

## Assessment of Some Selected Physical Fitness Components of Jimma University Sport Science Department Students

Menigistu GEZACHEW,  
Director of Dedo Secondary High School, Jimma Ethiopia

MD Babul AKHTAR,  
Department of Sport Sciences, Jimma University, Jimma Ethiopia

Biruk Amare SORATE  
Department of Sport Sciences, Jimma University, Jimma Ethiopia

### Abstract

The purpose of the study was to assess some selected physical fitness components of Jimma University sport science department students. For this study 136 subjects were screened using systematic random sampling. Cross-sectional study design was used because the subjects were tested once. The quantitative data was collected through anthropometric test and through physical fitness tests. Mean and standard deviation was computed for age, sex, weight, height, body mass index (BMI), push up test, Illinois agility test, sit and reach test and sit up test. Moreover, multiple comparison tests were used to examine the subject push up test, Illinois agility test, sit and reach test and sit up test. The significance level was set at  $P < 0.05$  for each of the statistical tests. The SPSS 20 software was used for the statistical analysis. The mean results of BMI in both male and female first, second and third year sport science students as compared with international norms, they were in the normal range. Both in male and female first year sport science students showed that a better mean difference than second and third year sport science in push up test, agility, sit & reach and sit up tests but there is no significant mean difference in  $p < 0.05$ . Male sport science students are fulfilling the international norms in most physical fitness tests. Female sport science students are not fulfilling the international norms in most physical fitness tests. Regular energetic activity needed to produce physical fitness improvements of sport science department students. To be more beneficial in all dimensions sport science students should have pre physical fitness exam to join the department. It is highly expected from sport professionals and related fields to guide and educate on the importance and value of physical fitness. Sport science department should design a special physical fitness program for their students. Further research on the benefits of physical fitness for sport science students and other students for their daily routine.

**Keywords:** Physical fitness, Sport Science, Students

### INTRODUCTION

Concept of physical fitness is as old as humankind. Throughout the history of mankind physical fitness has been considered an essential element of everyday life. The ancient people were mainly dependent upon their individual strength, vigor and vitality for physical survival. This involved mastery of some basic skill like strength, speed, endurance, agility for running, jumping, climbing and other skills employed in hunting for their livings (Manmeet *et al.*, 2010).

Physical fitness is an important health marker both in the early years and later in life (Ortega *et al.*, 2008 and Ruiz *et al.* 2009). There are numerous benefits of physical fitness for physical health (i.e., cardiovascular and metabolic diseases, obesity, and musculoskeletal problems) and mental health (i.e., depression and anxiety). In addition, a growing body of evidence suggests that physical fitness also may play a key role in brain health and academic performance in youths (Pontifex, *et al.* 2011, Chaddock *et al.* 2012, Van Dusen *et al.* 2011, Fedewa, & Ahn, 2011 and Etnier *et al.* 1997). The components of physical fitness with documented potential for improving health are cardiorespiratory capacity, muscular strength, and motor ability (Ruiz *et al.* 2009 and Ruiz, *et al.* 2011).

Every person has a different level of physical fitness which may change with time, place of work, situation and there is also an interaction between the daily activities, and the fitness of an individual, the point if where to put the level of optimum fitness. From the physiological point of view physical fitness may say to be ability at the body to adopt and recover from strenuous exercise. Chaudhary (1998) studied the difference in physical fitness of urban and rural students studying in class IX and X and found that rural students were better in physical fitness than urban students. Uppal and Sareen (2000) conducted a study to find out the comparison on cardiovascular fitness between rural and urban students and revealed that students with rural background performed better than that of their counterparts in urban area.

The National College Health Risk Behavior Survey reported that 35% of American college students are overweight (Lowry *et al.* 2000). This is not surprising considering that more than two-thirds of American adult

population are classified as overweight (Flegal *et al.* 2002), making weight gains America's leading health problem (Mokdad *et al.* 2001).

Thus, the researcher hypothesize that; Jimma University sport science department students may or may not fulfill in the assessments of some selected physical fitness components as compared with the international norms. Therefore, the purpose of this study was to assess some selected physical fitness components of Jimma University sport science students.

## METHODOLOGY

### Study Design and Area

Cross-sectional study design was used. The participants of the study was tested the field test at once to assess the selected physical fitness components and to compare with the international norms. The study was conducted at Jimma University Main Campus in Jimma town located 350 km in south-west of Addis Ababa.

### Subjects

The subject was selected using systematic random sampling those who are sport science department student of Jimma University and volunteer to participate in this study. According to this 39 first year, 44 second year and 53 third years a total of 136 sport science department students were included as a subject.

### Source of Data

The researcher was used both primary and secondary sources of data according to the nature of the problem. The primary data was taken from experimental variables according to the designed parameters and the secondary data was obtained from different secondary sources such as different documents, like the international norms of physical fitness tests.

### Methods and Procedures of Data Collection

The quantitative data was collected through anthropometric test like weight, height, and body mass index (BMI) to know the characteristics of the students and through physical fitness tests; like Push up test to measure upper limb muscle strength, Illinois agility test to measure agility, sit and reach test to measure flexibility and sit up test to measure muscular endurance. The qualitative data was the international norms of the above physical fitness tests and it was used to compare the results of fitness tests.

**Push up test:** Measure dynamic strength of triceps, pectorals, and anterior deltoids, indicating upper body strength and endurance. This test helps you compare your own upper body muscular endurance to others of your age and gender, and track your fitness program over time (sports medicine.about.com). Men should use the standard "military style" pushup position with only the hands and the toes touching the floor. Women have the additional option of using the "bent knee" position. To do this, kneel on the floor, hands on either side of the chest and keep your back straight. Do as many pushups as possible until exhaustion. Count the total number of pushups performed.

**Illinois Agility test:** The objective of the Illinois Agility Run Test is to monitor the development of the athlete's agility. Agility is an important component of many team sports, though it is not always tested, and is often difficult to interpret results. The Illinois Agility Test is a commonly used test of agility in sports, and as such there are many norms available. The average running score for males are between 18.1-16.2 seconds and females are between 21.7-18.0 seconds.

**Sit and reach test:** This test measures the flexibility of the lower back and hamstring muscles, and is a valid measure of this. It involves sitting on the floor with legs out straight ahead. Feet shoes are placed with the soles flat against the box, shoulder-width apart. Both knees are held flat against the floor by the tester. With hand on top of each other and palms facing down, the subject reaches forward along the measuring line as far as possible. After three practice reaches, the fourth reach is held for at least two seconds while the distance is recorded. Make sure there is no jerky movements and that the fingertips remain level and the legs flat (Ashok, 2008).

**Sit up Test:** The objective of this test is to measure abdominal muscular strength and endurance of the abdominals and hip-flexors, important in back support and core stability. The subject lies on a cushioned, flat, clean surface with knees flexed, usually at 90 degrees. A partner may assist by anchoring the feet to the ground. The position of the hands and arms can affect the difficulty of the test. They are generally not placed behind the head as this encourages the subject to stress the neck and pull the head forward. The hand may be placed by the side of the head, or the arms crossed over the chest, reaching out in front. The subject raises the trunk in a smooth motion, keeping the arms in position, curling up the desired amount. The trunk is lowered back to the floor so that the shoulder blades or upper back touch the floor (Davis, 2000).

### Methods of Data Analysis

Mean and standard deviation was computed for age, sex, weight, height, body mass index (BMI), push up test,

Illinois agility test, sit and reach test and sit up test. Moreover, multiple comparison test was used to examine the subject age, sex, weight, height, body mass index (BMI), push up test, Illinois agility test, sit and reach test and sit up test. The significance level was set at  $P < 0.05$  for each of the statistical tests. The SPSS 20 software was used for the statistical analysis.

## RESULTS AND DISCUSSION

### Anthropometric Test Result and Discussion

**Table 1:** Anthropometric characteristics of Jimma University Sport Science students in the study

Anthropometric characteristics in Mean $\pm$ SD										
Class Year	Male					Female				
	N	Age	Wt	Ht	BMI	N	Age	Wt	Ht	BMI
Year I	31	19.26 $\pm$ 1.31	58.52 $\pm$ 6.18	1.71 $\pm$ 0.08	19.91 $\pm$ 0.97	8	20.25 $\pm$ 0.46	49.13 $\pm$ 2.90	1.55 $\pm$ 0.05	20.36 $\pm$ 1.09
Year II	22	19.86 $\pm$ 0.71	54.27 $\pm$ 6.15	1.63 $\pm$ 0.08	20.34 $\pm$ 1.44	22	20.14 $\pm$ 1.03	50.82 $\pm$ 5.08	1.58 $\pm$ 0.07	20.24 $\pm$ 1.43
Year III	31	21.03 $\pm$ 1.16	60.42 $\pm$ 4.50	1.74 $\pm$ 0.05	19.89 $\pm$ 0.83	22	21.05 $\pm$ 1.13	52.14 $\pm$ 5.20	1.59 $\pm$ 0.05	20.45 $\pm$ 1.61

Mean  $\pm$  SD in the same columns in each parameter are significantly different ( $p < 0.05$ ), Height (m) = height in meter, Weight (kg) = weight in kilogram, BMI ( $\text{kg}/\text{m}^2$ ) = Body mass index.

Table 1 showed that the mean value of anthropometric characteristics of both male and female sport science students of first, second and third years. As indicated in table 1 the mean value of age in male first, second and third year sport science students' were 19.26, 19.86 and 21.03 years old respectively. The mean value of age in female first, second and third year sport science students' were 20.25, 20.14 and 21.05 years old respectively.

The mean value of weight in male first, second and third year sport science students' were 58.52 kg, 54.27 kg and 60.42 kg respectively. The mean value of height in male first, second and third year sport science students' were 1.71m, 1.63m and 1.74m respectively. And the mean value of BMI in male first, second and third year sport science students' were 19.91  $\text{kg}/\text{m}^2$ , 20.34  $\text{kg}/\text{m}^2$  and 19.89  $\text{kg}/\text{m}^2$  respectively. In this test there is no a significant difference between first year, second and third year sport science students.

The mean value of weight in female first, second and third year sport science students' were 49.13 kg, 50.82 kg and 52.14 kg respectively. The mean value of height in female first, second and third year sport science students' were 1.55m, 1.58m and 1.59m respectively. And the mean value of BMI in female first, second and third year sport science students' were 20.36  $\text{kg}/\text{m}^2$ , 20.24  $\text{kg}/\text{m}^2$  and 20.45  $\text{kg}/\text{m}^2$  respectively. In this test there is no a significant difference between first year, second and third year sport science students.

BMI ( $\text{kg}/\text{m}^2$ )	Classification
< 18.5	Under Weight
18.5 – 24.9	Healthy Weight
25.0 – 29.9	Over Weight
30.0 – 39.9	Obesity
> 40.0	Morbid Obesity

The mean results of BMI in both male and female first, second and third year sport science students as compared with international norms, they were in the normal range. This indicates that they engaged in the regular physical activity because of the nature of their profession. This is supported by Kyle and his friends in 2001; regular physical activity prevents or limits weight gain, and gain in body mass index (BMI) (Kyle *et al.* 2001)

Recent studies shows, the National College Health Risk Behavior Survey reported that 35% of American college students are overweight (Lowry *et al.* 2000). This is not surprising considering that more than two-thirds of American adult population are classified as overweight (Flegal *et al.* 2002), making weight gains America's leading health problem (Mokdad *et al.* 2001) respond similarly.

### Physical Fitness Tests Result and Discussion

**Table 2:** The mean value of physical fitness tests of Jimma University Sport Science students

Physical Fitness Tests in Mean $\pm$ SD										
Class Year	Male					Female				
	N	Push Up	Agility	Sit & R	Sit Up	N	Push Up	Agility	Sit & R	Sit Up
Year I	31	28.74 $\pm$ 13.19	18.8 $\pm$ 0.86	14.59 $\pm$ 6.7	30.23 $\pm$ 14.29	8	8.13 $\pm$ 8.99	22.04 $\pm$ 1.16	13.52 $\pm$ 8.37	15.75 $\pm$ 16.63
Year II	22	25.62 $\pm$ 9.18	18.5 $\pm$ 0.41	13.82 $\pm$ 7.47	33.64 $\pm$ 13.01	22	4.86 $\pm$ 1.35	20.49 $\pm$ 1.83	14.86 $\pm$ 6.22	4.82 $\pm$ 1.81
Year III	31	26.23 $\pm$ 8.89	18.19 $\pm$ 0.87	13.42 $\pm$ 7.17	32.58 $\pm$ 12.14	22	5.91 $\pm$ 5.67	24.22 $\pm$ 21.6	13.35 $\pm$ 7.01	12.50 $\pm$ 12.71

Mean  $\pm$  SD in the same columns in each parameter are significantly different ( $p < 0.05$ ), Push Up = in count, Agility (s) = Agility in Second, Sit and Reach (cm) = in centimeter and Sit Up = in count.

Table 2 showed that the mean value of physical fitness tests of both male and female sport science students of first, second and third years. As indicated in the table; the mean value of push up in male first, second and third year sport science students' were 28.74, 25.62 and 26.23 respectively. The mean value of push up in

female first, second and third year sport science students' were 8.04, 4.86 and 5.91 respectively.

Push Up Point Scale						
REPETITIONS	< 5	≥ 5	≥ 10	≥ 15	≥ 20	≥ 25
POINTS	Poor	Below Average	Average	Above Average	Good	Excellent

Based on the international norms the results of male sport science students were scored excellent, but female students were score below average.

Table 3: The mean difference values push up test of male and female students of first, second and third years

Dependent Variable	(I) Class Year	(J) Class Year	Male				Female			
			Mean Diff. (I-J)	Sig.	95% Confidence Interval		Mean Diff. (I-J)	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound			Lower Bound	Upper Bound
Push Up	Year I	Year II	3.12	0.301	2.85	9.08	3.26	0.129	0.98	7.50
		Year III	2.52	0.360	2.92	7.95	2.22	0.299	2.03	6.46
	Year II	Year I	3.12	0.301	9.08	2.85	3.26	0.129	7.50	0.98
		Year III	0.60	0.841	6.57	5.36	1.05	0.501	4.14	2.05

\*. The mean difference is significant at the .05 level.

As indicated in Table 3 the mean difference of male sport science students in push up test between first and second year sport science students were 3.12 and between first and third year students were 2.52 and also between second and third years students were 0.60. And also in female sport science students the mean difference of male sport science students in push up test between first and second year sport science students were 3.26 and between first and third year students were 2.22 and also between second and third years students were 1.05. From the result both in male female sport science students first year showed that a better mean difference than second and third year sport science in push up test, but there is no a significant mean difference in  $p < 0.05$ .

As far as one can understand from the above interpretation, male sport science students develop their strength. Recent study similarly shows, improvements in muscular endurance and muscular strength lead to enhance physical performance, protection against injury, improved body composition, better self-image, improved muscle and bone health with aging and reduced risk of chronic disease (Farley et al, 2003).

As indicated in table 2 the mean value of Illinois agility test in male first, second and third year sport science students' were 18.8 sec, 18.5 sec and 18.19 sec respectively; and in female first, second and third year sport science students' were 22.04 sec, 20.49 sec and 24.22 sec respectively.

Illinois Agility Test Point Scale						
Time (seconds)	> 21.01	≤ 21.0	≤ 20.0	≤ 19.0	≤ 18.0	≤ 17.0
POINTS	Poor	Below Average	Average	Above Average	Good	Excellent

As compared with the international norms the results of male sport science students were scored well. But first and third year female students were scored poor, while second year female students were scored below average.

Table 4: The mean difference values Illinois agility test of male and female students of first, second and third years

Dependent Variable	(I) Class Year	(J) Class Year	Male				Female			
			Mean Diff. (I-J)	Sig.	95% Confidence Interval		Mean Diff. (I-J)	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound			Lower Bound	Upper Bound
Agility	Year I	Year II	0.3027	0.166	0.12	0.73	1.55	0.793	10.23	13.33
		Year III	0.6123*	0.003	0.21	1.00	2.17	0.712	13.95	9.60
	Year II	Year I	0.3027	0.166	0.73	0.12	1.55	0.793	13.33	10.23
		Year III	0.309	0.157	0.12	0.74	3.72	0.389	12.33	4.88

\*. The mean difference is significant at the .05 level.

Table 4 also showed the mean difference of male sport science students in Illinois agility test between first and second year sport science students were 0.30 sec and between first and third year students were 0.61\* sec and also between second and third year's students were 0.30 sec. And also in female sport science students the mean difference of male sport science students in Illinois agility test between first and second year sport science students were 1.55 sec and between first and third year students were 2.17 sec and also between second and third years students were 3.72. From the result in male sport science students third year showed that a better mean difference than first and second year sport science in Illinois agility test, a significant mean difference has been observed in between third and first year students at  $p < 0.05$ . But in female sport science students third year

showed that a better mean difference than first and second year sport science in Illinois agility test, but there is no a significant mean difference in  $p < 0.05$ .

Taking in to account the above mentioned analysis, sport science students were performing well in Illinois agility test. Study shows, the expert committee of the World Health Organization (1981) described physical fitness as “the ability to undertake muscular work satisfactorily.” Physical fitness is the capacity to early out, reasonably well, various forms of physical activities, without being unduly tired and includes qualities important to the individual’s health and well-being. Every person has a different level of physical fitness which may change with time, place of work, situation and there is also an interaction between the daily activities, and the fitness of an individual, the point if where to put the level of optimum fitness. From the physiological point of view physical fitness may say to be ability at the body to adopt and recover from strenuous exercise.

As mentioned in the above table 2 the mean value of sit and reach test in male first, second and third year sport science students’ were scored 14.59cm, 13.82cm and 13.42cm respectively; and in female first, second and third year sport science students’ were 13.52cm, 14.86cm and 13.35cm respectively.

<b>Sit and Reach Point Scale</b>						
<b>LEVEL (cms)</b>	< 13	≥ 13	≥ 20	≥ 27	≥ 34	≥ 41
<b>POINTS</b>	Poor	Below Average	Average	Above Average	Good	Excellent

As compared with the international norms the results of male sport science students were scored below average, and also female students were scored below average.

Table 5: The mean difference values sit and reach test of male and female students of first, second and third years

Dependent Variable	(I) Class Year	(J) Class Year	Male				Female			
			Mean Diff. (I-J)	Sig.	95% Confidence Interval		Mean Diff. (I-J)	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound			Lower Bound	Upper Bound
Sit & Reach	Year I	Year II	0.77	0.699	3.16	4.70	1.34	0.641	7.07	4.39
		Year III	1.17	0.518	2.41	4.75	0.18	0.950	5.55	5.91
	Year II	Year I	0.77	0.699	4.70	3.16	1.34	0.641	4.39	7.07
		Year III	0.40	0.839	3.53	4.33	1.52	0.470	2.67	5.70

\*. The mean difference is significant at the .05 level.

From table 5 the mean difference of male sport science students in sit and reach test between first and second year sport science students were 0.77cm and between first and third year students were 1.17cm and also between second and third years students were 0.40cm. And also in female sport science students the mean difference of male sport science students in sit and reach test between first and second year sport science students were 1.34cm and between first and third year students were 0.18cm and also between second and third years students were 1.52cm. From the result in male sport science students first year showed that a better mean difference than second and third year sport science in sit and reach test, and also in female sport science students second year showed that a better mean difference than first and third year sport science in sit and reach test, but there is no a significant mean difference in both sex at  $p < 0.05$ .

Taking in to account the above mentioned analysis, both sexes of sport science students are less performance in flexibility. Good health provides sound and solid foundation on which fitness rests and at the same time fitness provides one of the most important key to health and living one’s life to fullest. Beside this, the benefits of flexibility include preventing abnormality stresses the lead to joint deterioration and possibly reducing the risk of injuries and low-back pain (Ibid, 2003).

And also as indicated above in table 5 the mean value of sit up test in male first, second and third year sport science students’ were 30.23, 33.64 and 32.58 respectively; and in female first, second and third year sport science students’ were 15.75, 4.82 and 12.50 respectively.

<b>Abdominal Strength Point Scale</b>					
<b>LEVEL</b>	< 17	17-19	20-25	26-30	≥ 30
<b>POINTS</b>	Poor	Below Average	Average	Above Average	Excellent

Based on the international norms the results of male sport science students were scored excellent, while female students were score poor.

Table 6: The mean difference values sit up test of male and female students of first, second and third years

Dependent Variable	(I) Class Year	(J) Class Year	Male				Female			
			Mean Diff. (I-J)	Sig.	95% Confidence Interval		Mean Diff. (I-J)	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound			Lower Bound	Upper Bound
Sit Up	Year I	Year II	3.41	0.357	10.73	3.91	10.93*	0.015	2.22	19.64
		Year III	2.35	0.484	9.03	4.32	3.25	0.457	5.46	11.96
	Year II	Year I	3.41	0.357	3.91	10.73	10.93*	0.015	19.64	2.22
		Year III	1.06	0.775	6.26	8.38	7.68*	0.019	14.04	1.32

\*. The mean difference is significant at the .05 level.

Table 6 showed the mean difference of male sport science students in sit up test between first and second year sport science students were 3.41 and between first and third year students were 2.35 and also between second and third year's students were 1.06. And the mean difference of female sport science students in sit up test between first and second year sport science students were 10.93\* and between first and third year students were 3.25 and also between second and third years students were 7.68\*. From the result in male sport science students second year showed that a better mean difference than first and third year sport science in sit up test, a significant mean difference has not been observed at  $p < 0.05$ . While, in female sport science students first year students showed that a better mean difference than second and third year sport science in sit up test, and there has been a significant mean difference at  $p < 0.05$  between first and second year students and also between second and third year students.

The aforementioned analysis shows that improved of performance have been observed in male sport science students.

### Conclusion

Based on the major findings of the study, assessment of some selected physical fitness components of Jimma University sport science students as compared with the international norms the following points are stated as conclusion. Male sport science students' are fulfilling the international norms in most physical fitness tests. Female sport science students' are not are fulfilling the international norms in most physical fitness tests. Regular energetic activity needed to produces physical fitness improvements of sport science department students.

### Recommendation

By considering the major findings and conclusions of the study, it is important to state the following points as a recommendation to investigate more on physical fitness components of sport science students. To be more beneficial in all dimensions sport science students should have pre physical fitness exam to join the department. It is highly expected from sport professionals and related fields to guide and educate on the importance and value of physical fitness. Sport science department should design a special physical fitness program for their students. Further research on the benefits of physical fitness for sport science students and other students for their daily routine.

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**Conflict of interest:** The authors declare that; have no conflict of interest.

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