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A comparative study on selected physical fitness parameters among judo and volleyball players

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Abstract

In more recent years, the emphasis has moved to greater stress on assessing fitness for enhancing performance.

Purpose: The objective of the study was to assess and Body Mass index, aerobic capacity, flexibility and agility among college level judo and volleyball players.

Methodology: For the purpose of the study one hundred judo and volleyball players (N=100) boys were selected from Aryabhata College, University of Delhi and IGIPSS University of Delhi. The age ranged between 19-23 years, with 50 (n=50) subjects in each judo and volleyball group. Body Mass index, aerobic capacity, flexibility and agility were selected a variable and were measured using height, weight & 20-meter shuttle run, sit and reach test & 10*4 shuttle run respectively.

Statistical Procedure: Descriptive statistics and independent t test was employed to get the results.

Results: There was a significant difference in aerobic capacity, flexibility and agility among judo and volleyball inter collegiate players while there was no significant difference in BMI among judo and volleyball inter collegiate players.

Conclusion: Aerobic capacity, flexibility and agility among judo players was significantly better than volleyball inter collegiate players.

Keywords: Body mass index, aerobic capacity, flexibility, agility

Introduction

Physical fitness is defined as the ability of body to function efficiently and effectively, to enjoy leisure, to be healthy, to resist disease, and to cope with emergency situations. Health-related components of physical fitness included body-composition, cardiovascular fitness, flexibility, muscular endurance, and strength. Skill-related components included agility, balance, coordination, power, reaction time, and speed. Physical fitness is used in two close meanings: health-related which state the health and well-being and skill-related which more task-oriented based on the ability to perform specific aspects of sports or occupations (Hian, Mahmud & Choong 2013) [5]. According to Clarke, H. Harrison (1976) [2] in a society where materials values predominates, participation solely for pleasure, recreation and allied benefits in any activity such as sports, that demands much time, energy and self-discipline is not likely to be very popular or widely practiced doctrine, especially when the nations of the world are openly using sports as an approach to national fitness and International prestige. Many sports are based on a complex, multi-dimensional performance profile (Buekers *et al.*, 2015) [1]. Thus, the talent selection should be focused on a multifaceted variety of general physical, physiological, psychomotor, and psychological performance diagnostics (Williams and Franks, 1998; Williams and Reilly, 2000) [14, 15]. In general, there is a lack of research investigating the discriminative value of different performance prerequisites over a range of different sport disciplines. Nevertheless, there were promising attempts to discriminate various sports by means of their profile of sports specific performance prerequisites. Participation in elite sport training at youth age is associated with the selection of athletes with specific prerequisites and the development of the specific anthropometric, motor and physiological characteristics of a particular sport (Pion *et al.*, 2015) [11]. For example, judo athletes at age U13 exhibit a higher sideward jumping ability compared to Karate and Taekwondo athletes (Pion *et al.*, 2014) [10].

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In volleyball, talented youth players are characterized by a higher stature as well as by a better jumping ability (Rikberg and Raudsepp, 2011) [12].

Methodology

For the purpose of the study one hundred judo and volleyball players (N=100) boys were selected from Aryabhata College, University of Delhi and IGIPSS University of Delhi. The age ranged between 19-23 years, with 50 (n=50) subjects in each judo and volleyball group. The selected subjects were divided into two groups, one who were judo players were labelled as judo and the other who were volleyball players were labelled as volleyball.

Body Mass index, aerobic capacity, flexibility and agility were selected a variable and were measured using height, weight & 20-meter shuttle run, sit and reach test & 10*4 shuttle run respectively. Descriptive statistics and independent t test were employed to get the results.

Result and findings of the study

The data collected from subjects was analysed by employing descriptive statistics and independent t test. For the purpose of the study and statistical analysis the level of significance chosen was 0.05. The calculation was performed using SPSS software and the findings pertaining to descriptive statistics and t-test has been presented below:

Table 1: Descriptive statistics and independent t test of body mass index (BMI) among judo and volleyball players

	Group	N	Mean	Std. Deviation	Std. Error Mean	t	df	Sig. (2-tailed)
Body mass index	Judo	50	21.0633	4.68594	.66269	-1.624	98	.108
	Volleyball	50	22.4353	3.70608	.52412			

The results indicate that there was no significant difference in body mass index between judo and volleyball players $t(98) = 1.62$, $P = 0.108$. That is the average score of judo ($M=21.06$, $SD=4.68$) was statistically different from that of volleyball ($M=22.43$, $SD=3.71$). It is evident from table that

in body mass index, a t value of 3.23 was obtained and the probability in the significance was $P=0.108$, which is greater than 0.05. Thus, it could be concluded that there was a significant difference in body mass index between intercollegiate judo and volleyball players.

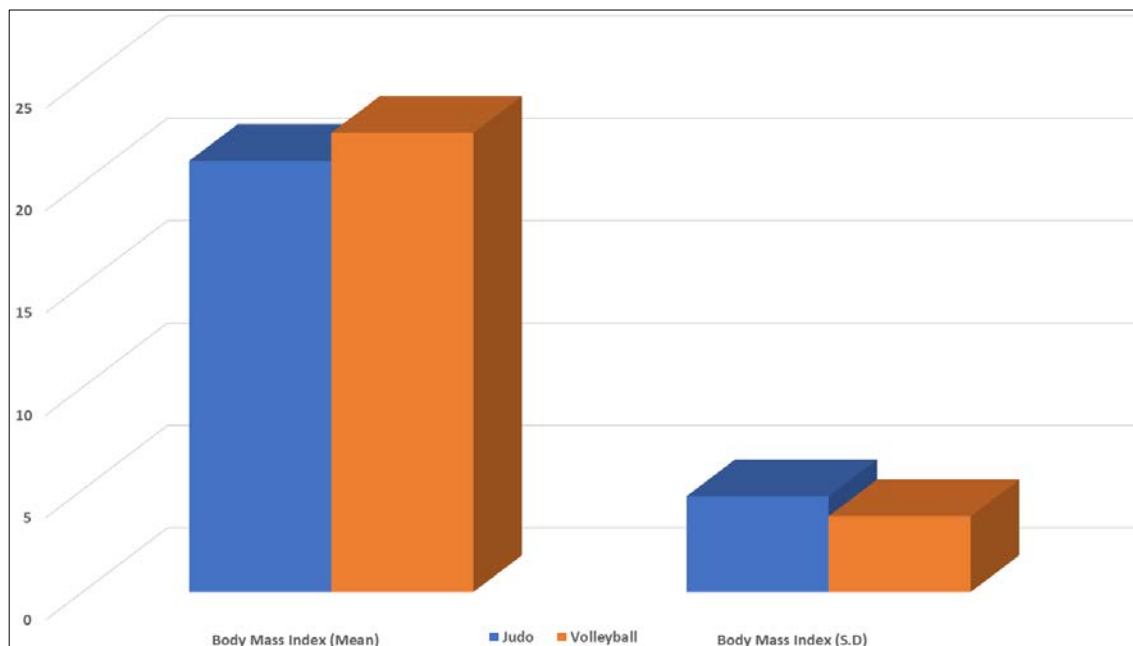


Fig 1: Graphical representation of Mean and SD of Body mass index (BMI) among Jodo and volleyball players

Table 2: Descriptive statistics and independent t test of aerobic capacity among judo and volleyball players

	Group	N	Mean	Std. Deviation	Std. Error Mean	t	df	Sig. (2-tailed)
Aerobic capacity	Judo	50	5.9780	3.30122	.46686	3.238	98	.002
	Volleyball	50	3.9880	2.82624	.39969			

The results indicate that there was a significant difference in aerobic capacity between judo and volleyball players $t(98) = 3.23$, $P = 0.002$. That is the average score of judo ($M=5.97$, $SD=3.30$) was statistically different from that of volleyball ($M=3.98$, $SD=2.82$). It is evident from table that

in aerobic capacity, a t value of 3.23 was obtained and the probability in the significance was $P=0.002$, which is less than 0.05. Thus, it could be concluded that there was a significant difference in aerobic capacity between intercollegiate judo and volleyball players.

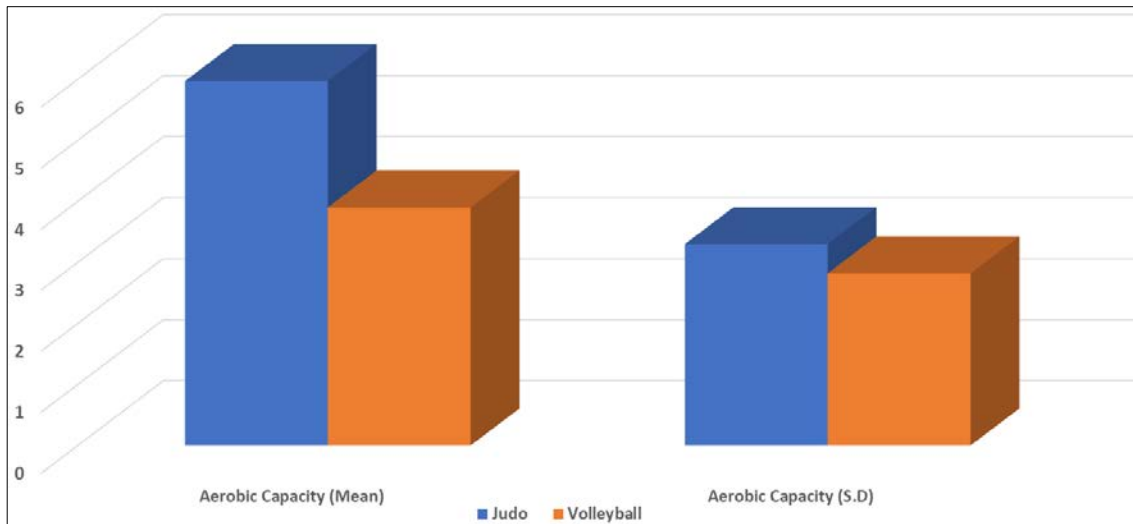


Fig 2: Graphical representation of Mean and SD of Aerobic capacity among Judo and volleyball players

Table 3: Descriptive statistics and independent t test of flexibility among judo and volleyball players

Flexibility	Group	N	Mean	Std. Deviation	Std. Error Mean	t	df	Sig. (2-tailed)
	Judo	50	23.21	2.72943	.38600			
Volleyball	50	21.54	4.63791	.65590	-2.121	98	.036	

The results indicate that there was a significant difference in flexibility between judo and volleyball players $t(98) = 2.12$, $P = 0.036$. That is the average score of judo ($M=23.21$, $SD=2.72$) was statistically different from that of volleyball ($M=21.54$, $SD=4.63$). It is evident from table that in

flexibility, a t value of 2.12 was obtained and the probability in the significance was $P=0.036$, which is less than 0.05. Thus, it could be concluded that there was a significant difference in flexibility between intercollegiate judo and volleyball players.

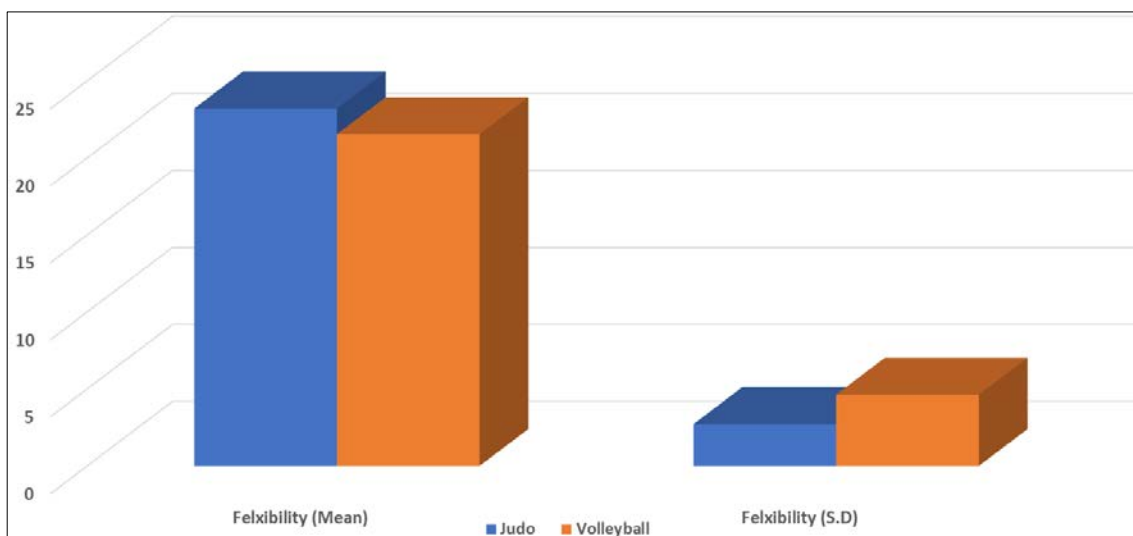


Fig 3: Graphical representation of Mean and SD of flexibility among Judo and volleyball players

Table 4: Descriptive statistics and independent t test of agility among judo and volleyball players

Agility	Group	N	Mean	Std. Deviation	Std. Error Mean	t	df	Sig. (2-tailed)
	Judo	50	9.8246	.68952	.09751			
Volleyball	50	10.7786	1.27183	.17986	-4.663	98	.001	

The results indicate that there was a significant difference in agility between judo and volleyball players $t(98) = 4.66$, $P = 0.001$. That is the average score of judo ($M=9.87$, $SD=0.68$) was statistically different from that of volleyball ($M=10.77$, $SD=1.27$). It is evident from table that in agility,

a t value of 3.23 was obtained and the probability in the significance was $P=0.001$, which is less than 0.05. Thus, it could be concluded that there was a significant difference in agility between intercollegiate judo and volleyball players.

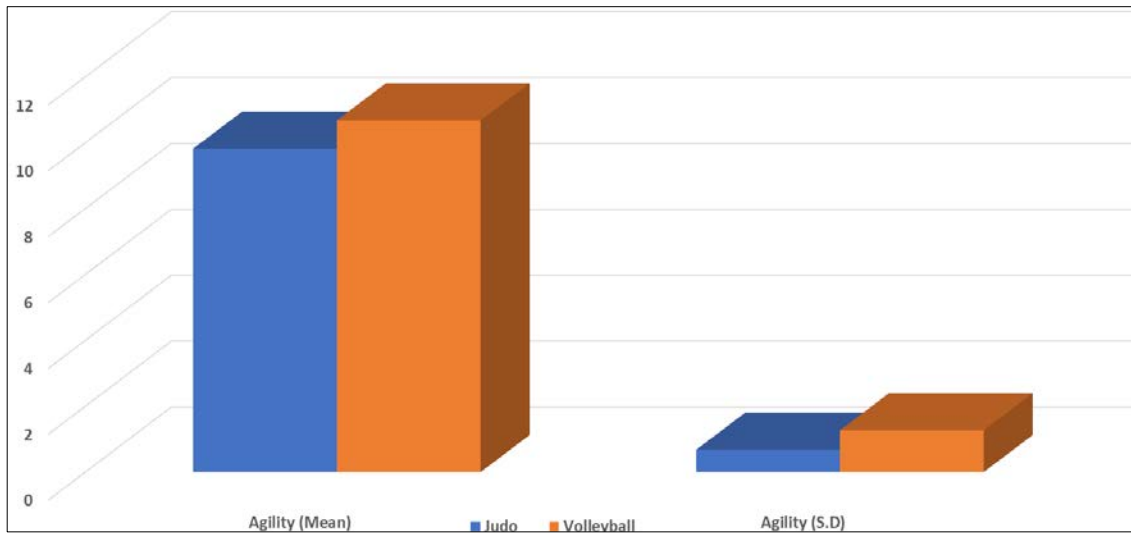


Fig 4: Graphical representation of Mean and SD of agility among Judo and volleyball players

Discussion

There was a significant difference in aerobic capacity, flexibility and agility among judo and volleyball inter collegiate players while there was no significant difference in BMI among judo and volleyball inter collegiate players.

The results indicate that there was no significant difference in body mass index between judo and volleyball players $t(98) = 1.62$, $P = 0.108$. That is the average score of judo ($M=21.06$, $SD=4.68$) was statistically different from that of volleyball ($M=22.43$, $SD=3.71$).

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Every sport requires different types of physical fitness, which varies sports to sports. The main physical fitness components that are required to play volleyball are coordination, power, and agility. Coordination is an ability of a person to coordinate with some external moving object. Power means how much work one can do in a specific period of time and on the other hand agility means the ability of a person to change its position while in motion. For a greater agility a good amount of core strength is required (Liben & Bigler, 2014) [8]. As judo requires lot of plyometric training Plyometric programs have also been correlated to musculoskeletal injuries and delayed-onset muscle soreness because of the high-intensity and compression forces on the joints and muscles (Holcomb *et al.*, 1998; Miller *et al.*, 2002; Robinson *et al.*, 2004) [6, 9, 13]. Greater upper body muscle volume, which in both judo and volleyball corresponds with better performances in the back strength test, contributed to their differentiation from other sports. Greater strength prerequisites in judo athletes that support throwing, sweeping, and clamping actions during a

fight were already reported by Franchini *et al.* (2011) [4]. These studies agree with our discovery that higher dynamic back muscle strength of the lumbar spine contributed significantly to the discrimination of judo and volleyball athletes from the other sport disciplines. In judo, this finding corroborates the early research of Kort and Hendriks (1992) [7], who attributed this advantage to a more specific training regimen in elite judo cadres. In elite volleyball, back squat exercises contribute an important portion of the daily training routine with the aim of creating a balanced trunk musculature and core stability, thus protecting tall volleyballers from the elevated risk of lower back pain (Ezechieli *et al.*, 2013) [3].

Conclusions

The following conclusions are drawn

1. There was no significant difference in body mass index among judo and volleyball inter collegiate players.
2. There was a significant difference in aerobic capacity among judo and volleyball inter collegiate players. Thus, it is concluded that aerobic capacity is significantly better in judo players than volleyball players.
3. There was a significant difference in flexibility among judo and volleyball inter collegiate players. Thus, it is concluded that flexibility is significantly better in judo players than volleyball players.
4. There was a significant difference in agility among judo and volleyball inter collegiate players. Thus it is concluded that agility is significantly better in judo players than volleyball players.

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