



# A Comparative Study of Physical Fitness Component of Football and Handball Players of Haryana

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**Abstract.** In sports, physical fitness is necessary aspect to achieve the excellent game performance, particularly in handball and football. Such sports require a great fitness level achieved from great playing capacity and high skills. These games needed the technical and scientific foundation. Physical fitness is the potential to perform the routine jobs with dynamism and attentiveness without exhaustion. It needs the sufficient energy to occupy in leisure searches and to fulfil emergency conditions. Physical fitness is necessary for improved performance in sports. This research presents provides the assessment on physical fitness components of football and handball players of Haryana. This research has the base as physical fitness of athletes. The work assists the trainers and athletes to understand their fitness level as well as encourage to focus on their weakness on specific physical fitness attributes. This research also provide the guidance to trainers for making an appropriate training program that can enhance the athlete's performance. This research additionally helps to understand the entire situation of Haryana and how such conditions will impact on the level of physical fitness and performance of football and handball players.

## 1. Introduction

Recently, researchers have the prime focus on physical education (PE) that has moved away from conventional game including a wider range of activities. Participants who are involved to sports such as hiking, walking, bowling, or Frisbee at the early age are more expected to gain lifelong practises of PE. Some instructor are using the Tai chi, deep-breathing, and yoga are few stress-reduction approaches. Conventional techniques highlights relaxed meditative movements that can be the excellent relaxation sources for pupils. Several research work have shown that such sports can enhance the flexibility, muscular strength and cardiovascular health of body (Bjørndal and Gjesdal, 2020). The psychological health gets benefit also like improved attentiveness, concentration and a more upbeat nature. Also, physical fitness is essential from the early age of humans that can enhance the skill level without or less need of specialized equipment. The football and handball kind of sports can be an important part of well—rounded curriculum of education for both mind as well as body. In school level, student shows more interest to take part in sports apart from their non-traditional teaching curriculum. Nowadays, physical education becomes the most active and engaging discipline. Physical education has shown the exponential growth in fitness improvement especially in youngsters.

Now, PE is accessible by anyone that has a wide range from primary school students to adults of entire age groups. In some last decades, PE becomes necessary for every school involving a diverse free-hand events, e.g. swimming, racing, walking etc. Government of India shows a keen interest after independence to launch several programs that assures the compulsory participation of students in PE. Throughout the entire globe, sports events are broadcast on large-scale. Several students like and seem happier to participate in games and other kind of physical activity that helps in maintaining the entire health of them. PE is a type of course especially designed for school students highlighting the physical activity to enhance the human capability. Physical activities involve kicking, pulling, pushing, throwing, climbing, leaning, hopping, sprinting, running, jogging, walking, and many more significant body motions.

PE consists a well-proportioned technical activity session that reliant on the proper understanding of physiological philosophies of training. The past and present understandings on PE in addition with the careful assessment of an individual's flexibility to a standard training task must deliver an efficient structure for an intelligent activity programs development. Such concepts follow "Specific Adaptations to Imposed Demands (SAID)" that gives the importance to health related constraints. It represents a fact on human body that is tremendously adjustable in its potential to accommodate itself according to the several forms of pressures forced upon it (Tunås, Nilstad, and Myklebust, 2015). Although, such adaptation is quite definite to the kind of pressure imposed. This concept discusses the importance of several activities that have various requirements upon the human as neurological, metabolic, temperature regulating, respiratory and circulatory functions on the physical fitness. PE works on specially the three major attributes as physical, physiological and anthropometric aspects. Such can sustain the whole mechanism of physical fitness of human body. Several compensatory as well as co-ordinated modifications happen in the entire body in the course of physical exertion including the metabolic operations over the respiratory, circulatory, muscular and nervous systems. The link of fatness with high risk of developing cardio-vascular disease, diabetes, hypertension and even cancers as quite complicated health issues. Aggravating the issue is the understanding that it involves several aspects such as psychological and physiological association that induce obesity and innumerable constraints that may be beneficial in the obesity restriction.

## 2. Background

Handball is a trending and famous sport that includes a small rubber ball hit by fist/hand against a single wall or in contradiction of a wall in a walled court or against a single wall. The objective is to acquire the ball to bounce back at an odd angle with different speed or strength, thus the rival team fail to return it. Handball is one of the oldest ball sports that showed its existence since the Roman baths. This sport was the precursor of contemporary jai alai that was consequently played in France as well as Spain as a bare-handed game known as pelota. In the 16<sup>th</sup> century, the British Isles provided the recognition to handball. Handball was already played in Ireland nearly thousand year before the invention of existing form of handball. The Irish country and town tournaments were generally performed on courts having the dimensions of 80 × 40 feet in the 1850s using a hard leather-covered ball. Phil Casey in 1886, developed a walled court in Brooklyn, New York. In the 1880s, the Irish colonists carried this sport to the US (Ekmekçic and Miçooğulları, 2018). This permits for specific athletes to achieve an extraordinary potential to return low balls with their feet that was supported.

The first international tournament was conducted after the meeting of Casey of America and John Lawlor in 1887. In the 1890s, US first utilized the soft balls, usually a tennis ball uncovered of its external layering. Such ball was generally utilized in the court with four-wall having lesser players in the New York region. It was not long before young athletes begun to utilize a larger ball in contradiction of the building outside. Other cities started to implement the soft ball, majorly for four-wall game. Due to the athletes' dissatisfaction with the massive, sluggish ball, a reduced

gas-filled ball was made, and resulted as the ignited renewed interest in the sport. In some cities such as Chicago, Milwaukee, Cleveland and Detroit, the four-wall softball sport became a trend hobby. Simultaneously, the strategies of the sport were changed and the court size was shorter. At the beginning of 1913, a in the New York City, one-wall game was designed and instantly disperse around the eastern US. It was shifted within by the Young Men's Christian Association and its allied groups/organizations when there was no more room outside (Hagman, Fristrup, Michelin, Krustrup, and Asghar, 2021).

In India, handball is one of the trending game and also is a part of Olympics due to the need for complete strength. Some of the Indian states such that Jammu and Kashmir, Himachal Pradesh, Haryana, Punjab etc. are excellent centers of handball. Handball is a form of team sport that involves the sportspersons utilizing either their single or both hands for ball striking against a wall in an attempt to score goals. The ball needs to toss or pass by the hands in order to score a goal. In 1972, Rohtak District of Haryana conducted the initial Championship of Senior Men's National Handball sport. In that time, Haryana as well as Vidharbha both won the silver medals. Handball was a trending game around the world as well as in India since ancient times. A fresco portraying this game was exposed in 1926 on the walls of Athens city. Based on a popular faith, the sport of handball, many centuries back to the year 600 B.C., a German gymnastics instructor named Konrad Koch, relaunched handball in 1890 to the world. The first introduction of contemporary handball to the people was made by west European countries. During the 1928 Olympic summer games, the tournaments to demonstrate the handball games were performed just before this sport was legitimately accepted in 1931 by the International Olympic Committee (IOC) (Risberg, Steffen, Nilstad, Myklebust, Kristianslund, Moltubakk, and Krosshaug, 2018). Around the world, more than fifty nations even take participation in this sport. On December 4, 1946, IHF was established at a conference conducted in Copenhagen (Steffen, Nilstad, Krosshaug, Pasanen, Killingmo, and Bahr, 2017). In early 1926, handball as an outdoor game were played in Berlin, while indoor sports with seven-a-side developed as the standard when handball were reestablished in Munich during 1972. Handball is not a male-dominated game in India; while it is correspondingly popular between women. Many female have made a name for themselves while playing for India at the state and national levels. It was not getting popular until 1976 where female handball tournament was first conducted.

Football is also popularly known as soccer. It is the most popular game in Western countries especially in Europe and US. Every team has needed 10 players with 1 goalie that are always on the arena. The players are free to make complete body utilization except for the goalkeeper. Football is targeted towards the goalposts of the rival squad. A goalie may just do it in the penalty zone next to the goal to tackle a football with his hand. In this competition, teams has to be a winner and a runner-up. This two teams have eleven players, attempt to acquire the ball from the other team's goal by using any body part excluding the arms/hands. Except the goalie, players are not permitted to touch the ball external of the penalty zone that settings the goal. At the end of a game, the team with the most goals wins the match. There are more people playing and watching football than any other sport on the planet. The sport's basic rules and equipment are so simple that it can be played practically anywhere, including football fields, gyms, streets, school playgrounds, parks, and even on the beach or in a park. There were approximately 250 million football players and 1.3 billion people who were "interested in football" at the turn of the 21st century, according to the Fédération International de Football Association (FIFA). In 2010 more than 26 billion people watched football's premier tournament, the quadrennial month-long World Cup finals.

In India, several people like to play the football since childhood, especially in the western, eastern and northern parts. It quickly became popular between the individuals when the British authorities presented football to India. In 1854, the first game was arranged among the "Calcutta Club of Civilians" and "The Gentlemen of Barrackpore". Established in 1872, the very first football team is Calcutta FC in Indian history. Before switching to football, the

Culcutta FC started as a rugby club in 1894 (based on reports). Some of the other Indian clubs are the Mohan Bagan Athletic Club (formed in 1889), the Naval Volunteers Club, the Traders Club and the Dalhousie Club that have been around since a very long time. Later on, the Mohun Bagan AC was formed from the 'National Club of India'. It wasn't until the 1930s that India's first football association named as the Indian Football Organisation (IFA), founded in Kolkata (then Calcutta), where it was established in 1893. The oldest Indian tournament named as the Durand Cup football event i.e. also the third oldest in the world, was conducted in 1898 at Shimla. India's former foreign minister named Sir Mortimer Durand, inaugurated the tournament as well as offered it his name that has in trend ever since. Mohun Bagan AC in 1911 was the first ever Indian club to achieve the IFA-Shield Trophy that made the history in football. The honor was exclusively gained by British teams with an Indian foundation for a long time. The success is still observed as one of greatest achievement of Indian Football team.

After Mohun Bagan AC's IFA-Shield Trophy win, football teams/events thrived. All-India Football Federation (AIFF) in 1937 was established due to the high number of football clubs. In 1954, Asian Football Confederation (AFC) was established, whereas in 1948, the Asian Football Confederation (AIFF) was initiated. All of such activities are held as noteworthy instants in Indian Football's history. From 1951 to 1962, it was known as the golden age of Indian Football, i.e. generally regarded as the most prosperous duration in the history of nation (Langevoort, Myklebust, Dvorak, and Junge, 2007). India won the gold medals held in Jakarta and New Delhi during the Asian Games of 1962 and 1951 and was the first Asian nation to reach the semi-finals of football in Olympic. For instance, in August 2007, the Indian football team won the Nehru Cup and has had many inspiring current performances. Due to this, AFC Challenge Cup, the squad qualified in 2011 and win the tournament. Along with the Indian national team, numerous Indian football clubs have done well in main global tournaments. AIFF has registered the services of Bob Houghton to lead the national squad. The Indian team has gained from his associations with few of the best Asian teams. Brazil and India hit a traditional pact in 2006. The contract said that the two countries will function along for the better good of encouraging football (Rossing, Nielsen, Elbe, and Karbing, 2016).

### 3. Material & Method

#### *Data Collection*

The physical fitness has some significant attributes that was achieved from several approved tools/instruments operated by the researcher at the football grounds in many Haryana district. The trainers were completely collaborated and helped in taking measurement. Before the real examination, the participants were provided the whole demonstration of every test with its purpose with detailed description.

#### *Subjects*

The objective of this research work is attained by targeting male players of interstate by choosing random sampling approach from several Haryana districts who already took participation in state level tournaments. Previous approval was taken from the respective trainers as well as the entire participants regarding the aim and the process of data collection. The current research was performed on 200 males that were state level players out of which 100 were handball and 100 were football.

### *Variables*

All participants were medically fit as well as no recent history of cardiorespiratory disorders, asthma and contagious ailments. Every participant provided their written permission as well as the local ethics commission accepted the research protocol. All participants were evaluated for the anthropometric variables including body composition attributes measurement utilizing the standardized process mentioned by the International Biological Program (IBP) guidelines concerning the fundamental principles/rules associated to the standard measuring tools, measurement techniques, standard conditions and parameter choice, accustomed before the measurement was performed. In a laboratory, weight and height were taken with participant dressed in light clothing. A fixed stadiometer can take the height was taken to the close of 0.1 cm and a standard scale using a portable balance can measure the weight to the close 0.1 kg.

The measurement of skinfold (mm) was taken from six sites by using skinfold caliper such as abdominal skinfold thickness, chest skinfold thickness, calf skinfold thickness, thigh skinfold thickness, forearm skinfold thickness and triceps skinfold thickness. The eight sites were chosen for the circumferences (cm) measurement by using an anthropometric tape such as maximum/minimum lower leg and upper leg circumference as well as maximum/minimum lower arm and upper arm circumference. In addition, the test was conducted by doing 12 min. run and walk, 50 yard dash, shuttle run, standing broad jump, bent knee sit ups and pull ups. The mentioned activities are most generally utilized event to analyze motor fitness level of students. Since services are limited only such events that are effortlessly to be performed having the usage of less equipment and space.

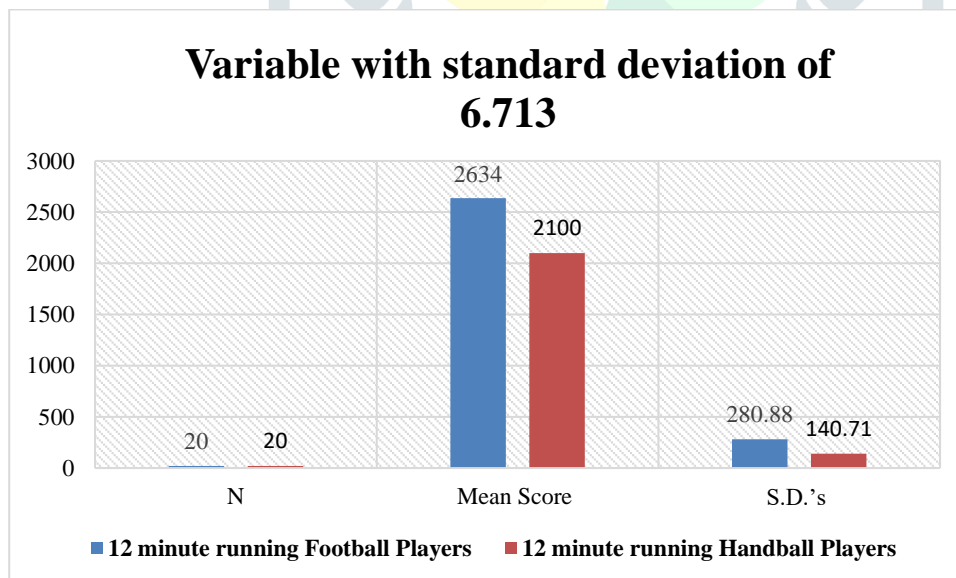
### *Statistical Analysis*

Data achieved from this study was analysed by utilizing SPSS Statistics 20.0 software, modified to be used on a laptop. Evocative measurements was utilized to measure the standard deviation and mean for every attribute. T-test and the LSD Post Hoc examination were performed to identify the impacts of each sport type (handball and football) on every attribute such as body fat, bone content, muscle mass, body mass index (BMI), weight and height as well as to observe them in participant referring common population. The significance was set 0.05 of an alpha level.

### **4. Results & Discussion**

The current research work was performed with the objective to measure the physical fitness in handball and football male players of Haryana state. The assessment was made on considering the 100 handball players and 100 football players of Haryana by imposing the 't' test to obtain the mean and standard deviation as descriptive statistics.

Sr. No.	Variable	Group	N	Mean Score	S.D.'s	t-value
1.	12 Minute Running	Football Players	20	2634	280.88	6.713**
		Handball Players	20	2100	140.71	
2.	50 Yard Dash	Football Players	100	7.18	0.48	6.713**
		Handball Players	100	7.64	0.49	
3.	Shuttle run	Football Players	100	10.08	0.60	6.316*
		Handball Players	100	9.64	0.36	
4.	Standing Broad Jumps	Football Players	100	2.23	0.36	3.635**
		Handball Players	100	2.37	0.17	
5.	Sit-ups	Football Players	100	24.41	3.71	11.130**
		Handball Players	100	33.70	7.47	
6.	Pulls-up	Football Players	100	5.65	1.855	14.297**
		Handball Players	100	9.93	2.349	



**Fig. 1 Graphical representation of 12 min. running of football and handball players**

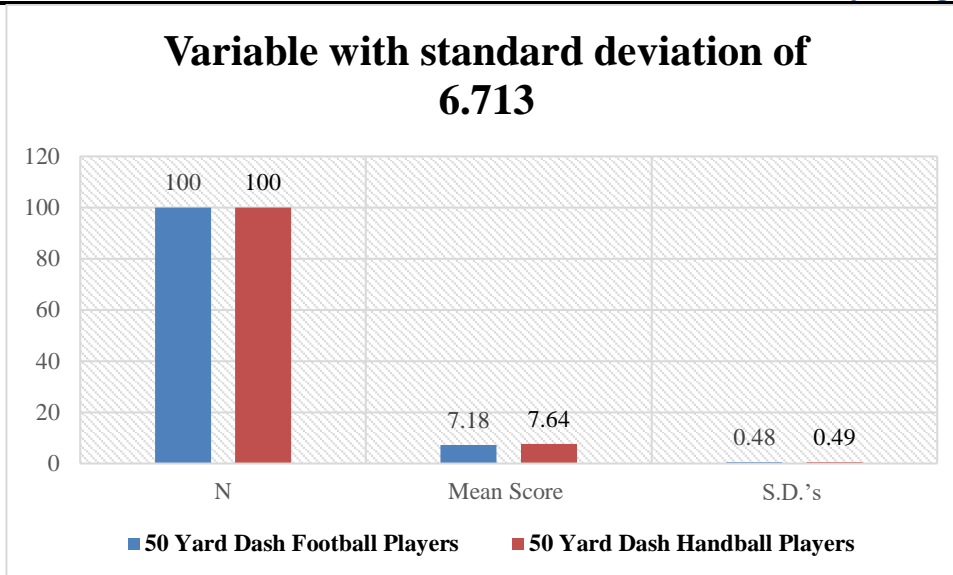


Fig. 2 Graphical representation of 50 Yard dash of football and handball players

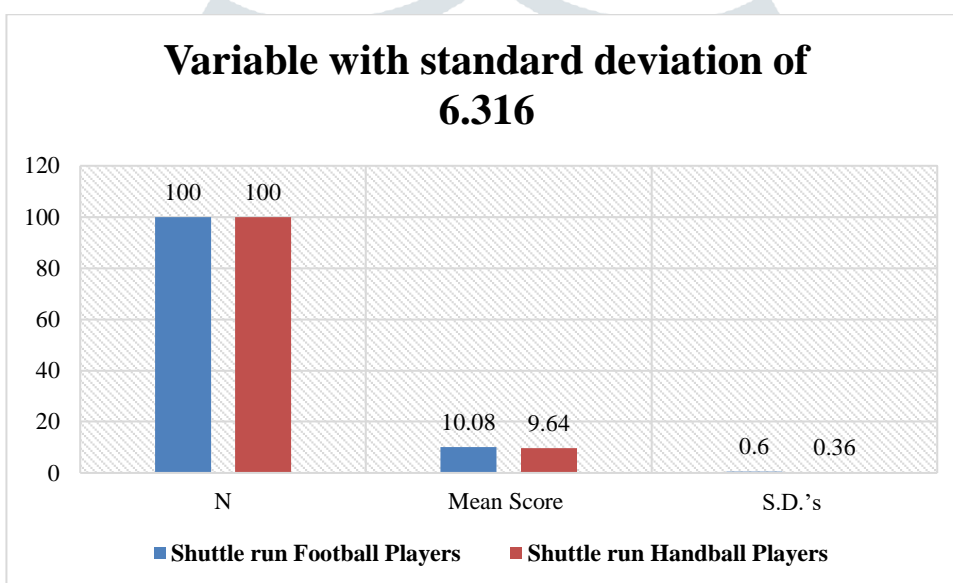


Fig. 3 Graphical representation of shuttle run football and handball players

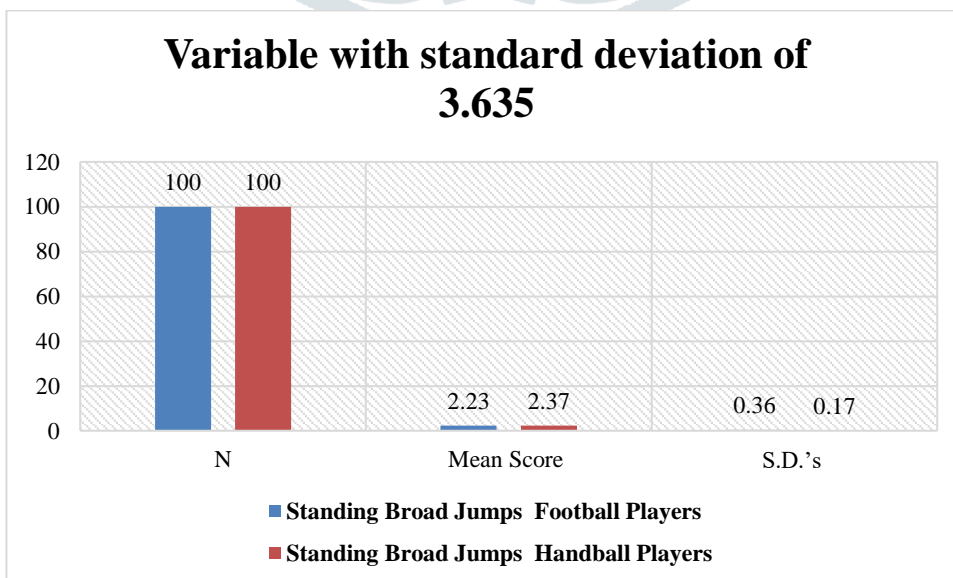
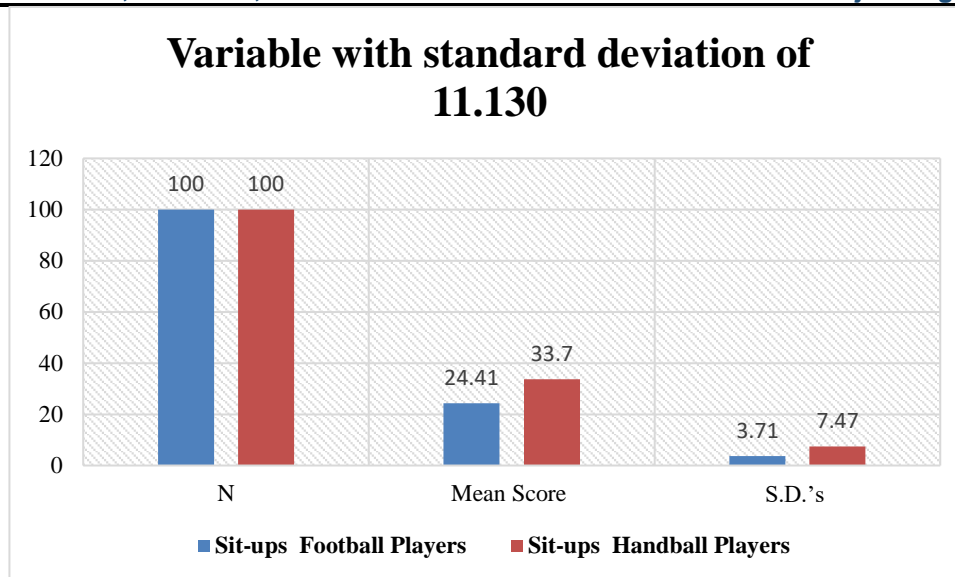
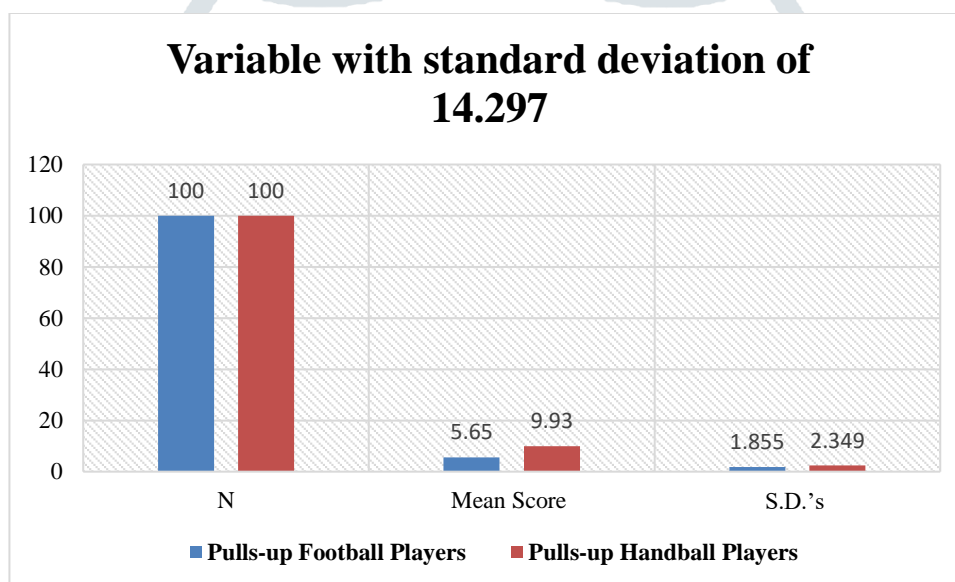


Fig. 4 Graphical representation of standing broad jumps football and handball players



**Fig. 5 Graphical representation of sit-ups football and handball players**



**Fig. 6 Graphical representation of pull-ups football and handball players**

As shown in Fig. 1, the mean scores of 12 minute running of handball/football Haryana players is significant at 0.01 level. In this condition, the null hypothesis that “There will be no significant difference in endurance of handball/football Haryana players” is rejected. As shown in Fig. 2, the mean scores of 50 yard dash of handball/football Haryana players is significant at 0.01 level. In this condition, the null hypothesis that “There will be no significant difference in speed of handball/football Haryana players” is rejected. As shown in Fig. 3, the mean scores of shuttle run of handball/football Haryana players are significant at 0.01 level. In this condition, the null hypothesis that “There will be no significant difference in agility of handball/football of Haryana players” is rejected. As shown in Fig. 4, the mean scores of standing broad jumps of handball/football of Haryana players is significant at 0.01 level. In this condition, the null hypothesis that “There will be no significant difference in strength of handball/football of Haryana players” is rejected. As shown in Fig. 5, the mean scores of sit-ups of handball/football of Haryana players is significant at 0.01 level. In this condition, the null hypothesis that “There will be no significant difference in flexibility of handball/football of Haryana players” is rejected. As shown in Fig. 6, the mean scores of pulls-



up of handball/football of Haryana player is significant at 0.01 level. In this condition, the null hypothesis that “There will be no significant difference in strength of handball/football and handball of Haryana player” is rejected

## 5. Conclusion

In conclusion, the present research provides the outcomes to validate that the handball players are relatively better than football players of Haryana. Handball players are better than football players in terms of strength, flexibility and agility. On the other hand, football players are better than handball players in terms of endurance and speed. Such depicts that steady energetic action can leads to physical fitness enhancements. The result of this research will act as supervision to hand-picked a better handball/football players. The outcomes of the study will be a crucial aspect for sports trainers, PE instructors and coaches to design their training program for such handball/football that requires the development to physical fitness variables as the significant constraints. The outcomes of the current research along with the process and selected in contemporary study will act as supervision for the forthcoming examines in the part of athletics for physical fitness.

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