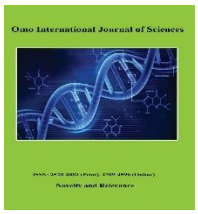
Omo International Journal of Sciences

https://survey.amu.edu.et/ojs/index.php/OMOIJS



Research Article

Effect of yoga training intervention on health-related physical fitness performance of U-17 male football project players

Getahun Mognnet[1*], Elsabet Mesfin[1]

[1]Department of Sport Science, College of Natural and Computational sciences, Arba Minch University, Arba Minch, Ethiopia

Abstract

Yoga training can significantly improve multiple health-related aspects of physical fitness of female subjects. Previous research findings recommend the need to evaluate the impact of yoga in different age groups, components of fitness, and measurement tools, along with the other regular training. So this study was aimed to assess the effectiveness of yogic exercise on selected health-related physical fitness performance of U- 17 male football project players in Dilla Town. A quasi-experimental study design was carried out for 8 weeks. The study was done on 30 players by using a convenient sampling method. The measure of cardiovascular endurance, leg strength, and flexibility of each player was taken and recorded immediately before and shortly after the 8-week yogic training. The mean and standard deviation were determined by using paired sample T-test. Data were analyzed by Statistical Package for scientific solution (SPSS version 20.0). The level of statistical significance was set at $P < 0.05$. It was found that yoga exercise has a significant effect on cardiovascular endurance (10.73 ±1.1 and 12.73±0.88 level) of the yogic group but, almost no change (10.60±1.183 and 10.87±0.990) in a non-yoga group. Yoga exercise improves flexibility (3.30±0.643 and 4.60 ±0.632 cm) of the yogic group but, almost no change in (3.34±0.83 and 3.68±0.60 centimeter) non-yogic group. It also improves leg strength (35.67±3.84 and 38.60±3.24 number) of the yogic group but, almost no change (37.67±3.28 and 37.87±3.38 number) in the non-yogic group. The results of this study showed that yoga exercise has a significant effect on the flexibility, strength, and cardiovascular endurance of football players. Therefore, yoga exercises can be installed in regular football training sessions.

Keywords: Football; Health; Physical fitness; Yoga

*Corresponding author: getahunmogninet@gmail.com

https://doi.org/10.59122/1345BD7

Received June 13, 2022; Accepted October 2, 2022; Published December 20, 2022

1. Introduction

Football is a sport that involves various skills, strategies, tactics, and physical elements which are required for improvement of a player's performance (Rosch et al., 2000). Among

those, physical fitness is one of the factors that could affect football players' performance (Rosch et al., 2000) and Kadagadakai & Pradhan (2018). In football, aerobic and anaerobic abilities, speed, strength, and power are variables that significantly affect the effectiveness of worldwide football players (Turner et al., 2011).

Different training methods like skill, tactic, physical, psychological, and fitness training should be included in the training session of football trainees (Reilly, 2007) and Reilly & Williams (2003). Aside from the necessary technical and tactical skills required, football players must also develop and retain a high level of aerobic and anaerobic conditioning, speed, agility, strength, and power (Turner & Stewart, 2014).

To attain maximum physical performance, the football-specific training program is used to improve selected physical fitness variables like speed, abdominal strength, leg explosive power agility, and flexibility (Sukuma, 2018). Among specific training programs, yogic practices are one of the football-specific training which is aimed at improving playing performances (Johnson & Mariayyah, 2007).

Another study also shows that a 12-week yoga training intervention was connected with the development of health-related physical fitness ability in young healthy individuals. The yoga training program was connected with a significant decrease in relative body fat and an increase in the hamstring flexibility and abdominal endurance of an individual (Shiraishi et al., 2017). Study shows that yoga training significantly improves the measures of flexibility (Iftkher et al., 2017). Yoga training plays a significant role in improving strength, hamstring, hip, and back flexibility performance (Kumar et al., 2013).

In the yoga training program, the common activities include static stretching exercises, weight training, and running (Polsgrove et al., 2016). If the static stretch is performed for 30 seconds at a frequency of 3 repeated stretches per single training session it is enough to enhance muscle length (Anoop et al., 2012). The slow stretching; twisting, and bending movements lead flexibility to other joints and muscles of the arch and supply nutrients and oxygen to all the cells of the body (Khan et al., 2016).

Yoga training can improve muscular strength, muscular endurance, flexibility, and cardio-respiratory endurance performance (Tran et al., 2011). It is recommended that doing a static stretching routine at the end of the regular training program is appropriate, for the best results in football players' performance (Rodiguez et al. (2016). Future studies are needed to

investigate the impact of yoga intervention on specific components of the fitness capacity of players in sport-specific tasks (Polsgrove et al., 2016)]. For betterment in leg strength, agility, and endurance ability long-period training programs may be more effective (Khan et al., 2016). Future study is required to do on a large sample size with different age category, other port departments, other components of fitness, and measurement tools (Iftekher et al., 2017). Taking these precedents into account the aim of this study was to examine the effect of yoga training on health-related physical performance among U- 17 male football project players in Dilla town, Southern Ethiopia.

2. Materials and Methods

2.1. Description of the study area

This study was conducted in Dilla town in Gedeo Zone, which is located in South Nations Nationalities and People Region States (SNNPRS), Ethiopia at a distance of 359 km from the capital city of Ethiopia, Addis Ababa, on the way from Addis Ababa to Moyale. It is located at 6° 22´ to 6° 42´ N and 38° 21´ to 38° 41´ E longitude with an altitude of about 1476 m above sea level.

2.2. Study design

In this study, a quasi-experimental study design was carried out from February 22, 2019, up to April 22, 2019, for 8 weeks.

2.3. Population and sample of the study

Selam hospital U-17 male football project players was taken as a source population. The project has 35 male football project players in the respective age category during the study period. Out of the 35 players, 30 players were selected by convenient sampling method, according to their availability and suitability guided by the coaches. To this end, samples were randomly assigned to the yogic group (n=15) and non-yoga group (n=15).

2.4. Variables of the study

In this study, the physical fitness components (cardiovascular endurance, muscular strength, and flexibility) were considered as dependent variables whereas, the independent variable was, the duration of training intervention (8 weeks, 3 days per week, 18 minutes per training session, and 1 up to 1½ minute per a single activity) and pattern of yoga asana.

2.5. Eligibility criteria

All U-17 male football project players, who actively play during the study period, were included in the study while new players, none volunteered players, and injured players were excluded from the study.

2.6. Yoga asana training protocol

During the period of yoga training for 8 weeks, players of both yogic and non-yogic groups have also taken part in the regularly pre-planned program for carrying out football-specific training. In addition to the regular training program, the yoga group took part in a 3-day yoga asana training session per week (Monday, Wednesday, and Thursday).

2.7. Data collection instrument

Testing and measurements are the means of collecting data upon which subsequent physical performance tests and decisions are made. The data has been collected using the pre-test and post-test on which the tests were performed between 9 AM and a couple of PM.

2.8. Sequence of testing

All football-specific field tests were performed sequentially with increasing performance tests inducing fatigue. So a test began with highly skillful testing tasks to tests that are inducing fatigue so that the latter does not distort the results. Therefore this study performed a test beginning from sitting and reaching to assess lower back and hamstring flexibility, a sergeant jump test to assess elastic leg strength and to beep test to assess cardiovascular endurance (Turner et al., 2011). The tests were performed on a natural grass football pitch.

2.9. Protocol of beep test

This test involves continuous running between 2 lines that were marked 20 m apart in time to record beeps. The players stood behind the starting line marks that face the 2nd line, and begin running when instructed by the recorded beeps. The speed at the tart is fairly slow. The players continued running between the two lines, turning when signaled by the recorded beeps. After about one minute, a beep sound indicates each minute. If the line is reached before the beep sounds, the players must wait until the beep sounds before continuing. If the road is not reached before the beep sound the individual is given a warning and must still to the road, then turn and check out to catch up with the pace within two more beeps. The subject was given a

warning the first time they fail to reach the line (within 2 meters) and eliminate after the second warning (Wood, 2008).

2.10. Sit and research the test

This study has employed this test to assess the lower back and hamstring flexibility of football project players. The sit and reach test was carried out as follows. At the start of a test, the players were sitting on the ground with shoes removed, feet flat against the table, and legs straight. Then the players bend and reach forward and push the fingers along the table as far as possible. The distance from their fingertips to the margin of the table represents the score for that player. It is important to possess several warm-up attempts first and to record an excellent score.

2.11. Sergeant jump test

This study was assessing leg strength through the sergeant jump test. The objective of this test is to assess leg strength performance. The test is conducted as follows: the players apply chalk at the end of their fingertips. Then stands side onto the wall, keeping both feet remaining on the ground, reaches up as high as possible with one hand, and ticks the wall with the tips of the fingers (T1). From a static position jumps as high as possible and ticks the wall with the chalk on his fingertips (T2). We measure the distance from T1 to T2. The test can be performed as many times as the player wishes.

2.12. Method of data analysis

The pre-test and post-test results were analyzed using a statistical package for scientific solution (SPSS) version 20.0 by paired sample T-test to compare means and statistical significance differences of the test. Statistical significance was declared at a 95% confidence interval with P-values $p < 0.05$.

3. Results and Discussion

3.1. Socio-demographic characteristics

A total of 30 U-17 football players were enrolled in this study. Out of the total respondents, all 30(100.0%) were aged 16 (Table 1).

Table 1. Socio-demographic characteristics of study subjects (n=30)

Variables	Category	Frequency (%)
Socio-demographic	16 years	30(100.0)

3.2. Analysis of pretest and posttest of the control and experimental groups

Both the yoga and non-yoga group of this study was actively trained U- 17 football player. Although they were active enough, they were not undergone such a scientific approach to measure their physical fitness status. This study found out what their actual fitness level looks like by using a scientific fitness testing approach as it was used by previous researchers. After all, this study evaluated the player's physical fitness level of both the yogic group and non-yogic group and thus resulted as follows.

3.3. Analysis of health-related physical fitness profiles (Experimental group)

There were 3 variables in the health-related fitness assessment of the players that had a P value of less than 0.05. The pre and post-test mean and SD scores of sit and reach test of the yoga group were 3.30±0.643 and 4.60 ±0.632 cm respectively, which was statistically significant (P <0.05, P=0.00). (See table 2). This indicates that two-month yoga training has caused an increase in the lower back and hamstring flexibility of the players. As shown in Table 2, the pre and post-test mean and SD scores of the beep test of the yogic group were 10.73 ±1.1 and 12.73±0.88 levels respectively, which was statistically significant(P=0.001). This indicates that yoga training improves the cardiovascular endurance of players. The pretest and post-test mean scores of the sergeant jump test of the yogic group were 35.67±3.84 and 38.60±3.24 cm respectively, which was statistically significant (P=0.001). This indicates that yoga asana training enhances the leg strength of the players.

Table 2. Comparison of selected health-related physical fitness variables of experimental groups

Variables	Group	Test (Mean ± S.D)		P-value
		Pre-test	Post-test	
Flexibility (sit and reach in cm)	Experimental	3.30±0.643	4.60 ±0.632	0.001
Cardiovascular Endurance (beep test)	Experimental	10.73 ±1.1	12.73±0.88	0.001
Leg Strength (sergeant jump test in cm)	Experimental	35.67±3.84	38.60±3.24	0.001

3.4. Analysis of health-related physical fitness profile (Control group)

The pre and post-test mean and SD scores of sit and reach test of the non-yoga group were 3.34±0.83 and 3.68±0.60 cm respectively. No significant difference (P=0.205) was found among the non-yoga group who performed the same test. This indicates that there is no improvement in the lower back and hamstring flexibility of the players having regular forms of football training but not yoga training (Table 3). The pre and post-test mean and SD scores of the beep test of the non-yogic group were 10.60±1.183 and 10.87±.990 levels respectively, which

was statistically insignificant (P=0.509). This indicates almost no changes in the cardiovascular endurance of players. The pretest and post-test mean scores of the sergeant jump test of the non-yogic group were 37.67±3.28 and 37.87±3.38cm respectively, which was statistically insignificant (P=0.77). This indicates no change, in the leg strength of the players.

Table 3. Comparison of selected fitness variables for pre-test and post-test for non-yoga groups

Variables	Group	Test (Mean ± S.D)		P-value
		Pre-test	Post-test	
Flexibility (sit and reach in cm)	Control	3.34±0.83	3.68±0.60	0.205
Cardiovascular Endurance (beep test)	Control	10.60±1.183	10.87±.990	0.509
Leg Strength (Squat in number)	Control	37.67±3.28	37.87±3.38	0.770

Regular practice of yoga has numerous health benefits (McDermott et al. (2014) and Aktar et al. (2013). Yoga also brings positive changes in physical performance and well-being if practiced regularly (Ross & Thomas, 2010); Boehde et al., 2005) by improving flexibility and balance (Johanson & Mariayyah, 2007; Polsgrove et al., 2016) as well as cardiovascular functions (Polsgrove et al., 2016; Bera & Rajapurkar, 1993). Moreover, yoga may have a direct link to improving the common elements of athletic performance.

The findings of the present study have strongly indicated that the yoga asana exercise of 8 weeks has shown significant improvement in cardiovascular endurance, leg strength, the flexibility of football players. The potential for hamstring injury during placekicking tasks about muscle length and range of motion. Joint flexibility is a crucial factor in soccer. Testing for limitations in the range of motion at a joint can be of benefit in screening for injury predisposition (Reilly & Williams, 2003).

The pre-test and post-test mean of lower back and hamstring flexibility were 3.30 and 4.60 cm respectively in the yoga group have a significant improvement (P=0.001). In contrast, non-yoga group, there is no significant improvement in their performance. The pre-test and post-test scores were3.34±0.83 and 3.68±0.60 cm respectively for a non-yoga group with (P=0.205).

This finding is consistent with studies conducted in different parts of the world. Our study finds similarities with other studies conducted for about 10 and above weeks of a yoga session in a similar setting, significantly higher improvement was seen in flexibility in Chicago: North America (Polsgrove et al., 2016), and India (Swami & Patil, 2016; Yuvaraji, 2016). This might be due to the lower duration of training that our study employed. Our study of lower back and hamstrings flexibility improvement was higher than in other studies conducted in India,

Bangladesh: Asia (Iftekhr et al., 2017); Turkey (Kartal & Ergin, 2020). This might be due to variations in study duration, and demographic characteristics of participants of the study, those studies employed a lower duration of training less than or equal to 6 weeks.

However, this is inconsistent with other studies conducted among Olympic weightlifters revealed that the 7 weeks of yoga training did not show significant differences between the yoga and nonyoga groups of players in flexibility measures (Ernst & Jensen, 2016), which is not agreed with the finding of our research. A possible explanation may be that the research was assessed using an inappropriate sequence of fitness testing. Hence, excluding only evidence from one research, we can surely recommend including yoga asana sessions along with the regular training programs is important in increasing the players' performance.

Various field tests for aerobic capacity are trend-upwards that need the players to either cover a maximal distance during a set time or a distance having made a firm decision within the short time possible. The beep test aimed at predicting aerobic capacity is often advised for football. The pre-test and post-test mean scores of the beep test were 10.73 and 12.73 in level respectively for the yogic group which has a significant effect on (P=0.001) cardiovascular endurance of football players. In contrast, in non-yoga groups, the pre-test and post-test mean of the beep test are 10.60±1.183 and 10.87±.990 in level respectively, which has no significant effect (P=0.509) on the cardiovascular endurance of football players having regular forms of football training but not yoga training. Other studies also show that yoga training can increase the cardio-respiratory endurance of students (Yadav & Malik, 2015; Kaur, 2016; Yuvaraj, 2016). This indicates that 8-week yoga asana training is used to improve the cardiovascular endurance performance of football players.

Strength in the lower limbs is of obvious concern in soccer: the quadriceps and hamstrings must generate high forces for jumping, kicking, tackling, turning, and changing pace. Due to the predominance of leg musculature during football we use the sergeant jump test to test leg strength. The pre and post-test mean scores of the sergeant jump test were 35.67±3.84 and 38.60±3.24 cm respectively, which has significant improvement (P <0.05, P=0.00) in leg strength. In contrast, in the non-yogic group, the pre and post-test mean scores of the sergeant jump test were 37.67±3.28 and 37.87±3.38cm respectively which have no significant difference (P> 0.05, P=0.77) in leg strength. This indicates that an 8-week yoga asana training intervention is used to improve the leg strength of football players. This is consistent with another study

(Boss & Thomas, 2010; Yadav & Malik, 2015; Kartal & Ergim, 2020), which employed different testing tools to assess the leg strength of football players.

4. Conclusion

Based on the finding of this study, taking part in a yoga training session with regular football training methods can help to improve the physical performance of football players. Additionally, the results of this study showed that yogic practice has a significant effect on flexibility, strength, and cardiovascular endurance.

Ethics Approval and Consent to Participate

The study was conducted by the ethical guidelines of Dilla University. Adequate information was provided to the research participants and their parents, participation in the research was also freely volunteered, with the understanding that the participant can withdraw at any time, consent with clear language was given at a level that the child can understand and in addition, informed consent was obtained from their parents and guardians for the study participation. All participants were informed orally and in writing about the study's purpose, risks, and benefits, and signed a written informed consent before being allowed to participate in the intervention. The intervention protocol was checked and approved by a research review committee of the Sports Science department at Dilla University.

Acknowledgments

We would like to thank the participants for their positivity and participation in this study. In a specific manner, we would like to express our deepest gratitude to Dilla University sports science department staff members, Selam Hospital U-17 male football project players, owner, and coach.

Competing Interests

The authors declare that they have no conflicts of interest.

References

Akhtar, Y., & Akhtar. (2013). Effects of yoga on functional capacity and well-being. International Journal of Yoga, 6(1), 76–76.

Bera, T. K., & Rajapurkar, M. V. (1993). Body composition, cardiovascular endurance, and anaerobic power of yogic practitioner. Indian Journal of Physiology and Pharmacology, 37(3), 225–225.

Boehde, D. D., Porcari, J. P., Greany, J., Udermann, B., Johanson, D., & Foster, C. (2005). The physiological effects of 8 weeks of yoga training. Journal of Cardiopulmonary Rehabilitation and Prevention, 25(5), 290–290.

Ernst, A., & Jensen, B. (2016). 7 weeks of yoga training and its effects on flexibility and rate of force development in Olympic weightlifters. In 34th International Conference on Biomechanics in Sport.

Iftekher, A., Bakhtiar, S., & Rahaman, A. (2017). Effects of yoga on flexibility and balance: A quasi-experimental study. Asian Journal of Medicine and Biological Research, 3(2), 276–281.

Johnson, P., & Mariayyah, P. (2007). Effect of selected hathayogic practices in enhancing kicking ability in soccer playing. Journal of Exercise Science and Physiotherapy, 3(2), 168–170.

Kadagadakai, P., & Pradhan, B. (2018). Study of physical fitness and technical skills on college soccer players playing positions. International Journal of Yoga, Physiotherapy and Physical Education, 3(2), 22–26.

Kartal, A., & Ergin, E. (2020). Investigation of the effect of 6-week yoga exercises on balance, flexibility, and strength in soccer players. International Journal of Human Movement and Sports Sciences, 8(3), 91–96.

Kaur, L. (2016). Effect of yoga asana on cardiovascular endurance in women players. International Research Journal of Commerce Arts and Science, 7(4), 68–73.

Khan, S., & Yadav, S. (2016). Effect of balancing yogic asana on selected physical fitness components of school football players. International Journal of Physical Education, Sports, and Health, 3(5), 439–442.

Kumar, P., Swami, S., & Vasanthi, G. (2013). Comparative study on the kinesthetic sense between football and field hockey players. International Journal of Physical Education Sports and Yogic Sciences, 2(2), 59–60.

McDermott, K. A., Rao, M. R., Nagarathna, R., Murphy, E. J., Burke, A., Nagendra, H. R., & Hecht, F. M. (2014). A yoga intervention for type 2 diabetes risk reduction: A pilot randomized controlled trial. BMC Complementary and Alternative Medicine, 14, 212.

Polsgrove, M. J., Eggleston, B. M., & Lockyer, R. J. (2016). Impact of 10 weeks of yoga practice on flexibility and balance of college athletes. Journal of Yoga, 9(1), 27–34.

Reilly, T. (2007). The science of training soccer. Abingdon, England: Routledge, UK.

Reilly, T., & Williams, A. M. (2003). Science and soccer (2nd ed). New York, NY, Routledge, USA.

Rodriguez, A., Sanchez, J., Rodriguez, A., & Villa, J. G. (2016). Effects of seven weeks of static hamstring stretching on flexibility and sprint performance in young soccer players according to their playing position. The Journal of Sports Medicine and Physical Fitness, 56(4), 345–351.

Rosch, D., Hodgson, R., Peterson, T. L., Baumann, T., Junge, A., & Chomiak, J. (2000). Assessment and evaluation of football performance. American Journal of Sports Medicine, 28(5), 29–39.

Ross, A., & Thomas, S. (2010). The health benefits of yoga and exercise: A review of comparison studies. The Journal of Alternative and Complementary Medicine, 16(1), 3–12.

Shiraishi, J., Gadelha, A. B., Bezerra, L. M., & Porto, L. G. G. (2017). Effects of a 12-week systematized yoga intervention on health-related physical fitness in healthy adults. Advances in Physical Education, 7(1), 27–37.

Sukuma, B. (2018). Effect of specific training on selected physical fitness variables of college football level players. International Journal of Yoga, Physiotherapy and Physical Education, 3(2), 64–66.

Swami, S., & Patil, S. (2016). The effect of selected yoga asanas on physical fitness of school children. International Journal of Physical Education, Sports, and Health, 3(3), 409–420.

Tran, M. D., Holly, R. G., Lashbrook, J., & Amsterdam, E. A. (2011). Effects of Hatha yoga practice on the health-related aspects of physical fitness. Preventive Cardiology, 4(4), 165–170.

Turner, A., & Stewart, P. F. (2014). Strength and conditioning for soccer players. Strength and Conditioning Journal, 36(4), 1–13.

Turner, A., Walker, S., Stembridge, M., Coneyworth, P., Reed, G., Birdsey, L., Barter, P., & Moody, J. (2011). A testing battery for the assessment of fitness in soccer players. Journal of Strength and Conditioning, 33(5), 29–39.

Wood, R. (2008). Beep test instruction. Retrieved January 15, 2022, from http://www.topendsports.com/tesing/tests/20mshutle.htm

Yadav, S., & Malik, A. (2015). A study on the effect of yogic practices on physical fitness. International Journal of Applied Research, 1(4), 184–185.

Yuvaraj, A. (2016). Effect of asana and pranayama practices on selected physical and physiological variables of college men. International Journal of Physical Education, Sports, and Health, 3(5), 204–205.