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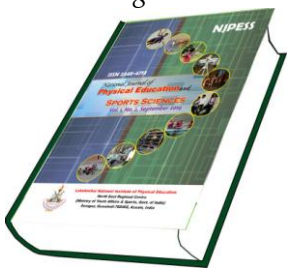

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Editorial

Epicenter Voyage of a Myth Institute-Lakshmibai National Institute of Physical Education
North East Regional Center

Lakshmibai National Institute of Physical Education, NERCis amongst the most admired centers of world-class education to foster academic excellence, physical fitness and research in sports committed to helping scholars, researchers and sports scientist leap into the 21st century. The present endeavor is a tribute to the holy symbol of Lakshmibai National Institute of Physical Education, NERC as the same was long precious aspiration. The journal shall symbolically signify the essence of quality research thereby appropriate in the ambition of the institute. The journal shall offer a much desired platform to publish quality research being undertaken in the whole world on the area in question. The journal shall bring the academicians and researchers from all over the globe to share their accumulated experiences and perceptions in order to realize new scientific and original innovation focused on aspects of the sports sciences and sports performance.

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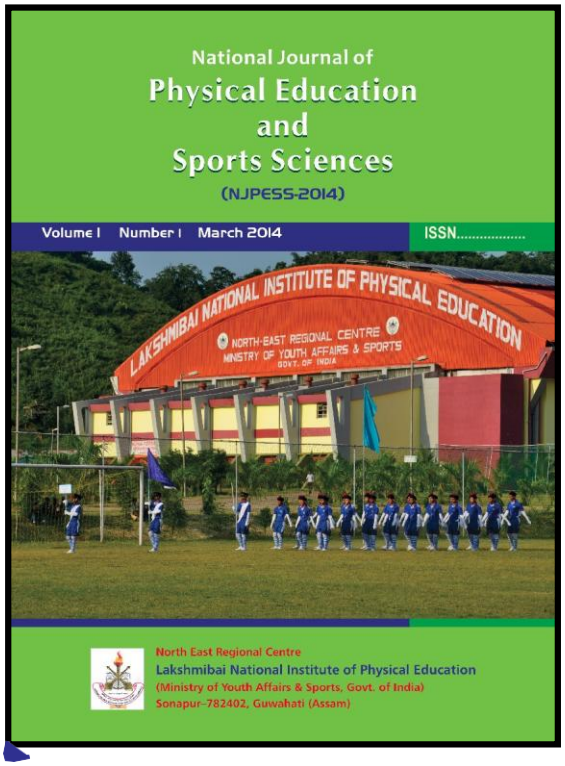

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Contents

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Relationship between Speed Variations and Selected Kinematic Variables of Pace Bowlers in Cricket: A Pilot Study

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Abstract
The purpose of the study was to find out the relationship of pace variations deliveries on kinematic factors associated with fast bowling technique in cricket. In this study four (04) injury free right handed slow medium pace bowlers age ranges from 16-19 years were selected who represented under- 19 cricket tournaments for Ghazipur, UP. The bowlers were instructed to bowl varied pace deliveries in a very fast, normal and slower ball category. To establish the relationship among the selected variables Pearson's product-moment correlation coefficients (r)and graph was used. The result of the study reveals that significant relationships were found between variations of ball release velocity and shoulder angle and trunk lateral flexion. It was concluded that using varied pace during fast bowling may change the kinematic factors which is directly associated with bowling technique.
Keywords: *Kinematic, Cricket, Fast Bowling, Speed Variations*

INTRODUCTION

Pace variations deliveries in cricket is foremost facilitator to fast bowling success, with in a fraction of time the batter has to judge the variations of the delivered ball and make picks regarding which shot to play against the delivery. The bowler delivers the ball to the striking batsman in a neck to neck battle between the two individual players, if the batsman attacks the ball then he is able to run while the fielding side attempt to catch, run out or stump him out. It is widely agreed that in pace bowling there are three classes of bowling delivery: (i) fast bowling, (ii) medium paced or swing bowling and (iii) slow bowling, where a fast bowler normally delivers the ball at a speed between 80 mph and 94 mph and delivers a slow ball between 60 mph and 75 mph. Similarly a medium pace bowler delivery a ball at speed is between 60 mph and 80 mph with two slow ball variations occurring around 50 mph and between 60 mph and 70 mph, (L.M. Justham, A.A. West & A.E.J. Cork, 2007). Numerous investigations on fast bowling have try to find to identify the aspects of fast bowling technique that are linked to ball release speed, in an attempt to understand how certain bowlers are able to release the ball at faster speeds than others. The research presented in this paper is an extension to the above mentioned investigations and is focused on the interactions between the various aspects of technique that have been associated with pace variations deliveries speed and their application to the coaching and performance of fast bowling. Hence the purpose of the study was find out the relationship of pace variations deliveries on kinematic factors associated with fast bowling technique in cricket.

METHODOLOGY

Sources of Data

For the purpose of the study four (04) male aged (18.6±1.14) junior pace bowlers of Uttar Pradesh were the subject of this pilot study. The subjects were selected from Ghazipur, Uttar Pradesh Cricket clubs at random who at least played for state level.

Experimental Protocol

Prior to the collection of the data, Bowlers were go for personal warm-up and bowling over the wicket and were instructed to aim to hit a target area shown in Fig. 1 as viewed from the bowler's end. Each participant was bowled six consecutive deliveries (an over). Within the over, participants were bowled three deliveries at their 'normal' match pace, while two deliveries were bowled at 'very fast' pace, that is; the bowler's fastest possible delivery speed, and the other a 'slower' delivery. The delivery order will be randomly allocated.

DATA COLLECTION

Filming Procedures

Three Digital HD video cameras, mounted on tripods, filmed each bowler during the bowling spells. The cameras was positioned in such a place from where the locus of movement of the major joint markings on the body were central to the video graphic plane of all cameras, and such that at least two cameras may track these land marks throughout the delivery stride. The experimental configuration is shown in Fig. 1.

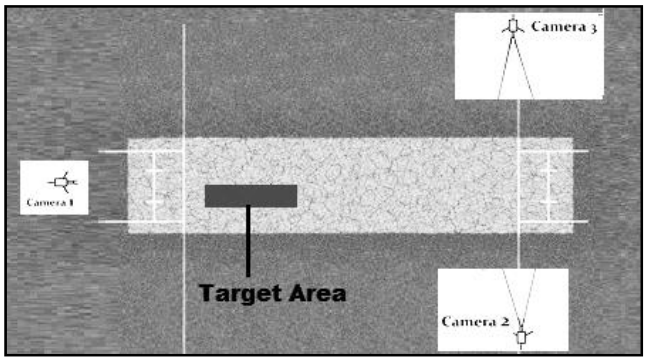

Fig. 1

The balls of each bowler's during their spell which were delivered at the target area (Figure 1), was recorded on film for analyses (Burnett, A., Elliott, B. and Marshall, R. 1995). The videos and photos was digitized and the velocity of ball release and approach run of each delivery were analyzed by using the Kenovea- 8.25 version software.

The following kinematic variables were selected for the purpose of the study.

Kinematic Variables

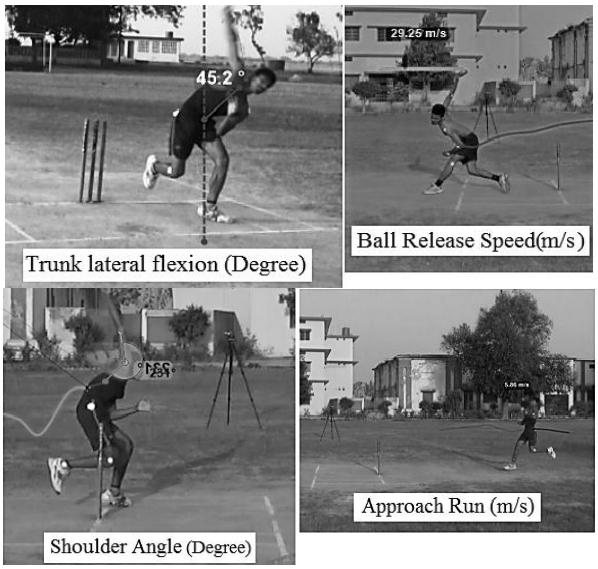

Fig. 2

Analytical Procedure to be Used

In order to test the homogeneity of the subject's descriptive statistics was applied, Pearson's product moment correlations was calculated and used to identify associations between each dependent variable and ball velocity within each of the three velocity categories. For testing hypothesis the level of significance will be set at 0.05.

Table 1: Descriptive Statistics of the Variations of Bowling Speed Categories and the Kinematic Factors Associated with Fast Bowling Technique

	Fastest Ball				Normal Delivery				Slower Delivery			
	BRS (m/s)	RS (m/s)	TLF (°)	SA (º)	BRS (m/s)	RS (m/s)	TLF (°)	SA (º)	BRS (m/s)	RS (m/s)	TLF (°)	SA (º)
Mean	27.83	6.14	31.41	238.11	26.06	6.19	31.80	229	23.37	6.28	30.07	224.5
S.E	0.64	0.11	3.08	4.62	0.56	0.12	2.69	2.41	1.70	0.06	3.73	4.87
S D	1.94	0.35	9.24	13.87	1.88	0.40	8.94	8	3.40	0.13	7.47	9.74
Range	4.75	1.07	26	43	5.16	1.41	25.9	32	8	0.29	18.2	22
Min	24.5	5.39	20.1	210	23.5	5.56	19.3	214	18.75	6.16	21.6	211
Max	29.25	6.46	46.1	253	28.66	6.97	45.2	246	26.75	6.45	39.8	233

BRS- Ball Release Speed; RS-Run-up Speed; TLF-Trunk Lateral Flexion; Shoulder Angle

RESULTS AND DISCUSSION

Table 1 reveals the descriptive statistics of the three categories of bowling deliveries where the mean value of the fastest deliveries (n= 04; 27.83 ms-1 ± 1.94) and the normal deliveries (n=04; 26.06 ms-1 ± 1.88) and the slower deliveries (n= 04; 23.37 ms-1 ± 3.40) the table also shows the mean, standard error of mean, standard deviation, range minimum and maximum scores of the kinematic factors namely bowling speed, run-up speed, trunk lateral flexion and shoulder angle.

Table 2: Pearson's Correlation Coefficient (R) for Ball Velocity Category and Kinematic Factors Associated with Fast Bowling Technique

Sl. No.	Variables	Fastest Delivery	Normal Delivery	Slower Delivery
1	Run-up Speed (m/s)	0.626*	0.017	0.269
2	Trunk Lateral Flexion (Degree)	-0.651*	-0.835*	-0.963*
3	Shoulder Angle (Degree)	0.884*	0.516	-0.394

*Significant at 0.05 level (1-tailed)

The Table 2 shows the Pearson's correlation coefficient (r) for ball velocity category and kinematic factors associated with fast bowling technique where significantly positive relationship were found between run-up speed (0.626) and ball release speed of fastest delivery, however highly significant negative relationships were found among Trunk lateral flexion and ball release speed of the fastest deliveries (-0.651), normal deliveries (-0.835) and slower deliveries (-0.963).Shoulder angle was found significantly higher positive relationship with the ball release speed of fastest delivery category.

DISCUSSION

The results of this study, shows that the ball release velocity of the fastest delivery category have a significant relationship with run-up speed and this may be because of the bowlers who delivers the ball with a fastest speed with a quicker run-up have a greater amount of linear momentum that can potentially be converted into ball speed. The findings is with the agreement of the findings of Peter J. Worthington, Mark A. King, Craig A. Ranson, (2013); Glazier PS, Paradisis GP, Cooper SM, (2000) and Elliott BC, Foster DH., (1989).

However an increased trunk lateral flexion trend was noted with varying levels of ball release velocity. It was found that bowlers use trunk flexion laterally during ball release where significantly high negative correlation with all the three categories of deliveries namely fastest delivery, normal delivery, slower delivery. The result of this study is corroborated with the finding of Kane Middleton, Poonam Chauhan, Bruce Elliott and Jacqueline Alderson (2015) the observations may be due to bowlers who 'fell away' less were able to bowl at higher ball release velocities. This finding is in opposition to the results of Salter et al.(2007) where the result shows an in-significant negative relationship between ball release velocity and ball release height ($r = -0.283$) and stated that ball release height is predominantly the summation of knee flexion, trunk flexion and upper arm abduction angle. Therefore arm abduction angle may have been a contributing factor to this negative relationship as it has been previously shown that lower arm abduction angles are significantly associated with ball release speed (Hanley *et al*., 2005).It was found in the current study that slower delivery speeds increased lateral flexion and the findings are associated with the result of (Sachlikidis & Salter, 2007; van den Tillaar & Ettema, 2009).

In the present study shoulder angle at front foot contact shows a higher significant relationship with the ball release velocity of the fastest delivery category and was with the similar findings of Peter J. Worthington, Mark A. King, and Craig A. Ranson, (2013) where they stated that the fastest delivery bowlers had their arm further back relative to their upper trunk as they released the ball. Although it might be expected that having the arm further forward would contribute more to ball speed, the fact that the arm is further back indicates the position the fastest bowlers adopt at ball release as a consequence of their technique during the delivery stride. They also stated that delaying the onset of arm circumduction (larger shoulder angle at FFC) enables bowlers to release the ball at faster speeds. A larger shoulder angle at front foot gives a larger range of motion at the shoulder over which to generate ball speed and may also allow greater torques to be exerted about the shoulder. This trend for the fastest bowlers to delay the motion of their bowling arm was previously reported by, Tyson F. (1976). Previously Burden. AM. (1990); Burden AM, Bartlett RM, (1989); Elliott BC, Foster D, Gray S., (1986); reported a trend for quicker bowlers to release the ball with the arm "further out in front of the line of the trunk. The results of the present study appear to contradict these observations and supported with the observations of Peter J. Worthington, *et al*., (2013) where it was established that bowlers use trunk lateral flexion to generate ball speed. As the bowlers of the present study generated bowling arm speed using predominantly their shoulder muscles, it is unlikely their arm would be behind the line of the upper trunk at ball release.

CONCLUSION

Within the limitation of the study it may be concluded that in order to make variations in fast bowling by changing the pace into fastest delivery a bowlers should have a quicker run-up, have larger amounts of trunk lateral flexion up to ball release and appear to delay the onset of arm circumduction by having larger shoulder angle.

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Effect of Intensive Interval Sports Training on Blood Pressure

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Abstract

Aim of sports training is diversified its aim is not only to achieve an Olympic gold or to enhance sports performance. But people around the globe are getting more conscious towards health. Health depends upon many factors it can be physiological, psychological and can be environmental conditions. Health is a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity (WHO). Present study tries to find the effect of sports training (intensive interval training) on blood pressure. Fifty five (N=50) healthy male students of Lovely Professional University, Phagwara, Punjab were selected for the study. Only those students were selected who had qualified the physical efficiency test. To measure blood pressure assistance of employee of department of Pharmacy was taken. The collected data was analyzed statistically by using t-test. For testing the hypotheses, the level of significance was set at 0.05 level. After twelve weeks of intensive interval training statistical significant difference was found in the systolic blood pressure whereas there was difference in the mean in diastolic blood pressure but no statistical difference was found. So it can be concluded that intensive interval training is an effective method to stabilise blood pressure.

INTRODUCTION

One size does not fit all. For this reason, the people at Healthcare of Today are working to create a new model of customized care that can meet family's needs and surpass ones expectations. By providing healthcare today, many of the families can enjoy many tomorrows. Healthcare continues to pose a major challenge for developing countries. The successes of individual health programmes remain overshadowed by the problems these nations face in the 21st century. UN Millennium Development Goals (MDGs) recognise, health is inextricably linked with development—a failing economy cannot provide adequate healthcare, and a sick population, unable to work productively, cannot boost the economy.

Developing nations have always had to contend with infectious diseases. HIV/ AIDS, malaria and tuberculosis continue to ravage vast areas of Africa, Asia and Latin America. Additionally, newer deadly threats, such as SARS and bird flu, are emerging. An increasingly globalised world makes it harder than ever to contain these diseases, and collaboration between countries in research, monitoring and surveillance is crucial.

Some countries—Brazil and India—for example, are becoming more developed, and better able to deal with infectious diseases. But richer developing countries also have to contend with growing rates of chronic, non-communicable diseases, such as heart disease, blood pressure, diabetes and cancer.

Tackling both infectious and non-infectious disease requires a robust health system, which many poor countries lack. Healthcare systems need adequate and sustained government funding, skilled workers, and sometimes, technical knowledge and assistance from more developed countries. Local knowledge and customs, traditional healers and techniques, can also play a large part in dealing with diseases.

Scientific research has an integral role in healthcare. Developing countries need to build the capacity to develop research agendas and tailor them to their nation's needs. Only about ten per cent of the world's resources for health research are used to tackle the health problems of the world's poor, accounting for about 90 per cent of global disease. Also, many countries need better-defined research ethics guidelines to determine how trials can be undertaken without exploiting local populations.

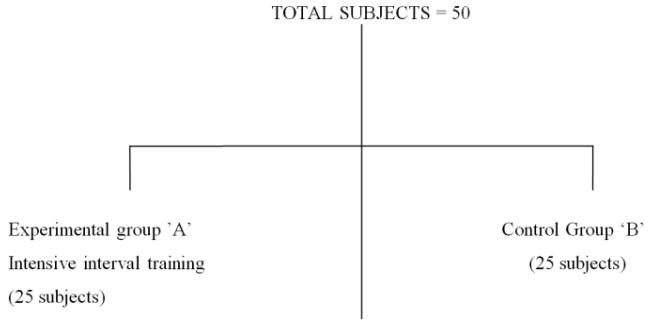
By providing up-to-date and accurate information about healthcare issues we seek to help developing countries use scientific knowledge and understanding for the improvement of their population's health, and thus their development and well being.

METHODS AND PROCEDURES

The present investigation is an experimental type of research. The random group design was adopted for this study. Participants were systematically assigned to experimental and control groups after the selection.

Fifty (N=50) healthy male students of Lovely Professional University, Phagwara, Punjab were selected for the present study. Only those students were selected who had qualified the physical efficiency test.

Fifty athletes who have given their consent to act as the subject for the present study were randomly selected after the clearance of physical and medical fitness test. Then subjects were randomly divided into two groups of twenty five each. One group served as the experimental group that participated in the intensive while another served as the control group. Group A (N=25) for intensive interval training, Group B (N=25) for control group. Group A was given twelve weeks training for three sessions per week during evening hours from 4.30pm to 6.30pm, whereas the control group has taken part in their daily routine activities. Sunday remained as the rest day for all the groups. Subjects were trained for two weeks to make them familiarized with the testing procedures and the task ahead, which was to be given to the subjects for the next twelve weeks. A copy of twelve weeks training schedule was also given during the familiarization of the testing procedures. Training was given under the guidance and supervision of the experts and the medical representative of the institute.



One independent variable (intensive interval training) and one dependent variable (blood pressure) was selected for the study.

To measure blood pressure assistance of employee of department of Pharmacy was taken. Training programme was based on the interval training principles. All the fifty subjects attended their regular theory and practical classes according to the curriculum, except the training sessions. Subjects were given treatments thrice a week between 4.30 pm to 6.30pm.

Intensity was calculated by taking out maximum and by calculating training heart rate. Formulas by which intensity of the subjects were calculated is given as under:

For example 60–80 percent intensity of an athlete is to be calculated, by using Karvonen formula.

Target Heart Rate= ((maximum heart rate–resting heart rate) x % intensity) + resting heart rate, maximum heart rate can be taken as 220.

Table 1

Method	Intensity	Recovery
A Intensive	80%–90%	90sec–180sec

Table 2 Twelve weeks Intensive interval training schedule which was followed by intensive interval group.

Table 2

Weeks	Tuesday	Thursday	Saturday	Sunday
1.	40 mtrs x 3 rep 50mtrs x 4 rep 60mtrs x 5 rep	10mtrs shuttle run x 4 sets 20 mtrszig-zag x 5sets	6 repetitive horizontal jumps + 10 mtrs high knee, 6 sets	Rest
2.	Sit-ups 10 rep. x 3sets Plank 1min. x 3 sets	Bend and reach 30sec hold 3rep. 3 Low hurdles 40mtrs x 3rep. 40mtrs dash x 3 rep.	400mtrs x 3 rep. 800mtrs x 1rep.	Rest
3.	Sprinting ABC 7 exercises. 6 rep.	Boomerang run 3 rep. Jump and turn + 10mtrs dash 8rep.	Half squats 12 x 5 rep. Burpee jumps 10 rep. x 4 sets	Rest
4.	Lateral plank 1min hold x 5sets Trunk flexion in supine position 8 rep. x 4 sets.	Bridge ex's 3 times. 3kg med. Ball throw 10 rep. Active flexibility 15 mins.	Acceleration runs in 400mtrs track x 5 rep.	Rest
5.	50mtrs x 6 rep. 60mtrs x 4 rep. 80mtrs x 2 rep.	Cross-over-striding for 20mtrs x 3 rep. 15 mtrs shuttle run x 3sets Jump and turn followed by 20mtrs dash x 6 rep.	Jumping jack 5mins x 6 sets.	Rest
6.	Heel raise 60 sec. x 6rep. Skipping 5 mins. X 3 rep. Crunches 10 x 4 rep.	Passive flexibility 10 mins. 100 mtrs. x 4 rep. 80 mtrs. X 3 rep.	40 stairs up-down 4sets. Pace runs 200mtrs. X 6 rep.	Rest
7.	20 mtrs striding 6 sets. 8sec. High Knee action x 20mtrs dash x 3 rep. 50mtrs dash x 5rep.	5 Low hurdles 50 mtrs. 5 rep. Sideways run 10mtrs left and right x 5 rep.	Full squat with 20Kg wt. x 5rep. x 5 sets. 3 Frog jumps x 30mtrs dash 5 sets 20 mtrs dash x 3 sets	Rest
8.	Inclined sit-ups 8 x 3 sets Chakras asanas 1min hold 3 sets Heel raise 60 secs hold x 3sets	Side touch while running 50mtrs x 4sets. 60mtrs x 3rep. 50mtrs x 2rep. 40 mtrs x 1rep.	150mtrs x 3 rep. 120mtrs x 3 rep. 400mtrs x 1 rep.	Rest

Weeks	Tuesday	Thursday	Saturday	Sunday
9.	Bench press 10 rep x 3 sets. Leg press 10 rep x 3 sets. Leg extension 10 rep. x 3 sets	Shuttle run 10mtrs x 4rep. Boomerang 4 rep. 800mtrs jog.	Tyring 50mtrs x 6 rep. Simple bounding and 10mtrs dash x 6 rep. Striding 50mtrs x 6rep.	Rest
10.	Circuit training 10 stations x 3 sets	Sand running x 50mtrs dash x 6 rep. 10 repetitive horizontal sand jumps + 10mtrs dash x 3sets.	800mtrs x 3 rep. 1000mtrs x 1 rep.	Rest
11.	Sprinting ABC 10mtrs + 10mtrs dash x 5sets.	Lateral running 20mtrs. 200mtrs hill running x 6 rep.	Plyometrics session	Rest
12.	Olympic lift 6 sets	Weight circuit training 10 stations x 3sets	220mtrs x 3 110 mtrs x 3 55mtrs x 3	Rest

Fig. 1: Illustrating Circuit Training

Warm Up and Cool Down: Proper warm up was done prior to the practice session followed by the work out and after the session proper cool down session was held.

STATISTICAL DESIGN

The collected data was analyzed statistically by using t-test. For testing the hypotheses, the level of significance was set at 0.05 level.

Analysis of data was done by using Microsoft Office Excel Sheet.

RESULTS

Table 3: Significance of Difference between Pre-test and Post-test Mean Scores of Intensive Interval and Control Group on the Variable of Systolic Blood Pressure

Groups		Mean	SD	DM	SEDM	t-value
Intensive interval	Pre-test	125.80	7.86	5.00	2.07	2.42*
	Post-test	120.80	6.72			
Control	Pre-test	124.40	6.51	0.80	1.87	0.43
	Post-test	123.60	6.70			

* significant at.05 level. t> 2.06 (df=24) N=25

Table 3 presents results regarding Intensive interval, Control group on the variable of systolic blood pressure. The pre-test mean score of Intensive interval group was 125.80 whereas post-test mean score was recorded as 120.80 with mean difference of 5.00. The pre-test and post-test SD values were 7.86 and 6.72 respectively whereas SEDM value of Intensive interval group was found 2.07. The t-value 2.42 was found to be statistically significant as obtained t-value was found greater than the tabulated value 2.06 required to be significant at 0.05 level of confidence with degree of freedom=24.

The pre-test mean score of Control group was 124.40. However, post-test mean score was recorded as 123.60 with mean difference of 0.80. The pre-test and post-test SD values were 6.51 and 6.70 respectively whereas SEDM value of Control group was found 1.87. The t-value 0.43 was not found to be statistically significant as obtained t-value was found lesser than the tabulated value 2.06 required to be significant at 0.05 level of confidence with degree of freedom=24.

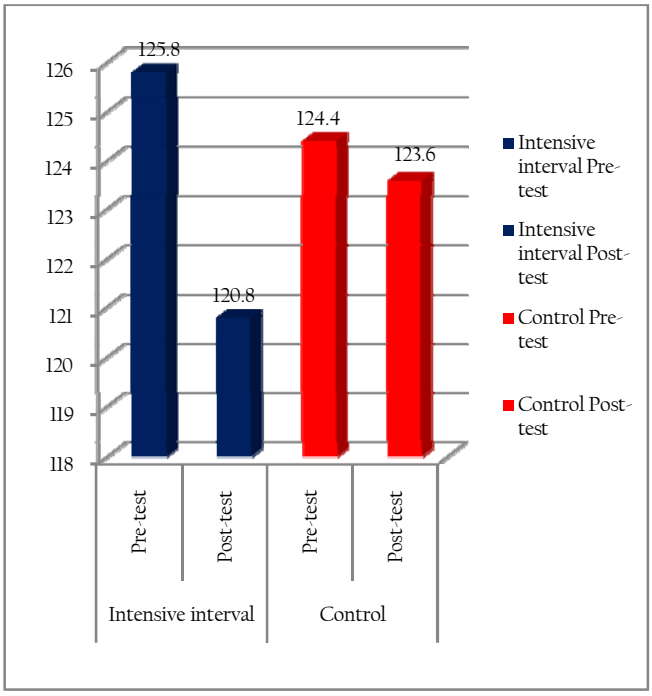


Fig. 2

Figure 2 represents the comparison of pre-test and post-test means of two groups with regard to the variable of Systolic blood pressure.

DISCUSSIONS

It is evident from the obtained t-value of 2.42 that there exists statistically significant difference between pre-test and post-test mean scores of Intensive interval training group on systolic blood pressure. The results revealed that Intensive interval training has significant effect on systolic blood pressure of male subjects. The t-value of Control

group was found 0.43 which shows insignificant results thereby indicating that control group has not shown any improvement in their systolic blood pressure.

The findings of the present study were supported by Lalande Sophie and OkazakKazunobu (2010) who have examined the effects of 3-month interval walking programme on peak aerobic capacity, blood pressure, blood lipids, and glucose concentration. Pre-test and post-test measurements were taken, and they concluded that very modest amounts of aerobic exercise involving brief periods of interspersed higher intensity exercise can significantly increase peak aerobic capacity and reduce resting systolic blood pressure. Another study done by DorthStensvold et al. (2010) analysed metabolic syndrome i.e. obesity, elevated blood pressure, high fasting glucose and triglyceride levels, and low HDL levels and concluded that all three training regimes have beneficial effects on physiological abnormalities associated with metabolic syndrome. Patricia et al. (2008) have also studied effects of a 12-week twice weekly additional exercise training comprised a combination of circuit-based resistance training and aerobic exercises. They concluded that exercise training significantly improved systolic blood pressure in experimental group.

Table 4: Significance of Difference between Pre-test and Post-test Mean Scores of Intensive Interval and Control Group on the Variable of Diastolic Blood Pressure

Groups		Mean	SD	DM	SEDM	t-value
Intensive interval	Pre-test	87.20	8.05	3.00	2.14	1.40
	Post-test	84.20	7.02			
Control	Pre-test	86.44	8.40	1.24	2.28	0.54
	Post-test	85.20	7.70			

* significant at.05 level. t> 2.06 (df=24) N=25

Table 4 presents results regarding Intensive interval and Control group on the variable of diastolic blood pressure. The pre-test mean score of Intensive interval group was 87.20 whereas post-test mean score was recorded as 84.20 with mean difference of 3.00. The pre-test and post-test SD values were 8.05 and 7.02 respectively whereas SEDM value of Intensive interval group was found 2.14. The t-value 1.40 was not found to be statistically significant as obtained t-value was found smaller than the tabulated value 2.06 required to be significant at 0.05 level of confidence with degree of freedom=24.

The pre-test mean score of Control group was 86.44. However, post-test mean score was recorded as 85.20 with mean difference of 1.24. The pre-test and post-test SD values were 8.40 and 7.70 respectively whereas SEDM value of Control group was found 2.28. The t-value 0.54 was not found to be statistically significant as obtained t-value was found smaller than the tabulated value 2.06 required to be significant at 0.05 level of confidence with degree of freedom=24.

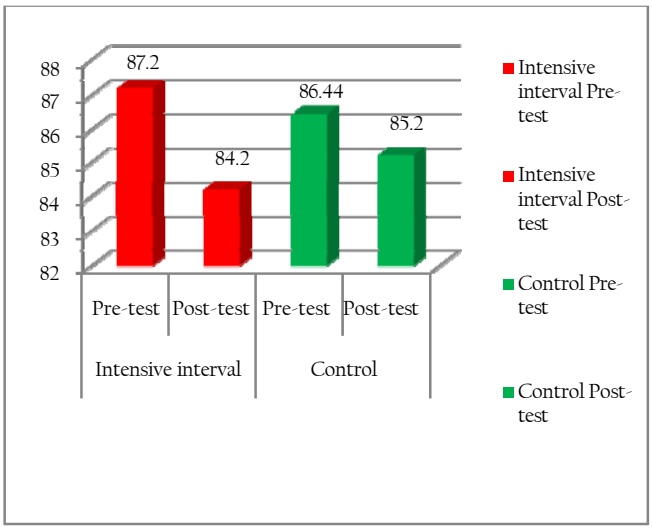


Fig. 3

Figure 3 represents the comparison of pre-test and post-test means of two groups regarding Diastolic blood pressure.

DISCUSSIONS

The t-values of Intensive interval and Control group were found 1.40 and 0.54 respectively which shows insignificant results on the variable of Diastolic blood pressure.

Findings of the present study with regards to Intensive interval training contradict the results of **Shannan and Gormley (2008)** on Diastolic blood pressure in which they have reported significant effects of various intensities of aerobic training on Diastolic blood pressure. But the findings of present study with regard to intensive interval training are in line with the findings of Shannan and Gormley.

Results revealed significant difference between pre-test and post-test mean of Intensive interval group on systolic blood pressure thus rejecting hypothesis No. 1.

Hypothesis No. 2 is accepted since results have shown significant difference between pre-test and post-test means of Intensive interval group on diastolic blood pressure.

Interval training promotes greater gradients of shear stress because patients fluctuate between high and low intensities. Dr. Guirmares and his colleagues wrote introducing their study. They have proved that interval exercise acutely decreases blood pressure in hypertensive patients.
(http://www.cbass.com/IntervalsArterialStiffness.htm)

CONCLUSION

On the basis of above findings the following conclusions have been drawn:

1. Significant differences have been noticed with regard to intensive interval training on the variable of Systolic blood pressure. However, no significant difference was found relating to control group on Systolic blood pressure.
2. However, no significant differences were observed relating to intensive interval and control group on the variable of Diastolic blood pressure.

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Nutritional Status and its Comparison among Student from Different Income Status (Groups)

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Abstract
The purpose of the study to assess Nutritional status and its comparison among student from different income status (groups). For the purpose of the study, ninety male student of B.H.U. Varanasi (30 Higher Income, 30 Middle Income and 30 Lower Income) was randomly selected as the subject for the study. The age level of the subjects was ranging from 18 to 28 years. Prudent Diet was assessed by the total scores in Prudent Diet Questionnaire and Calorie control was assessed by the total scores in calorie control questionnaire. The data was analyzed by applying Descriptive statistic & ANOVA in order to assess and compare the nutritional status among student from different Income groups (30 Higher, 30 Middle and 30 Lower) of B.H.U. Varanasi. The lever of significance was set at 0.05. Results of this study have shown that there was a mean significant difference exit between higher income, Middle income & lower income in relation to Prudent Diet and mean insignificant difference exits between higher income, Middle income & Lower income in relation to Calories Control. It is concluded that, there is significant difference in the Prudent Diet of male students due to higher income, Middle income & Lower income and insignificant difference was found in case Calories Control of male students due to higher income, Middle income & Lower income.

Keywords: *Nutritional Status, Prudent Diet and Calories Control*

INTRODUCTION

The original term was used by a sub-committee of the League of Nations (1932) referring to a set of medical task to determine the nutritional status of a population (Gibson, 2005). After 1976 (Bastian& Blackburn et al.), it became a standardized, hospital based set of tools to predict nutrition and health outcomes in individual patients with post-op complications, trauma or malnutrition. In 1996, Theresa Schneider RD decided to take assessment tools out of the hospital to assess the health of athletes, those with chronic diseases and corporate executives today a nutrition assessment includes computerized food intake analysis, clinical nutrition body composition assessment (bioelectrical impedance), laboratory blood test results if applicable, anthropometric, review of medications, lifestyle and fitness indicators. Whether your goal is to improve your athletic performance, or you want to make a nutrition lifestyle choice or you want to better manage your medical condition nutrition assessment can help you succeed. (Rosalind, S. Gibson, Principles of Nutritional Assessment, Second Edition, Oxford University Press, Oxford, 2005.)

Measures of nutritional intake estimate the amount of food a person is eating and can be used to assess adequacy of the quantity of dietary energy (and protein) supply. In simple terms, one can categorize people as being well - nourished or undernourished based on whether their intake of food matches their food energy needs or nutrient requirements. The methodologies that provide such information are those based on national sample surveys or dietary surveys that attempt to measure the food consumption or intake levels of representative individuals within a population, as discussed by Ferro-Luzzi in this series. These methods of ten tend to provide an estimate of the risk of the population or individual to inadequacy of food but do not help to identify actual individuals in the population who are deficient; nor do they help define the degree of severity of the food inadequacy.

The prevalence of abnormal nutritional status has increased in children and adolescents since 1980 in both developed and developing countries, alerting the public health system for the possible risks in terms of cardiovascular, metabolic, and psychiatric diseases and economic impact for additional costs to prevent or manage the illness.

The second option assesses the nutritional status of the individual or a representative sample of individuals within a population by measuring anthropometric, biochemical or physiological (functional) characteristics to determine

whether the individual is well nourished or undernourished. This method makes use of objective, measurable criteria that reflect the changes in anthropometric, biochemical or functional characteristics of the individual as a consequence of inadequate intakes of food for long periods of time, or as a result of seasonal fluctuations in intakes of food or poor absorption and utilization of ingested food. A hierarchical model of the causes of under nutrition emphasizes the importance of repeated infectious episodes and poor care and neglect as determinants of under nutrition, in addition to the lack of adequate food (UNICEF, 1998).

METHODOLOGY

For the purpose of the study, ninety male student of B.H.U. Varanasi (30 Higher Income, 30 Middle Income, 30 Lower Income) was randomly selected as the subject for the study. The age level of the subjects was ranging from 18 to 28 years. Prudent Diet was assessed by the total scores in Prudent Diet Questionnaire and Calorie control was assessed by the total scores in calorie control questionnaire. The data was analyzed by applying Descriptive statistic & ANOVA in order to assess and compare the nutritional status among student from different Income groups (30 Higher, 30 Middle and 30 Lower) of B.H.U. Varanasi. The lever of significance was set at 0.05.

RESULTS AND FINDINGS

The results pertaining to analysis of data between Dependent Variables (Higher income, Middle income & Lower income) and Independent Variable (Prudent Diet and Calories Control Questionnaire) Descriptive Statistics and Analysis of Variance (ANOVA) was used. The data pertaining to the results of analysis of students have been presented through the Table No.

Table 1: Descriptive Statistics of Prudent Diet for Higher Income, Middle Income, and Lower Income Group of Male Students

Variable	Group	N	Mean	Std. Deviation	Std. Error	Minimum	Maximum
Prudent Diet	Higher Income	30	13.7000	2.16795	.39581	7.00	18.00
	Middle Income	30	13.1000	2.89292	.52817	8.00	20.00
	Lower Income	30	15.1000	2.32453	.42440	11.00	20.00
	Total	90	13.9667	2.59407	.27344	7.00	20.00

Table 1 reveals that, the mean and standard deviation of Prudent Diet of Higher Income (13.70 ± 2.16, Middle Income 13.10 ± 2.89, Lower Income 15.10 ± 2.32).

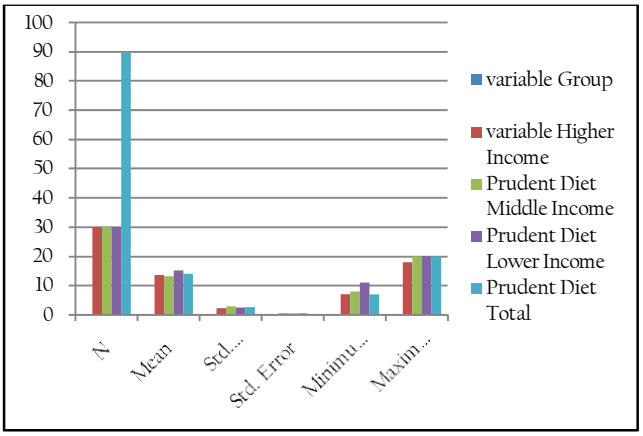

Fig. 1: Graphical Representation of the Descriptive Statistics of Prudent Diet for Higher Income, Middle Income and Lower Income Group of Male Students

Table 2: Analysis of Variance of the Means of Higher Income, Middle Income and Lower Income Group in Relation to Prudent Diet

Variable		Sum of Squares	df	Mean Square	F-ratio
Prudent Diet	Between Groups	63.200	2	31.600	5.132
	Within Groups	535.700	87	6.157	
	Total	598.900	89		

* Significant at 0.05 level of significance

F = Ratio needed for significance at 0.05 level of significance = df (2, 87) = 3.09

The analysis of variance for Prudent Diet indicated that the resultant F-ratio of 5.132 was significant in case of Higher Income, Middle Income, and Lower Income means from which it is clear that the random assignment of subjects to the Higher Income, Middle Income, and Lower Income groups was quite successful. The F-ratio needed for significance with 2, 87 degree of freedom is 3.09 at 0.05 level of confidence. Thus, mean significant difference exits between Higher Income, Middle Income, and Lower Income group in relation to Prudent Diet.

Table 3: Descriptive Statistics of Calories Control for Higher Income, Middle Income and Lower Income Group of Male Students

Variable	Group	N	Mean	Std. Deviation	Std. Error	Minimum	Maximum
Calories Control	Higher Group	30	11.3000	2.85452	.52116	7.00	19.00
	Middle Class	30	10.9667	2.98829	.54558	7.00	18.00
	Lower Class	30	11.9333	2.53164	.46221	8.00	17.00
	Total	90	11.4000	2.79566	.29469	7.00	19.00

Table 3 reveals that, the mean and standard deviation of Calories Control of Higher Income (11.30 ± 2.85, Middle Income 10.96 ± 2.98, and Lower Income 11.93 ± 2.53).

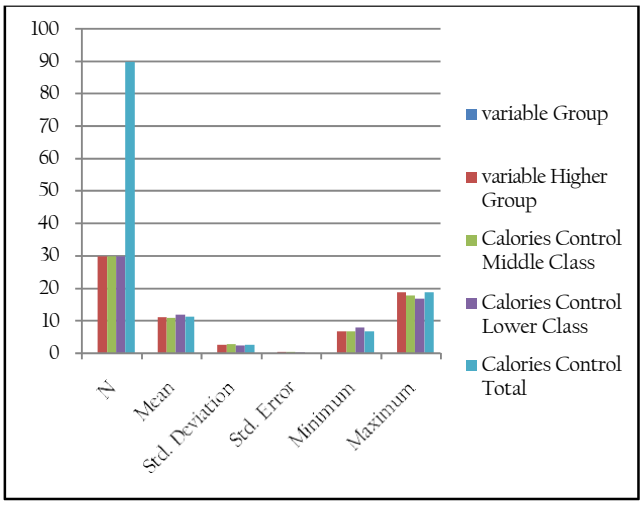

Fig. 3: Graphical Representation of the Descriptive Statistics of Calories Control for Higher Income, Middle Income and Lower Income Group of Male Students

Table 4: Analysis of Variance of the Means of Higher Income, Middle Income and Lower Income Group in Relation to Calories Control

Variable		Sum of Squares	df	Mean Square	F-ratio
Calories Control	Between Groups	14.467	2	7.233	0.924
	Within Groups	681.133	87	7.829	
	Total	695.600	89		

* Significant at 0.05 level of significance

F = Ratio needed for significance at 0.05 level of significance = df (2, 87) = 3.09

The analysis of variance for Calories Control indicated that the resultant F-ratio of 0.924 was insignificant in case of Higher Income, Middle Income, and Lower Income means from which it is clear that the random assignment of subjects to the Higher Income, Middle Income, and Lower Income groups was quite successful. The F-ratio needed for insignificance with 2, 87 degree of freedom is 3.09 at 0.05 level of confidence. Thus, mean insignificant difference exits between Higher Income, Middle Income, and Lower Income group in relation to Calories Control.

DISCUSSION OF FINDINGS

Results of this study have shown that there was a mean significant difference exit between higher income, Middle income & lower income in relation to Prudent Diet and mean insignificant difference exits between higher income, Middle income & Lower income in relation to Calories Control. Results of the presented study are completely supported by other similar studies.

FeliFei Wang & Tim Mc Donald Studies on "To examine the influence of physical activity (PA) and BMI on health care utilization and costs among Medicare retirees". This cross-sectional study was based on 42,520 Medicare retirees in a us-wide manufacturing corporation who participated in indemnity/preferred provider and one health risk appraisal during the years 2001 and 2002. Participants were assigned into one of the three weight groups: normal weight, overweight, and obese. PA behavior was classified into three levels; sedentary (o time/wk.), moderately active (1 to 3 times/wk.) and very active retirees had $1456, $1731 and 1177 lower total health care charges than their sedentary counterparts in the normal weight, overweight, and obese groups, respectively ($p<0.01$). The very active retirees. Health care utilization and specific cast showed similar trends with PA levels for all BMI groups. The total health care charges were lower with higher PA level for all age groups ($p<0.01$). Regular PA has strong do response effects an both health care utilization and costs far overweight/obese as well as normal weight people. Prompting active lifestyle in this Medicare population, especially overweight and obese groups, could potentially improve their will-beinn and save a substantial amount of health care expenditures. Because those Medicare retirees are hard to reach in general, more creative approaches should be launched to address their needs and interests as well as help reduce the usage of health care system.

CONCLUSIONS

On the basis of analysis and the results of the study following conclusion were drawn:

- In the light of the findings, it is concluded that, there is significant difference in the Prudent Diet of male students due to higher income, Middle income & Lower income.
- In the light of the findings, it is concluded that, there is insignificant difference in the Calories Control of male students due to higher income, Middle income & Lower income.

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Effect of Kapalbhati on Selected Body Composition Variables

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Abstract

The purpose of the study was to determine the effect of kapalbhati on selected body composition variables. Thirty male students of B.P.E. first year of LNIPE (Deemed University), Gwalior were randomly selected as subjects for this study. Subjects were divided into two groups i.e. one experimental group and one control group. The quantitative measurements of each subject were taken with the help of standard equipment, before and after the treatment period of twelve weeks. The selected Body Composition Variables were Body Fat (%), Lean Body Mass (Kg), Body Water Content (%) and Basal Metabolic Rate (Kcl). All the test were administered in the Yoga Laboratory of the Institute. Paired 't' test was applied to determine the effect of Kapalbhati on selected Body Composition Variables. The Paired 't' test revealed that practice of Kapalbhati pranayama had significant effect on Body Fat Percentage (t = 5.47), Lean Body Mass (t = 9.65), Body Water Content (t = 17.24) and Basal Metabolic Rate (t = 9.410) against required tabulated value of 1.761 which showed significant effect of practice of Kapalbhati pranayama. On the basis of results following conclusions were drawn: 1.Significant effect was found on Body Fat Percentage 2. Significant effect was found on Lean Body Mass. 3. Significant effect was found on Body Water Content. 4. Significant effect was found on Basal Metabolic Rate.

INTRODUCTION

Today yoga being a subject of varied interests, has gained worlds wide popularity. Recent research trends have shown that it can serve as an applied science in a number of fields such as education, physical education and sports. Health and family welfare, psychology, medicine and also one of the valuable means for the development of human resources for better performance and productivity. However, there exists controversy in accepting yoga as medicine and therapy because it has generally been believed that yoga is spiritual science having emancipation as it goals and hence cannot be treated only as a therapy.

Yoga exercise are scientific means for strengthen of all living or atrophying muscle fibers and tissues. This system teaches how to awake new life pulsation in active tissues. In this context it is different from other system of exercise in as much as it is different from other system of exercise in as much as it teaches one how to concentrate his attention on the awakened energy which is the direct gives of power, strength and vitality of all the parts of the body. It develops will power along with bodily strength. This aspect of yoga is technically known as "asanas" which was developed by the latin hatha yogic into a well organised system of physical culture.

Pranayama is a science of Respiration. It consists of three phases Purack, Kumbhak, Rechak. High abdominal pressure created in pranayama by the action and counter action of the different anatomical parts together with the upward pull of the crura, is responsible for wakening of Kundalini.

The word Kapalbhati is a compound consisting of two members: Kapal and Bhati. In Sanskrit Kapal means the skull and Bhati is derived from a Sanskrit rot meaning to shine. Hence Kapalbhati means an exercise that makes the skull shining. Kapalbhati is one of the six cleansing processes, known in Hatha yoga as shat kriysa, and is intended to clear the nasal passages contained in the skull, along with the remaining parts of the respiratory system. As the exercise necessarily cleanses a part of the skull, the name Kapalabhati is appropriately given to it.

The assessment of body composition is generally performed in order to determine and monitor one's health and fitness status, and to aid in planning training programs for athletes. It has been well established that a high percentage of body fat (low lean body mass) is associated with a higher risk of heart disease, diabetes, hypertension, cancer, hyper lipidemia and a variety of other health problems. On the other hand, a high percentage of lean body mass and low-fat mass is associated with athletic prowess and good health.

OBJECTIVES OF THE STUDY

1. To know the effect of Kapalbhati on Body Fat Percentage.

2. To know the effect of Kapalbhati on Lean Body Mass.
3. To know the effect of Kapalbhati on water content.
4. To know the effect of Kapalbhati on Basal Metabolic Rate.

Methodology

Subjects

Thirty male students were randomly selected from B.P.E. I Year of Lakshmibai National Institute of Physical Education, (Deemed University) Gwalior. The age group was from 17-22 years. Further two groups i.e. one experimental group and one control group (each of 15 students) were randomly selected from the selected subjects.

Variables

The following Body Composition Variables were chosen for the study. Body Fat Percentage, Lean Body Mass, Water Content and Basal Metabolic Rate

CRITERION MEASURES

The criterion measures chosen for testing hypothesis were: Body Fat Percentage (%tage.), Lean Body Mass (Kilogram), Water Content (%tage) and Basal Metabolic Rate (Kilo calories).

TRAINING OF KAPALBHATI

There were two groups i.e. control group and experimental group. Control group was not given any kind practice of panayama however experimental group was exposed to training of Kapalbhati pranayama for the duration of twelve week. Both the groups were performing their regular practice of the game. For the experimental group the duration of training session was half-an-hour and the training was conducted in the afternoon 3:00 to 3:30 pm from Monday to Friday.

KAPALBHATI

It consists of active puraka and passive recheka. In every Recheka during Kapalbhati as much air was expelled or driven out of the lungs as a sudden and vigorous inward stroke of the front abdominal muscles._At the end of Recheka abdominal muscles are contracted. But in puraka one had to simply withdraw his control from these muscles and they were relaxed. Relaxation of muscles is a passive act. Time duration was for first two weeks was 10 minutes. In Kapalbhati the rest of two minutes was allowed after every five minutes. After two weeks time it was increased gradually.

DESIGN OF THE STUDY

Random group design was utilized for the purpose of the study.

Administration of Tests

The tests for Body Fat Percentage, Lean Body Mass, Water Content and Basal Metabolic Rate were administered in the Yoga Research Laboratory of Lakshmibai National Institute of Physical Education, Gwalior with the help of a team of tester and research assistant under the guidance and supervision of the experts using Body Composition Analyzer with following standard procedure:

- Measure the exact height.
- Step on the equipment.
- Track the exact weight minus the additional weight.
- Feed the built of an individual (Standard/Athletic)
- Feed in the gender.
- Feed the age of an individual.
- Feed the height in cms.
- Enter n wait for the process to complete.
- Take out the analyses from print out.

STATISTICAL TECHNIQUE

In order to find out the effect of Kapalbhati on selected Body composition variables, paired 't' test was applied at 0.05 level of significance.

ANALYSIS OF DATA AND RESULT OF THE STUDY

The statistical analysis of data and results of the study are presented from Table 1–4.

Table 1: Body Fat Percentage

Groups	$\bar{D}$	S	't' ratio
Experimental Group	3.68	2.60	5.47*
Control Group	0.007	0.0764	0.354

* Significant $t_{0.05(14)} = 1.761$

Since the calculated t (5.47) is more than tabulated t (1.761) at 0.05 level of significance, thus it may concluded that the Body Fat Percentage shown the significance effect of Kapalbhati.

Table 1 reveals that the significance effect not shown in the control group. Calculated 't' value of control group is t (0.354) which is below the required value of 0.05 level of

significance (t=1.761). It has no effect on Body Fat Percentage of Control Group.

Table 2: Lean Body Mass

Groups	D	S	't' ratio
Experimental Group	1.01	0.405	9.65*
Control Group	0.64	1.417	1.747

* Significant $t_{0.05}(14) = 1.761$

Since the calculated t(9.65) is more than tabulated t(1.761) at 0.05 level of significance, thus it may concluded that the Lean Body Mass shown the significance effect of Kapalbhati.

Table 2 reveals that the significance effect not shown in the control group. Calculated 't' value of control group is t (0.354) which is below the required value of 0.05 level of significance (t=1.761). It has no effect on Lean Body Mass of Control Group.

Table 3: Water Content

Groups	D	S	't' ratio
Experimental Group	1.25	0.287	17.24*
Control Group	0.69	1.810	1.475

* Significant $t_{0.05(14)} = 1.761$

Since the calculated t (17.24) is more than tabulated t (1.761) at 0.05 level of significance, thus it may concluded that the Body Water Content shown the significance effect of Kapalbhati.

Table 3 reveals that the significance effect not shown in the control group. Calculated't' value of control group is t (0.354) which is below the required value of 0.05 level of significance (t=1.761). It has no effect on Body Water Content of Control Group.

Table 4: Basal Metabolic Rate

Groups	D	S	't' ratio
Experimental Group	139.7	57.45	9.410*
Control Group	0.533	1.45	1.422

* Significant $t_{0.05(14)} = 1.761$

Since the calculated t (9.410) is more than tabulated t(1.761) at 0.05 level of significance, thus it may concluded that the Basal Metabolic Rate shown the significance effect of Kapalbhati.

Table 1 reveals that the significance effect not shown in the control group. Calculated 't' value of control group is t (0.354) which is below the required value of 0.05 level of significance (t=1.761). It has no effect on Basal Metabolic Rate of Control Group.

CONCLUSIONS

Within the limitations of the present study the following conclusions were drawn:

1. Significant effect was found on Body Fat Percentage and no change was found in Control group.
2. Significant effect was found on Lean Body Mass and no change was found in Control group.
3. Significant effect was found on Body Water Content and no change was found in Control group.
4. Significant effect was found on Basal Metabolic Rate and no change was found in control group.

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