, 2008.

Sushil, Lega (2010), "Effects of Yoga Training on Cardio-respiratory Functions of School Children", *Journal of Physical Education and Yoga,* Vol. 01(01), pp. 22–32.

Lohan, Rajesh (2002), "Effect of Asanas and Pranayamas on Physical and Physiological Components of Boys Between Age Group 12–16 Years", *Journal of Adopted Physical Education and Yoga,* Vol. 7(2), pp. 47–55.

Ms. Swati Choudhary

Research Scholar, Department of Physical Education, Punjab University, Chandigarh

Dr. Vijay Chaudhary

Asst. Professor, Govt. PG College, Jalesar, U.P.

Mr. Gyan Prakash Arjeria

Teaching Assistant, M.D. Institute of Physical Education, Bundelkhand University, U.P.

International Journal of Physical Education and Applied Exercise Sciences

COPYRIGHT TRANSFER STATEMENT

The copyright to this article is transferred to the International Journal of Physical Education and Applied Exercise Sciences (IJPEAES) effective if and when the article is accepted for publication. The copyright transfer coves the exclusive right to reproduce and distribute the article, including reprints, translations, photographic reproduction, microform, electronic form (off-line, on-line) or any other reproductions of similar nature. The author warrants that this contribution is original and that he/she has full power to make this grant. The author sings for and accepts responsibility for releasing this material on behalf of any and all co-authors.

Manuscript Entitled.....

.....

1. Author Name.....

Postal Address:.....

.....

City.....State:.....PIN:.....

(M):.....Ph:.....Fax:.....

Email.....

Institutional Affiliation.....

.....

2. Author Name.....

Postal Address:.....

.....

City.....State:.....PIN:.....

(M):.....Ph:.....Fax:.....

Email..... .....

Institutional Affiliation.....

.....

3. Author Name.....

Postal Address:.....

.....

City.....State:.....PIN:.....

(M):.....Ph:.....Fax:.....

Email.....

Institutional Affiliation.....

.....

Corresponding Author.....

1. Author Name:_____	2. Author Name:_____	3. Author Name:_____
Signature:_____	Signature:_____	Signature:_____
Date:_____	Date:_____	Date:_____

International Journal of Physical Education and Applied Exercise Sciences

SUBSCRIPTION ORDER FORM

Dr. Biswajit Basumatary
Lakshmibai National Institute of Physical Education
NERC, Sonapur, Guwahati, Assam-782402 (INDIA)
Tel: +91 8811018526 (M)
Editorial Board: lnipeguwahati@gmail.com
Editor-in-Chief: satpalresearch@gmail.com

Contact Details

Address _____

_____

City _____Pin Code_____

State _____Country _____

Tel City Code _____ Tel Number _____

(M):_____

E-mail_____

Date:_____ Signature :_____

I wish to subscribe in 20..... to: 20.....

Subscription, Publishing and Authors Fees

The Submission and peer-review of manuscript are free of charge.

Institutional Subscription : 5000/- Indian Rupee(INR) per year.

Individual Subscription : 1000/- Indian Rupee(INR) per year.

For publishing, authors are requested to pay 1500/- Indian Rupee (INR) per year.

Payment Details

☐ I have attachment Cheque/Money Order (Payable to Dean, LNIPE, NERC, SONAPUR inc.)

Send to : IJPEAES inc. Lakshmibai National Institute of Physical Education, NERC,
Sonapur, Guwahati, Assam–782402 (INDIA)
Ph: +91 8811018526 (M):
E-mail: satpalresearch@gmail.com

*Payment is required in advance. Please pay in India Rupee (INR).