"EFFECTIVENESS OF TABATA TRAINING ON AGILITY AND SPEED AMONG ADOLESCENT AMATEUR FEMALE KHO-KHO PLAYERS" - A RANDOMIZED CONTROLLED TRIAL

Dissertation Submitted to the

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In Partial fulfilment of the requirements for the degree of

MASTER OF PHYSIOTHERAPY (M.P.T)

In

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Under the guidance of

Prof. JOSEPH OLIVER RAJ

DEAN, ABSMARI

ABHINAV BINDRA SPORTS MEDICINE & RESEARCH INSTITUTE

Bhubaneswar, Odisha

2021-2023

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LIST OF ABBREVIATIONS

1. **ABSMARI –** Abhinav Bindra Sports Medicine and Research Institute
2. **BMI –** Body Mass Index
3. **CON –** Control group
4. **HIIT -** High-Intensity Interval Training
5. **MCID-** Minimal Clinically Important Differences
6. **MTT –** Modified T- Test
7. **SD-** Standard Deviation
8. **SPSS –** Statistical package for social science
9. **TAP –**Tabata Training Protocol

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ABSTRACT

EFFECTIVENESS OF TABATA TRAINING ON AGILITY AND SPEED AMONG ADOLESCENT AMATEUR FEMALE KHO-KHO PLAYERS- A RANDOMIZED CONTROLLED TRIAL

Background- Kho-Kho is a game that requires agility and speed to perform well in the game. Agility is needed to get away from the chaser, the runner must move quickly and unexpectedly break. A runner must abruptly change their direction to avoid getting touched. The Kho-Kho performance also depends upon the Speed of both Chaser and Runner when running between the two poles. There are numerous kinds of fitness training regimens to help athletes perform better, but TABATA training becomes popular in the fitness industry due to it has been shown significantly increase fitness without the use of any equipment in a short period of time. Unfortunately, Adolescent female athletes have not been the subject of sufficient research to determine how to increase their Agility and speed. The aim of the study was to see the effects of Tabata training on agility and speed among adolescent amateur female Kho-Kho players

Methods- Forty amateur Kho-Kho players aged between 12-16 years were randomly assigned to Tabata (n=20) and control (n=20) group. Each training intervention consisted of 4 minutes of exercise and 10 minutes of warm-up, and 5 minutes of cool-down. Agility and Speed performance were assessed before and after the 2 weeks of intervention using Modified T-tests, and 50m Dash test respectively.

Results – The results within the group show that both Speed and Agility significantly ($p<0.05$) improved in both Group A and Group B. The between-group analysis revealed that the TABATA group showed a significant improvement in Agility than the Control group but no significant difference was seen in speed.

Interpretation and Conclusion-

The study concluded that Agility and Speed was improved among female Kho-Kho players by the Tabata Training. But Agility was significantly improved as compared to Speed.

Key Word- Tabata; Kho-Kho players; Agility; Speed; HIIT

INTRODUCTION

Kho–Kho is one of the two most popular traditional tag games in the Indian subcontinent.(1) Kho-Kho Federation of India was formed in 1960. A Kho- Kho team has 12 players, but only 9 of them play at once; the other 3 serve as substitutes. Kho-Kho is played on a rectangular court with two poles at each end and a central lane running through it. The field is 27 by 16 meters (89 by 52 ft), the distance between the two poles is 24 meters (79 ft), and the width of the center lane is 30 centimeters (12 in). Three runners from the defensive team race around the court and try to avoid being touched while nine players from the chasing team (attacking team) are on the pitch, from which in the central lane eight of them sitting (crouched). Each sitting player on the chasing team faces the opposite direction of their adjacent teammates.

Kho-Kho's fundamental moves include sitting in square formations, diving, running, pole dives, chain formation, making circles, giving Chou, twisting around the pole, sudden changes in direction, and dodging. To get away from the Chaser in Kho- Kho, the runner must move quickly and unexpectedly break. To avoid being touched runner need to change direction suddenly. Because chasers cannot change direction once they start running toward the pole so nimbleness is exceptionally fundamental for Kho-Kho players.(2)

To perform better in all games and sports, players require various physical fitness components including adequate degrees of health, posture, physique, good health habits, proper functioning of vital organs and nutrition, along with an adequate amount of endurance, agility, strength, speed, stamina, and flexibility requirements.(3) Agility and speed are the key characteristics which are the most important factors for good performance of Kho-Kho players.(4)

Agility

The ability to change the place of the body in a speed quickly and precisely without loss of balance. (2)

Agility can also be defined as the control and coordination ability that enables the body and joints to be in the right position in space while quickly changing direction during a series of movements.

Speed

The capacity to move the entire body in a shortest duration time to a specific point is known as speed.

In Kho- Kho, the Chaser sprints across the court to tag the runner as quickly as possible, while the Runners also move rapidly to avoid being touched from the Chaser. So in Kho-Kho, players need to have quick reactions.

Several physical conditioning regimens are intended to increase an athlete's agility and speed. But in this current environment, it's essential to embrace a speedier physical conditioning regimen that will improve physical fitness and gaming performance without being detrimental. Tabata Training Program (TAP) is one of them.

Tabata Training Program (TAP)

Tabata training is a High-Intensity Interval Training (HITT) that aims to improve aerobic and anaerobic capacity in athletes and has become more popular in recent years(5)

Elite athletes have been using interval training to increase their athletic performance for decades. (6)

The term Tabata Training was used for the first time in 1996 by the Japanese scientist Izumi Tabata. The word "HIIT," which comprises a number of training techniques involving intermittent/interval high-intensity exercise, or the more contemporary phrase "interval training" can both be used to describe the original and distinctive training method known as "Tabata training." (6)

HIIT improved aerobic capacity up to continuous training with moderate intensity, but also a 28% increase in anaerobic capacity.(5)

In Tabata training, the selected movement is done within 20 seconds with maximum load and repetition. After 10 seconds of active rest and then move to the second move. This high-intensity interval training is repeated 8 times and a total of 4 minutes of Tabata Training Program (TAP) training is completed. (5)

In skeletal muscles that have been trained specifically, there is an increase in the expression of proteins with specific physiological roles. Citrate synthase, which may be the anaerobic metabolism's rate-limiting enzyme, is increased by aerobic activity, and glycogen phosphorylase and phosphofructokinase (PFK) are increased by high-intensity exercise.(6)

The performance of a sportsman in any game depends on physical fitness. Physical fitness is an important motor ability namely neuro-physiological factors and sports performance in all sports depends to a great extent on these abilities. Physical fitness improvement and maintenance is the most important aim of sports training. (7)

It has been seen that agility exercises have a positive effect on changing direction and speed characteristics and thus on sportive performance. Exercises involving speed and agility should be initiated in the early ages. (8)

Physical fitness, as one component of overall fitness, is a way to cultivate a person's personality in its whole. Equitable levels of endurance, strength, stamina, and flexibility are all components of physical fitness, as are excellent diet, healthy lifestyle choices, and a nice physical appearance.

When we discuss about Kho-Kho, agility & speed are the main physical component of a Kho-Kho player. In India it is a relatively a neglected field by adolescence player.

Fig-1.1 – Kho-Kho game

Fig-1.2 – Time of Chasing and change in direction

Need of the Study

Agility, which depends on strength, response time, movement speed, and muscle coordination, is the capacity to quickly alter the direction of the body or its parts. Fast starts, stops, and direction changes are essential for successful sports performance.(7) There aren't enough studies on adolescent female Kho-Kho players to help them increase their agility.

Running speed is not only a sporting event in and of itself, but it also plays a significant role in Kho-Kho and can determine whether a performer is able to gain the advantage over her opponent. Adolescent female athletes have not been the subject of sufficient research to determine how to increase their speed.

Due to insufficient physical training, amateur athletes are more vulnerable to injuries during adolescence. Players' agility and speed should be increased during adolescence to reduce the risk of injury while playing.

Less research has been done on Tabata training in adolescent athletes so, to see how athletes in their adolescence respond to Tabata training.

There is more research need to conduct on adolescence female Kho-Kho players.

Improves Agility & speed hence it improves Kho –Kho performance Skills.(4)

Aim of the Study

To see the effectiveness of Tabata training on agility & speed among adolescent amateur female Kho- Kho players.

OBJECTIVES OF THE STUDY

- To see the effect of Tabata exercise on agility by modified T test.
- To see the effect of Tabata exercise on speed by 50m dash test.

Hypothesis

- **Null Hypothesis**

- There will be no significant effectiveness of Tabata training on agility and speed in adolescent amateur female Kho-Kho players.

- **Alternative Hypothesis:**

- There will be significant effectiveness of Tabata training on agility and speed in adolescent amateur female Kho-Kho players.

REVIEW OF LITERATURE

1. **Radhouan haj ,Sassi et al (2009)**

   Conducted a study to evaluate the relative and absolute Reliability of T –test and its relation with vertical jump and sprint.86 subjects are taken and they found no significant correlation between T-test and other test, modified T-test has a good relative and absolute reliability for both women and men to asses agility.

2. **Singh Raspal and Singh Hoshiyar (2013)**

   Conducted a study to evaluate specific physical fitness parameters of Kabaddi, Kho-Kho and Wrestling players from Haryana and Punjab, India & they concluded that Agility of Kho-Kho players was the best from kabaddi & wrestling.

3. **Sanesh Kumar and Navin Kumar (2015)**

   Conducted a study between Kho-Kho and kabaddi girls' players of Haryana were compared with regard to several aspects of their physical condition. The study's results regarding Agility shows that Haryana's female players of Kho-Kho had better speed than those of Haryana's female players of Kabaddi. The study's results regarding speed shows that Haryana's female players of Kho-Kho had better speed than those of Haryana's female players of Kabaddi.

4. **R.Saravanan and Sugumar.C. (2016)**

   Conducted a study to see the effect of Tabata interval methods of various durations on speed agility and speed endurance of school students & they concluded that Tabata interval training with 20:10 seconds active movement : rest ratio enhances the performance of speed, speed endurance and agility than Tabata interval training with 20:20 seconds active movement: rest ratio.

5. **Shashi Kant (2017)**

   Conducted a study to analyze the Playing Ability of Kho-Kho from Selected Physical Fitness Variables among College Level Players. Based on the findings, he came to the conclusion that agility, speed, and endurance abilities were crucial for success in Kho-Kho.

6. **Nebahat Eler and Serdar Eler (2018)**

   Conducted a study to examine the impact of agility drills given to female students participating in school handball teams on their change of direction (COD) speed and speed in terms of distance travelled & they concluded that agility exercises have a positive effect on changing direction and speed characteristics and thus on sportive performance. Exercises involving speed and agility should be initiated at the early age.

7. **Izumi Tabata (2019)**

Conducted a further study on the effectiveness of Tabata training & he conclude that Tabata training is useful to enhance sports performances that depend on both the aerobic and anaerobic energy-releasing mechanisms that synthesize the ATP required in the particular sports.

8. **Nitin Bariya (2019)**

Conducted a study on Test-retest reliability of the 50 m Dash Test as a measure of sprinting performance in collegiate sprinters, & concluded that Test-retest reliability for the 50-meter dash is excellent (ICC value above 0.90: excellent).

9. **Nithin M.N1 et al. (2020)**

Conducted a study on effect of Tabata training on agility and speed among male elite hockey players & conclude that there was a significant improvement in agility and speed due to the effect of Tabata training among male hockey players.

10. **Bethany L. Anderson and Rod A. Harter et al (2021)**

Conducted a study on The Acute Effects of Foam Rolling and Dynamic Stretching on Athletic Performance. The Study suggests that the inclusion of foam rolling in a dynamic warm-up may benefit an individual's ability to acutely increase power and agility more than after completing a dynamic warm-up alone.

METHODOLOGY

- Study Design – Randomized controlled trial
- Study Population - adolescent amateur female Kho-Kho players
- Sample Size – 40
- The sample size was calculated by using the formula – $2K \times sd^2 / d^2$
- Sampling Technique – Purposive Sampling (Non-random sampling)
- Study Setting – ABSMARI. Subjects were recruited from Kalinga Institute of Social Sciences, Bhubaneswar
- Study Duration – 6 months

Selection Criteria

- **Inclusion Criteria** :

1. Female adolescent amateur Field Kho-Kho players
2. Age group 12-16years(9)
3. Active training status- since last 1-2 years athlete is playing field Kho-Kho for at least 1h/day and at least 2 days/week.
4. Athletes using normal turf shoes in their training and matches
5. Subjects those who have given consent for participation.

.

- **Exclusion Criteria :**

1. History of respiratory and cardiovascular disease.
2. Recent injury within 6 months
3. Athletes with injuries, illness, or surgery that can affect Agility and performance in the last six months, those with orthopedic, neurological, or congenital problems, and those who stayed out of the sport for more than two weeks in the last three months.
4. History of any gynecological problem within 6 months.
5. Subjects who are not willing to participate in the study.

Materials Used:

1. Stop watch -1
2. Measuring tape-1
3. Agility cones-4

Fig 1.3 - Materials

Outcome Measures:

1. Agility – Modified T-test
2. Speed- 50m Dash test

Fig- 1.4 Modified T-test Measurement

Sample selection and Randomization:

The institutional Ethical Committee evaluated and approved the current study. A total of 50 samples were screened by using purposive sampling. 40 participants were selected based on inclusion criteria and exclusion criteria and 10 subjects were excluded. They were chosen for this study based on certain criteria, such as being female adolescence amateur Field Kho-Kho players who have been playing for the last one to two years for at least one hour per day and at least two days per week. Everyone who participated in the study was informed of the protocol and their informed consent were taken.

Groups' allocation was done by using Block Randomization. 1 box for experimental group and 1 box for control group, each box contain 20 chits.

20 subjects were placed in Group A (Experimental Group)

20 subjects were placed in Group B (Control Group)

Procedure:

Baseline assessment were taken which include Agility and Speed.

Agility was taken using a modified T-test where subject runs to the front cone, which is at a distance of 5 meters, moves laterally to the left, covering a distance of 2.5 meters, then returns to the center and moves right for another 2.5 meters, returning to the center and running backwards to the finish line. Time was recorded from start to completion of the test.

Speed was measured using a 50-meter dash test, which involves the individual running directly from one cone to the next, covering a distance of 50 meters. Finish line time was recorded throughout the test.

All groups did a warm-up that comprised active movement of all joints, jogging and dynamic stretching(10) for 10 minutes before the intervention and a cool-down that included slow walking and static stretching(11) for 5 minutes following the intervention.

All groups took intervention for a total of 19 minutes from which 15 minutes are for Warm-up and cool down and 4 minutes for the intervention.

Group A Under gone with Tabata Training

Group B performed their regular exercises

Group A subjects took intervention 1 session per day 6 day in a week for 2 weeks

First training program continues for 1 week then the progression given for next 1 week.

At the end of 2nd week, post-intervention data were assessed,

For both groups data were analyzed. The difference between the two groups was assessed by independent t-test and the difference between pre-intervention and post-Intervention within the group was assessed using paired t-test.

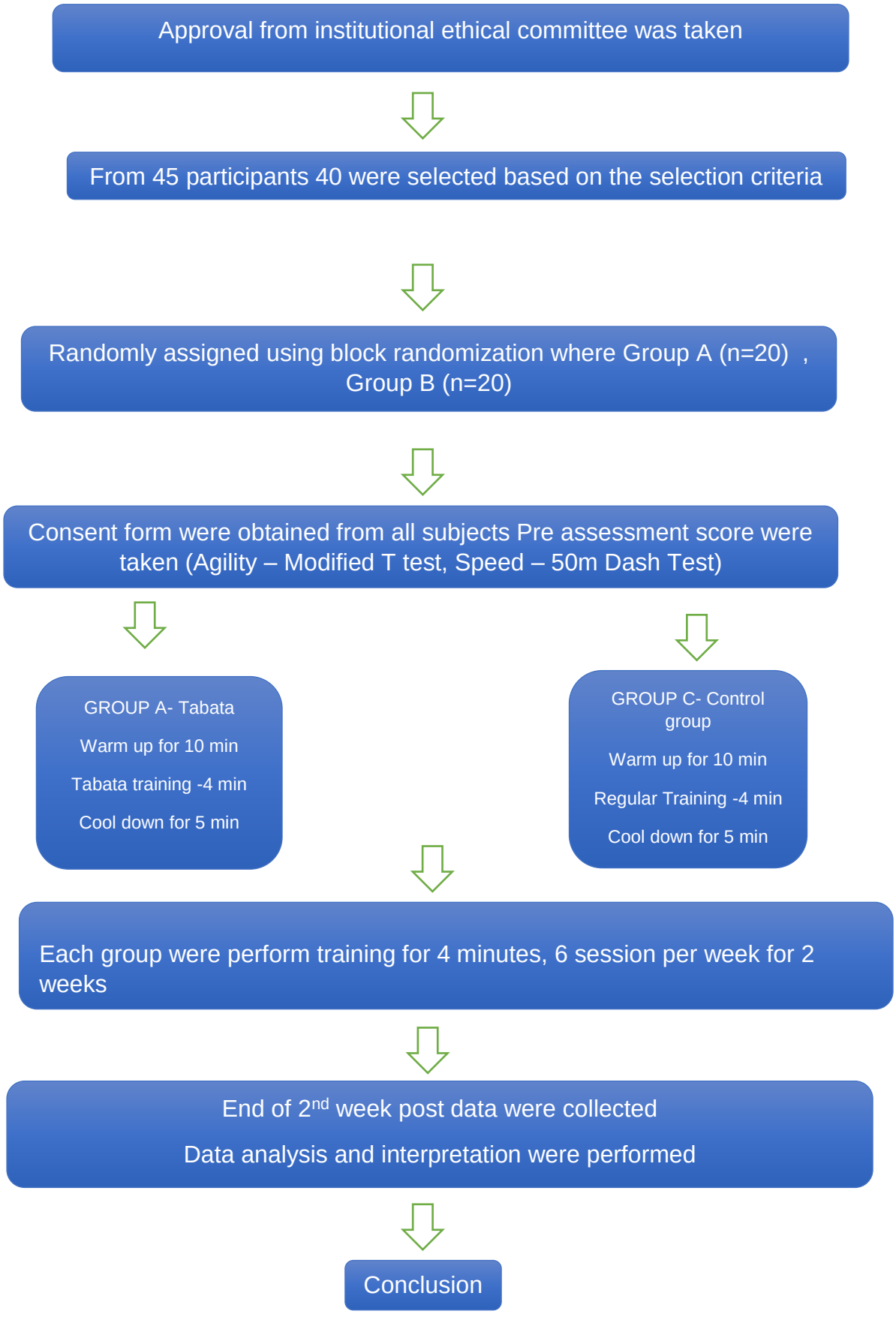

Fig 1.5 Flow chart of study procedure

SAMPLE SIZE ESTIMATION

Sample size calculation was done by using the formula for experimental studies

(Outcome – Modified T-test)

$$n=2k\ SD^2 / d^2$$

Where,

n= Number of samples

k= Power

SD=Standard Deviation

d = MCID Value

K =10.5

SD= 1.50

d(MCID value)=1.75

$n= 2k * SD^2/d^2$

$2x10.5 \times (1.50)^2/(1.75)^2$

=21x0.73=15.44 added 5 dropout

=20 per group (2 groups are there so total of 40 subject)

Training Programs

Tabata Training Group

1st week

Exercises	Repetition	Rest
Push-ups	10sec with maximum repetition	10sec
High knees/running in place	10sec with maximum repetition	10sec
Side lunges	10sec with maximum repetition	10sec
Mountain climbers	10sec with maximum repetition	10sec
Burpees	10sec with maximum repetition	10sec
Squat jumps	10sec with maximum repetition	10sec
Jumping jacks	10sec with maximum repetition	10sec
Crunches	10sec with maximum repetition	10sec

Table-1.1- Training program for 1st week

Fig 2.1 Push-ups

Fig 2.2 High knees/running in place

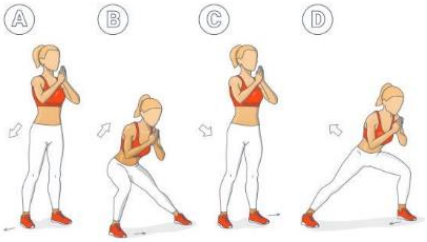

Fig 2.3 Side lunges

Fig 2.4 Mountain climbers

Fig 2.5 Burpees

Fig 2.6 Squat jumps

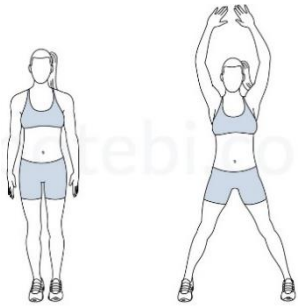

Fig 2.7 Jumping jacks

Fig 2.8 Crunches

Tabata Training

2nd week

Exercises	Repetition	Rest
Push-ups	20sec with maximum repetition	10sec
High knees/running in place	20sec with maximum repetition	10sec
Side lunges	20sec with maximum repetition	10sec
Mountain climbers	20sec with maximum repetition	10sec
Burpees	20sec with maximum repetition	10sec
Squat jumps	20sec with maximum repetition	10sec
Jumping jacks	20sec with maximum repetition	10sec
Crunches	20sec with maximum repetition	10sec

Table-1.2- Training program for 2nd week

RESULTS

Statistical Analysis

Data was analyzed using statistical package **SPSS 29.0**(SPSSInc,Chicago,IL) and level of significance was set **at p<0.05 Descriptive statistics** was performed to assess the mean and standard deviation of specific groups. Normality of the data was assessed using **Shapiro-Wilk test**. **Interferential statistics** to find out the difference within groups was done using **paired -t test.** Analysis between two groups using **Independent Samples Test.**

Table 2.1 Mean age Analysis

	Mean	SD
Tabata	13.15	1.08942
Control	13.55	1.05006

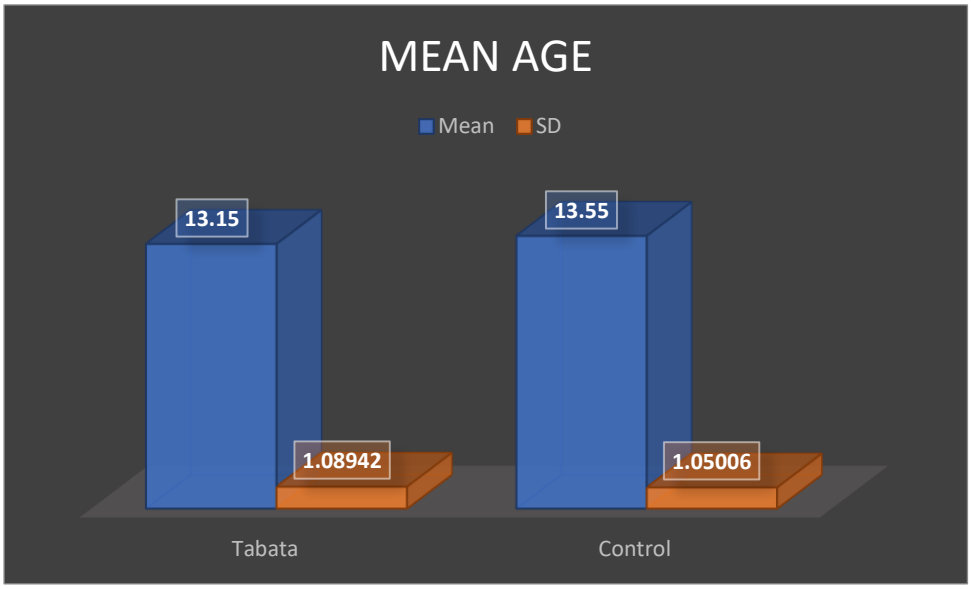

Fig 3.1 Graphical presentation Mean Age

Table 2.2 Mean BMI Analysis

	Mean	SD
Tabata	16.68	2.05467
Control	17.435	1.9299

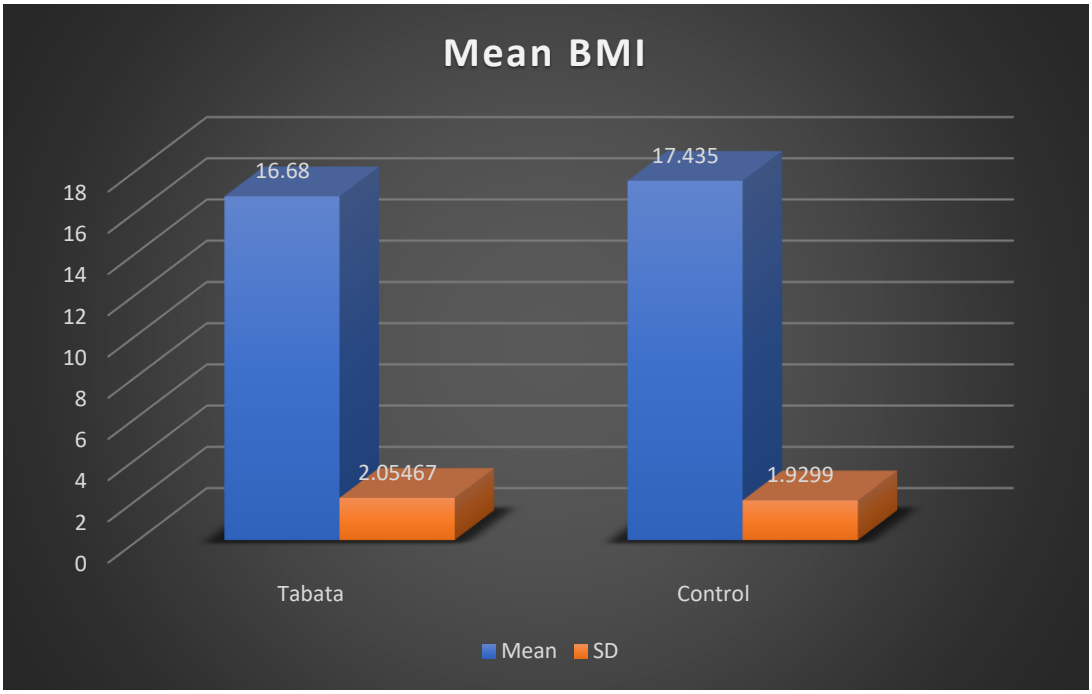

Fig 3.2 Graphical presentation Mean BMI

Table 2.3 Modified -T Test within Group Analysis

	PRE	POST	P VALUE	MEAN DIFFERENCE
Tabata	9.05	7.72	.001	1.33
Control	8.89	8.83	.319	0.06

Modified T test analysis with paired t test indicates statistically significant difference within the group in Tabata group ($p < 0.05$), CON group ($p<0.05$). The difference in mean value was reported was as follows, Tabata group > Control group.

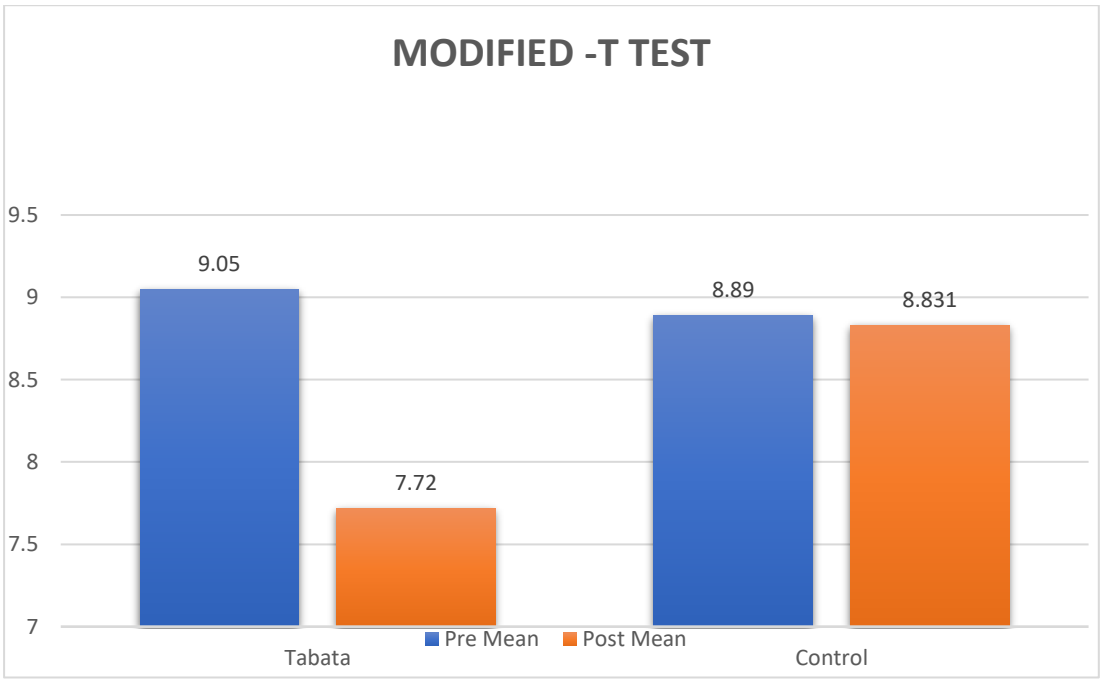

Fig 3.3 Graphical presentation MODIFIED -T TEST WITHIN GROUP ANALYSIS

Table 2.4 50m Dash test WITHIN GROUP ANALYSIS

	PRE	POST	P VALUE	MEAN DIFFERENCE
Tabata	7.39	7.25	0.003	0.14
Control	7.88	7.75	0.009	0.13

50m Dash test analysis with paired t test indicates both groups are statistically significant difference within the group ($p < 0.05$). The difference in mean value was reported was as follows, Tabata group > Control group.

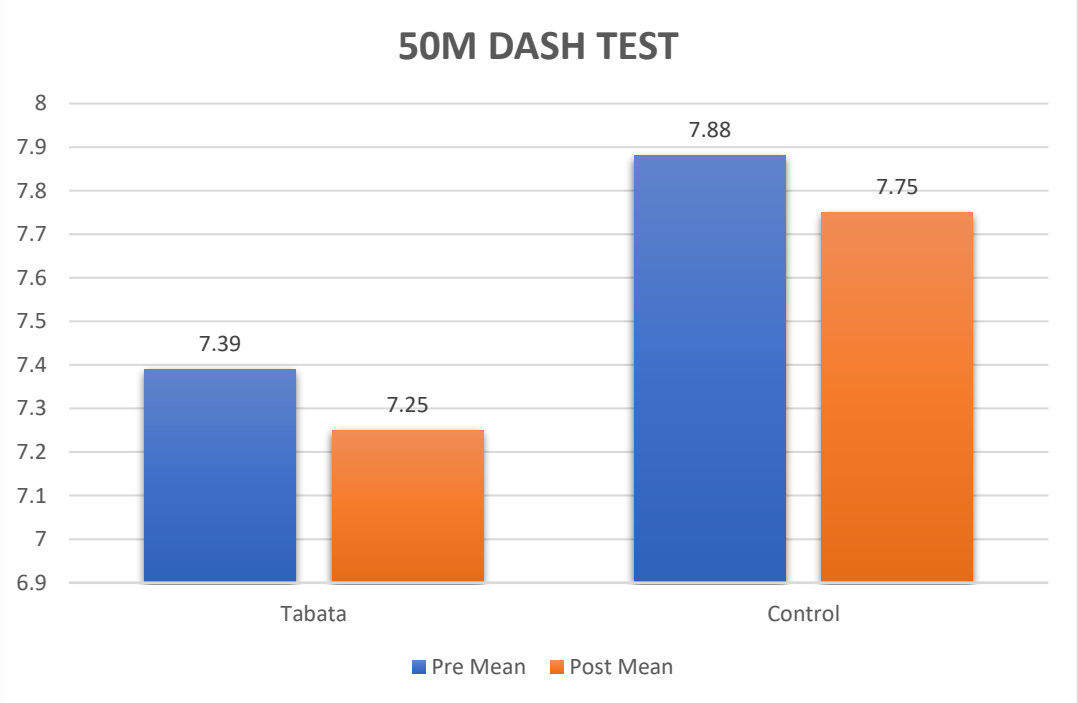

Fig 3.4 Graphical presentation of 50m Dash test WITHIN GROUP ANALYSIS

Table 2.5 Between group Analysis of outcome Measures

Outcome	Group	Mean difference	P value	Effect Size
Modified T test	Tabata v/s Control	1.16800	.001	2.645
50M Dash Test	Tabata v/s Control	.00200	.971	.012

Between group Analysis by using independent T –test Showed A significant Difference between Tabata & Control Group ($p<0.05$) where Tabata Group > Control group in modified T test. & There is no significant Difference between Tabata & control Group ($p>0.05$) where Tabata Group =Control Group in 50M Dash Test.

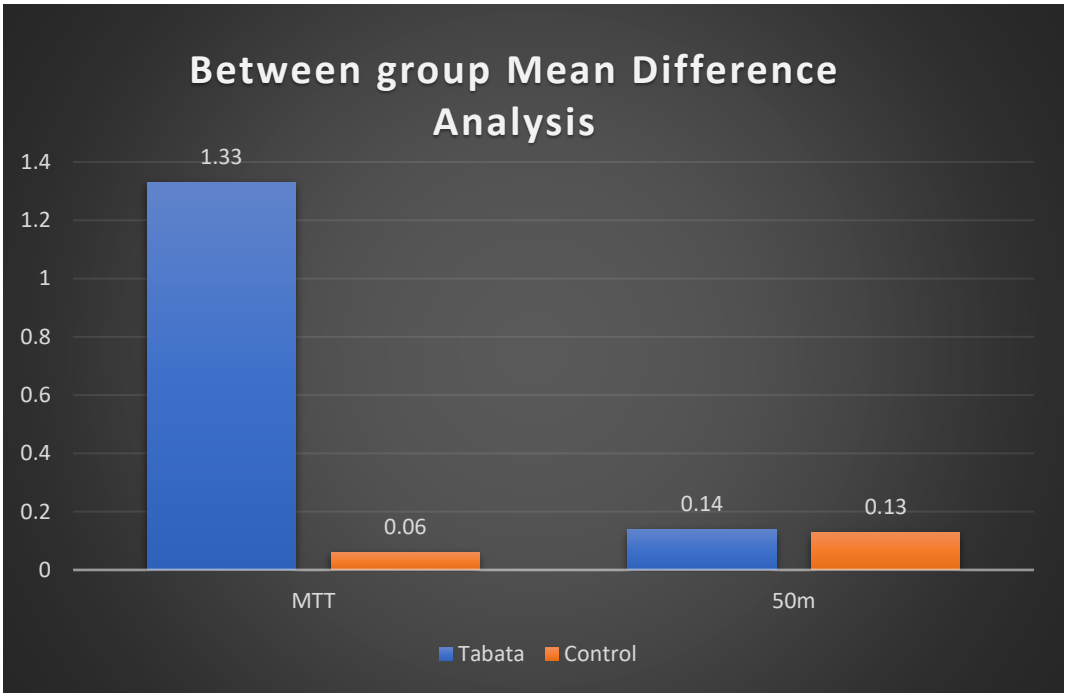

Fig 3.5 Graphical presentation of between groups Analysis

DISCUSSION

The present study investigated the effect of Tabata training on agility, and Speed performance. The participants who underwent the Tabata training program demonstrated notable improvements in both agility and speed, showcasing the effectiveness of this high-intensity interval training method in positively impacting performance.

The observed enhancements in agility can be attributed to the nature of Tabata training, which requires participants to perform quick and precise movements during the intense exercise intervals. This repetitive practice of rapid changes in direction likely improved participants' neuromuscular coordination, spatial awareness, and proprioception, enabling them to manoeuvre more efficiently on the Kho-Kho field.(4) Such advancements in agility are of paramount importance in Kho-Kho, where players must elude defenders with swift changes in direction and avoid being tagged by opponents. Moreover, the significant improvements in speed among the participants can be attributed to the anaerobic demands of Tabata training. The repeated short bursts of maximum effort during the workout likely enhanced the players' fast-twitch muscle fibers and anaerobic capacity, leading to quicker acceleration and improved sprinting abilities. The studies found that the increasing anaerobic lactate (90%) was influenced by the Tabata training, while the other 10% was influenced by the other factors.(12)

In a fast-paced sport like Kho-Kho, where rapid sprints are crucial for success, these gains in speed can offer a distinct competitive advantage to players.

A study done by Saravanan and Sugumar (2019) revealed that Tabata training improves the speed, speed endurance and agility of student athletes.(13) Another study done by Ajayaghosh et.al (2017) reported that twelve-week Tabata training of young adult male football players improved their speed and speed endurance abilities.(14) A study on aerobic capacity Tabata training showed that the group improved significantly on all functional fitness components. Mainly significant improvement was seen in all the selected physical variables namely agility, explosive power, muscular strength endurance and flexibility among female handball players.(15) The Tabata training also had an impact on 66.3% of agility endurance, 87.3% of power endurance, and 82.2% of speed endurance(16).

Results of this study coincide with result of above study stating that both group A and B i.e., Tabata group and Control Group showed improvement in agility and speed within the group i.e. pre and post, but Significant Improvement was seen in agility and speed with Tabata training than in control group when done between group analysis. The improved agility and speed gained through Tabata training can potentially reduce the risk of injuries during gameplay. Players who can quickly change direction and accelerate are less likely to strain their muscles or encounter awkward landings, ultimately contributing to a safer and more sustainable sports practice.

CONCLUSION

The results show that both speed and agility improved in both group A and group B when analyzed within the group i.e. pre and post. The between group analysis revealed that Tabata group showed significant improvement in agility than control group but no significant improvement was seen in speed. This study provides valuable insights into the impact of Tabata training on agility and speed in Kho-Kho players.

Thus, by integrating Tabata training in routine training in Kho-Kho players the players can improve themselves to excel in the dynamic and demanding nature of the Kho-Kho game.

Future scope and recommendations:

The current study investigating the effect of Tabata training on agility and speed in adolescent armature female Kho-Kho players has significant implication for future research and training practices. Future study could explore long term effect of Tabata training, compare its effectiveness with other training methods and combining it with other training method.

Understanding individual responses and adaptations to Tabata training would facilitate personalized training program. Overall, this study forms a strong foundation for further advancement in sport science and enhance performance in Kho-Kho players. Future study can be done in male Kho-Kho players as well as other sports also.

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ANNEXURES.1

CONSENT FORM

CONSENT FORM

Title of the study –

EFFECTIVENESS OF TABATA TRAINING ON AGILITY AND SPEED AMONG ADOLESCENT AMATEUR FEMALE KHO-KHO PLAYERS - A RANDOMIZED CONTROLLED TRIAL

I have been informed by Mr. Abhishek Abhinandan; pursuing MPT (sports) conducting the above-mentioned study under the guidance of Prof. Joseph Oliver Raj, Dean, Department of Physiotherapy ABHINAV BINDRA SPORTS MEDICINE AND RESEARCH INSTITUTE (ABSMARI), BHUBANESWAR.

I have no objection and will be a part of that group. I also understand that the study does not have any negative implication on my health. I understand that the information produced by the study will become a part of the institute's record and will be utilized, as per confidentiality regulations of the institute. I am also aware that the data might be used for medical literature and teaching purposes, but all my personal details will be kept confidential.

I am well informed to ask as many questions as I can to Mr. Abhishek Abhinandan either during the study or later.

I understand that my assent is voluntary and I reserve the right to withdraw or discontinue the participation from the study at any point of time during the study.

I have explained to MR/MISS/MRS the purpose of the research, the procedure required in the language he/she could understand to the best of my ability.

(Investigator) (Date)

I confirm that Mr. Abhishek Abhinandan (investigator) has explained to me in the language I can understand, the purpose of the study and the procedure. Therefore, I agree to give my assent for the participation as a subject in this study and I will be accountable for the decisions.

(Signature) (Date)

ANNEXURES.2

ASSESMENT FORM

ASSESMENT FORM

DEMOGRAPHIC DATA:

Name-

Age- Gender-

Address-

Phone number-

Height – Weight-

Date of examination-

- Pre test-
- Post test –

GROUP -

HISTORY

- Any medical condition-
- Any musculoskeletal condition-
- Any Recent injury within 6 months
- Any history of smoking ,alcohol

ON EXAMINATION

Test	PRE INTEVENTION SCORE	POST INTRVENTION SCORE
Modified T test		
50m Dash test		

ANNEXURES.2

ETHICAL COMMITTEE CLEARANCE CERTIFICATE

ABHINAV BINDRA
Sports Medicine & Research Institute
A Unit of the Abhinav Bindra Foundation Trust
Recognised by DMET, Health & FW Dept., Govt. of Odisha, Affiliated to Utkal University
Recognised by Odisha State Council for Occupational Therapy and Physiotherapy

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Reference No. – ABSMARI/IRB/03/2023
Date: 26th Apr 2023

INSTITUTIONAL REVIEW BOARD

To
Mr Abhishek Abhinandan,
Post Graduate student, Department of Physiotherapy,
Abhinav Bindra Sports Medicine and Research Institute (ABSMARI).

This is to certify that your proposal for the study titled "**Effectiveness of Tabata Training on Agility and Speed among Adolescence Amateur Female Kho-Kho Players - A Randomized Controlled Trial**" has been taken for discussion in the meeting held on 20th Apr 2023. Following the meeting, the committee approves the proposal and it has no objection on the study being carried out.

You are advised to familiarize yourself with the ICMR guidelines on biomedical research in human subjects and also adhere to the principles of Good Clinical Practice. You are hereby directed to submit the final report to the committee, on completion of the study. Any case of adverse reactions should be informed to this ethics committee and action will be taken thereafter.

Any such adverse reactions during the course of the study are the sole responsibility of the Principal Investigator and there is no onus on the Ethical Committee members resulting thereof.

We wish you all the best for your study.

26.4.23
Member Secretary

ABHINAV BINDRA SPORTS MEDICINE AND RESEARCH INSTITUTE

26/4/23
Chair Person

ANNEXURES.4

MASTER CHART

	Age1	Age2	BMI1	BMI2	PRE MTT1	PRE MTT2	PRE 50M 1	PRE 50M 2	POST MTT1	POST MTT2	POST 50M1	POST 50M 2
Player 1	15	12	19.4	14.1	9.01	9.48	6.92	8.59	7.25	9.5	6.89	8.54
Player 2	14	13	16.6	15.4	9.27	8.64	7.23	7.16	8.01	8.8	7.09	7
Player 3	12	12	15.8	16.2	9.73	9.72	6.97	7.28	7.57	9.68	7.02	7.22
Player 4	12	14	14.3	16.6	9.54	8.48	7.09	8.4	8.17	8.46	7.02	8.29
Player 5	12	13	15.8	16.2	9.52	9.03	7.38	8.96	7.7	9.26	7.28	8.78
Player 6	12	13	14.9	16.2	10.77	8.79	8.29	7.32	8.24	8.82	8.21	7.21
Player 7	12	12	14.9	17.6	9.44	8.64	7.96	7.22	7.91	7.82	7.98	6.87
Player 8	12	13	15.5	17.4	8.5	9.36	7.29	7.36	8.24	9.4	7.02	7.31
Player 9	12	13	14.9	17.4	8.83	9.49	7.55	8.96	8.35	9.52	7.45	8.18
Player 10	12	15	18.9	16.2	9.39	8.62	7.79	7.44	7.84	8.61	7.21	7.32
Player 11	14	15	19.2	17.4	8.07	9.84	7.34	9.54	6.91	9.74	6.88	9.56
Player 12	13	14	17.4	17.4	8.64	9.29	6.94	8.15	7.57	9.4	6.91	8.11
Player 13	14	13	16	18.4	8.54	8.46	7.51	8.32	7.32	8.7	7.32	8.28
Player 14	14	16	16.4	21.3	8.46	8.33	7.34	7.75	7.3	8.38	6.95	7.31
Player 15	14	13	15.8	16.2	10.43	7.59	8.09	7.38	8.37	7.8	7.9	7.39
Player 16	14	14	21.5	19.3	7.76	8.39	7.57	7.06	7.44	8.48	7.66	7.04
Player 17	15	14	18.7	17.4	8.64	8.67	7.44	7.43	7.15	8.8	7.41	7.63
Player 18	14	14	18.7	19	8.49	8.93	8.01	7.11	7.74	9.02	8.1	6.84
Player 19	13	14	14.1	16.6	9.47	8.43	6.71	7.34	8.29	9.05	6.42	7.11
Player 20	13	14	14.8	22.4	8.41	8.44	6.37	8.93	7.03	8.55	6.32	8.98
					9.0455	**8.831**	**7.3895**	**7.885**	**7.72**	**8.8895**	**7.252**	**7.7485**

In variables

1 signifies to Tabata Group

2 Signifies to Control Group

Eg: Age1 signifies to Player Age of Tabata Group & Age 2 signifies to Player Age of control group