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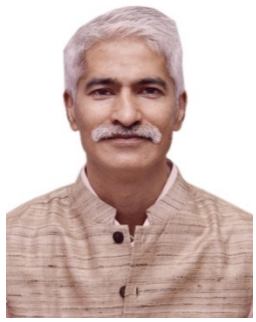
Editorial



Dr. Vikram Singh

Welcome to the October 2020 Edition of the Entire Research International Research Journal (ISSN 0975-5020) focusing on "New Perspectives in Yoga, Physical Education and allied Studies during COVID-19 lockdown". It has regularly submitted manuscripts; selected and reviewed by the regular system and accepted for publication. There seems to be a large pool of manuscripts falling within yoga, physical education, psycho-social aspects, family health and biomedical sciences, and putting them together in a thematic edition seems to be the obvious consequence.

The salient features of this edition are the articles that address the issue of immunity, mental health, rejuvenation, exercise therapy among vast population that has been affected due to unprecedented situation of COVID-19 pandemic. Major concerns like psycho-physiology mental health, exercise prescription, gathering data regarding the best practices, impact of online courses, classes and conferences across the world and various strategies of support and encouragement for people who are affected, have been covered from the researchers lens.

All the papers published in this edition underwent stringent peer-review process involving a minimum of two reviewers comprising internal as well as external referees. This was to ensure that the quality of the papers justified the high ranking of the journal, which is renowned as a fairly-cited journal not only by authors and researchers in India but by those in other countries around the world as well. It has been ensured that no-plagiarized bonafide studies are being taken up through an in-house set of procedure being followed in a rigorous manner to maintain the quality of journal. We anticipate that you will find the evidence presented in this edition to be intriguing, thought-provoking and useful in reaching new milestones in your own research. Please recommend the journal to your colleagues and students to make this endeavour meaningful.

We thank the authors for agreeing to publish their papers in this Edition, and the editors and reviewers involved in the publishing process of these papers.

We are currently accepting manuscripts for upcoming issues based on original qualitative or quantitative research that opens new areas of inquiry and investigation.

Dr. Vikram Singh
JNU, New Delhi

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The Selection of Basic Exercises for Physical Development of Preschoolers (Aged 5-6 Years Old) in Hanoi, Vietnam

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Summary:

For preschoolers (5-6 years old), health is of great importance since all the cognitive, emotion, behaviour and other aspects are developed based on the health of children. In order to develop physical health for preschoolers, it is necessary to use regularly and synchronously 21 physical exercises (divided into 4 groups), which are: Walking in pairs; Walking with various direction and speed; Walking on the balance bridge, going up and down the slope and Long-distance walking; Running under the specific direction of signal; Running slow and walking; Running fast in 25m; Running in different direction and Running with high thigh; High jumping to touch the object hanging above; Jumping across a small lines/bars…; Jumping with different styles; Jumping with run and Skipping; Throwing the objects; Throwing the objects to hit the small targets; and Rolling the objects to hit the moveable and unmovable targets; Climbing the ladder; Climbing the slide; Crawling under the caves or obstacles; and Crawling backward... The results of the four - month pedagogical experiment have confirmed that the selected basic exercises are accurate and effective. The physical condition of preschoolers (aged 5-6 years old) in Hanoi City, Vietnam has improved remarkably.

Keywords: preschool; basic exercises; children, physical development, Hanoi City.

Introduction:

In the development process of every person, especially children of lower-kindergarten age (5-6 years old), health plays a very important role because of all perceptions, emotions, behaviors and other aspects are developed based on the health of children. Sports activities in a smart way and suitable for preschool children is a most positive and effective factor to promote children's health, and to develop harmouniously both physical and mental health. Being aware of the importance as well as the influence of physical training on children's physical development from the 1950s, the scientific work of EG Leevi-Gorinhepskaia researched and presented typical Indicators denoting physical performance in preschoolers. In 1960-1970, E.N. Vavilopva and Mr.G.Arakeerian also demonstrated a high intellectual development of children depending on their diet and physical exercise. In 1993, the scientific work of author Luu Tan (China) on children's physical training before schooling introduced a number of criteria and measurement methods in physical examination for children before school age: the indicators criteria on morphology, function, criteria for checking physical strength and basic operational capacity. In Vietnam, the aforementioned research mainly focus on the program development research, investigate some biological indicators of the children, the perspectives to orient the goals, content, methods and educational programs of preschoolers. Up till now, there has been a scare of the research on the field in the literature (Le, 1995); (Han, 1996); (Lam, 2007) have established a testing system and criteria for

assessing the fitness level of preschoolers in the Central region, and also identified a measure to improve the effectiveness of education for children aged 3-6 years old. Thus, the aforementioned authors have studied the physical development of preschool children, but there have not been any research projects on basic exercises for physical development of preschoolers. In fact, the physical condition of kindergarten children in Hanoi is not really good. According to the survey, preschoolers in Hanoi have used a lot of exercises during the hours of pre-school education for children, but the usage is not synchronized, frequent, which leads to the poor physical condition of children. Therefore, the selection of basic physical exercises for physical development of preschoolers (aged 5-6 years old) in Hanoi City Vietnam which is appropriate to the age and characteristics of the child will help them stay healthy and develop physically and mentally. In the future, they will become healthy, and useful to our society.

Methodology:

The study employed the methods: analyzing and synthesizing documents; interview, and seminar; anthropometric; pedagogical observation; pedagogical examination; Experimental pedagogy; and statistical mathematics.

In order to evaluate children's physical development, 06 tests: 10m running (gy), jumping in place (cm), throwing an object with a dominant hand (m), smashing and catching the ball with two hands (l/ph), balancing on one foot (gy), seated forward bend (cm) These tests were chosen based on Lam (2007)'s work, the interviews with consultants, and PE teachers in many kindergarten in Hanoi, Vietnam.

1. Findings and discussion

1.1 Physical condition of kindergarten students in Hanoi, Vietnam

In order to assess the height and weight of preschoolers (aged 5-6 years old), we conducted a measurement, combined with the formula of the nutrition institute, by entering the birth dates of 42 boys and 42 girls of preschool in Hanoi (divided into 2 groups, experimental group and control group) into a board system, the machine will automatically measure and compare the height of children according to the age regulations with the current situation of children. To check and classify the child's physical fitness, we used 6 TEST. The results are shown in Table 1.1 and Table 1.2.

Table 1.1. The results of the physical tests of the kindergarten students (aged 5-6 years old) in control group and experimental group in Hanoi, Vietnam

Content	Boy (n = 21)		Girl (n = 21)	
	Control Group	Experimental Group	Control Group	Experimental Group
Height (cm)	109.2 ± 2.167	108.1 ± 1.911	100.3 ± 1.961	100.9 ± 1791
Weight (kg)	23.81 ± 2.247	23.71 ± 2.02	21.05 ± 1.741	21.37 ± 1.765
10m running (gy)	2.492 ± 0.154	2.406 ± 0.151	3.012 ± 0.210	3.053 ± 0.262
Jumping in place (cm)	91.38 ± 18.97	93.88 ± 15.49	86.77 ± 10.80	86.82 ± 10.84
Throwing an object with a dominant hand (m)	6.072 ± 1.135	6.474 ± 0.466	4.138 ± 1.253	4.111 ± 1.293

Smashing and catching the ball with two hands (l/ph)	13.55 ± 7.081	15.52 ± 4.362	14.58 ± 7.101	13.71 ± 6.506
Balancing on one foot (gy)	7.432 ± 4.809	9.938 ± 4.665	6.685 ± 4.436	6.785 ± 4.301
Seated forward bend (cm)	2.939 ± 2.146	3.322 ± 2.396	2.471 ± 2.029	2.401 ± 2.014

The results from table 1.1 show that the height of boys and girls of the control group and experimental group has no significant difference. There existed children in both groups experiencing overweight and obesity.

In general, results of the testes are not high. The average time for completing 10m of the boys in the two groups were mostly lower than the expectation (the random group was 2,492 seconds while the experimental group was 2,406 seconds). Jumping in place's results of the random group was 91.38cm, while the experimental group was 93.88cm (for boys); and 86.77cm and 86.82cm (for girls). In the test of hand-throwing, the average result for random group was 6,072m, while the experimental group was 6,474m. In general, the results of physical tests of kindergarten students in random and experimental groups have no significant difference; This difference is at probability $P > 0.05$; so it is not significant.

Table 1.2. The results of classifying fitness level based on the standard of the preschoolers (aged 5-6 years old) in Hanoi, Viet Nam

	Content	Control Group			Experimental Group		
		Good %	Pass %	Fail %	Good %	Pass %	Fail %
		Boy (n = 21)					
1	10m running (gy)	19.05	52.38	23.81	14.28	57.14	23.81
2	Jumping in place (cm)	14.28	42.86	42.86	14.28	47.61	38.11
3	Throwing an object with a dominant hand (m)	9.52	61.91	28.57	19.04	52.38	28.58
4	Smashing and catching the ball with two hands (l/ph)	14.28	47.62	38.10	14.28	47.62	38.10
5	Balancing on one foot (gy)	4.76	57.14	38.10	9.52	57.14	33.33
6	Seated forward bend (cm)	9.52	61.90	28.57	14.28	57.14	23.80
		Girl (n = 21)					
1	10m running (gy)	0	61.91	38.09	4.76	57.14	38.10
2	Jumping in place (cm)	4.76	61.91	33.33	14.28	52.38	33.33
3	Throwing an object with a dominant hand (m)	9.52	52.38	38.10	4.76	61.91	33.33
4	Smashing and catching the ball with two hands (l/ph)	23.81	52.38	23.81	19.04	52.38	28.57
5	Balancing on one foot (gy)	9.52	57.14	33.33	14.28	57.14	28.57
6	Seated forward bend (cm)	14.28	57.14	28.57	23.80	61.90	14.28

The number of children who failed to meet the requirements of each test is quite high (from 14.28% - 42.86% depending on the test). The results between control group and experimental group were insignificant and not significant at $P > 0.05$. (table 1.2).

1.2 The selection of basic exercises for the physical development of preschoolers (aged 5-6 years old) in Hanoi, Vietnam.

1.2.1. *The selection of basic exercises for the physical development of preschoolers (aged 5-6 years old) in Hanoi, Vietnam.*

Based on the five Principles of exercises selection (the selected exercises must have physical development orientation for preschool children in general and preschool children aged 5-6 years old in particular:

- be suitable for the level and mind characteristics of preschool children and also their training conditions;
- reflect the diversity and excitement of training for preschool children;
- be systematic and logic;
- and ensure the high practicality),

we propose 30 exercises to get the feedback of 50 teachers – those who are directly involved in teaching children of five pre-schools in Hanoi City Vietnam. We choose exercises that are accepted by more than 80% of experts and teachers. The results are shown in Table 1.3.

Table 1.3. Results on selecting basic physical exercises for physical development of preschoolers (5-6 years old) in Hanoi (n=50)

No.	Type of exercises	Major training effects	Approval	Percentage
Exercises for improving walking skills				
1	Walking in pairs	Improve body's control and rhythm	41	82
2	Walking through low obstacle	Strengthen thigh muscles and develop balance capacity	35	70
3	Walking with hands up	Strengthen back, stomach, and arms, and develop balance and rhythm.	33	66
4	Walking with various direction and speed	Improve agility, flexibility of movement	45	90
5	Walking on the balance bridge, going up and down the slope	Develop balance capacity	44	88
6	Walking backward	Develop balance capacity and rhythm	37	74
7	Long-distance walking	Develop endurance capacity	42	84
Exercises for improving running skills				
1	Running in circles, in narrow roads	Develop balance capacity and rhythm	37	74
2	Running under the specific direction of signal	Develop flexibility, balance and rhythm	43	86

3	Running slow and walking (200 – 300m)	Enhance cardiopulmonary function and develop endurance capacity	42	84
4	Running fast in 25m	Develop speed and flexibility	44	88
5	Running in different direction	Improve speed, flexibility, being able to quickly change	43	86
6	Running with high thigh	Strengthen the thigh muscles.	43	86
Exercises for improving jumping skills				
1	Jumping forward	Strengthen leg bounce and flexibility	35	70
2	High jumping to touch the object hanging above	Improve jumping skills and rhythm	47	94
3	Jumping across a small lines/bars…	Improve leg and thigh muscles; Develop endurance, balance capacity and rhythm	48	96
4	Jumping with different styles	Improve flexibility and rhythm	45	90
5	Jumping with run	Improve jumping ability and rhythm	45	90
6	Skipping	Improve rhythm capacity and visual motor skills	46	92
7	Hopping	Improve leg strength and flexibility	25	50
Exercises for improving throwing skills				
1	Rolling the object to hit the target	Strengthen hand wrists and muscles	33	66
2	Throwing the objects	Strengthen the back's muscles, shoulders and arms; Develop the rhythm	46	92
3	Throwing the objects to hit the small targets	Develop the throwing accuracy	45	90
4	Rolling the objects to hit the moveable and unmovable target	Strength hands' muscles; Develop the throwing accuracy	43	86
5	Snow-ball throwing	Increase the power of arms, and body; Develop the throwing accuracy; Develop rhythm and endurance capacity; Improve body's reaction	25	50
Exercises for improving climbing and crawling skills				
1	Climbing the ladder	Strengthen the power of hands, feet; Increase the flexibility,	50	100

		skillfulness and bravery		
2	Climbing the slide	Strengthen the power of hands, feet and body; Increase the flexibility of movement	41	82
3	Going up and down the stairs	Strengthen the power of legs; Increase balancing capacity, rhythm and endurance	39	78
4	Crawling under the caves or obstacles	Increase flexibility and rhythm of movements	45	90
5	Crawling backward	Increase flexibility and rhythm of movements	44	88

- Walking capability development exercises: out of seven exercises, two exercises whose the results range from 66% - 74% were not selected, and four exercises: Walking in pairs; Walking with various direction and speed; Walking on the balance bridge, going up and down the slope; Long-distance walkingexercises whose results are from 82% - 90% were selected.
- Running capability development exercises: out of six given exercises, one was not selected: Running in circles, in narrow roads (74%). The five remaining exercises with a result of 84% - 86% were selected are: Running under the specific direction of signal; Running slow and walking (200 - 300m) ; Running fast in 25m; Running in different direction; Running with high thigh
- Jumping capability development exercises: out of seven given exercises, jumping with Jumping forward andHoppingexercise was not selected (50% - 70%); the remaining five exercises whose results are from 92% - 96% were selected. These five exercises are: High jumping to touch the object hanging above; Jumping across a small lines/bars…: Jumping with different styles; Jumping with run; Skipping.
- Pushing capability development exercises: out of five exercises: two exercises with the results from 50% - 66% were not selected; the three remaining exercises with the results of 86% - 92% were selected, namely: Throwing the objects: Throwing the objects to hit the small targets; Rolling the objects to hit the moveable and unmovable target
- Climbing and crawling capability development exercises: out of five given exercises: Going up and down the stairsthe ladder with the results of 78% was not be selected, while four other exercises with the results from 82% - 100% were selected, which are: Climbing the ladder; Climbing the slide; Crawling under the caves or obstacles; Crawling backward.

1.2.2. Experimental results assessing the effectiveness of the selected basic exercises for physical development of preschoolers (aged 5-6 years old) in Hanoi, Vietnam

The experiment process was carried out in 4 months in 84 preschool children who were divided into 2 groups: experimental and control; Each group consisted of 21 boys and 21 girls. The control group performed the exercises according to the current program. Experimental group performs selected exercises in PE lessons during the week and in the first 30 minutes of daily activities, every week.

After the research period, the results of the physical fitness assessment have been synthesized and presented in table 1.4 and 1.5.

It can be seen from table 1.4 that the control group's test results showed initial but not significant growth, yet this difference was insignificant and not significant at the threshold $P > 0.05$.

When compared with the initial test results, the experimental group also experiences a huge increase with an average W% of 33.51 for boys, and 32.14 for girls.

Table 1.4. The physicl fitness accessment results of preschoolers (aged 5-6 years old) in exprerimental group and control group pre and post experiment.

Group	TEST	Boys (n=30)		Girls (n=24)	
		$\overline{x}_{TTN} \pm \delta$	$\overline{x}_{STN} \pm \delta$	$\overline{x}_{TTN} \pm \delta$	$\overline{x}_{STN} \pm \delta$
Control Group	10m running (gy)	2.492 ± 0.154	2.428 ± 0.167	3.012 ± 0.210	2.677 ± 0.133
	Jumping in place (cm)	91.38 ± 18.97	105.9 ± 10.78	86.77 ± 10.80	92.23 ± 6.169
	Throwing an object with a dominant hand (m)	6.072 ± 1.135	6.597 ± 0.959	4.138 ± 1.253	5.182 ± 0.526
	Smashing and catching the ball with two hands (l/ph)	13.55 ± 7.081	16.51 ± 6.337	14.58 ± 7.101	17.61 ± 2.918
	Balancing on one foot (gy)	7.432 ± 4.809	10.38 ± 2.895	6.685 ± 4.436	10.27 ± 3.710
	Seated forward bend (cm)	2.939 ± 2.146	4.428 ± 2.488	2.471 ± 2.029	3.612 ± 0.312
Experimental Group	10m running (gy)	2.406 ± 0.151	2.150 ± 0.153	3.053 ± 0.262	2.581 ± 0.134
	Jumping in place (cm)	93.88 ± 15.49	113 ± 5.473	86.82 ± 10.84	97.29 ± 7.494
	Throwing an object with a dominant hand (m)	6.474 ± 0.466	7.627 ± 0.573	4.111 ± 1.293	5.636 ± 0.678

	Smashing and catching the ball with two hands (l/ph)	15.52 ± 4.362	25.05 ± 3.278	13.71 ± 6.506	20.92 ± 5.187
	Balancing on one foot (gy)	9.938 ± 4.665	15.15 ± 3.022	6.785 ± 4.301	13.31 ± 4.777
	Seated forward bend (cm)	3.322 ± 2.396	6.613 ± 2.810	2.401 ± 2.014	4.656 ± 1.813

In comparison the results, the experimental group had a different increase to the random group, with boys from 2.676 to 5.430 and $p < 0.01$, girls from 2.284 to 2.366 and $p < 0.05$. In the experimental group, the growth of girl group changed from 3.61% to 25.77%; boys grew from 6.74% to 39.58% and had higher growth than girls, depending on the content.

Table 1.5. The growth of preschoolers (aged 5-6 years old) in experimental group and control group.

TEST	Trẻ trai (n=21)				
	$\overline{x}_{ĐC} \pm \delta$	$\overline{x}_{TN} \pm \delta$	t	P	W (%)
10m running (gy)	2.428 ± 0.167	2.150 ± 0.153	5.430	<0.01	12.17
Jumping in place (cm)	105.9 ± 10.78	113 ± 5.473	2.731	<0.01	6.74
Throwing an object with a dominant hand (m)	6.597 ± 0.959	7.627 ± 0.573	3.185	<0.01	8.68
Smashing and catching the ball with two hands (l/ph)	16.51 ± 6.337	25.05 ± 3.278	2.995	<0.01	16.7
Balancing on one foot (gy)	10.38 ± 2.895	15.15 ± 3.022	2.676	<0.01	17.19
Seated forward bend (cm)	4.428 ± 2.488	6.613 ± 2.810	3.603	<0.01	39.58
	Trẻ gái (n=21)				
10m running (gy)	2.677 ± 0.133	2.581 ± 0.134	2.254	<0.05	3.61
Jumping in place (cm)	92.23 ± 6.169	97.29 ± 7.494	2.329	<0.05	5.34
Throwing an object with a dominant hand (m)	5.182 ± 0.526	5.636 ± 0.678	2.366	<0.05	8.39
Smashing and catching the ball with two hands (l/ph)	17.61 ± 2.918	20.92 ± 5.187	2.484	<0.05	17.16
Balancing on one foot (gy)	10.27 ± 3.710	13.31 ± 4.777	2.248	<0.05	25.77
Seated forward bend (cm)	3.612 ± 0.312	4.656 ± 1.813	2.284	<0.05	17.15

This is understandable, because of the gender differences, psychological characteristics of boys are stronger than girls and boys are physically better than girls so the growth of boys will be better than girls.

Summary:

In conclusion, after 4 months of practicing the selected exercises, the experimental results of the boys and girls in the experimental group were better than those of the control group in all the categories, and the meaning of this difference is at threshold of $P < 0.01$and $P < 0.05$ (girls); The number of overweight and obese children has decreased significantly. This proves that the selected basic exercises are very suitable for the physical development of preschoolers in Hanoi Vietnam.

Conclusion:

1. The physical condition of kindergarten students compared to the target is still low and there are so many students who are overweight and obesity;
2. In order to develop the physical condition of students who are at preparatory classes, it is necessary to practice regularly 21 physical exercises, divided into 4 main types, including:
    - Exercises for improving walking skills: Walking in pairs; Walking with various direction and speed; Walking on the balance bridge, going up and down the slope and Long-distance walking;
    - Exercises for improving running skills: Running under the specific direction of signal; Running slow and walking; Running fast in 25m; Running in different direction and Running with high thigh;
    - Exercises for improving jumping skills: High jumping to touch the object hanging above; Jumping across a small lines/bars…; Jumping with different styles; Jumping with run and Skipping;
    - Exercises for improving throwing skills: Throwing the objects; Throwing the objects to hit the small targets; and Rolling the objects to hit the moveable and unmovable targets;
    - Exercises for improving climbing and crawling skills: Climbing the ladder; Climbing the slide; Crawling under the caves or obstacles; and Crawling backward.
3. The results of 4-month conducting exercises have shown that the selected basic physical exercises are accurate and effective. The physical condition of kindergarten students (5-6 years old) in Hanoi, Vietnam has improved significantly. The girls increased by 3.61% to 25.77%; while the boys increased from 6.74% to 39.58%.

Recommendation:

The results of the project are associated with the practical training of kindergarten schools in Hanoi. However, other kindergartens across the country can refer to these results and apply the basic physical exercises to develop the most suitable ones for their children (5-6 years old) in their cities.

References:

1. Ministry of Education and Training, ECEC Research Center, ECEC Department (2004), Guidance on reforming organizational form of educational activities for children aged 3-4, Education Publishing House, Hanoi.
2. Ministry of Education and Training (1999), ECEC Strategy from 1998 to 2020, Education Publishing House, Hanoi.
3. Han Nguyet Kim Chi et al. (2000), "Study on characteristics of physical and psychological development of babies up to 36 months of age", Project Code B1998-49-19
4. Lam Thi Tuyet Thuy (2007), "Developing physical health of preschoolers in some provinces in the Central region", PhD thesis in Education Studies, Institute of Sports Science, Hanoi.
5. Zeng. N, et al, (2017), Effects of Physical Activity on Motor Skills and Cognitive Development in Early Childhood: A Systematic Review, BioMed Research International
6. National Center for Sport and exercise medicine (2015), Physical activity in the early years, Loughborough University.
7. WHO, Measuring changes in nutritional impact, Geneve 6/1980.
8. Wortham. C. S (1998), Early childhood Curriculum, Printed in the United States of America.
9. Zigler. E. F, Stuvenson. M. F (1986), Chapter 7 – Physical development in the preschool period, Toronto, pages 318-347.
10. Sue C Wortham (1998), Early Childhood Curriculum, Printed in the Unite states of American.

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An Investigation into the Current Situation of Selecting and Training Sport Coaches in Vietnam

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Abstract:
The study evaluates the current situation in selection and training of Vietnamese sports coaches, showing their needs and aspirations to advance their work performance.

Keywords: Coach, selection, training.

1. Rationale:

In Viet Nam, many institutions and centers have coach training programs, including: 3 universities namely Bac Ninh University of Physical Education and Sports, Da Nang University of Physical Education and Sports, Ho Chi Minh University of Physical Education and Sports; 27 Sport Leagues, Ifs, AFS, Olympic Committee, etc. Learners of these institutions and centers are mainly professional athletes who compete in professional tournaments and study to become coaches at the same time.

In addition to professional training, these learners are provided with knowledge and skills related to professional ethics and political qualities necessary to become future coaches.

In 2017, the Viet Nam General Department of Sports and Physical Training had mobilized 404 coaches, 28 experts (32 key sports groups 1 and 2) to prepare for international games and tournaments.

Normally, coaches in athletic gifted schools or sports training centers are former athletes who are no longer in their peak performance years. Most of them, having graduated from Physical Education and Sports University, are professional coaches, senior coaches or advanced coaches. Coaches whose students are competitive or have excellent achievements will be mobilized to join the national team.

The aim of this study is to evaluate the current situation of coach training and identify their needs and aspirations to propose solutions to help advance their work performances thus contributing more to sports in Viet Nam.

2. Research methodology:

The study employs common research methods in sports, including: documents analysis and synthesis, sociological investigation, mathematical statistics.

3. Research findings:

3.1 Survey on current situation of coaches

Using questionnaire surveys with 147 coaches (including 106 coaches in national teams who are trainers at Bac Ninh University of Physical Education and Sports, Hanoi National Sports Training Center, Da Nang National Sports Training Center; and 41 coaches at sports training centers in Viet Nam), we found that before working as administrators and trainers, 80.27% of coaches used to be athletes, 14.28% are teachers and 1.36% are from other professions (Figure 1).

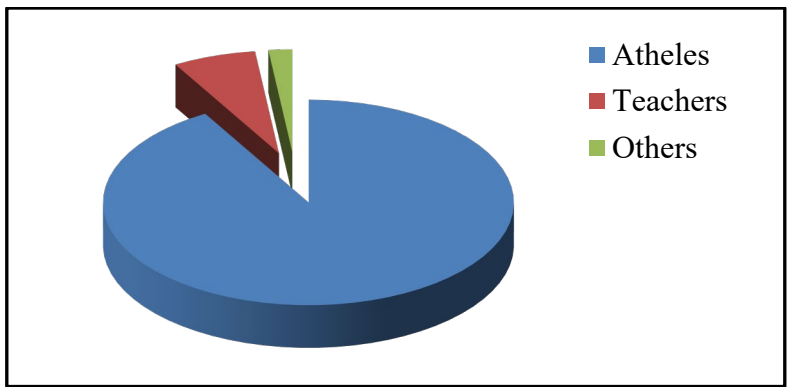

Figure 1. Professional status of gifted coaches (n=147)

The survey respondents' years working as administrators and trainers are diverse: for less than 5 years (at 23.8%), over 5 years (at 34.7%), and over 10 years (at 41.5%) (Figure 2).

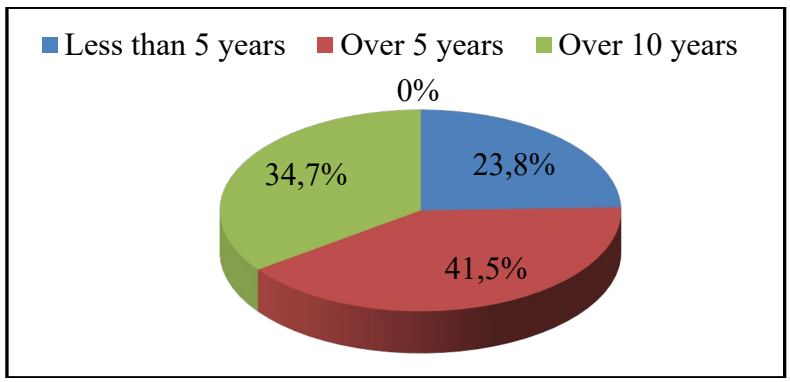

Figure 2. Working experience of talented coaches (n=147)

These respondents have domestic and international training achievements through national tournaments (accounted for 55.78%), international tournaments (56.46%), both national and international competitions (12.9%). The current selection methods of athletes applied at the center are: "scientific selection" (53.74%), "selection according to experience" (43.53%), "selection from tournaments outcomes" (53.06%) and random recruitment (3.4%).

The survey results also indicated that the current recruitment and training activities are: "good" (61.9%), "not good" (19.72%) and "need attention" (18.36%) (Figure 3).

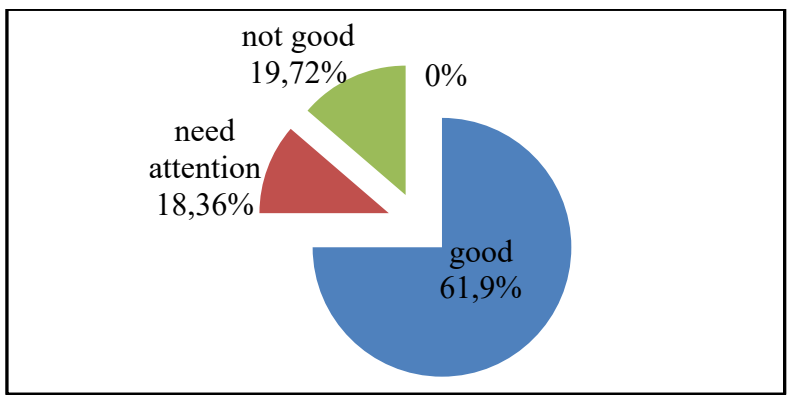

Figure 3. Current situation of recruitment and training (n=147)

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These 147 trainers are directly training 3854 athletes in 21 sports, namely: Swimming, Athletics, Taekwondo, Shooting, Sepak takraw, Pencaksilat, Karatedo, Wrestling, Weightlifting, Table Tennis, Badminton, Rowing, Canoeing, Bicycle, Boxing, Wushu, Volleyball, Boat Racing, Handball, Weightlifting, Archery. According to the survey results, the athletes' attitude towards training are: "Good" (accounted for 53.06%), "Fair" (34%), "Normal" (10.2%), "Weak" and "Poor" (2%).

Regarding employment of athletes who are no longer able to compete, the results show that 48,97% of former athletes are employed while 9.5% of them can not find a job, and about 41.49% agreed that having a job or not is "depending on the sport" (Figure 4).

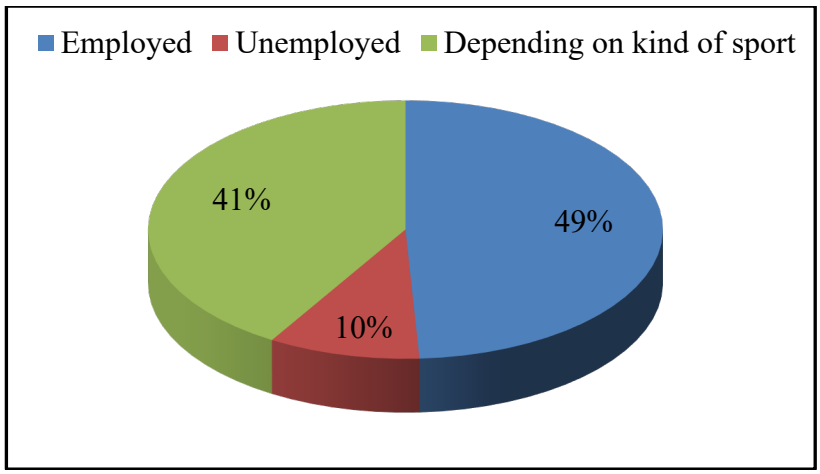

Figure 4. Survey on employment of former athletes (n=147)

Regarding attention changing of athletes at these sport training centers, "good" accounts for 51.7%, "fair" accounts for 24.48%, "normal" accounts for 20.4% and "weak" is 2% (Figure 5).

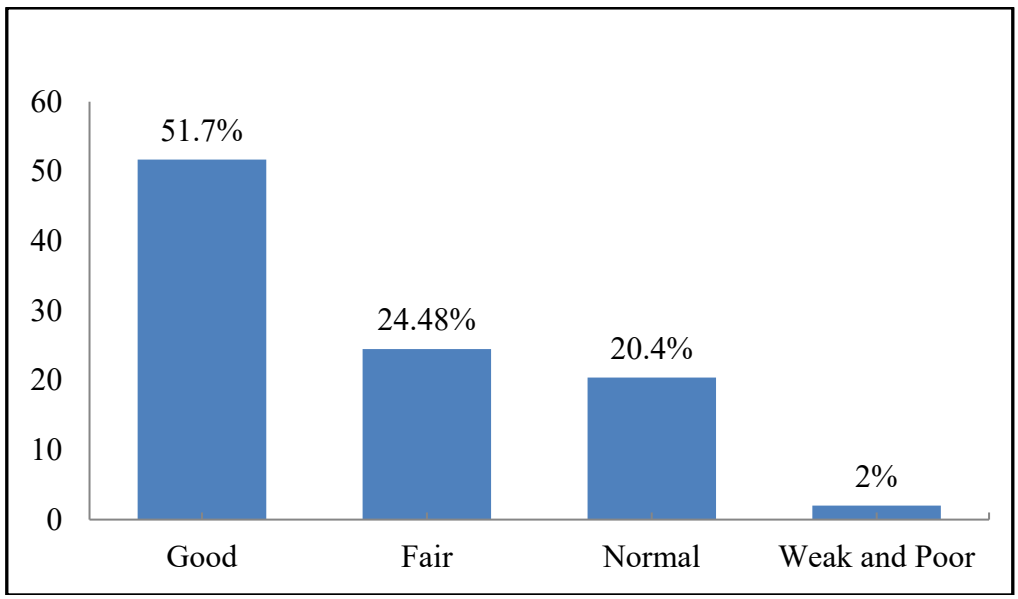

Figure 5. Current situation of attention changing of athletes in training (n=147)

Regarding facilities for selecting and training athletes, we found that only 47.6% of survey participants answered “Adequate”, 12.92% said “Inadequate” and 40.13% agreed that existing facilities “need improving” to better meet the demand of selecting and training (Figure 6).

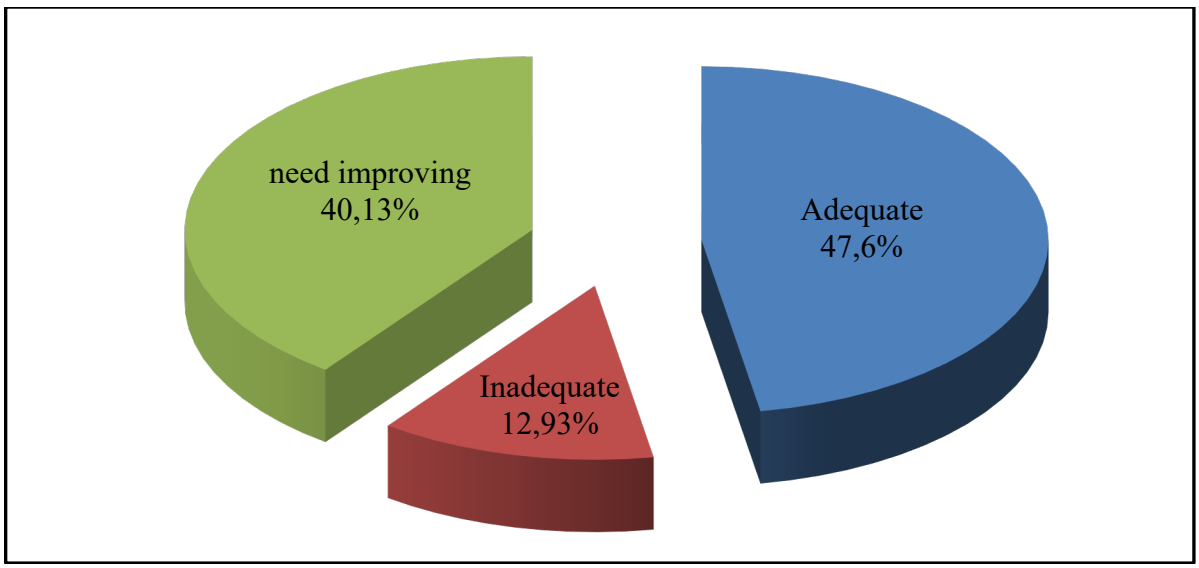

Figure 6. Current situation of facilities for selecting, training athletes (n=147)

Regarding current situation of managing and training athletes, "Good" accounted for 37.4%, "Fair" accounted for 40.1%, "Normal" accounted for 21.7% and "Weak, Poor" accounted for 1% rate (Figure 7).

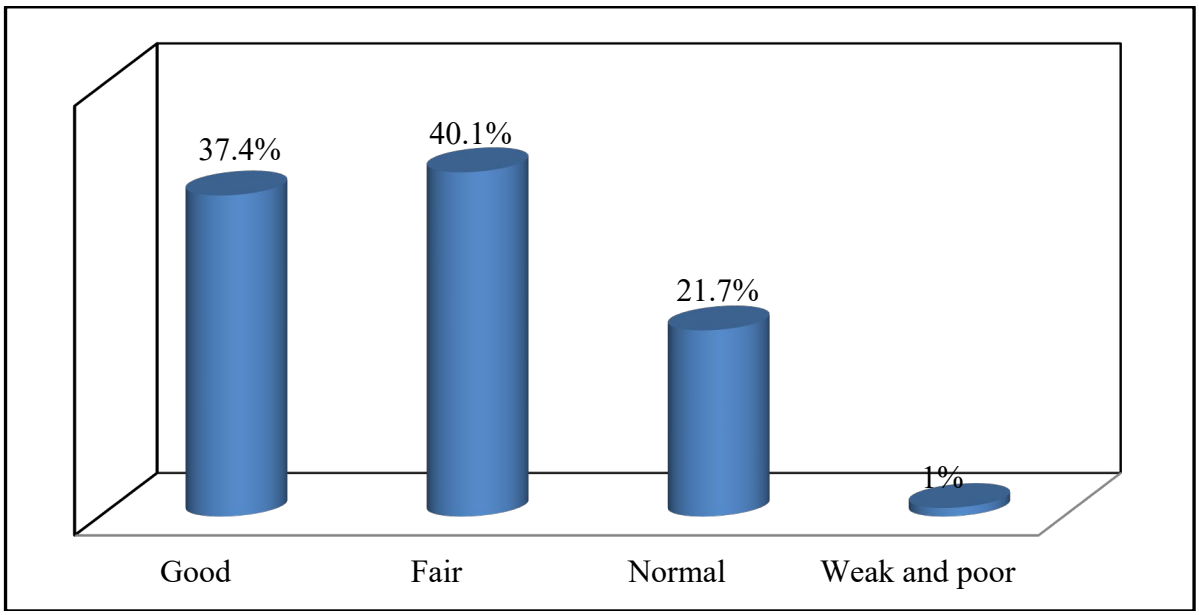

Figure 7. Current status of management and training of athletes (n=147)

The answers for current treatment policy for coaches are "appropriate" (20.4%), "inappropriate" (43.53%), and "need improving" (37.4%) (Figure 8).

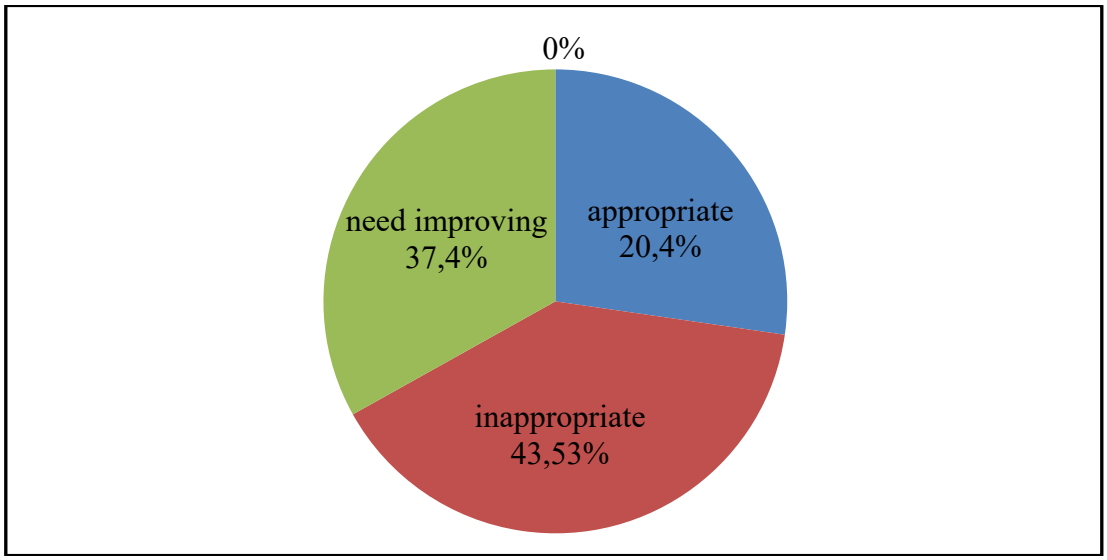

Figure 8. Survey on policies for coaches (n=147)

Regarding sending administrators, coaches, and athletes for overseas training, we found that 66.66% of respondents agreed that it is "very necessary" (66.66%), and "necessary" (33.33%) (Figure 9).

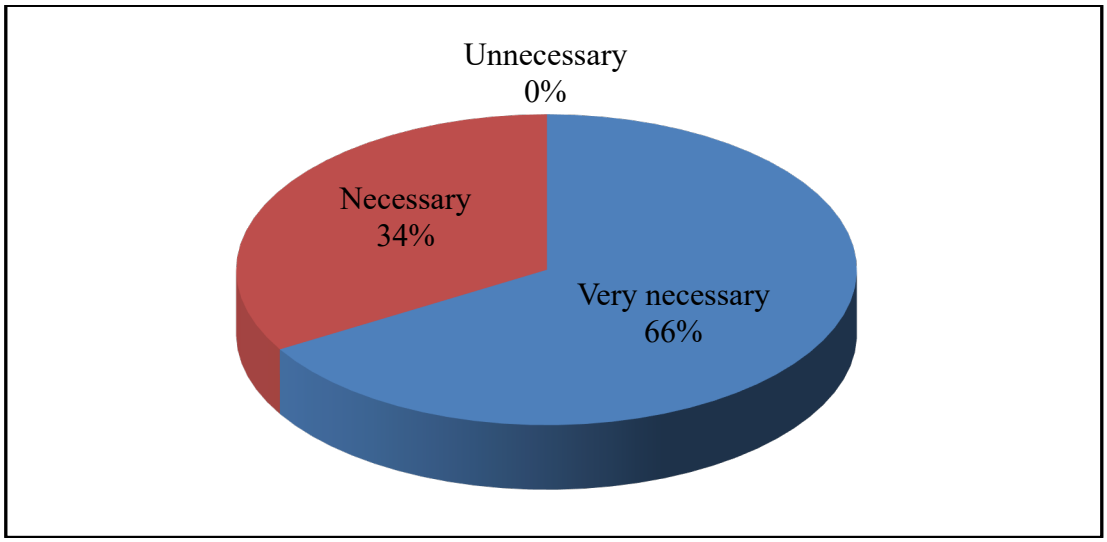

Figure 9. The need to send administrators and coaches for overseas training (n=147)

In terms of regular training courses to improve professional knowledge and awareness for coaches and athletes, 81.63% respondents agreed they are "very necessary" while only 18.36% disagreed (Figure 10).

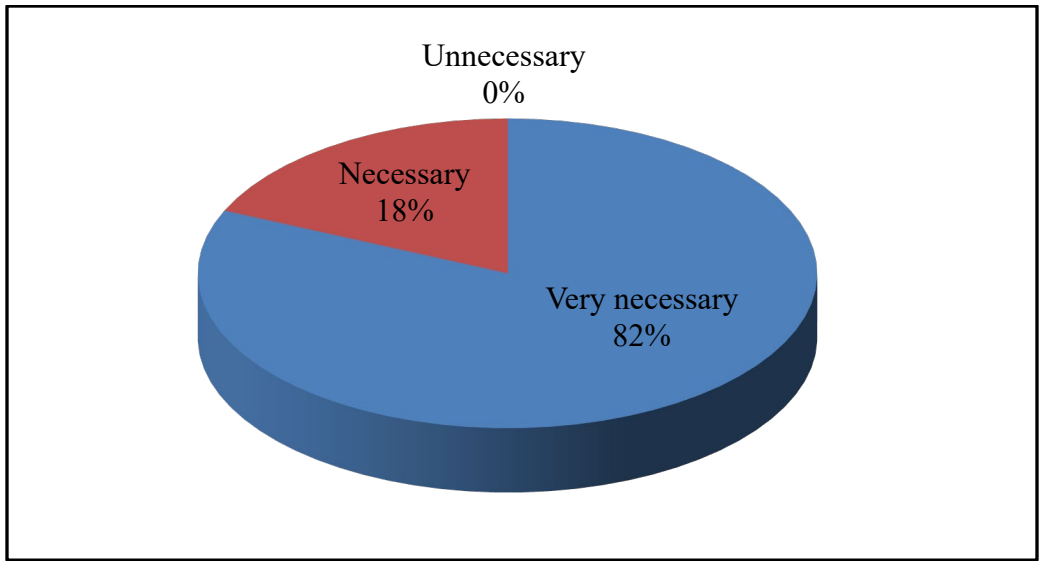

Figure 10. Opinion on organizing training courses to improve knowledge and awareness for coaches and athletes (n=147)

Additionally, 59.18% respondents agreed that domestic and international sports tournaments are "essential", while 40.81% said "necessary". About 61.9% agreed that opening courses to improve foreign language skills are "essential" while 38.09% said "necessary". Hiring qualified experts, reputable foreign referees to participate in training program is "essential" (with 55.78%), "necessary" (42.85%), and "Unnecessary" (1.36%) (Figure 11).

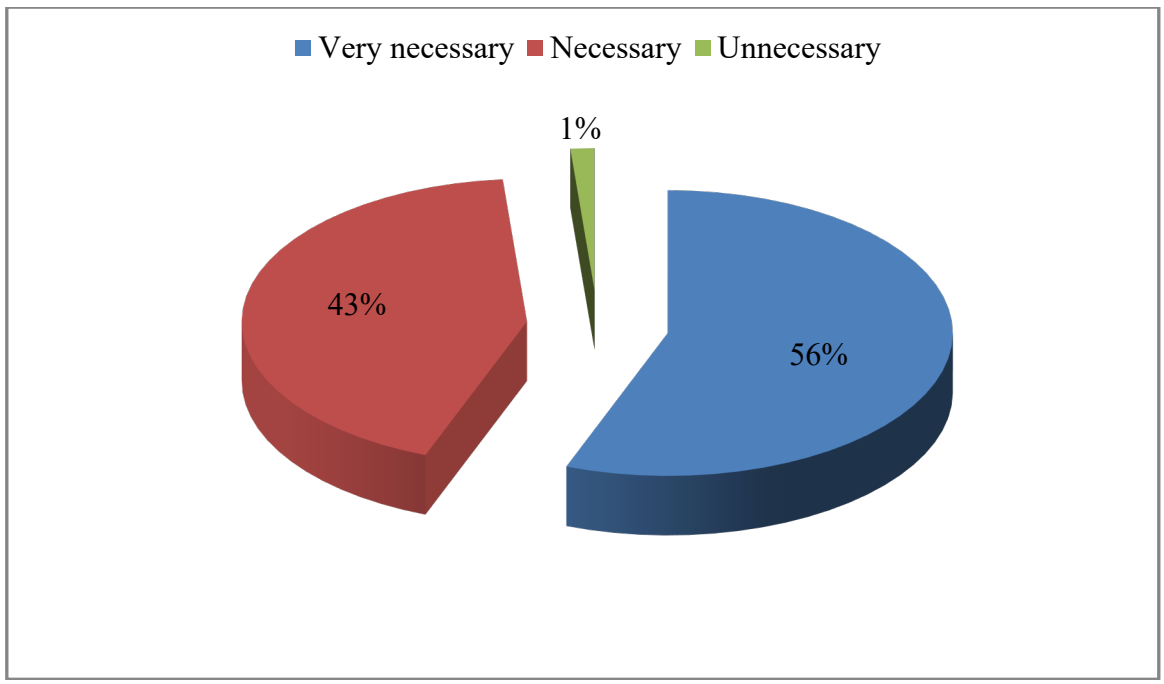

Figure 11. Opinion on hiring foreign experts in training (n=147)

3.2 Suggestions and recommendations of coaches

Apart from the above-mentioned matters, all coaches have similar needs, including: Firstly, to regularly select young talented athletes for the key sports; Secondly, to increase financial rewards for athletes with good achievements to support their lives. In this sense, they will be motivated to train and compete. Thirdly, improve specific treatments for coaches, including meals, wages, nutrition programs, supplementary foods, etc. Fourthly, to invest in upgrading facilities and equipment for sports training serving the training, selection and researching of coaches and athletes. Also, to improve the quantity and quality of assisting staff to administrators at the National training centers. Last but not least, to have appropriate appropriate preferential treatment for assisting staff, administrators of specialized sports at National training centers; to develop training classes for coaches to improve their professional capacity; and to apply information technology in training and selection of athletes.

Source: Project of selecting and training sports talents from now until 2030, vision to 2035.

References:

1. Bui Quang Hai (2015), Selection of Sports Athletes, Hanoi Sport Press.
2. Summary report of Sports training centers (2017).
3. Social study about coaches (2017)
4. Tudor O. Bompa, Ph.D. (1994) Theory and Methodology of training, Kendall/hunt publishing company, Toronto, Ontario Canada
5. Озолин. Н. Г(1986), Спортсменам о спортивной тренировке – Москва. Издательство «Физкультура и спорт»
6. В. п. губа, Москва (2008), Теория и практика спортивного отбора и ранней ориентации В виды спорта

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Comparison of Different Relaxation Methods on Reaction to Frustration Among Adults

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Abstract:

The main objective of present study was to compare the effect of three methods of relaxation namely Hatha Yoga, Aerobics followed by Yoga and General relaxation on Frustration level. Normative survey method was being used in the present study. 80 female sportspersons who had between 2 to 5 years of experience in their respective methods of achieving relaxation in the age group of 21 to 27 years from different educational institutions of Delhi were selected using random sampling technique. Reactions to Frustration Scale (RFS) constructed and standardized by Dr. B.M. Dixit and Dr. D.N. Srivastava (2004) was implemented. Descriptive statistics like mean, standard deviation MANOVA was used with the help of SPSS 23 statistical package. The findings revealed that there was significant main effect for the method/technique of relaxation used on level of frustration. Multiple comparison was being done further in which the Hatha Yoga group was found to have significantly lower level of frustration at $p > 0.1$ on aggression, fixation, regression, resignation and in total score in comparison to general relaxation group and aerobics and relaxation group. Further the aerobics relaxation group was found better than general relaxation group on level of frustration ($p < .01$).

Keywords: Reaction to Frustration, Hatha Yoga, Aerobics, General Relaxation

1. Introduction:

Physical, mental and emotional reactions to various day to day conditions, changes and demands are a natural phenomenon in every human being's life. The working professionals, students and even house wives experience varying levels of stress in one form or the other. Walter Canon (1929) had said that stress is sometimes necessary to help us with an acute response such as in "fight or flight" response condition. Just like the varying degrees of stress, there are different coping mechanisms as well that are incorporated either externally or sometimes dealt with our innate tendencies and dispositions internally. Various alternative therapies like acupressure, acupuncture, massage, yoga asana techniques have been documented to help in stress management by inducing relaxation. Some of these techniques work as a first-aid to alleviate extreme stress where as others require mastery over the period of time. In one way or the other these methods work without any considerable side effects by ensuring a healthy and productive response to the stress stimuli.

Researchers suggest that Hatha yoga, aerobics followed by relaxation and various other European techniques are known as intellectual and mental exercises, improves healthy feeling and might help in subduing the reaction to frustrating experiences manifested in our behavior that can vary from mild to severe. According to Stagner, "frustration is a state of emotional stress that is characterized by confusion, annoyance and anger". Sigmond Freud said "Frustration occurs when favorable options are blocked due to some reasons". Frustration can also result from feelings of fear of loss in an important match or inability to come up to

our own or someone's expectations or due to some sports injury. Sources of frustration can be the physical environment, due to biological limitations or due to psychological compensate. Psychologists generally study the sports person's abnormal behavior like unprovoked aggression, resignation, fixation and regression that are four major factors of manifestation of behavior off and on the field during practice and in competition. Aggression is a reaction to frustration that indicates frustration dynamics in hostile situation during the match, resignation means when the person tries desperately to escape from reality like the behavior of the player if a yellow card is being shown to him/her, regression is the tendency to revert to perceived comfortable position or reaction. For example an emotional outburst that involve crying, shouting or throwing tantrums childishly or getting overwhelmed during a confrontation and feel ourselves shut down and fixation is the fixed or compulsive type of behavior in order to deal with the challenging situation at hand like nail biting, chewing gum, smoking etc.

Frustration is likely to occur when a good player doesn't get selected despite good form, due to injury, pressure to perform well, official's decisions, fellow good players not turning up for the important match, missing easy opportunity to score a goal so and so forth. Though not a part of the present paper, it is important to mention that correct diagnosis is important before implementing techniques to learn to deal with frustrating situations on and off the sports arena because according to frustration regression hypothesis, frustration during one type of activity might have a carryover effect and can adversely affects the quality of performance in some other activity for example if a sportspersons gets frustrated due to non availability of proper training equipment then it may affect his/her ability to plan and execute or might lead to laid back attitude. India does well in mental games like chess, archery, shooting. It is therefore pertinent for the trainers and coaches to understand this important psychological, age related and experience related factor of reaction to frustration not only for the players but also for themselves that is often ignored and might affect performances.

2. Procedure:

Normative Survey method to collect the data was being used in the present study. A sample of 80 female fitness enthusiasts (28 in Hatha Yoga and relaxation group, 21 in general relaxation group and 31 in aerobics and relaxation group) in the age group of 21 to 27 years practicing their respective methods of staying fit since more than 2 up to 5 years from various yoga, health and fitness centers and sports academies was collected using random sampling technique. Reactions to Frustration Scale (RFS), constructed and standardized by Dr. B.M. Dixit and Dr. D.N. Srivastava (2004) was being implemented. This scale covers four reactions namely-aggression, resignation, fixation and regression to meet the growing demands of the psychologists engaged in the measurement of reaction to frustration. It consists of 40 items out of which each reaction to frustration has 10 items equally divided into positive and negative items. The test items are presented as simple statements with six alternative responses.

Table 1. Shows item distribution in the various reactions to frustration

Item Distribution in RFS

SI. No.	Reaction to Frustration	SI. No. of Positive Items	SI. No. of Negative Items	Total
1	Aggression (AGG)	1-5	21-25	10
2	Resignation (RES)	6-10	26-30	10
3	Fixation (FIX)	11-15	31-35	10
4	Regression (REG)	16-20	36-40	10=40

Reliability:

The test has sufficient degree of reliability. The reliability of the RFs was determined by two methods – test-retest method and method of internal consistency. The test-retest reliability of the test ranges from 0.62 to 0.82 and the internal consistency reliability ranges from 0.61 to 0.78. All these reliability coefficients use high and significant.

Validity:

The scale was validated against Nairashya Mapa by Chauhan (1972), Verbal Frustration Test by Muthayya (1976) and Situational Test of Frustration by Malviya (1977). The validity against different criteria ranged from 0.42 to 0.80. Obtained correlation coefficient was found significant, providing evidence for sufficient degree of validity coefficient.

Table 2. Norms for interpretation of frustration level response

Percentile	Agg	Res	Fix	Reg	Total	Interpretation
100	39	44	45	44	159	Very High Frustration
95	35	38	39	42	130	
90	32	32	35	39	121	
80	28	29	33	36	115	
75 (Q_3)	27	28	32	34	113	High Frustration
70	26	27	31	32	110	
60	24	26	29	31	107	Average Frustration
50 (Md)	23	24	27	30	104	
40	21	23	25	28	101	
30	20	21	23	26	96	Low Frustration
25 (Q_1)	19	20	22	23	94	
20	17	19	21	21	91	Very Low Frustration
10	14	15	16	19	84	
5	11	13	12	16	72	

Hypothesis:

The research questions (Ho) of interest was - is there a main effect for type of activity being practiced by the subjects? That is, do practitioners group differ significantly in their frustration level, if yes then and which group is higher than the other.

3. Results and discussion:

Normative Survey method to collect the data was being used in the present study. A sample of 80 female fitness enthusiasts (28 in Hatha Yoga and relaxation group, 21 in general relaxation group and 31 in aerobics and relaxation group) in the age group of 21 to 27 years practicing their respective methods of staying fit since more than 2 up to 5 years from various yoga, health and fitness centers and sports academies was collected using random sampling technique. Reactions to Frustration Scale (RFS), constructed and standardized by Dr. B.M. Dixit and Dr. D.N. Srivastava (2004) was being implemented. This scale covers four reactions namely-aggression, resignation, fixation and regression to meet the growing demands of the psychologists engaged in the measurement of reaction to frustration. It consists of 40 items out of which each reaction to frustration has 10 items equally divided into positive and negative items. The test items are presented as simple statements with six alternative responses.

Table 3. Descriptive statistics of type of activity and level of frustration sub factors

Reaction to Frustration variable	Type of Activity	Mean	Std. Deviation	N
Aggression	Hatha Yoga rel	18.821	2.1951	28
	Aerobics & rel	20.258	1.1823	31
	General Rel	20.952	2.0850	21
	Total	19.937	2.0084	80
Fixation	Hatha Yoga rel	22.964	2.0089	28
	Aerobics & rel	25.225	1.9614	31
	General Rel	27.047	2.4591	21
	Total	24.912	2.6394	80
Regression	Hatha Yoga rel	25.571	2.7001	28
	Aerobics & rel	29.064	2.7439	31
	General Rel	31.428	3.1236	21
	Total	28.462	3.6420	80
Resignation	Hatha Yoga rel	20.964	2.0454	28
	Aerobics & rel	22.838	1.8456	31
	General Rel	23.952	2.2688	21
	Total	22.475	2.3383	80
Total Level of Frustration	Hatha Yoga rel	88.321	5.3545	28
	Aerobics & rel	97.387	6.2539	31
	General Rel	103.381	7.7812	21
	Total	95.787	8.7217	80

Descriptive statistics table-3 shows that the mean and standard deviation values for Hatha yoga and relaxation group on aggression variable was 18.82 ± 2.19, for aerobics and relaxation group on aggression variable it was 20.25 ± 1.18, for general relaxation group on

aggression variable it was 20.25 ± 2.08. Mean and standard deviation values for Hatha yoga and relaxation group on fixation was 22.96 ± 2.00, for aerobics and relaxation group on fixation variable it was 25.22 ± 1.96, for general relaxation group on fixation variable it was 27.04 2.45. Mean and standard deviation value for Hatha yoga relaxation group on regression variable was 25.57 ± 2.70, for aerobics and relaxation group on regression variable it was 29.06 ± 2.74, for general relaxation group on regression variable mean and standard deviation values was 31.42 ± 3.12. Mean and standard deviation value for hatha yoga relaxation group on resignation variable was 20.96 ± 2.04. For aerobics and relaxation group on resignation value it was 22.83 ± 1.84, for general relaxation group on resignation variable mean and standard deviation value was 23.95 ± 2.26. Mean and standard deviation value of hatha yoga relaxation group on total level of frustration was 88.32 ± 5.35, for relaxation and aerobics group on total level of frustration variable mean and standard deviation value was 97.38 ± 6.25. Mean and standard deviation for general relaxation group on total level of frustration variable was 103.38 ± 7.78. These initial statistics (presented in table-3) suggest that the Hatha yoga and relaxation group was better than the other two groups on all the variables of reaction to frustration. Similarly the aerobics with relaxation group was better than the general relaxation group on all the five reaction to frustration variables.

Table 4. Multivariate Tests

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared	Observed Powerd
Intercept	Pillai's Trace	1.00	4355.674b	4	74.00	0.00	0.996	1.00
	Wilks' Lambda	0.00	4355.674b	4	74.00	0.00	0.996	1.00
	Hotelling's Trace	235.44	4355.674b	4	74.00	0.00	0.996	1.00
	Roy's Largest Root	235.44	4355.674b	4	74.00	0.00	0.996	1.00
Type of activity/ relaxation method used	Pillai's Trace	0.49	6.059	8	150.00	0.00	0.244	1.00
	Wilks' Lambda (ʎ)	0.51	7.298b	8	148.00	0.00	0.283	1.00
	Hotelling's Trace	0.94	8.571	8	146.00	0.00	0.320	1.00
	Roy's Largest Root	0.93	17.505c	4	75.00	0.00	0.483	1.00
a. Design: Intercept + Type of activity/relaxation method used								
b. Exact statistic								
c. The statistic is an upper bound on F that yields a lower bound on the significance level								
d. Computed using alpha = .05								

Table-4 presents four lines of data, each of which represents a calculation for multivariate significance (we are concerned only with the outcomes reported in the 'Type of activity/relaxation method used'; we ignore 'Intercept'). Wilks' Lambda (ʎ) was the best option here as we have three groups. That line of data is highlighted in yellow in table-4. We have a significant multivariate effect for the combined dependent variables of reaction to frustration in respect of the type of activity/relaxation method adopted: ʎ= 0.51, F (8, 148) = 7.298, p < .001).

Table 5. Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	Observed Power[f]
Corrected Model	Aggression	59.692a	2	29.846	8.873	0.00	0.187	0.967
	Fixation	205.051b	2	102.526	22.86	0.00	0.373	1
	Regression	430.017c	2	215.008	26.795	0.00	0.41	1
	Resignation	113.840d	2	56.92	13.778	0.00	0.264	0.998
	Total Level of Frustration	2850.973e	2	1425.487	34.752	0.00	0.474	1
Intercept	Aggression	31177.29	1	31177.29	9269.101	0.00	0.992	1
	Fixation	48971.75	1	48971.75	10919.29	0.00	0.993	1
	Regression	64080.04	1	64080.04	7985.75	0.00	0.99	1
	Resignation	39715.68	1	39715.68	9613.358	0.00	0.992	1
	Total Level of Frustration	723001.3	1	723001.3	17626.28	0.00	0.996	1
Type of activity/ relaxation method used	Aggression	59.692	2	29.846	8.873	0.00	0.187	0.967
	Fixation	205.051	2	102.526	22.86	0.00	0.373	1
	Regression	430.017	2	215.008	26.795	0.00	0.41	1
	Resignation	113.84	2	56.92	13.778	0.00	0.264	0.998
	Total Level of Frustration	2850.973	2	1425.487	34.752	0.00	0.474	1
Error	Aggression	258.995	77	3.364				
	Fixation	345.336	77	4.485				
	Regression	617.871	77	8.024				
	Resignation	318.11	77	4.131				

	Total Level of Frustration	3158.414	77	41.018				
Total	Aggression	32119	80					
	Fixation	50201	80					
	Regression	65857	80					
	Resignation	40842	80					
	Total Level of Frustration	740029	80					
Corrected Total	Aggression	318.687	79					
	Fixation	550.388	79					
	Regression	1047.887	79					
	Resignation	431.95	79					
	Total Level of Frustration	6009.388	79					
a. R Squared = .187 (Adjusted R Squared = .166)								
b. R Squared = .373 (Adjusted R Squared = .356)								
c. R Squared = .410 (Adjusted R Squared = .395)								
d. R Squared = .264 (Adjusted R Squared = .244)								
e. R Squared = .474 (Adjusted R Squared = .461)								
f. Computed using alpha = .05								

Table-5 suggests that all the five dependent variables differed significantly in respect of the independent variable (Type of relaxation method used): Aggression: F (2, 77) = 29.846, p = .000; Fixation: F (2, 77) = 102.526, p = .000; regression: F (2, 77) = 215.088, p = .000; Resignation: F (2, 77) = 56.92, p = .000; Total level of frustration: F (2, 77) = 1425.487, p = .000.

Dependent Variables			**Mean Difference (I-J)**	**Std. Error**	**Sig.**	**95% Confidence Interval**	
						Lower Bound	**Upper Bound**
Aggression	Hatha Yoga Relaxation	Aerobics & Relaxation	–1.4366*	0.478	0.01	–2.58	–0.29
		General Relaxation	–2.1310*	0.529	0.00	–3.40	–0.87
	Aerobics & Relaxation	Hatha Yoga Relaxation	1.4366*	0.478	0.01	0.29	2.58
		General Relaxation	–0.6943	0.518	0.38	–1.93	0.54
	General Relaxation	Hatha Yoga Relaxation	2.1310*	0.529	0.00	0.87	3.40

		Aerobics & Relaxation	0.6943	0.518	0.38	–0.54	1.93
Fixation	Hatha Yoga Relaxation	Aerobics & Relaxation	–2.2615*	0.552	0.00	–3.58	–0.94
		General Relaxation	–4.0833*	0.611	0.00	–5.54	–2.62
	Aerobics & Relaxation	Hatha Yoga Relaxation	2.2615*	0.552	0.00	0.94	3.58
		General Relaxation	–1.8218*	0.599	0.01	-3.25	-0.39
	General Relaxation	Hatha Yoga Relaxation	4.0833*	0.611	0.00	2.62	5.54
		Aerobics & Relaxation	1.8218*	0.599	0.01	0.39	3.25
Regression	Hatha Yoga Relaxation	Aerobics & Relaxation	–3.4931*	0.739	0.00	-5.26	-1.73
		General Relaxation	–5.8571*	0.818	0.00	-7.81	-3.90
	Aerobics & Relaxation	Hatha Yoga Relaxation	3.4931*	0.739	0.00	1.73	5.26
		General Relaxation	–2.3641*	0.801	0.01	-4.28	-0.45
	General Relaxation	Hatha Yoga Relaxation	5.8571*	0.818	0.00	3.90	7.81
		Aerobics & Relaxation	2.3641*	0.801	0.01	0.45	4.28
Resignation	Hatha Yoga Relaxation	Aerobics & Relaxation	–1.8744*	0.530	0.00	-3.14	-0.61
		General Relaxation	–2.9881*	0.587	0.00	-4.39	-1.59
	Aerobics & Relaxation	Hatha Yoga Relaxation	1.8744*	0.530	0.00	0.61	3.14
		General Relaxation	–1.1137	0.574	0.13	-2.49	0.26
	General Relaxation	Hatha Yoga Relaxation	2.9881*	0.587	0.00	1.59	4.39
		Aerobics & Relaxation	1.1137	0.574	0.13	-0.26	2.49
Total Level of Frustration	Hatha Yoga Relaxation	Aerobics & Relaxation	–9.0657*	1.670	0.00	-13.06	-5.08
		General Relaxation	–15.0595*	1.849	0.00	-19.48	-10.64
	Aerobics & Relaxation	Hatha Yoga Relaxation	9.0657*	1.670	0.00	5.08	13.06
		General Relaxation	–5.9939*	1.810	0.00	-10.32	-1.67
	General Relaxation	Hatha Yoga Relaxation	15.0595*	1.849	0.00	10.64	19.48
		Aerobics & Relaxation	5.9939*	1.810	0.00	1.67	10.32
Based on observed means. The error term is Mean Square (Error) = 41.018.							
*. The mean difference is significant at the .05 level.							

Since we had three groups for our independent variable, post hoc test was being used to explore the source of the significant difference. Table-6 presents the post hoc tests using the Tukey HSD outcome.

1. Table-5 and 6 shows that on aggression variable, the Hath yoga relaxation group was having significantly less severe reaction than aerobics and relaxation group (p = .01) and the general relaxation group (p = .00). There was no significant difference between aerobics and relaxation group vs general relaxation group (p = 0.38) on aggression.
2. On fixation variable Hatha yoga relaxation group showed significantly less severe reaction in comparison with aerobics and relaxation group (p = .00) and general relaxation group (p = .00). There was significantly lower fixation level among aerobics and relaxation group than general relaxation group (p = 0.01).
3. On regression variable Hatha yoga relaxation group showed significantly less severe reaction than aerobics and relaxation group (p = .00) and same as for the general relaxation group (p = .00). There was significantly lower regression level among aerobics and relaxation group than general relaxation group (p = 0.01).
4. On resignation variable Hatha yoga relaxation group showed significantly less severe reaction than aerobics and relaxation group (p = .00) and lesser than general relaxation group (p = .00). There was no significant difference on resignation level between aerobics and relaxation group and general relaxation group (p = 0.13).
5. Total value of level of frustration variable of Hatha yoga relaxation group was significantly less than the aerobics and relaxation group (p = .00) and also significantly less than the general relaxation group (p = .00). There was also significant lower total frustration level among aerobics and relaxation group as compared to general relaxation group (p = .00).

Very limited closely related studies were found. To quote two of the most suitable ones, Parthasarathy S et. al. (2014) in their study on Effect of Integrated Yoga Module on Selected Psychological Variables among Women with Anxiety Problem found that the selected yoga and asanas decreased anxiety and frustration scores but treatment with an integrated yoga module resulted in significant reduction of anxiety and frustration in women, and yoga as an integrated module significantly improved anxiety scores in young women with proven anxiety without any ill effects.

In contrast to the present study, Vollbehr NK et al. (2018) in their study entitled "Hatha yoga for acute, chronic and/or treatment-resistant mood and anxiety disorders: A systematic review and meta-analysis found eighteen studies, fourteen in acute patients and four in chronic patients. Most studies were of low quality. For depression outcomes, hatha yoga did not show a significant effect when compared to treatment as usual, an overall effect size of Cohen's d -0.64 (95% CI = -1.41, 0.13) or to all active control groups, Cohen's d -0.13 (95% CI = -0.49, 0.22). A sub-analysis showed that yoga had a significant effect on the reduction of depression compared to psychoeducation control groups, Cohen's d -0.52 (95% CI = -0.96, -0.08) but not to other active control groups, Cohen's d 0.28 (95% CI = -0.07, 0.63) Regarding anxiety, hatha yoga had no significant effect when compared to active control groups, Cohen's d -0.09 (95% CI = -0.47, 0.30). The I2 and Q-statistic revealed heterogeneity amongst comparisons. Qualitative analyses suggest some promise of hatha yoga

for chronic populations. The researchers further said that the ability to draw firm conclusions is limited by the notable heterogeneity and low quality of most of the included studies. With this caveat in mind, the results of the this meta-analysis suggest that hatha yoga does not have effects on acute, chronic and/or treatment-resistant mood and anxiety disorders compared to treatment as usual or active control groups. However, when compared to psychoeducation, hatha yoga showed more reductions in depression. The researchers said it is clear that more high-quality studies are needed to advance the field.

4. Conclusion

Main effect of type of method/technique being practiced on frustration level is highly significant means that the 3 groups differ in their frustration level. In summary, the multivariate analyses indicated that the Hatha yoga group differed significantly in respect of frustration level; those dependent variables were not too highly correlated. Subsequent univariate analyses showed that there were significant effects for type of relaxation method adopted on level of frustration and (separately) in respect of scores. Tukey post hoc analysis suggested that Hatha yoga group were significantly less frustrated than aerobics and general relaxation groups, and that aerobics group was significantly less frustrated than general relaxation group but the frustration response was not better than that of Hatha yoga group. Below is the graphical representation of scores of all the 3 groups (independent variables) on 5 levels of frustration.

References:

1. Stagner R., Psychology of Personality, (3rd Ed.) New York: McGraw Hill, (1961)
2. Freud S., New Introductory Lectures on Psycho-analysis. New York, Norton, (1933)
3. Dixit, B.M and Srivastava, D.N. 2004. Reactions to Frustration Scale. National Psychological Corporation, Agra.
4. Parthasarathy S, Jaiganesh K, Duraisamy. Effect of Integrated Yoga Module on Selected Psychological Variables among Women with Anxiety Problem. West Indian Med J. 2014;63(1):78-80. doi:10.7727/wimj.2012.054
5. Vollbehr NK, Bartels-Velthuis AA, Nauta MH, et al. Hatha yoga for acute, chronic and/or treatment-resistant mood and anxiety disorders: A systematic review and meta-analysis [published correction appears in PLoS One. 2019 May 2;14(5):e0216631]. PLoS One. 2018;13(10):e0204925. Published 2018 Oct 1. doi:10.1371/journal.pone. 0204925.

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Comparison of Sportspersons of Different Games on Emotional Maturity

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Abstract:

The present study was being undertaken to compare the male sportspersons from football, basketball, athletics and swimming sports on Emotional Maturity. The investigators adopted normative survey method for the present study. 132 sportspersons who had between 2 to 5 years of playing experience at minimum state level participation in the age group of 18 to 25 years from different educational institutions of Delhi were selected using random sampling technique. Emotional Maturity Scale of Dr. Yashvir Singh and Dr. Mahesh Bhargava (1999) was implemented to collect data. Descriptive statistics like mean, standard deviation and one way ANOVA was used with the help of SPSS 23 statistical package. The findings revealed that there was no significant difference between the four groups of sportspersons on Emotional Maturity.

Keywords: Emotional Maturity, Sportspersons, SPSS

1. Introduction:

Maturation is an important factor in education and sports as it plays an important role in modifying human's experience transforms their instinctive urges and impulses and determines their attitude and beliefs. Sports involve a lot of emotions from the beginning of sporting career to peak performance. The maturity level and emotions of the spectators also play an important role that determines crowd behavior and has its influences on socio-political front as can be seen when India is playing against Pakistan. Emotions are important components of our daily lives. A person becomes emotionally mature naturally with growth and development. A sportspersons maturity can be seen in terms of his/her ability to perform a skill or movement in a manner that is desirable to his/her age and gender failing which it is often seen that the child would not pursue sports as a career. A lot of work is being dedicated to emotional intelligence, strength and maturity in schools and colleges. Even corporate houses are laying emphasis on emotional stability of their employees to get the best out of them and develop them in life. As we develop through childhood to adolescence to adulthood, our emotions become more easily classified as fear, hatred, anger, disgust, passion, Joy etc. Emotional Maturity refers to the degree to which a person has realized his/her potential for richness of having and has developed his capacity to enjoy things, to love and to laugh, his capacity for whole hearted sorrow when occasion for grief arises. Emotional Maturity not only reflects one's personality but it also helps to provide right direction during a person's development. The concept of mature emotional behavior of any level is that which reflects the

fruits of normal emotional development. Emotional Maturity implies having awareness about the emotions rather than controlling emotions. There is a lack of interest amongst the social science researchers and psychologists to study emotional maturity as one of the major factors affecting student behavior. Objective of the present study is to analyze the emotional maturity of the sportspersons from different sports. It has been hypothesized that there will be no significant difference in the emotional maturity among sportspersons.

2. Procedure:

Normative Survey method was being used in the present study. A sample of around 200 male sportspersons in the age group of 18 to 25 years between 2 to 5 years of playing experience at minimum state level participation from various coaching centers and sports academies was collected using random sampling technique. Finally 132 sportspersons from 4 disciplines namely football, basketball, athletics and swimming who completed the full procedure were studied. Emotional Maturity Scale of Dr. Yashvir Singh and Dr. Mahesh Bhargava (1999), English version, was implemented. Emotional maturity scale deals with interplay of forces with intensities and quantities in terms of different aspects:

1. Emotional instability
2. Emotional regression
3. Social maladjustment
4. Personality disintegration
5. Lack of independence
6. Total score

Only total score was being considered in the present study. Emotional maturity scale has a total of 48 items and is a self- reporting five-point scale. The five reply options and corresponding scores awarded were:

Very much	5 marks
Much	4 marks
Undecided	3 marks
Probably	2 marks
Never	1 mark

Hypothesis:

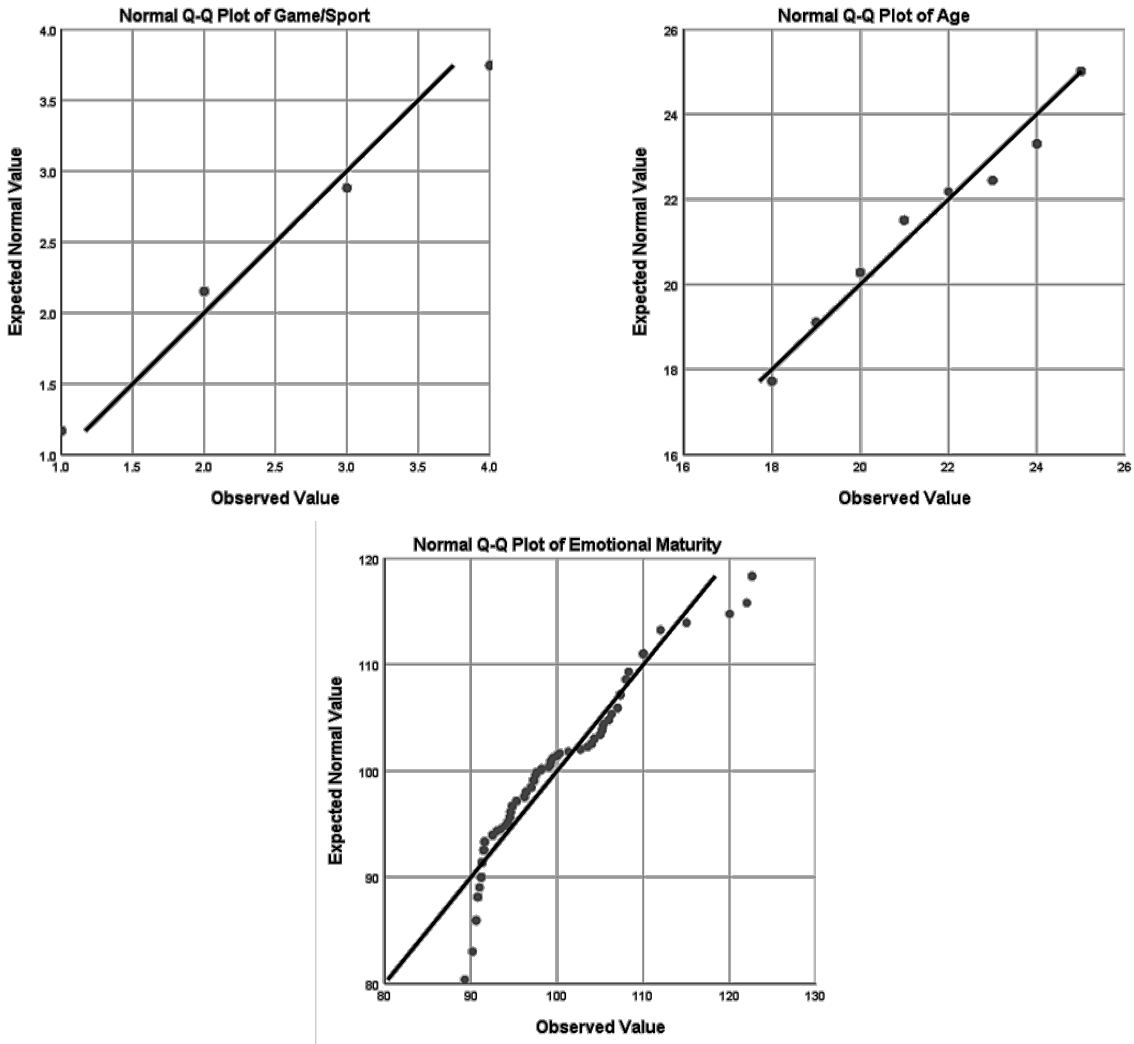
Ho = Null hypothesis was framed that says there will not be significant differences on emotional maturity of basketballers, footballers, athletes and swimmers.

Ha = Alternate hypothesis was framed that says there will be significant differences on emotional maturity of basketballers, footballers, athletes and swimmers.

The descriptive statistics like mean, standard deviation and ANOVA was used to draw inferences.

3. Results and Discussion:

Fig-1. 3 graphs showing Q-Q plots of game/sport, age and emotional maturity variables



Since the points of each Q-Q Plot lie close to their respective diagonal lines, we conclude that each of the data groups is from an approximately normally distributed population.

Table 1. Test of Homogeneity of Variances

		Levene Statistic	df1	df2	Sig.
Emotional Maturity	Based on Mean	1.087	3	128	0.357
	Based on Median	0.804	3	128	0.494
	Based on Median and with adjusted df	0.804	3	122.064	0.494
	Based on trimmed mean	0.998	3	128	0.396

Table-1 shows homogeneity of variances on emotional maturity. The Levene Statistic p-value = Sig. = 0.357 is greater than α = 0.01, so we fail to reject the null hypothesis that the variances are all equal. Since the variances appear to be equal (and we have random/ independent samples), we may continue with ANOVA.

Fig-2. Mean and SD of age variable of all players from 4 sports disciplines

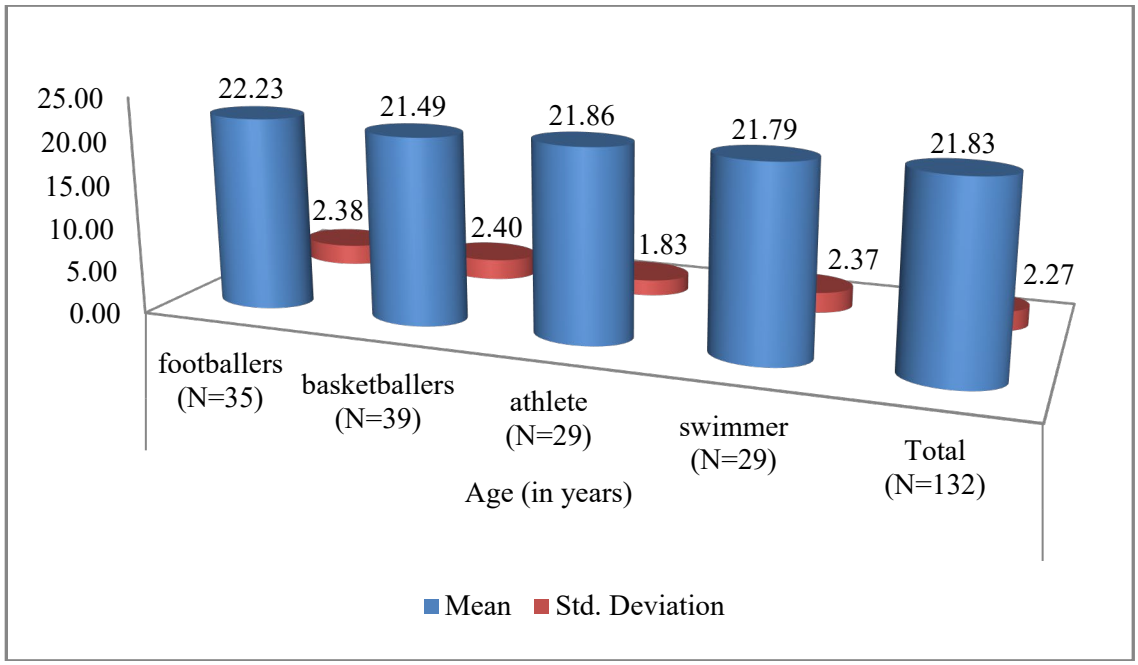


Table 2. Descriptive statistics for Emotional Maturity (EM) variable of sportspersons

Variable	Group	Mean	Std. Deviation	Std. Error	Minimum	Maximum
Emotional Maturity	Footballers (N=35)	99.13	8.26	1.40	89.30	122.60
	Basketballers (N=39)	100.51	6.99	1.12	91.20	122.00
	athlete (N=29)	99.68	6.80	1.26	91.00	110.00
	Swimmers (N=29)	101.27	8.55	1.59	90.60	122.60
	Total (N=132)	100.13	7.62	0.66	89.30	122.60

Table-2 shows that the mean emotional maturity (EM) value for footballers was 99.13±8.26, mean EM value for basketballers was 100.51±6.99, mean EM value for athletes was 99.68±6.80, mean EM value for swimmers was 101.27±8.55.

Fig-3. Mean and SD of age variable of all players from 4 sports disciplines

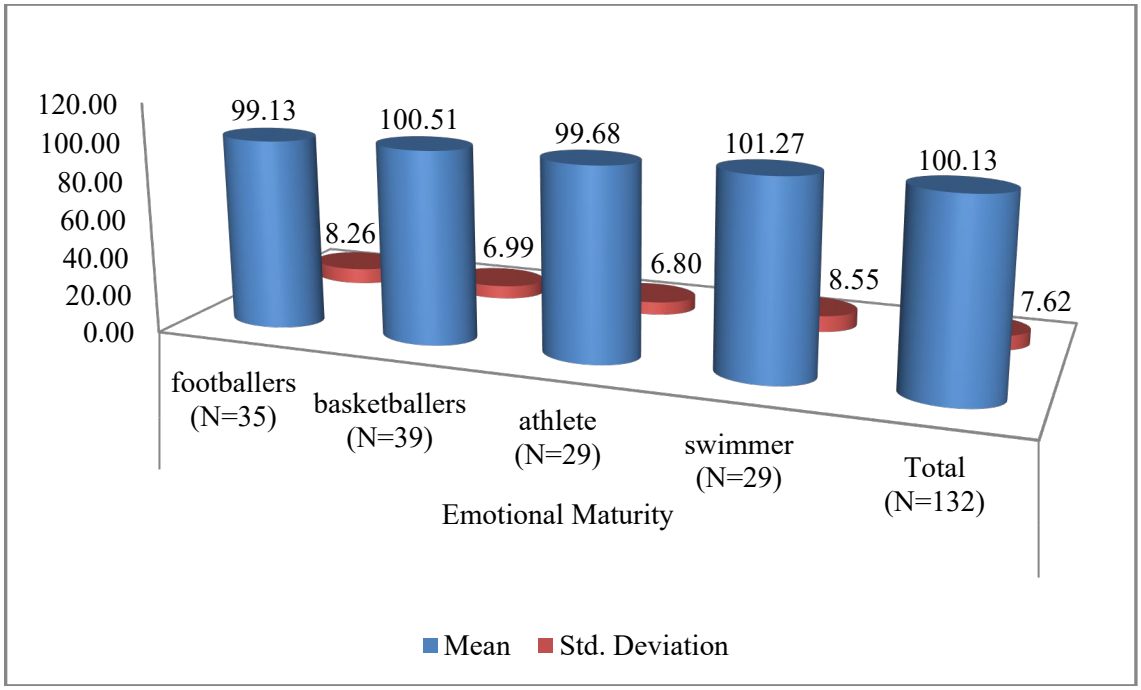


Table 3. One way ANOVA showing differences between groups on emotional maturity

		Sum of Squares	df	Mean Square	F	Sig.
Emotional Maturity	Between Groups	84.51	3.00	28.17	0.48	0.70
	Within Groups	7516.73	128.00	58.72		
	Total	7601.25	131.00			

According to the one-way ANOVA for emotional maturity (F(3,128) = 0.48, p-value = 0.70), it can be said that there was a statistically non significant difference between the groups. Null hypothesis is therefore accepted and alternate hypothesis thence is accepted.

Singh, Kaur and Dureja (2012) studied 200 male and female subjects, out of which one hundred [N = 100] sportspersons (N = 50 male and N = 50 female) and one hundred [N = 100] non-sportspersons (N = 50 male and N = 50 female) of various affiliated colleges and campus of Punjab University, Chandigarh. Sportspersons were those who had participated in Inter-college and Interuniversity competitions in various games/sports. Non–sportspersons were those students who did not participate in any game or sport activity. The age of all subjects was ranged between 18 to 26 years. Significant differences on the sub-variable Social Maladjustment between male sportspersons and female sportspersons were seen. However, no significant differences were found with regard to emotional instability, emotional regression, personality disintegration, lack of independence, 'emotional maturity' (total) between male sportspersons and female sportspersons. The results with regard to male non-sports persons and female non-sportspersons revealed significant differences on emotional instability,

emotional regression, social maladjustment, personality disintegration, lack of independence and emotional maturity (total). Rathee & Salh (2010) found that the international players are significantly better in emotional maturity as compared to state level players.

4. Conclusion:

The null hypothesis that there will not be any significant differences in the emotional maturity of sportspersons from 4 different sports has been found to be true and therefore the alternate hypothesis that at least one of the variances will be found significantly different between the 4 groups is rejected. So the emotional maturity level of the basketball players, football players, athletes and swimmers was same.

References:

1. Dalwinder Singh, Simerjeet Kaur and Gaurav Dureja. "Emotional Maturity differentials among University Students." Journal of Physical Education and Sports Management (May 2012), Vol. 3(3): 41-45.
2. Rathee NK, Salh MS. Exploring Cognitive Style and Emotional Maturity among Indian Handball Players Performing at Varying Level. International Journal of sports Science and physical Education. 2010; 1(1):26-33
3. Yashvir Singh and Bhargava. M (2007). Emotional Maturity Scale.

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Effect and Relief from Yoga Therapy on various Factors to the Patients Suffering with Multiple Sclerosis

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Abstract:

This examination planned to survey the plausibility of customized yoga treatment mediation in a private setting and its impact on Quality of Life (QOL), sleep quality, and side effect help among patients with Multiple sclerosis (MS). A solitary gathering pre and post-trial study was directed among 10 individuals from the Multiple Sclerosis Society of India between December 2018 and April 2019. At pattern and during development, QOL, sleep quality, indications, and torment were surveyed utilizing the Multiple Sclerosis Quality of Life, Pittsburgh Sleep Quality Index, MS Symptom Checklist, and visual simple scale, separately. The intercession contained 12 private redid yoga meetings of 1 hour term and three gathering meetings; all spread more than 3 months. Understanding input and direct perceptions by the yoga specialist were reported at every meeting. Ten patients (seven female, three male, age 31–52 years) were taken a crack at the yoga mediation; seven finished 8–12 meetings, and three finished less than 5 meetings. Specialist to tolerant proportion was 1:2. All areas aside from sexual capacity indicated clinically huge improvement in QOL scores. Factually critical improvement was found in social capacity ($p = 0.014$) and change in health status ($p = 0.029$) scores after the intercession. In spite of the fact that there was improvement in agony and rest quality, these progressions were not factually critical. Patients detailed improvement in side effects with training of yoga close by way of life changes. The examination bolsters the attainability of this 3-month yoga mediation for patients with MS. Studies with bigger example sizes are needed to affirm our discoveries.

Keywords: therapeutic yoga, Multiple sclerosis (MS), MS symptom management, asana for MS, pranayama

Introduction:

Multiple sclerosis (MS) is an ongoing fiery demyelinating malady that influences the central nervous system and prompts fluctuating degrees of inability in influenced people. The infection, when thought about uncommon, is by and large progressively determined in India to have enhancements in demonstrative modalities and accessibility of nervous system specialists. Despite the fact that network based evaluations are not accessible, the predominance from clinic based examinations is supposedly as high as 7–10 for each 100,000 populace, almost 180,000 patients in total numbers. Beginning of infection commonly happens in youthful grownups matured 20–40 years and is more predominant in females than in guys. The malady has complex pathophysiology; henceforth, there is consistently eccentricism and variety in people in dis-ease movement, seriousness, and signs and symptoms[1] which influences quality of life (QOL).[2] Fatigue, asthenia, balance and mobility loss, depression, and decreased cognitive function are basic issues experienced by MS patients[3]. Symptomatic administration of the condition with prescription has momentary advantages. Proof for long haul benefits is missing, and unfavorable impacts are

reported[4,5]. Of first significance in patients with MS is upgrading physical capacity and QOL, as there is no fix. Numerous patients utilize offbeat medicines or correlative and elective medication (CAM) that incorporates physical mediations, treatments, and diets. Physical intercessions that have demonstrated improved indicative administration are needle therapy, chiropractic medication, cooling treatment, dental mixture expulsion, Feldenkrais, guided symbolism and unwinding, hyperbaric oxygen, attractive field treatment, knead, neural treatment, reflexology, kendo, and yoga[6]. Regarding the adequacy of CAM, 67.1% patients announced improvement [7]. Evidence is collecting that CAM medicines are helpful for patients with MS.Studies have revealed that MS patients demonstrated positive reactions to yoga treatment and that it is protected and feasible[8][9]. Although yoga might be considered to address torment, psychological wellness, exhaustion, spasticity, balance, bladder control, and sexual function[10] a meta-investigation reasoned that yoga improved just mind-set and saw weakness however not muscle work, intellectual capacity, or health related QOL. The examinations included little quantities of patients with MS and henceforth couldn't permit inside and out evaluation of muscle function, psychological capacity, and different boundaries. As yoga was not related with extreme antagonistic occasions, the meta-investigation suggested that its training in patients with MS need not be debilitated. Yoga concentrates with patients with MS utilized gathering meetings, and the sorts of yoga were Raja Yoga, Hatha Yoga, Iyengar Yoga, Chair Yoga, Sivananda Yoga, or type left to the educator (combination of postures from different schools).

Constraints in yoga-related writing incorporate the premastery of gathering meetings without a benchmark group and deficient depiction of the yoga mediation, halfway because of its emotional nature. Likewise, past investigations don't mention adjustment or customization of yoga rehearses dependent on the individual patient. In this manner, the current investigation expected to survey the achievability of customized yoga treatment mediation in the genealogy of T. Krishnamacharya, in a private setting with a 1:2 proportion of specialists to patients. Patients with MS were given redone, need-based changes in their yoga practices, and impacts of the intervention on QOL, rest quality, and indication alleviation were surveyed. The methodology taken was individual-driven as opposed to infection driven.

Methods:

A single group pre and post experimental design was adopted for the present study. The study was carried out among the members of the Multiple Sclerosis Society of India (MSSI), between December 2018 and April 2019.

MSSI is an enrolled intentional, non-benefit association set up in 1985 and subsidiary with the Multiple Sclerosis International Federation, United Kingdom. The association offers direction and clinical and monetary help to patients with MS. During month to month MSSI uphold bunch gatherings, data about the examination was imparted to patients and parental figures. Banners with data on yoga treatment classes were shown on the release board at MSSI . The yoga specialists assessed patients who assented to partake for qualification to be tried out the investigation. The consideration rules were capacity to impart in Telugu, Hindi, or English; capacity to move around without the help of someone else for at least 25 feet; no act of yoga over the most recent a half year; and assent from a nervous system specialist to rehearse yoga. The prohibition model was presence of any genuine ailments over the most recent two months. An organized proforma was utilized to assemble data on socio segment subtleties, clinical history, and side effects. Clinical subtleties, for example, MS and backslide

history and current objections were gathered from clinical records and clinical meeting. The panchamaya (five sheaths) model was utilized as a comprehensive structure to comprehend the person on the five degrees of annamaya (physical), pranamaya (physiological), manomaya (information and contemplations), vijnanamaya (inward will and capacity to separate), and anandamaya (feeling of euphoria, satisfaction). This system was utilized so every part of the individual was examined, perceived, and utilized for the mediation. An intensive evaluation was finished utilizing perception (darshanam) and meet (prashnam) to inspire data identifying with these perspectives. QOL, sleeep quality, indications, and agony were surveyed utilizing the Multiple Sclerosis Quality of Life (MSQOL)– 54,11 Pittsburgh Sleep Quality Index, MS Symptom Checklist, and visual simple scale, individually. All instruments were managed at gauge and toward the finish of the mediation. Moreover, input on changes in side effects and practice adherence was gathered during every meeting. Yoga advisors gathered the information and controlled the psychometric devices.

Framework for Personalized Yoga Intervention:

An individualized yoga therapy module based on the Krishnamacharya tradition was developed by a group of certified yoga therapists to meet the patients' needs and capabilities. Conscious breathing and its application in asana (physical postures) is the main tool for practice, as breath has the power to influence the body and the mind simultaneously.

The information gathered about the patient was organized using the following framework from Patanjali's Yoga Sutras to understand suffering (duhkham) as well as its manifestation, causes, goals, and means to overcome it.

- Heyam: immediate symptoms/issues bothering the person; the effect they have on the individual's life, work, roles they play, etc.; other health concerns and how much they bother the individual
- Hetu: possible causes and factors such astriggers, aggravating factors, diet, lifestyle, personality of the individual, and context
- Hanam: short-term goals of bringing symptom relief and improving the individual's sense of health and long-term goals of strengthening and empowering the person from within
- Upayam: what to avoid; tools to address short-term goals, address/eliminate contributing factors, and prepare the person for long-termgoals

At each stage, apparatuses and procedures (asana, pranayama breathwork, meditation) were picked dependent on the capacities to be accomplished, which were then tweaked for the individual and instructed as a training grouping. This strategy for sequencing rehearses that are objective arranged utilizing proper preliminary stances, counter-stances, and satisfactory rest periods where required is a remarkable element of the Krishnamacharya convention of yoga. The intercession of 12 private hour-long meetings, spread more than 3 months, was led by yoga advisors with involvement with overseeing patients. What's more, a sum of three gathering meetings were led to acquaint patients with the fundamental way of thinking of yoga, general rules of yogic practice, diet, rest, way of life alterations, and the function of breathing and its impact on the brain in mending. Each gathering meeting went on for 90–100 minutes, including asana (45 minutes), pranayama (20 minutes), guided contemplation (15 minutes), and conversation (15–20 minutes). Both individual and gathering meetings were booked on ends of the week. The weekly hour long individual yoga meetings included breathing practices (pranayama, 15 minutes), stances with cognizant breathing (asana, 30

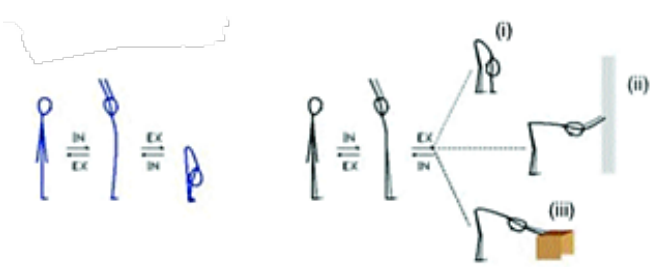
minutes), contemplation (5 minutes), and profound unwinding (10 minutes). The length of the training was characterized by the quantity of breath cycles; a normal practice included 80–100 breaths. Patients were relied upon to do the training at home and to return for the week by week audits. In light of the ability of the individual, the training position could be situated (seat or ground), resting (recumbent as well as inclined), or remaining, with development being dynamic, static (and controlled by the quantity of breaths), or both. The pranayama, asana, and different instruments were adjusted for every patient now and again dependent on their changing capacities and necessities, with an attention on the current indications. Stances were held for half a month to empower arriving at versatility/adaptability objectives. The yoga practice was envisioned on a gift given to patients after every meeting. The normally utilized asana were tadasana (mountain present), virabhadrasana (champion) I, uttanasana (remaining forward twist), dvipadapitham (or setubandhasana, connect), and jatharaparivrtti (recumbent straight-leg contort). Pranayama strategies were sitali (cooling breath) or sitkari (murmuring breath) and utilizing sounds, for example, OM, murmuring, serenades, or supplications as favored by the patients. Extra devices utilized were perceptions in asana and pranayama, nyasam (finger development composed with breathing), and unwinding practice. Practices were not confined to the yoga tangle, yet interlaced in patients' day by day lives, for instance, situated arm and leg developments and pranayama while at work. A portion of the customizations utilized were keeping the feet separated (mountain, forward curve, connect), bowing the knees (mountain, champion I, forward twist, recumbent wind), uphold from a divider or seat (mountain, fighter I, forward twist, connect), moving each arm in turn (mountain, hero I), in any case adjusted arm developments (mountain, champion I, forward twist, connect), and moving into the stance on exhalation rather than inward breath (connect). The alterations made for the six most basic stances utilized are introduced in Figure 1.

Figure 1. Mean and SD of age variable of all players from 4 sports disciplines

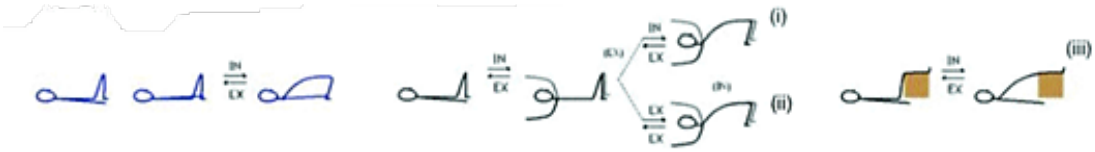
1. **Tasasana**

2. **Virabhadrasana**

3. **Virabhadrasana**



4. Dvipadapitham



5. Seated arm movements

6. Paschimottanasana

*For all postures except No. 5, the classical version is shown at the far left, with possible modifications to the right.

Nine patients were given both morning and evening practices, and one patient was given only evening practice due to his work schedule. Evening practices were focused on relaxation. Three patients who worked for long hours intheir jobs (shopkeeping, IT, tailoring) were asked to take breaks during their work and do 3–4 asana with breathing. The following lifestyle changes were suggested for patients: going to bed on time, waking up a few minutes earlier, drinking less water before sleeping, making time for family, getting involved in household chores (formale patients), and eating home-cooked food regularly. Dietary suggestions were offered based on ayurvedic principles, suchas avoiding foods that increase heat (chicken, spice,curd/yogurt) and foods that are heavy to digest such as oily, fried food. Patients were advised to include plant-based fiber throughout the year and cooling foods during summer. Written informed consent was obtained from all patients. Adverse events were reported to the consultant for immediate remedy.

Data Collection and Analysis:

The data were entered using Microsoft Excel. Frequency and percentage were computed for sociodemographic data, attendance, and adherence. QOL scores were converted to a 0–100 scale and summarized using multiple domains as described in the MSQOL-54 tool; the higher the score, the better the QOL. Also, physical health composite score and mental health composite score were calculated based on the range of scores assigned to each item. Differences between baseline and postintervention in pain, QOL, symptoms, and sleep were analyzed using the Wilcoxon signed-rank test with a statistical software program (IBM SPSS Statistics for Windows, version 21.0). Changes in symptoms experienced by the patients were presented as narratives for each patient.

Patients:

Of the 18 patients registered with MSSI, 8 patients could not be included (5 because of their medical conditions and 3 because of expected difficulty in spending time for the intervention). Ten patients (age range 31–52 years) were enrolled in the yoga intervention.

The three male patients were working as a store manager, mechanic, and team lead in a software firm, respectively. Of the seven female patients, four were housewives, two were self-employed, and one was working in a software firm.

MS History:

Clinical manifestations reported by patients were loss of sensation in legs and/or arms (ranging from numbness to complete paralysis), impact on eyes (double vision, blurred vision, swaying effect, vertigo, loss of depth perception, eye-balls turned to one side or shaking of eyeballs), bladder dysfunction, shivering, and disorientation. Number of previous relapses reported ranged from 1–8; 60% of patients had 4 or fewer relapses, whereas 40% had 5–8 relapses. Number of years since the first MS attack ranged from 3–20: Three patients reported that their first attack happened fewer than 10 years ago, five reported that their first attack was11–19 years ago, and two reported that their first attack was 20 or more years ago. Three patients had their most recent MS attack/relapse 6 months before the study, four had an attack less than 5 years before the study, and three had an attack between 5 and 10 years before the study. Stress in personal life and lifestyle were reported as precipitating factors for the first MS attacks. Six patients were taking weekly MS medication (oral/injections). Other medications used were for acidity (n = 1), urinary incontinence (n = 4), bowel movement (n = 1), anxiety (n = 4), depression (n = 2), sleep (n = 2), and nutritional supplementation (n = 3).

Common Complaints Reported:

The site of pain and stiffness varied from patient to patient, although five female patients had problems with memory, dizziness, balance, and moods wings. Low confidence and restricted social interaction were also noticed by the yoga therapists during the interactions between therapist and patient. The following findings were recorded during the sessions.

Annamaya (Physical Body):

Tightness in the neck and upper back was observed in four patients. Stiffness in the neck was reported by two, low back pain by four, pain in the knees by two female patients, and restricted movement in the right shoulder and right leg with atrophy in the left leg by one male patient.

Pranamaya (Energy Body):

Breath was short and quick, with short inhalation and a strained exhalation. Average inhalation exhalation ratio at the time of consultation was 3s : 3s. Reported issues in this area were poor energy level, indigestion, incontinence, anger and frustration, burning sensation (n = 2), and hot flashes (n = 1). One female patient reported dizziness during the consultation process. Sleep was disturbed and poor in twopatients.

Manomaya, Vijnanamaya, and Anandamaya (Mental/Emotional Aspects):

Anxiety, worry, low mood, sadness, agitation, suppression of emotions, anger, rage, helplessness, and distraction were some of the common complaints reported by patients. Some patients reported feelings of being a burden to the family, not being understood by family, and being victimized. One patient reported being relaxed and calm. Giving up on their interests and passions and having no interest in self-care were alsoreported.

Results:

Of the ten patients, seven finished 8–12 meetings and three finished less than 5 meetings. The most well-known grievances/indications were torment and low energy. Changes in energy level, rest, urinary incontinence, and adaptability of the body, just as fractional improvement in torment, were accounted for from meeting 2 on. Toward the finish of the intercession, upgrades were accounted for by patients and saw by advisors in breathing, torment, adaptability, balance, energy levels and endurance, processing, rest, bladder control, temperament, disposition toward torment and condition, certainty, family connections, enthusiasm for mingling, capacity to distinguish pressure triggers, and generally prosperity. There were no adjustments in consuming sensation, deadness, unsteadiness, misery, or cognitive decline. Three patients revealed weight reduction, and three others detailed withdrawal of prescription for causticity, urinary incontinence, agony, and actuating hunger. Patients clung to proposed diet and way of life changes and report-ed changes in rest, appetite, satiation, and general prosperity. Progressively, the patients turned out to be more perceptive about their perspective and changed their reactions to every day circumstances. Male patients announced that their family watched changes in their mind-set and offered further help and support. Patients announced that way of life changes helped them. No unfriendly consequences of yoga practice were seen/announced.

Change in Quality of Life:

The change in QOL in multiple domains is described in Table 2 and Figure 2. All domains except sexual function showed clinically significant improvement in QOL scores after the yoga intervention. There was a statistically significant improvement in social function scores after the intervention (median score of 54.4 vs. 87.5; $p = 0.014$). Similarly, median QOL score on change in health status improved from 50.0 to 87.5, a statistically significant increase ($p = 0.029$). Although not statistically significant, QOL scores in domains of physical health, role limitations due to physical problems, emotional well-being, and cognitive function improved after yoga.

Changes in physical health and mental health compos- ite scores are described in Table 3. The physical health composite score improved from a median of 72.1 to 78.9; this increase was not statistically significant ($p = 0.063$). Similarly, mental health scores improved from a median of 73.3 to 85.3 ($p = 0.093$).

Change in Pain Score and Sleep Quality:

The median (interquartile range [IQR]) pain scores before and after yoga were 6.0 (4–8) and 4.5 (0–7), respectively. Although there was a decrease in pain scores, this was not statistically significant ($p = 0.091$). Similarly, there was improvement in sleep quality, as the scores decreased from a median (IQR) of 8(5–15) to 6(5–11); the difference was not statistically significant ($p = 0.061$).

Discussion:

Our study examined the effect of a yoga intervention on QOL, sleep quality, pain, and improvement in MS symptoms, with encouraging findings. There was improvement in almost all domains under QOL. There were statistically significant improvements in the social function and change in health status domains after the individualized yoga intervention. Although there were improvements in pain scores and sleep quality, the differences were not

statistically significant. Patient narratives and therapist observations supported the quantitative findings. The improvements in social function were supported by thepatients' narratives that they felt motivated and good after practice ofyoga.Trials done on MS have shown positive results with yoga interventions. Previous studies based on interventions involving yoga alone or as one of the components have shown significant improvement in QOL[9]. A study of an 8-week mindfulness-based intervention that used yoga movement, mindfulness meditation, and relaxing music included 22 MS patients and reported improvements in physical functioning and mental health scores [12]. A single-group pilot study was done in the United States on the effect of an 8-week yoga program for 14 patients with moderate MS-related disability [9]. The intervention had a positive effect on physical performance, mental function, and QOL. Our study findings are comparable to the above studies. A quasi experimental study involving a yoga-based intervention and a control group also reported improvement in subscales of QOL [13]. Our study findings contrast with the results of a three-arm randomized controlled trial evaluating the effects of two 12-week exercise training interventions movement to music and adapted yoga on physical and psychosocial outcomes [14]. That study found no significant differences between adapted yoga and control groups. The difference in findings could be due to methodological differences such as types of yoga involved and patient characteristics including disease severity. Similarly, a meta analysis show edno significant effect of yoga on QOL, muscle function, orcognitive symptoms; the analysis also did not report any adverse effects, suggesting the possibility of yoga's efficacy given better experimental setups [15]. This uncertainty as to the effect of yoga on MS may be due to our lack of knowledge of the exact mechanism by which yoga affects physiology and functioning in MS patients [16].

In the present study, physical improvements were reported and observed in breathing, pain, flexibility, balance, energy levels and stamina, digestion, sleep, and bladder control as the patients progressed during the yoga intervention. In support of this finding, yoga intervention has been beneficial in reducing fatigue 17 and improving QOL and physical pain management [18] [19]. Guner and Inanici [20] have shown significant improvements in balance, walking speed, and step length, whereas hip flexor movements showed improvements that were not statistically significant after 12 weeks of yoga practice.

Patil and colleagues [21] affirmed that yoga has a positive effect on the symptoms of MS and helps in lifestyle management. The present study also showed clinically significant improvements in bladder control and digestion. Patients also reported improved confidence, family relationships, and social interaction, as found in other studies that have shown significant psychological affects of yoga [14] [22].

Table 1. Symptoms, Goals, and Changes Reported in MS Patients

Patient (No. of Classes Attended)	Heyam (Symptoms)	Hanam (Goals)	Changes Reported by Patient (R) or Observed by Yoga Therapist (O)[a]
AM (10)	Burning sensation; numbness; poor sleep; fatigue; low energy; distracted; agitated	Improve sleep and energy level; calm mind	Improvement in energy (R-7); state of mind calmer (O-9)

HS (10)	Pain in chest, upper back, shoulders, left arm, and left knee; stiff hips; disturbed and poor sleep; urinary incontinence; stress	Relax neck, shoulder, and upper back area; improve flexibility in the upper body and hips, sleep, and bladder control; reduce stress	Improvement in pain in chest (R-2), upper back (R-4), shoulders (R-4), and left arm and knee (R-6); improvement in sleep (R-3) and urinary incontinence (R-3)
MK (12)	Heaviness and pain in calf muscles; discomfort in upper back, shoulders, and neck; constipation; low energy; mood swings; anger and irritability	Reduce pain and improve mobility in shoulder, neck area, and legs; improve energy and digestion; stabilize mood	Reduction in pain in calf muscles (R-7); better energy levels (R-4) and regularity of bowel movement (R-7); improvement in neck flexibility (O-4) and mood (O-4)
MT (4)	Pain in neck and low back; low energy levels and mood; dizziness when eyes are closed; depression; short-term memory loss; fear of falling; irritability and anger	Reduce pain in neck and lower back; improve balance and energy; enhance and stabilize mood	Improvement in mood (R-3)
MI (8)	Neck pain; tightness in legs; overall stiffness; inability to sleep; poor appetite; urinary incontinence; anger	Reduce neck pain; improve flexibility in spine and legs, sleep, digestion, and bladder control; calm mind	Improvement in sensation of hunger (R-2); reduction in neck pain (R-4), stiffness in legs (R-4), and frequency of anger outbursts (R-5); better bladder control (R-5); improvement in posture (O-3) and social interaction (O-5)
ND (12)	Pain in neck, shoulders, and upper back; knee locking; twitching in left cheek; numbness in right thigh; ringing in ears; urinary incontinence; poor memory; low energy; anger and rage	Reduce pain and improve flexibility in shoulder and upper back area; improve bladder control and energy levels; calm mind	Reduction in ringing in ears (R-2), pain in neck, shoulder and, upper back (R-4); improvement in energy levels (R-3); better bladder control (R-6) and memory (R-10)
NA (3)	Fatigue; mid-back and elbow pain; confusion and poor memory	Reduce pain and fatigue; improve mental state	Improvement in energy levels and reduction in fatigue (R-2)

SN (10)	Weakness in left leg; tingling sensation in abdomen; burning sensation in feet and palms; numbness in fingers, palms, toes, and soles of feet; restriction in right shoulder; temper tantrums (reported by patient)	Improve digestion, stability, balance, circulation, and mood	Improvement in strength in left leg (R-7); reduced numbness in fingers and palms (R-7) and toes and soles (R-10); improvement in flexibility in right shoulder (R+O-4); reduced frequency of temper tantrums (R-2); more social interaction (O-4); lessfear of falling and better balance (O-7)
SG (11)	Pain in calf muscles, upper back, and neck; numbness in right arm; fatigue; light-headedness; imbalance; rinary incontinence; constipation; fear of falling; mood swings	Improve energy levels, bladder control, digestion, balance, and mood; reduce pain and tightness in legs, upper back, and neck	Improvement in bowel movement (R-6); reduction in pain in neck and upper back (R-7) and calf muscles (R-8); better social interaction (O-7)
TRK (4)	Urinary incontinence; anxiety; constipation; disturbed sleep	Improve bladder control, digestion, and sleep; reduce anxiety	Improvement in bladder control (R-3)

[a]Class number during which change(s) observed/reported given in parentheses

Table 2. Quality of Life (QOL) in MS Patients Before and After Yoga Intervention

QOL Domain (MSQOL-54)	Before (n = 8)		After (n = 8)		p Value[a]
	Median	IQR	Median	IQR	
Physical health	57.5	40–80	70.0	48–80	0.178
Role limitations due to physical problems	66.7	33–100	100.0	67–100	0.085
Role limitations due to emotional problems	100.0	50–100	100.0	100–100	0.158
Pain	60.0	50–73	65.8	58–81	0.439
Emotional well-being	70.0	58–76	82.0	74–92	0.091
Energy	60.0	52–72	66.0	60–72	0.778
Health perceptions	77.5	55–83	70.0	60–88	0.674
Social function	54.2	50–79	87.5	83–96	0.014*
Cognitive function	62.5	40–80	72.5	63–88	0.067
Health distress	82.5	75–93	92.5	85–98	0.232
Sexual function (n = 7)	91.7	58–100	83.3	67–100	0.799
Change in health	50.0	38–75	87.5	75–100	0.029*
Satisfaction with sexual function (n = 7)	75.0	75–100	100.0	75–100	0.515
Overall QOL	73.4	64–83	79.2	70–87	0.723

[a]Based on Wilcoxon signed-rank test.
*Statistically significant change.
QOL = quality of life; IQR = interquartile range.

Figure 2. Quality of Life in MS Patients Before and After Yoga Intervention

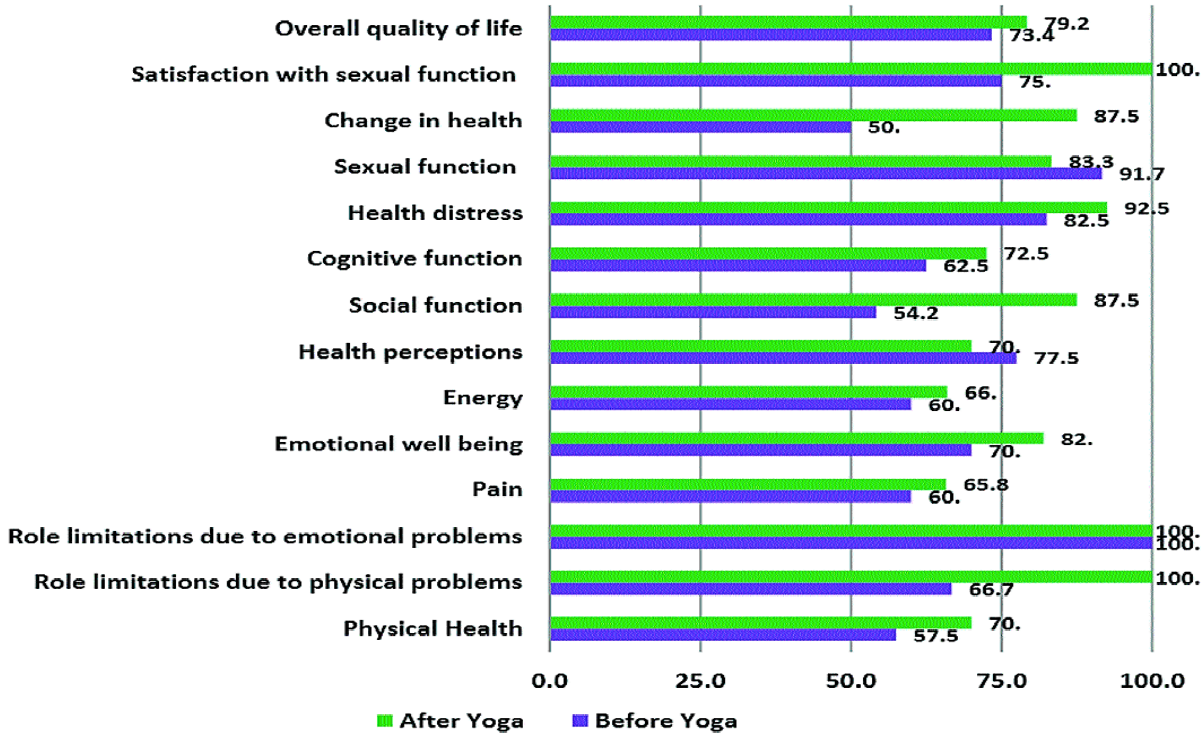


Table 3. Composite Physical and Mental Health Scores in MS Patients Before and After Yoga Intervention

Composite Score (MSQOL-54)	Before (n = 8)		After (n = 8)		p Value[a]
	Median	IQR	Median	IQR	
Physical health composite score	72.1	57–80	78.9	69–81	0.063
Mental health composite score	73.3	65–85	85.3	84–88	0.093

[a]Based on Wilcoxon signed-rank test.
MSQOL = Multiple Sclerosis Quality of Life; IQR = interquartile range

Limitations:

Our study has the following limitations. First, thenumber of patients was too small to prove the effect of the yoga intervention. Although we were able to show improvements in the majority of the QOL domains, our study was under powered to detect changes in QOL scores after the intervention. Second, the yoga intervention being customized to individual needs precludes standardization; in real-world practice, one-size-fits-all interventions may not be feasible or effective. Third, not all patients completed the intervention; only seven out of ten patients were able to attend the maximum number of sessions. Finally, some changes were subjectively self-reported by the patients. Hence, our study findings should be generalized with caution.

In our study, the yoga sessions were conducted by trained and experienced yoga therapists, which addsstrength to the findings. As practices were progressively adapted to changing needs of the individual, a patient at any stage of MS progression was supported by

appropriate practices, with the possibility of strengthening during remission periods. Also, we used a combination of quantitative and qualitative approaches to assess the feasibility and effect of the intervention. Direct observations by therapists at each session and perceptions of the patients after each session helped us to better customize the asana.

Conclusions:

The examination has commonsense ramifications in the board of patients with MS. We prescribe bigger investigations to affirm the discoveries from our examination. In spite of the fact that the quantity of patients was little, practically totally demonstrated improvement with respect to indication alleviation, sleep quality, and QOL. Consequently, practice of yoga might be urged notwithstanding clinical administration for better QOL, which incorporates social and intellectual capacity and physical and psychological well-being. Practices are basic, needing negligible help from helps and props; almost anyone can learn them and practice all alone at home, looking for help occasionally from the specialist. This expands self-office for patients, who will figure out how to be more independent and sure. Our examination, in view of individualized utilization of the apparatuses of yoga, is undeniably fit to MS, which is unpredictable and shows fluctuated degrees and nature of handicap movement. Moreover, as the intercession is essentially breath-based, it achieves physical, physiological, mental, and enthusiastic changes that are intervened by cognizant breathing; these progressions have a broad impact on the person's prosperity and practical status. The supportability of the yoga intercession for the long haul could be high and the related expense for rehearsing yoga is unimportant. Yoga intercession for patients with MS is practical. Seven out of ten patients included went to most of the meetings. The improvement seen in QOL, particularly in social and intellectual capacity, was empowering. Way of life changes proposed as a feature of the intercession were discovered useful by the patients, which recommends that yoga has a few advantages in patients with MS and reduces different physical, physiological, and mental manifestations.

References:

1. Ropper, A.H., & Samuels, M.A.(2009). Adams and Victor’s principles of neurology (9th ed.). New York: McGraw-Hill Professional.
2. Brown, T. R., & Kraft, G. H. (2005). Exercise and rehabilitation for individuals with multiple sclerosis. Physical Medicine and Rehabilitation Clinics of North America, 16,513–555.
3. Foley, J. F., & Brandes, D. W. (2009). Redefining functionality and treatment efficacy in multiple sclerosis. Neurology, 72(5), S1–S11.
4. Petejan, J. H., Gappmaier, E., White, A. T., Spencer, M. K., Mino, L., & Hicks, R. W. (1996). Impact of aerobic training on fitness and quality of life in multiple sclerosis. Annals of Neurology, 39, 39–41. http://dx.doi.org/10.1002/ana.410390405.
5. Ahmadi, A., Arastoo, A. A., Nikbakht, M., Zahednejad, S., & Rajabpour, M. (2013). Comparison of the effect of 8 weeks aerobic and yoga training on ambulatory function, fatigue, and mood status in MS patients. Iranian Red Crescent Medical Journal, 15, 449–454.http://dx.doi.org/10.5812/ircmj.3597.

6. Allen, C., Bowling, M. D., Murray, T. J., John, H., Noseworthy, M. D., Chris, H., Polman, M. D., Alan, J., & Thompson, M. D. (2016). Multiple sclerosis: The guide to treatment and management (6th ed.). New York: Demos Medical Publishing.
7. Apel, A., Greim, B., &Konig, N. (2006). Frequency of current utilisation of complementary and alternative medicine by patients with multiple sclerosis. Journal of Neurology, 253(10), 1331–1336.
8. Esmonde, L., & Long, A. F. (2008). Complementary therapy use by persons with multiple sclerosis: Benefits and research priorities. Complementary Therapies in Clinical Practice, 14,176–184.
9. Cohen, E. T., Kietrys, D., Fogerite, S. G., Silva, M., Logan, K., Barone, D. A., & Parrott, J. S. (2017). Feasibility and impact of an 8-week integrative yoga program in people with moderate multiple sclerosis–related disability: A pilot study. International Journal of MS Care, 19(1), 30–39. http://dx.doi.org/10.7224/1537-2073.2015-04.
10. Frank, R., & Larimore, J. (2015). Yoga as a method of symptom management in multiple sclerosis. Frontiers in Neuroscience, 9, 133.
http://dx.doi.org/10.3389/fnins.2015.00133
11. Vickrey, B. G., Hays, R. D., Harooni, R., Myers, L. W., & Ellison, G. W. (1995). A health-related quality of life measure for multiple sclerosis. Quality of Life Research, 4(3),187–206.
12. Gilbertson, R. M., & Klatt, M. D. (2017). Mindfulness in motion for people with multiple sclerosis: A feasibility study. International Journal of MS Care, 19(5), 225–232.
13. Nejati, S., Rajezi, E. S., Rahmani, S., Afrookhteh, G., & Hoveida, S. (2016). The effect of group mindfulness-based stress reduction and consciousness yoga program on quality of life and fatigue severity in patients with MS. Journal of Caring Sciences, 5(4),325–335.
14. Young, H., Mehta, T. S., Herman, C., Wang, F., & Rimmer, J. H. (2018). The effects of M2M and adapted yoga on physical and psychosocial outcomes in people with multiple sclerosis. Archives of Physical Medicine and Rehabilitation, 100,391–400.
15. Cramer, H., Lauche, R., Azizi, H., Dobos, G., & Langhorst, J. (2014). Yoga for multiple sclerosis: A systematic review and meta-analysis. PLoS One, 9, e112414.
16. Rogers, K. A., & MacDonald, M. (2015). Therapeutic yoga: Symptom management for multiple sclerosis. The Journal of Alternative and Complementary Medicine, 21(11), 655–659.
17. Oken, B.S.,Kishiyama, S.,Zajdel, D.,Bourdette, D.,Carlsen, J.,Haas, M., & Mass, M. (2004). Randomized controlled trial of yoga and exercise in multiple sclerosis. Neurology, 62(11), 2058-2064.
18. Doulatabad, S.N., Nooreyan, K., Doulatabad, A.N., & Noubandegani, Z. M. (2013). The effects of pranayama, hatha and raja yoga on physical pain and the quality of life of women with multiple sclerosis.African Journal of Traditional, Complementary and Alternative Medicines, 10(1), 49–52.

19. Hassanpour-Dehkordi, A., & Jivad, N. (2014). Comparison of regular aerobic and yoga on the quality of life in patients with multiple sclerosis. Medical Journal of the Islamic Republic of Iran, 28,141.
20. Guner, S., & Inanici, F. (2015). Yoga therapy and ambulatory multiple sclerosis: Assessment of gait analysis parameters, fatigue and balance. Journal of Bodywork and Movement Therapies, 19(1), 72–81.
21. Patil, N. J., Nagaratna, R., Garner, C., Raghuram, N. V., & Crisan, R. (2012). Effect of integrated yoga on neurogenic bladder dysfunction in patients with multiple sclerosis A prospective observational caseseries. Complementary Therapies in Medicine, 20(6), 424–430.
22. Rahnama, N., Namazizadeh, M., Etemadifar, M., Bambaeichi, E., Arbabzadeh, S., & Sadeghipour, H. R. (2011). Effects of yoga on depression in women with multiple sclerosis. Journal of Isfahan Medical School, 29(136).

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Role of Technology to Improve the Performance of Elite Sports

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Abstract:

The utilization of innovative applications is presently far reaching crosswise over many significant games science disciplines and the appropriation of these devices to increase an 'upper hand' is an undeniably significant element of tip top games. These advancements have molded the manner in which information is gathered and handled, how data is transferred among mentors and staff or to competitors, and has bigly affected the manner by which competitors are observed in the every day preparing and rivalry situations. This paper features and gives instances of probably the most recent advances for information collecting and handling, input strategies or feedbacks and preparing training tools. We wrap up by talking about certain contemplations for sports researchers and mentors before executing new advances.

Keywords: Technology, sport, performance, feedback

Introduction:

The field of game and exercise science has gotten profoundly specialized, provoking applied researchers and mentors to coordinate their useful use of information with the steady appearance of new innovations. The overwhelming dependence on innovation might be ascribed to the intrinsic want to increase a preferred position over the restriction in tip top and aggressive games, so as to give extra data that can be encouraged back to mentors as well as competitors. Innovation has been rationally characterized as any physical instrument(s) that can be utilized for critical thinking. In light of this definition, the utilization of innovation isn't new to don, nor does it absolutely recommend the utilization of costly highest quality level estimation apparatuses. Or maybe, it proposes innovation includes a moving scale from minimal effort and simple to utilize estimation instruments up to costly and refined frameworks. Due to the huge cluster of devices accessible to mentors and applied game researchers, this decision, combined with the expanded want to gather and process data quickly and at least expense to the client, may build the odds of choosing the prevailing fashion alternative, instead of a fitting instrument. Various innovation in sport surveys have recently been distributed and small scale innovation sensors in group activities. In separating from past surveys, our point with this composition is to give an outline of a portion of the new game advances accessible, and open up the discussion of how the utilization of innovation can improve or disable execution.

Research Methodology:

A systematic review of the peer-reviewed literature and personal observations of technological developments through various Games was conducted. The study was conducted through discussion groups, a series of interviews and an Internet search. The advantage of doing a qualitative research was that it allowed greater understandings of the interviewees' personal constructs and experiences. All participants in the study were fully informed and

voluntarily consented to their involvement. Participants were also free to withdraw from the research without giving reason or justifying their decision at any time, if they so wished. All sports that were examined are currently contested at either the semiprofessional, professional or Olympic level. Any sport which did not use technology in the officiating of the sport was not considered for the research.

Developments in Data Collection:

Surely, one of the significant advantages for researchers has been the movement from lab based settings to those constant in the field. The capacity to know expanding insight concerning singular competitors and groups during rivalry has been made accessible by a bunch of mechanical movements in the course of recent decades. Sports researchers crosswise over boss controls have demanded equipment and programming advancements so as to explicitly grow better devices and improve strategies to catch and process player execution information. These advances have permitted analysts and applied games researchers to all the more promptly measure key parts of execution in the field setting, which were frequently recently compelled to the lab. The major advantage of this change is that it has expanded the abilities to gather data in an environmentally legitimate setting, without undue weight on experts. Maybe one of the most outstanding movements in the region of information assortment and handling strategies, includes PC vision. PC vision utilizes calculations to recognize distinguishing highlights inside video film, for example, example or shading contrasts. This method has picked up enthusiasm for the zones of execution investigation and biomechanical evaluation as a result of the capacity to semi-computerize the examination of group or individual player development, without influencing the players' condition. Instances of this sort of innovation can be found in execution examination frameworks, for example, Prozone utilized generally in soccer in England and European nations, Sports VU utilized in the National Basketball League in North America, and Hawk-eye. PC vision frameworks ordinarily require numerous cameras to be set around the games ground, and can require manual contribution of game occasions. While some game cases can be completely robotized, challenges in the utilization of PC vision advances to mechanize the catch of player developments are as yet present. For instance, catching exact player following information can be risky when various players are accumulated in a little region. Furthermore, PC calculations ordinarily anticipate smooth development, yet the dynamic idea of sports implies players regularly alter course rapidly and furthermore every now and again slam into different players. The blend of AI with PC vision to improve programmed ID of movement or game occasions will be profoundly powerful to execution examination in sports later on. PC vision innovation has additionally assumed a job in marker less movement catch improvements in biomechanics and different games sub-disciplines, with items, for example, the Microsoft Kinect T M utilized as a minimal effort answer for movement following. Customarily, three-dimensional biomechanical assessment requires numerous markers to be put over the body to distinguish the posture of each body portion. This procedure can be tedious and can bring about the member feeling confined in their developments. With marker less movement catch, PC vision systems are utilized to recognize and ascertain itemized estimations of position and direction (present) of fragments. The essential advantage of this method is that it permits the athlete(s) to move all the more uninhibitedly, without development limitations forced through wearing markers and marker bunches. Applied researchers are in this way profited by the decreased time required for member planning. Tip top Form is one such model that uses the

Microsoft Kinect TM cameras to give real time input encompassing pinnacle and normal force in like manner quality preparing practices in the rec center condition. In any case, in spite of guarantee, marker less movement catch arrangements still require advancement so as to advance to a progressively adequate degree of exactness in correlation with marker-based strategies. Given the advantages related with marker less systems, all things considered, this territory will keep on improving. An extraordinary case of the movement that can happen in sports through the utilization of imaginative advancements drawn from other science disciplines incorporates the utilization of automatons for the assortment of flying game or occasion film. The flight way of automatons can be controlled by means of remote or savvy gadget applications, giving them the possibility to offer more adaptable and less laborious arrangements than setting numerous fixed cameras around a playing field . Besides, gadget abilities, for example, following through GPS or consolidated sonar, PC vision and PC learning innovations, accessible in shopper showcase rambles offers ascend to the probability of automatons being utilized as more than 'play-toys' for the formation of self-trailed individual recordings, however following instruments for execution examination and different investigations drawn from game vision. At last, one advancement gathering, presently ordinary innovation for Post-Millennials, incorporates keen gadgets. The coming of the iPad in 2010 started the utilization of uses (or "Applications"), which frequently run reciprocal to PC programming bundles. These convenient hand held interfaces have become an essential device for some applied researchers and mentors to help in the arrangement of hardware, assortment of information and additionally in the arrangement of input. There are various instances of this, including Swift Performance's Speed Light App application, which helps set up and the account of information; Coda which permits ongoing game examination to be performed utilizing an iPad, instead of requiring the examiner to sit behind a PC; or Silicon mentor Live Mobile enabling you to perform essential two dimensional biomechanical investigation on recordings you have put away on the web, or have recorded on your gadget. Brilliant gadgets and applications may give clear favorable circumstances over increasingly conventional advancements and, at any rate narrative, have given improved chances to information assortment and use by mentors and competitors. The assortment of individual competitor and group based execution information has gotten ordinary in expert and first class sport. As a rule, data on player development and group arrangements has been viewed as supportive to help in the plan and organizing of training, and the following of execution. Notwithstanding, regardless of whether such applications and innovation improves execution is at last subject to how the data picked up is utilized. The following area will talk about how savvy gadget applications and innovation gives advantages and difficulties in the manner criticism is given to competitors.

Developments in Data Feedback:

Verifiably, mentors would watch and afterward transfer data; the person in question would give criticism assembled from visual perception of a competitor's aptitude, depending entirely on their capacity to see changes in development and translate the outcomes. Today, numerous mentors are tested with an abundance of choices identifying with the determination of an input mode; the individual in question must conclude which is the most proper per singular case (visual, sound-related, haptic, multimodal), so as to eventually improve execution. Therefore, the mode and timetable of criticism are essential components requiring thought for improving games execution. Expanded criticism, that is input given by an outer

source, is for the most part accepted to viably improve engine learning. New advances have made it feasible for applied games researchers and mentors to separate this data from exhibitions and hand-off this data to competitors at a fast rate. One driving model identifying with the speed at which criticism could be come back to competitors includes the generation of Clip Coach. Clip Coach was created before the London Olympics in 2012 as a component of a development venture joined forces with Olympic games. The framework utilizes a progression of machine vision camcorders and power plates to record the movement of the jumper. Rapid video input of the plunge is accessible to the mentor and competitor quickly post jump, permitting both moderate movement audit and jump correlations with be made. The Clip Coach framework definitely changed the manner by which input was given to Great Britain's jumpers. The planning of when input is given is a key idea inside engine learning. Criticism can be ordered by the time purpose of its arrangement, with simultaneous input being given during aptitude execution, while terminal criticism is given after expertise execution. One of the significant patterns in sports innovation has been focused on constant applications and gadgets that can give competitors, mentors or researchers access to prompt information. The booking of expanded criticism is maybe one of the most examined parts of input, yet understanding the complexities of planning criticism is a difficult assignment perplexed by task multifaceted nature, aptitude level and remarkable quality of undertaking inherent criticism. Coaches are progressively calling for sport researchers to convey continuous criticism, be that as it may, given the generally new nature of these simultaneous strategies, information encompassing the impacts of this mode and the ideal timetable of constant criticism may at present be required. Research directed around there fits the constructive outcomes of ongoing criticism. Models characteristic of this have been given in exercises, for example, paddling (for example ongoing visual criticism on kinematics appeared to build the kinematic consistency when contrasted with no input, netball shooting and running (for example simultaneous or constant input prompted learning and execution enhancements,. All things considered, given principal engine learning information relating variables, for example, how an excess of input can be impeding to execution (for example on the off chance that it makes the competitor become dependent on the data), we propose that more proof on the impacts of realtime input is required around there. In spite of the expanded adaptability of input techniques now accessible, applied researchers and mentors must stay industrious and focussed in what material is given back to the athlete(s). Concentrated datasets have been made progressively conceivable to gather, offering the potential for mentors, experts or researchers to become overpowered and dismiss the key execution factors. Mentors ought to stay focussed on the basic components impacting a given exhibition. Phillips and partners recommend that criticism ought to be given dependent on the accompanying standards:

1) the chose variable must be important to improved execution,
2) the variable must have the option to be constrained by the competitor and
3) estimation of the ideal variable must have the option to be precisely and dependably estimated by the framework or gadget being utilized Advances in the manner by which input can be given, and the promptness of criticism that would now be able to be conveyed provokes mentors to guarantee such innovation is utilized viably without reducing any inherent criticism normally accessible to competitors and without making a dependence on input.

Technology and the Training Environment:

Another territory that innovation has impacted games execution is preparing and methodology. There are numerous models that stretch over various sub-controls of sports science (for example GPS innovation illuminating quality and molding; kinematic examination and biomechanical intercession; game investigation and information investigation advising strategic basic leadership programs). This area will concentrate on the recreated preparing condition. Changes to the standard preparing condition to incorporate reproduction of "game like" situations by means of expanded reality have gotten progressively increasingly achievable through dynamic innovation. The reason for reenactment and virtual situations is to help preparing. It permits an advantageous preparing condition, where those requiring extra work or harmed players who can't completely prepare, are given the chance to improve perceptual subjective and perceptual engine capacity. Instances of these devices incorporate video-based basic leadership devices, augmented reality conditions and reproduced batting situations. Video-based basic leadership apparatuses can be practical for groups and enable the mentors to utilize any game vision they have and choose the most attractive choices giving a high level of adaptability to suit any group. Instruments, for example, the Elite Decisions and Elite Recall iPad applications utilized by various Australian football and Rugby League groups gives the alternative to group competitors to attempt this type of preparing in any area. Further developed computer generated experience situations enable competitors to be completely drenched in an intelligent domain. This kind of innovation has been exceptionally embraced by groups in the National Football League to enhance customary practice strategies, where the usage of augmented reality enables players to prepare without high physical effect loads, which may somehow be confronted if going through specific 'plays' during preparing. For instance, the Minnesota Viking's utilized computer generated experience to prepare their young quarterback. The procedure enabled the mentor to be inundated in a similar domain as the quarterback so as to call attention to address peruses and show botches. Different groups, for example, the Tampa Bay Buccaneers have utilized computer generated simulation to preliminary their hostile arrangements against the guarded developments of up and coming rivals. ProBatter gives one more case of how innovation has affected preparing condition in sports, for example, baseball, softball and cricket. ProBatter furnishes competitors with the chance to take a shot at perceptual engine capacity, by blending an anticipated superior quality video of a pitch with an anticipated ball. The matched video of the pitcher with the ball projection gives more data than the ball trip of the pitching machine alone. This innovation endeavors to give significant spatial and transient data segments of the pitch, permitting the coupling of observation activity. The test system can toss most of pitching mixes, making the preparation device various, and enabling players to prepare up aptitudes without putting extra burden on different players. While such advancements have been broadly embraced in preparing situations, understanding the restrictions with respect to their compelling use is foremost. The ProBatter framework for example is restricted in the way that discharge consistently happens similarly situated, which isn't valid for true pitching development. What's more, it is indicated that survey viewpoint is a significant thought while analyzing perceptual-intellectual basic leadership expertise, with basic leadership prevalent when seeing a flying point of view contrasted with a "player" point of view, bringing up issues about suitable review viewpoints. Further, contemplations incorporate 'activity loyalty', that is, guaranteeing that the undertaking sufficiently catches the dynamic idea of game. Research has indicated that

baseball players may depend on various observation activity coupling when confronting a pitcher and swinging a bat compered to viewing a video and squeezing a catch – an errand utilized in lab settings. Extra research in baseball has demonstrated players to utilize visual, material and sound-related criticism while modifying their swing. A portion of the previously mentioned advances may evacuate accessible input, and again limit the viability of preparing with such gadgets. Such research features the need to fundamentally assess how such advancements are utilized in applied settings to guarantee the assignment being prepared is illustrative of the real undertaking.

Considerations for the Use of Technology in Sport:

There is no doubt that technology has and will continue to have an impact on sport. What remains in contention is the extent at which scientists, coaches and athletes can appropriately use and understand new technologies. When working with elite athletes, small changes most often need to be made in a relatively short amount of time.

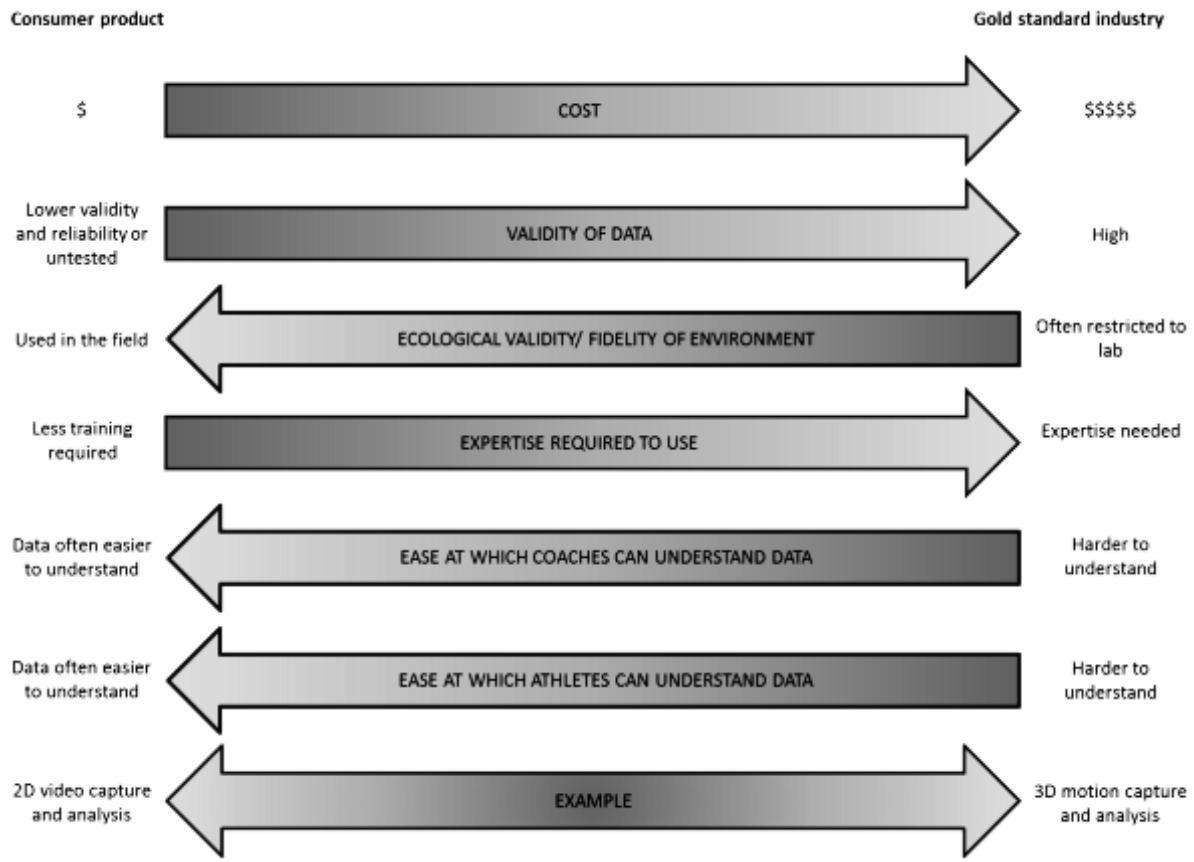
Thus, three key factors may play a role in the effectiveness of a new technology,

a) validity and reliability of the data,
b) meaningful data, and
c) processing speed.

Typically, the outputs from technical systems such as forceplates, isokinetic dynamometers and three-dimensional motion capture systems, seen as the gold-standard equipment, can be data rich and very comprehensive. There is merit in using these methods in order to collect valid and reliable data, and extract in-depth, meaningful information. These systems, however, are often limited in their use because of requiring a great period of preparation, processing and analysis time. Nonetheless, systems that become used in standard practice may become highly automated and close to real-time through the streamlining of data processing and standardised procedures. The limitations of gold-standard equipment (cost, environmental restrictions, specific training required, see Figure 1) are likely factors that drive new commercial devices and applications to be made available for purchase. Unfortunately, not all devices are found to provide valid and reliable data and thus, if the rate at which technology is adopted exceeds the rate of validation, then scientists coaches and athletes are at risk of using technology that has not been appropriately tested. Feedback or training interventions based on invalid and unreliable data may then be detrimental to performance. Whether looking to implement changes toward short or long term goals, meaningful information is required in order for sports scientists and coaches to make informed decisions that affect the performance of his or her athletes. Thus, the ease at which information rich datasets can now be collected can be problematic if analysts are not focussed in their analysis. There is a risk that coaches, and more importantly athletes will become overloaded with the amount of information presented, which could be detrimental to learning or performance. ‘Paralysis by analysis’ or ‘choking’ is common outcome that results from conscious control of a movement that is typically automated, which is quite possibly brought about by an overabundance of information and continual monitoring Furthermore, technology has shown great potential for monitoring performance in sport, but it can only be effective if the individual athlete is aware of the performance goal and if he or she perceives the need to carry out corrections to technique or training.

Finally, there is a trade-off between the usefulness of data to monitor and improve overall performance and duration of analysis when working with elite athletes. During competition, in order for athletes to implement any changes, there is a limited time to provide meaningful information. This necessitates the need for advanced tools with faster processing speeds such as the example of the ClipCoach system. With the myriad of technology available that can be used to affect sport performances in both competition and training setting, we believe it is paramount for the sport scientist and coach to determine the goals and practical outcomes of using new technology. With new gadgets, widgets and applications being made available to the consumer market at a rapid rate, it is easy to get caught up in the "latest craze" without considering the practically of the systems used or output delivered. We encourage our applied colleagues to consider the potential benefits against any consequences or unknowns, prior to employing any new tool and before diving head first into purchasing unvalidated high-tech products.

Fig-1. Trade-off of benefits and weaknesses between consumer and industry products.



References:

1. Anderson, R., Harrison, A., & Lyons, G. M. (2005). Rowing: Accelerometry-based feedback- can it improve movement consistency and performance in rowing? Sports Biomechanics, 4(2), 179-195. doi:10.1080/14763140508522862

2. Barris, S., & Button, C. (2008). A review of visionbased motion analysis in sport. Sports Medicine, 38(12), 1025-1043. doi:10.2165/00007256-200838120-00006
3. Leite, N. J. (2007). Analysis of the distances covered by first division Brazilian soccer players obtained with an automatic tracking method. Journal of Sports Science and Medicine, 6(1), 233-242.
4. Bennett, J. (2015, Nov 4). NFL teams are now practicing plays in virtual reality. Retrieved fromhttp://www.popularmechanics.com/technology/a18074/the-nfl-is-taking-virtual-ealityseriously / Ceseracciu, E., Sawacha, Z., & Cobelli, C. (2014).
5. Comparison of markerless and marker-based motion capture technologies through simultaneous data collection during gait: Proof of concept. PloS one, 9(3),e87640.doi:10.1371/journal.pone.0087640
6. Choppin, S., & Wheat, J. (2013). The potential of the Microsoft Kinect in sports analysis and biomechanics. Sports Technology, 6(2), 78-85. doi:10.1080/19346182. 2013.819008
7. Crowell, H. P., Milner, C. E., Hamill, J., & Davis, I. S. (2010). Reducing impact loading during running with the use of real-time visual feedback. Journal of Orthopaedic & Sports Physical Therapy, 40(4), 206-213. doi:10.2519/jospt.2010.3166
8. Cummins, C., Orr, R., O'Connor, H., & West, C. (2013). Global positioning systems (GPS) and microtechnology sensors in team sports: A systematic review. Sports Medicine, 43(10), 1025-1042. doi: 10.1007/s40279-013-0069-2
9. Dellaserra, C. L., Gao, Y., & Ransdell, L. (2014).Use of integrated technology in team sports: A review of opportunities, challenges, and futuredirections for athletes. The Journal of Strength Conditioning Research, 28(2), 556-573. doi:10.1519/JSC. 0b013e3182a952fb
10. Ehrlenspiel, F. (2001). Paralysis by analysis? A functional framework for the effects of attentional focus on the control of motor skills. European Journal of Sport Science, 1(5), 1-11. doi:10.1080/17461390100071505
11. Ferreira, F. T., Cardoso, J. S., & Oliveira, H. P. (2015). Video analysis in indoor soccer using a quadcopter. Proceedings of the International Conference on Pattern Recognition Applications and Methods (ICPRAM), Lisbon, Portugal, (pp.78-86).

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Impact of Practicing AshtangaVinyasa Surya Namaskar

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Abstract:

Today pre-adulthood is in developing age they have absence of physical and mental wellness, for example, speed, quality, adaptability, balance, stress, nervousness, melancholy and so on. The AshtangaVinyasa Surya Namaskar rehearses (AVSN) is the most famous contemporary style of yoga it causes the youthfulness to improve their physical and mental wellness factors. The reason for the examination was to discover the Impact of Ashtanga Vinyasa Surya Namaskar A&B (AVSN) rehearses on quality and parity among puberty young men. To accomplish the reason for the current examination, forty immaturity young men from Maharashtra were chosen as subjects aimlessly and their ages went from 15 to 19 years. The subjects were additionally arranged aimlessly into two equivalent gatherings of 20 subjects each, for example, Experimental Group and Control Group. Exploratory Group went through AshtangaVinyasa Surya Namaskar A&B (AVSN) Practices for threefold in seven days for about a month and a half. Control Group (CG) didn't partake in any uncommon preparing separated from the customary day program. The chose factors, for example, quality and equalization were estimated by utilizing push up and Stork Balance Stand Test. The gathered information were examined factually through break down of covariance (ANCOVA) to locate a huge contrast. The consequences of the investigation demonstrated that quality and parity were fundamentally improved because of AshtangaVinyasa Surya Namaskar A&B (AVSN) rehearses among puberty young men.

Keywords: AshtangaVinyasa Surya Namaskar, strength, balance, adolescence boys

Introduction:

India has a rich convention of yogic practices. Presently a-days yoga, the antiquated act of stances, breathing and contemplation is increasing a ton of consideration from medical services experts. With expanding logical examination in yoga, its helpful perspectives are additionally being investigated. Suryanamaskar – The greeting to the God Sun, is likewise a piece of Indian customary yogic practices. Each pattern of suryanamaskar is a grouping of specific 'asanas', performed alongside 'pranayama' [1]. The succession of asanas is with the end goal that every asana is complimentary to the following. During Suryanamaskar, muscles of the whole body experience stretch and weight then again and hence it is said to give more advantages with less consumption of time [2]. It is asserted that suryanamaskar practice gives advantages of both-asana and pranayama and improves general wellbeing and wellness Ashtanga yoga depends on the Antaranga yoga of Patanjali yoga framework, it gives a down to earth and simple way to deal with arrive at higher conditions of cognizance. This is the most orderly technique for accomplishing the most elevated condition of reflection. The person who follows this sort of yoga framework which brings them into insight, control, concordance and composure, which grasps the aggregation of information, obscure, insight, arusing of clairvoyant forces, theory and reflection. Ashtanga yoga which is comprise of eight crease framework, for example, yama, niyama, asana, pranayama, prathyahara, dharana,

dhyana, and samadhi (Krishankumarsuman, 2015) The word Vinyasa, implies stream in view of the postures run together in smooth manner, and it's an expansive arrangement that incorporates a wide range of kinds of yoga, including Ashtanga and force yoga (Anna Pizer, 2019).

Hypotheses:

H1 - It was hypothesized there may be a significant difference on Flexibility due to suryanamaskar practice among all datasets

H2 - It was hypothesized there may be a significant difference on BMI due to suryanamaskar practice among all data sets.

H3 - It was hypothesized there may be a significant difference on Cardio Vascular Endurance due to suryanamaskar practice among data sets.

H4 - It was hypothesized that there may not be a significant difference on selected physical fitness variables of the control group among data sets.

Methodology:

The reason for the investigation is to discover the Impact of AshtangaVinyasa Surya Namaskar A&B (AVSN) rehearses on quality and equalization among puberty young men. To accomplish the reason for the current examination, forty puberty young men from Maharasthra were chosen as subjects indiscriminately and their ages went from 15 to 19 years. The subjects were additionally arranged aimlessly into two equivalent gatherings of 20 subjects each for Experimental Group and Control Group. Exploratory Group went through AshtangaVinyasa Surya Namaskar A&B (AVSN) Practices for threefold in seven days for about a month and a half. Control Group (CG) didn't take an interest in any exceptional preparing separated from the ordinary day program.

Materials and apparatus used:

- Sit and reach box (Baseline Sit and Reach Evaluation Instrument)
- Universal Goniometer
- Measure tape
- Paper
- Pen

Outcome Measures:

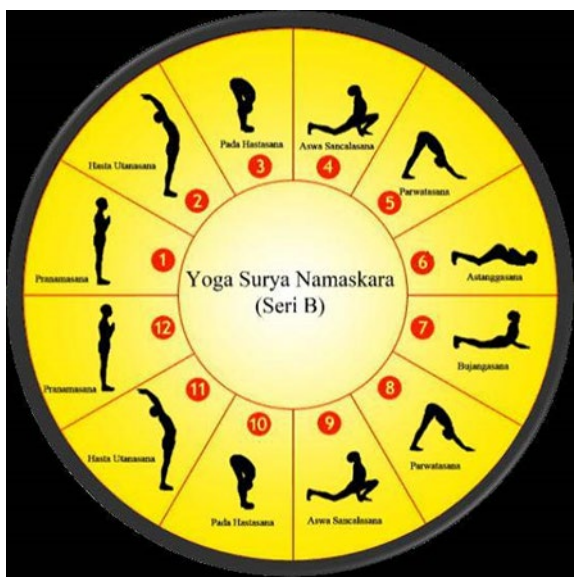
- Sit and reach test: This test needs a sit and reach test box. The subjects sat barefooted on the floor keeping their knees extended and feet against the box.
- They placed the right hand over the left and reached forwards as far as they can by sliding their hands along the measuring board and measurement was recorded in centimeters. Best of three trials were taken. [9]
- Popliteal angle: To measure the popliteal angle subject was laid in supine position and was asked to flex both hips to 90° while the knees are bent. The subject grasped behind the knees with both hands to stabilize the hips at 90°of flexion. Then the subject actively extended each knee in turn as much as possible. The angle formed between two lines i.e. one line along the shaft of femur and one line along the line of the tibia was the popliteal angle. [10]
- Lumbar flexion: Lumbar flexion was measured using modified Schober test. A point was marked midway between the two PSISs (“dimples of the pelvis”), which is the level

of S2; then, points 5 cm below and 10 cm above that level are marked. The distance between the three points is measured, the patient is asked to flex forward, and the distance is re- measured. The difference between the two measurements is an indication of the amount of flexion occurring in the lumbar spine. [11]

Procedure:

All the subjects were measured for hip and trunk both flexibility using the sit and reach test. Popliteal angle was taken to measure the individual hamstring flexibility and lumbar flexion values were also taken. The subjects were demonstrated the techniques prior to measurement. After recording the pre measurements the subjects were made to do 10 slow Surya Namaskar with 10 sec hold at each asana.

Surya Namaskar Postures:



It consists of a total of 12 postures/asanas:

- **Pranamasana (Prayer pose) – 1st and 12th Posture:**
  Stand erect with folded hands close to the chest and palms are held together inthe form of prayer pose. Look straight ahead, Exhale the breath normally.
- **Hasta Uttanasana (Raised arms pose) – 2nd and 11th Posture:**
  Raise both the hands up above the crown from Pranamasana pose. Inhale the breath normally while raising your hands. Bend the trunk and neck slightly backward.
- **Padahastasana (Hand to Foot pose) – 3rd and 10th Posture:**
  Bend forward from Hasta Uttanasana pose and try to touch the floor with your both hands. Exhales breathe normally while bending forward.
- **AshwaSanchalanasana (The Equestrian Pose) – 4th and 9th Posture:**
  Stretch the leftlegas far back as possible from Padahastasanapose while inhaling the breath normally. At the same time, bend the right knee. While looking straight ahead the hands should be kept straight with fingers touching the floor. Arch the back a little with head tilted back. The same steps should be repeated with left knee in the 9thposture of SuryaNamaskara.

- **Parvatasana (The Mountain Pose) – 5th and 8th Posture:**
  While exhaling, take the right leg backward from AshwaSanchalanasana pose and place it parallel to the left leg, raise the buttocks at the same time. Place the hands straight supporting the weight of the body. The head should be placed between thehands.
- **AshtangaNamaskara (Eight-Limbed salutation) – 6th Posture:**
  Lower the body to the ground. Bend the legs and place your knees in contact with the floor. Bend the arms and lower trunk towards ground. Keep your chin on the floor. Keep the chest along the floor. Finally raise the abdomen and hips slightly off the ground. Body is in contact to ground at 8 points: 2 palms, 2 knees, 2heels, chest andchin.
- **Bhujangasana (The Cobra Pose) – 7th Posture:**
  While inhaling raise the body by using the hands from AshtangaNamaskara pose. Arch your head backward. This position looks like the cobra which has raised its hood. [4]

Training Programme:

During the training period the experimental group underwent 6 weeks of AshtangaVinyasa Surya Namaskar A&B (AVSN) practices. The duration of training programme was planned for 60 minutes that is from 7.00am to 8.00am on Mondays, Wednesdays and Fridays. All the subjects involved in this study were carefully monitored throughout the training programmes, Each session 60 minutes consist of 5 min warm up exercise followed by Starting Prayer (2Min) Preparatory Practices-Warm up (13Min) Surya Namaskar–A&B (25Min) Loosening Exercise (5Min) Relaxation (13Min) Closing Prayer (2Min) After completion of 6 weeks of training period, the participants wereretested.

Warm Up and Loosening Exercise:

Ankle Rolls, Knee Circle, Hip Circles, Sacrum Circles, Pelvic Rotations, Spine Rolls, Spinal Twist

Surya Namaskar (A):

Inhale–UrdhvaHastasana, Exhale–Utanasana, Inhale–UrdvahUtanasana, Exhale–Chaturanga Dandasana, Inhale–UrdvahMukhaSvanasana, Exhale–AdhoMukhaSvanasana, Inhale–Urdvah Utanasana, Exhale–Utanasana, Inhale–UrdhvaHastasana, Exhale–Samasthiti

Surya Namaskar (B):

Inhale–Utkatasana, Exhale–Utanasana, Inhale–UrdvahUtanasana, Exhale–Chaturanga Dandasana, Inhale–UrdvahMukhaSvanasana, Exhale–AdhoMukhaSvanasana, Inhale–Virabhadrasana I, Exhale–ChaturangaDandasana, Inhale–UrdvahMukhaSvanasana, Exhale–AdhoMukhaSvanasana, Exhale–AdhoMukhaSvanasana, Exhale–ChaturangaDandasana, Inhale–UrdvahMukhaSvanasana, Exhale–AdhoMukhaSvanasana, Inhale– UrdvahUtanasana, Exhale–Utanasana, Inhale–Utkatasana, Exhale–Samasthiti

Statistical Tool:

The collected data were analysed statistically through analyse of covariance (ANCOVA) to find the significance difference through IBM SPSS tool.

Analysis of the Data:

The data collected prior and after the experimental periods on strength and balance of experimental group (AVSN) and control group (CG) were analysed and presented in table–I &II. The level of significance was fixed at 0.05 level of confidence to test the 'F' ratio obtained by analysis of covariance.

Table 1. Analysis of covariance for pre and post data on strength (Scores in Numbers)

Test	Experimental Group (AVSN)	Control Group (CG)	Source of variance	Sum of Squares	DF	Mean square	F
Pre-test mean	16.00	15.75	Between	0.625	1	0.625	0.13
			Within	177.75	38	4.67	
Post-test mean	20.00	15.85	Between	172.22	1	172.22	40.76
			Within	160.55	38	4.22	
Adjusted mean	19.89	15.95	Between	154.69	1	154.69	162.46
			Within	35.23	37	0.95	

* Significant at 0.05 level of confidence. (The table value required for significance at 0.05 level of confidence with DF 1 and 38 and 1 and 37 were 4.09 and 4.10 respectively).

Table 2. Analysis of covariance for pre and post data on balance (Scores in Seconds)

Test	Experimental Group (AVSN)	Control Group (CG)	Source of variance	Sum of Squares	DF	Mean square	F
Pre-test mean	14.35	14.50	Between	0.22	1	0.22	0.05
			Within	161.55	38	4.25	
Post-test mean	18.15	14.55	Between	129.6	1	129.6	25.76
			Within	191.5	38	5.03	
Adjusted mean	18.21	14.48	Between	138.55	1	138.55	64.39
			Within	79.60	37	2.15	

* Significant at 0.05 level of confidence. (The table value required for significance at 0.05 level of confidence with df 1 and 38 and 1 and 37 were 4.09 and 4.10 respectively).

An alpha-level of 0.05 was used to determine statistical significance. Paired t-test was applied inpre–post of Sit and Reach test, Lumbar flexion and popliteal angle to see the immediate effect of Surya Namaskar.

Table 3. Comparison of all outcome measures following Surya Namaskar

Outcome Measures	Pre Mean (SD)	Post Mean (SD)	t-value	P-value
Sit and reach (cm)	30.60 (6.11)	33.07 (5.94)	-12.30	0.00
Lumber flexion (cm)	5.13 (1.14)	6.04 (1.12)	-13.67	0.00
Popliteal angle (Rt) (degrees)	144.70 (7.45)	151.30(5.87)	-11.75	0.00
Popliteal angle (Lt) (degrees)	143.90 (6.16)	151.60 (5.67)	-13.16	0.00

As shown in the above table there is significant difference in the values of sit and reach, lumbar flexion and popliteal angles readings at level of significance p=0.00.

Table 4. Comparison of all outcome measures following Surya Namaskar

Parameter	Mean ± SD (Before)	Mean ± SD (After)	p value
Pulse (/min)	80.7 ± 5.61	76.75 ± 3.90	< 0.0001
Systolic BP (mmHg)	125.5 ± 5.61	119. ± 3.92	< 0.0001
Diastolic BP (mmHg)	82.7 ± 5.51	77.8 ± 4.62	< 0.0001
Vital capacity (ml)	3692.3 ± 470.41	3896.35 ± 444.52	< 0.001
MVV (L/min)	101.08 ± 10.45	110.1 ± 10.67	< 0.001
FEV1 (sec)	89.69 ± 2.91	93.85 ± 1.59	< 0.001
VO2 max (L/min/Kg)	30.33 ± 3.50	33.1 ± 4.38	< 0.0001
40mm endurance (sec)	31.97 ± 3.25	39.13 ± 2.51	< 0.0001

Table 5. Comparison of all outcome measures following Surya Namaskar

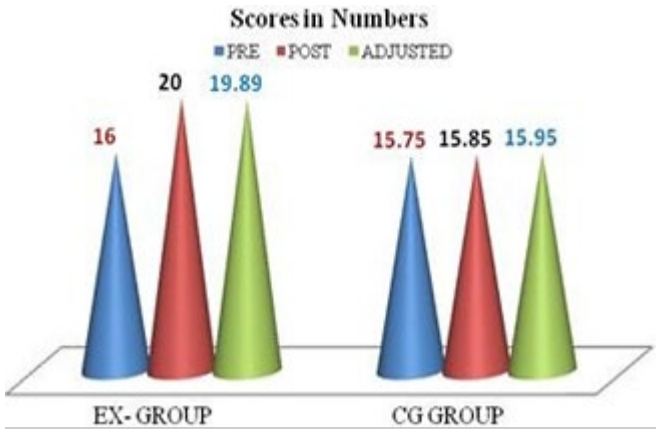
Parameter	Before Mean ± SD	After Mean ± SD	P value
Pulse (/ min)	82.75 ± 4.27	77.9 ± 4.12	< 0.001
Systolic BP (mmHg)	113.6 ± 5.33	110.4 ± 4.28	< 0.001
Diastolic BP (mmHg)	77.5 ± 6.49	75 ± 6.13	< 0.001
Vital capacity (ml)	3595.5 ± 471.15	3791.95 ± 473.34	< 0.001
MVV (L/min)	97.97 ± 10.15	107.79 ± 11.02	< 0.001
FEV1 (sec)	86.83 ± 4.07	89.97 ± 2.82	< 0.001
VO2 max (L/min/kg)	26.75 ± 2.27	29.43 ± 2.23	< 0.001
40mm endurance (sec)	25.95 ± 3.57	30.73 ± 3.41	< 0.001

Discussion on Findings of Strength:

The obtained F value on pre test scores 0.13 was lesser than the required F value of 4.09 to be significant at 0.05 level. This proved that there was no significant difference between the groups at initial stage and the randomization at the initial stage was equal. The post test scores analysis proved that there was significant difference between the groups as the obtained F value at 40.76 was greater than the required F value at 4.09. This proved that the differences between the post-test mean at the subjects were significant. Taking into consideration the pre and post test scores among the groups, adjusted mean scores were calculated and subjected to statistical treatment. The obtained F value at 162.46 was greater than the required F value at 4.10. This proved that there was Significant differences among

the means due to six weeks of AshtangaVinyasa Surya Namaskar practice A&B (AVSN) on strength. The obtained adjusted mean values were presented through bar diagram in figure1.

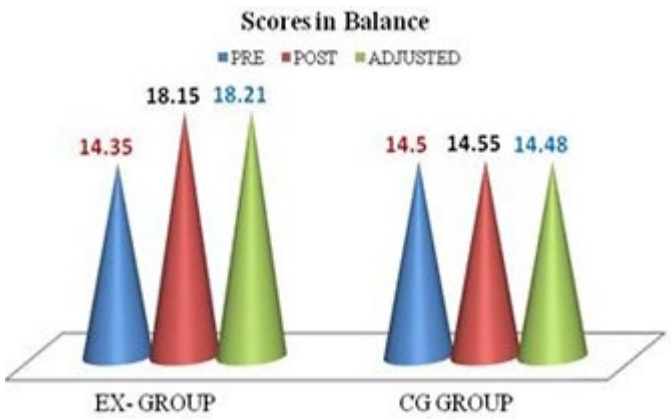
Fig-1. Bar diagram showing the mean values Experimental group and Control group on strength



Discussion on Findings of Balance:

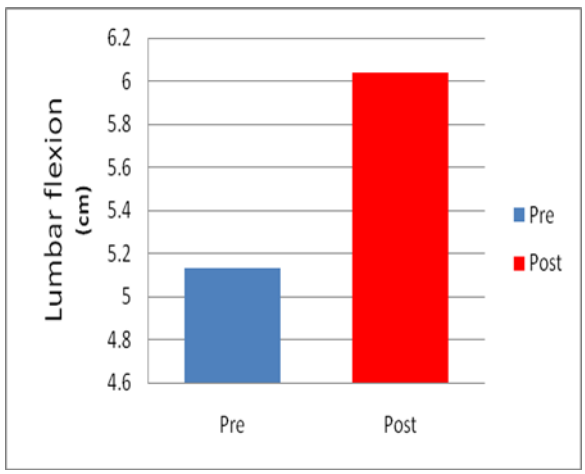
The obtained F value on pre test scores 0.05 was lesser than the required F value of 4.09 to be significant at 0.05 level. This proved that there was no significant difference between the groups at initial stage and the randomization at the initial stage was equal. The post test scores analysis proved that there was significant difference between the groups as the obtained F value at 25.76 was greater than the required F value at 4.09. This proved that the differences between the post-test mean at the subjects were significant. Taking into consideration the pre and post test scores among the groups, adjusted mean scores were calculated and subjected to statistical treatment. The obtained F value at 64.39 was greater than the required F value at 4.10. This proved that there was Significant differences among the means due to six weeks of AshtangaVinyasa Surya Namaskar practice A & B (AVSN) onbalance. The obtained adjusted mean values were presented through bar diagram in figure2.

Fig-2. Bar diagram showing the mean values Experimental group and Control group on Balance

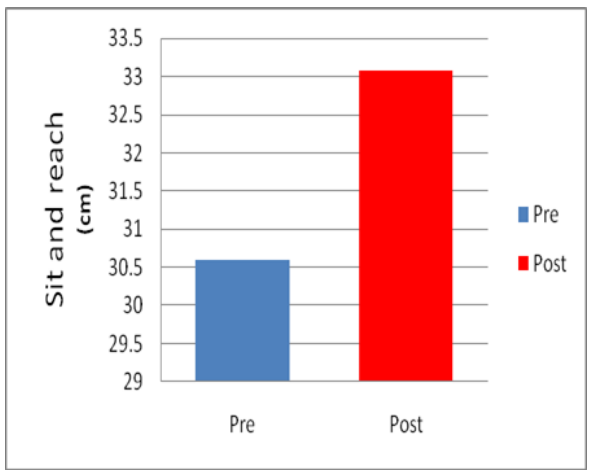


In the present study subjects were asked to perform Surya Namaskar for 10 times with 10 sec hold at each asana. Then their flexibility was measured before and after doing Surya Namaskar by sit and reach test, modified Schober test and popliteal angle by goniometer. The results of the present study as shown in table are mean values for sit and reach test before and after doing Surya Namaskar are 30.60±6.11 cm and 33.07±5.94 cm respectively; mean for lumber flexion is 5.13±1.14 cm and 6.04±1.12 cm respectively and mean for popliteal angle in right lower limb are 144.70±7.45 degree and 151.30±5.87 degree and for leftlower limb are 143.90±6.16 degree and 151.60±5.67 degreerespectively. Thus, it is found that Surya Namaskar shows immediate effect on improving flexibility of themuscles. The increase in flexibility can most likely be attributed to the static stretching nature of the asanas. The probable reason may be that Surya Namaskaris the combination of twelve exercises that include stretching, holding and relaxation. Stretching is most commonly advised as a method for increasing flexibility. The increased range of motion resulting from prolonged stretching is most likely due to an increase in length of both connective and muscle tissue. Increased connective tissue length can occur due to its property of elastic elongation. The findings of our study are consistent with the study of Safa A et al. (2017) who found mean difference of 4.56 at $p < 0.0001$ for sit and reach test. the increased temperature of the muscle allowing a smoother contraction. The flexibility of the muscle improves as it becomes more pliable and accommodating to the forces placed on it due to its elevated temperature.

Graph 1: Mean of lumbar flexion



Graph 2: Mean of sit and reach



Conclusion:

Adolescence refers to the period of transition from childhood to adulthood. During this period young boys and girls develop to sexual maturity. Developing one's own identity, dealing with sexual maturation and development, emancipation from home, re-examination of beliefs are the major physical and psychological developments for the adolescent. AshtangaVinyasa Surya Namaskar practice (AVSSN) postures not only help to strengthen bones and muscles, but when one reaches the adolescence stage, the execution of the postures is done with more time and awareness than when one is younger and the body is still developing. Physical movements from one posture to another provide strength, balance, flexibility and health in general to the bones and muscles; maintaining the positions for a period of time brings about internal, hormonal and cellular changes.

1. It was concluded that selected criterion variables strength was significantly improved due to AshtangaVinyasa Surya Namaskar A&B (AVSN) practice among adolescence comparing to the controlgroup.
2. It was concluded that selected criterion variables balance was significantly improved due to AshtangaVinyasa Surya Namaskar A&B (AVSN) practice among adolescence comparing to the controlgroup.

Reference:

1. VishwasMandlik. YogShikshan Mala, YogParichay: 2001 6th Ed. Yogchaitanya Publication, Nashik: 36-45
2. Datey KK, Gharote MS. Yoga for your heart: 1985 Jaico Publishing house, Mumbai, pg 11-15
3. Ranade VG. Practical physiology. 2nd ed. 2000 Pune VidyarthigrihaPrakashan.
4. William D. McArdle, Frank I. Katch, Victor L. Katch. Individual differences and measurement of energy capacities. In Exercise Physiology Energy, Nutrition and Human Performance 5th Ed. Lippincott Williumsand Wilkins, Baltimore, USA 2001; 242-243
5. Wenger M.A. and Bagchi B.K. Studies of autonomic functions in practitioners of yoga in India. 1961 Behavioral science, 312-323.
6. Vempati RP, Telles S. Yoga-based guided relaxation reduces sympathetic activity judged from baseline levels. 2002 Psycho.Rep, 90: 487-494
7. Karambelkar P.V. and BholeM.V.. Heart control and yoga practices. 1971 Yoga Mimansa, 53-65
8. Makwana K., Khirwadkar N. and Gupta H.C. Effects of short term yoga practice on ventilatory function tests. 1988 Indian journal of physiology and pharmacology, vol.32, 202-207.
9. Nayar H.S., Mathur R.M.et.al.. Effects of yogic exercises on human physical efficiency. Oct.1975 Indian journal of medical research, 1369-1375.
10. Thomas ARaS. The Health Benefits of Yoga and Exercise:A Review of Comparison Studies. The journal of alternative and complementary medicine. 2010; 16.
11. Prof. (dr.) Kanwaljeetsinghdbsbdwv. The effect of Surya Namaskaryogasana on muscular endurance and flexibility among intercollege yoginis. Journal of Physical Education and Sport. 2010; 27.
12. Saraswati S. Surya Namaskar-A technique of solar vitalization. : Munger Yoga Publications Trust.; 1983.
13. AmitVaibhavSSaOPS. Surya Namaskar (Sun Salutation): A Path to Good Health. International Journal of Pharmacological Research. 2016; 6(7).
14. Sinha B RUPASW. Energy cost and cardiorespiratory changes during the practice of Surya Namaskar. Indian Journal of Physiology and Pharmacology. 2004; 48(2): p. 184-90.
15. AshwiniDeshmukh et al. A comparative study between Pilates and Surya Namaskar on flexibility in women having sedentary lifestyle using sit and reach test and shoulder and wrist test. International Journal

16. Doriel Hall, Jean Hall. The Practical Encyclopaedia of Astanga Yoga and Meditation, Joanna Lorenz publication, 2009; 44.
17. Doriel Hall, Jean Hall. The Practical Encyclopaedia of Astanga Yoga and Meditation, Joanna Lorenz publication, 2009; 47.
18. Raj Tater Sohan. Yoga therapy, 2010; 1.
19. Satyanarayana. Sports Training, Sports Publication, 2016; 53.
20. ShriPattabhiJois K. An Introduction to the Fundamentals of Astanga Yoga, 2013; 4.
21. Swami SatyanandaSaraswati. Asana Pranayama Mudra Bandha Yoga Publications Trust, Munger, Bihar, India, 2002; 1-3.
22. Uppal AK. Principles of Sports Training, Friends Publications, 2001; 38.

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