A comparative study of physical fitness status between regular and summer in-service sport science female students: The case of Wollo University

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Abstract
The study was conducted to compare the physical fitness status of regular and summer in service Sport Science Female Students of Wollo University in the year 2017/2018. As a subject of the study the researcher selected 50 female participants, half of them were from regular Sport Science students and the rest half were students from summer in service Sport Science program. The researcher used purposive sampling technique to select the Subjects. The study used a standardized instrument of American Alliance for Health, Physical Education, Recreation and Dance (AAHPERD) (1976, 1980), (2010), there were 4 activities in field tests: 1 mile run cooper test, 50m run test, vertical jump test and standing broad jump test. To assess the significant differences of their physical fitness status, independent t-test was applied. The findings of this study reveal that there are statistically significant differences between regular and summer female students considering age, weight, height, BMI, endurance, vertical jump performance and broad jump performance as a parameter, though some insignificant differences were observed on their speed performance. Based on the analysis made, regular students were found to be good at endurance and explosive muscular power compared with summer in-service students. On the basis of the above narration, the researcher recommended that the University should organize fitness test programs and design the possible means by which those in service trainees can get access on their job sites; whereas, it has to do more on female regular students so as to progress their physical fitness performance to an excellent level. Moreover, it is found to be advisable if students start physical training during their school age so that they can be fit throughout their life.

Keywords: Cardio respiratory endurance, explosive muscular power, speed

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

Physical fitness can be defined in two categories: health related and motor related. The health related components of physical fitness are of great importance because they make an individual fit, functional and productive for everyday living. Motor related components make an individual successful in athletics or motor developed activities. Components of physical fitness most important for health are cardio respiratory endurance, muscular strength and endurance, flexibility and body composition (proportion of fat to fat free mass), while that of Motor fitness include speed, power, coordination, reaction time and agility (Insel, Roth & Price, 2006)[12].

Individuals can reach a permanent or high level of good physical fitness if the frequency and the intensity of the work-out is maintained, but this becomes difficult to achieve if one reaches a high level of physical fitness, stops the programme and expects to be fit (Basel, 2007) [13]. However, an individual’s fitness can fall through poor feeding habit, diseases, sedentary life style, anxiety and fatigue. Maintaining physical fitness requires a continuous process just as good nutritional habit must be continuous to maintain wellness. Therefore maintaining physical fitness involves eating good food, engaging in regular exercise, having good rest/sleep and relaxation.
To increase one’s physical fitness status, one must increase the intensity and length of work-out sessions (Rushall & Pyke, 2000).[21] Engaging in physical activities in schools and maintaining good physical fitness enhance the cardio respiratory, neuromuscular, skeletal and metabolic systems of children thereby resist hypokinetic diseases in adulthood (Brandon, 2009). However, Athletes with high physical fitness status perform better and they succeed in their chosen physical fitness is deterioration in adult across all genders, ages and racial/ethnic groups (Ichinohe et al., 2004).[10] The negative effects of degraded physical fitness on both the individual and society are serious and multi-dimensional. It can cause many risk factors to health including coronary heart disease, certain forms of cancer, diabetes, hypertension, stroke, gall bladder diseases, osteoarthritis, and respiratory problems and is associated with increases in all-cause mortality (Cataldo, 1999).[3]. In adults, relationship among physical activity, health related fitness, and health are fairly well established. Low levels of physical activity and cardio-respiratory fitness are both associated with higher risk of all cause and disease specific mortality (Thune et al., 1998). Physical fitness is the ability to perform daily activities willingly and actively. Physical fitness includes not only components of sports but those of health as well as regular physical activity prevents or limits Weight gain, and gain in body mass index (BMI) (Kyle et al., 2001).[14]. The expert committee of the World Health Organization (WHO) described physical fitness as “the ability to undertake muscular work satisfactorily.” Every person has a different level of physical fitness which may change with time, place of work, situation and there is also another 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 the ability of a body to adopt and recover from strenuous exercise. The experience gained from several European studies suggest that physical form is a key indicator of the health of children and adolescents (Ruiz et al., 2006) [20] and is a predictor of health in later life (Ruiz et al., 2009). Regular monitoring of the level of physical activity and physical fitness of the entire population should be considered a public health priority (World Health Organization, 2010). Monitoring involves constant measuring and/or estimating (collective test) levels of physical activity and physical fitness of the individual as well as the evaluation of the data (CNSPEC, 1990) [4]. The state of being fit or in condition is primary concern to any nation or people. Physical fitness as a term refers to the total dynamic physiological state of the individual, ranging on a continuum from optimal human performance to serve debilitations and death. There are a number of fitness components that need to be developed. These are cardio respiratory endurance, strength, agility flexibility, muscular endurance, power, speed and the correct maintenance of body weight. It is possible for athletic to have a great deal of one component and very little of another. Also, when considering a wide range of sports certain components assume a considerable importance.

To cope up with time inconvenience, the test was conducted both for regular and summer in-service female students at the same time; that means at the end of second semester for regular students and at the beginning of the summer program for summer in-service students. Therefore the time adjusted by the researcher, was convenient to compare and contrast the physical fitness components the participants had at that moment.

Hoping that the study helps to fill out the fitness level gap between the two categories, the following research questions were attempted to be dealt with

1. What cardio respiratory endurance differences are visibly seen between Regular and summer in-service Sport science female Students in Wollo University?
2. To what extent do female students in Regular and summer in-service Sport science Students differ with regards to speed in Wollo University?
3. Is there any difference between Regular and summer in-service Sport science female Students regarding explosive muscular power in Wollo University?

Methods and Materials
Research Design
The study used a Cross sectional study design to compare the current physical fitness status of regular and summer in-service Sport Science female students. The study employed quantitative research methods. The desired populations of the study were Wollo university 3rd year regular and summer in-service Sport Science female students in 2017/2018 academic year. Out of the total population of 70 female students from 3rd year regular and summer in-service Sport Science department female Students. 50 female students, half in each program were selected purposively. The researcher selected the subjects ranging 21-25 years old. There are probably hundreds of standard fitness tests used and hundreds of variations of these. Each test also has many advantages and disadvantages that can ultimately determine which is the most appropriate test to perform. As a result, the researcher used standardized instrument of American Alliance for Health, Physical Education, Recreation and Dance (AAHP ERD) (1976, 1980), (2010), there were 4 activities in field tests, such as 1 mile run cooper test, 50m run test and vertical jump test and standing broad jump test as main instrument to gather the data. To assess the significant difference of their physical fitness independent t-test was applied.

The main focus is to set the strengths and weaknesses of the university students. This study was done by comparing test results between Wollo university students of two groups, regular and summer in-service Sport Science female students, involving in the same activities.

The results of the groups were investigated through comparing results. For this study, standardized test of physical fitness was involved in view of research criteria of availability, reliability and validity to confirm the consistency of data. To test physical fitness in this study 1 mile run test/1600m run test, 50m speed test, vertical jump test and standing broad jump test. The selected components was cardio respiratory endurance, speed and explosive muscular power that were measured by different means and methods: cardio respiratory endurance is measured by 1mile run or 1600m/ “Cooper” test, speed is measured by 50m run test and explosive muscular power is measured by vertical jump and standing broad jump and interventions in selected physical fitness test in order to identify the condition encountering the overall physical fitness status or performances level of the two subjects Wollo University Sport science department 3rd year regular and summer in service Sport science female students.
Fitness test analysis
To conduct physical fitness test, the study used a standardized instrument of American Alliance for Health, Physical Education, Recreation and Dance (AAHPERD) (1976, 1980), (2010) Therefore there was no need testing for Validity and Reliability. However, prior to the commencement of the test, informed consent were sought from the subjects. A parameter of physical fitness components variables was recorded especially during filed tests.

Test Description/protocol
1 mile run test or 1600m/ “Cooper” Test
This test is a measure of cardio respiratory endurance or aerobic power, which is determined by the body’s ability to transport and utilize oxygen to produce energy. This is important for performing tasks involving stamina and endurance (pursuits, searches, prolonged use of force situations, etc.) and for minimizing the risk of cardiovascular health problems.

The subject was being asked to take a standing position and start. At the start, you will line up behind the starting line. When I say “Go,” the clock will start. You will begin running at your own pace. The subjects start running the 1,600m run. For this test the participant had to maintain the pace to complete the race and to cover as much distance as Possible the score is the time taken to complete the course in minutes and seconds.

50m speed test
The aim of this test is to determine speed. Speed tests can be performed over varying distances, depending on the factors being tested and the relevance to the sport. The 50 Meter Sprint is part of the International Physical Fitness Test.

The test involves running a single maximum sprint over 50 meters, with the time recorded. To carry out this practice, a thorough warm up should be given, including some practice starts and accelerations. The runner starts from a stationary standing position (hands cannot touch the ground), with one foot in front of the other. The front foot must be behind the starting line. Once the subject is ready and motionless, the starter gives the instructions "set" then "go.". The tester should provide hints for maximizing speed (such as keeping low, driving hard with the arms and legs) and the participant should be encouraged to not slow down before crossing the finish line.

Two trials are allowed, and the best time is recorded to the nearest 2 decimal places. The timing starts from the first movement (if using a stopwatch) or when the timing system is triggered, and finishes when the chest crosses the finish line and/or the finishing timing gate is triggered.

Vertical jump test
This test measures leg power, which is important in jumping or vaulting objects such as walls and ditches, and in moving heavy objects such as people. Have the participant stand with one side toward the wall, heels together, and reach upward as high as possible. Record the maximum standing reach. Then, using a rocking, one-step approach (“step-feet together-jump”), have the participant jump as high as possible, reaching upward at the same time. Record the maximum jumping reach.

The number of inches between the standing reach and the jumping reach, measured to the nearest half inch, is the score. Use the best of three trials as the score.

Standing broad jump test
To measure lower body explosive muscular power, the participants were instructed to stand with their feet shoulder-width apart, with their toes just behind the starting line. They were told to bend their knees and arms in front of them, parallel to the ground. As they swing both arms, they should push off vigorously and jump forward as far as possible the distance jumped was measured from the start line to the point where the back of the heel lands on the ground. A further attempt was allowed if the child fell backwards or touched the floor with another part of the body. The result was measured to the nearest cm.

Body mass index (BMI)
Purpose: Measurement of body size. Health relation: A higher BMI is associated with a worse cardiovascular profile.
Equipment: An electronic scale and measuring tape fixed on the wall to measure weight and height respectively. BMI was calculated using the formulae BMI = kg/m².

Method of data analysis
To determine the significant differences of physical fitness status between the two subjects, the data was analyzed and compared by the help of Statistical Package for the Social Sciences (SPSS; version 20). In the procedure, frequency, percentage, mean, standard deviation and independent t-test was used to determine significant difference between variables.

Ethical issues
The study was dealing with the ethical issue related to the investigation. It protected the privacy of research participant and makes guaranty and confidentiality of the information that has given to the study, and risk harm due to participation. Participation of subjects in this study is purely a voluntary based activity and their right not to participate and can resign at any time of training session have been respected. Therefore the study will be conducted all action based on the university rule, code of conduct and policies concerning.

Results and Discussion

Table 1: Comparison of Physical characteristics between regular summerzsin- service female students of Wollo University.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Subjects</th>
<th>N</th>
<th>Mean</th>
<th>Std.</th>
<th>Std. error mean</th>
<th>t-value</th>
<th>df</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>Regular</td>
<td>25</td>
<td>21.88</td>
<td>.726</td>
<td>.14</td>
<td>-5.28</td>
<td>24</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>Summer</td>
<td>25</td>
<td>22.76</td>
<td>1.09</td>
<td>.21</td>
<td>-4.70</td>
<td>24</td>
<td>.000</td>
</tr>
<tr>
<td>Weight</td>
<td>Regular</td>
<td>25</td>
<td>55.08</td>
<td>4.43</td>
<td>.88</td>
<td>-4.04</td>
<td>24</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>Summer</td>
<td>25</td>
<td>55.22</td>
<td>3.71</td>
<td>.74</td>
<td>-4.70</td>
<td>24</td>
<td>.000</td>
</tr>
<tr>
<td>Height</td>
<td>Regular</td>
<td>25</td>
<td>1.57</td>
<td>.019</td>
<td>.03</td>
<td>-3.48</td>
<td>24</td>
<td>.002</td>
</tr>
<tr>
<td></td>
<td>Summer</td>
<td>25</td>
<td>1.58</td>
<td>.018</td>
<td>.07</td>
<td>-3.48</td>
<td>24</td>
<td>.002</td>
</tr>
<tr>
<td>BMI</td>
<td>Regular</td>
<td>25</td>
<td>20.99</td>
<td>1.79</td>
<td>.35</td>
<td>-2.82</td>
<td>24</td>
<td>.009</td>
</tr>
<tr>
<td></td>
<td>Summer</td>
<td>25</td>
<td>21.58</td>
<td>1.85</td>
<td>.37</td>
<td>-2.82</td>
<td>24</td>
<td>.009</td>
</tr>
</tbody>
</table>
The above table shows, the result of independent t-test conducted to determine if there was significant difference between regular and summer female students mean scores of their age or not. The result exposed that there was an extremely statistically significant difference between regular t (M=21.88, SD =.726) and summer (M= 22.76, SD = 1.090) at the 0.05 level of significance (t=-.528, df = 24 n=25, p<0.05). This shows that there is significant age difference and it is one of the determinant factors of physical fitness performance. From the table above of the second variable, the result of independent t-test conducted to determine whether there was significant difference between regular and summer female students mean scores of their weight or not. The result exposed that there was an extremely statistically significant difference between regular t (M= 52.08, SD = 4.43) and summer (M=55.22, SD = 3.71) at the 0.05 level of significance (t=-4.70, df = 24 n=25, p<0.05). From this it can be deduced that weight becomes one of the decisive factors of physical fitness performance. As can be visibly seen, the result of independent t-test conducted to determine to check the significant difference between regular and summer female students mean scores of their height is as follows: the result exposed that there was an extremely statistically significant difference between regular t (M= 1.57, SD =.019) and summer (M= 1.58, SD =.018) at the 0.05 level of significance (t= 3.48, df = 24 n=25, p<0.05). Having this in mind, one can infer that height becomes one of the decisive factors of physical fitness performance. Regarding the fourth variable, the BMI, the result of independent t-test conducted to determine the difference between regular and summer female students mean scores of their BMI is calculated and discussed here below. The result exposed that there was an extremely statistically significant difference between regular t (M= 20.99, SD =1.79) and summer (M=21.58, SD = 1.85) at the. 05 level of significance (t=-2.82, df = 24 n=25, p<0.05). From this it can be deduced that BMI is one of the crucial factors of physical fitness performance. To sum up the above discussion in short, since the statistical P-value for each of the physical parameters is less than 0.05, there is an effect on the fitness level of the subject.

**Table 2**: Comparison of physical fitness test between regular and summer in service female students of Wollo University.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Subjects</th>
<th>N</th>
<th>Mean</th>
<th>Std.</th>
<th>Std. error mean</th>
<th>t-value</th>
<th>df</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Endurance</td>
<td>Regular</td>
<td>25</td>
<td>6.55</td>
<td>.90</td>
<td>.18</td>
<td>-4.24</td>
<td>24</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>Summer</td>
<td>25</td>
<td>7.56</td>
<td>.71</td>
<td>.14</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Speed</td>
<td>Regular</td>
<td>25</td>
<td>8.16</td>
<td>.38</td>
<td>.07</td>
<td>-1.37</td>
<td>24</td>
<td>.182</td>
</tr>
<tr>
<td></td>
<td>Summer</td>
<td>25</td>
<td>8.29</td>
<td>.41</td>
<td>.08</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vertical</td>
<td>Regular</td>
<td>25</td>
<td>26.24</td>
<td>5.81</td>
<td>1.16</td>
<td>3.64</td>
<td>24</td>
<td>.001</td>
</tr>
<tr>
<td></td>
<td>Summer</td>
<td>25</td>
<td>20.52</td>
<td>4.38</td>
<td>.87</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jump</td>
<td>Regular</td>
<td>25</td>
<td>1.74</td>
<td>.09</td>
<td>.01</td>
<td>6.84</td>
<td>24</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>Summer</td>
<td>25</td>
<td>1.54</td>
<td>.09</td>
<td>.01</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

From table 2 above, one can look at, the result of independent t-test conducted to determine if there was significant difference between regular and summer female students mean scores of their endurance or not. The result exposed that there was an extremely statistically significant difference between regular t (M=6.55, SD =.90) and summer (M=7.56, SD = .71) at the 0.05 level of significance (t=-.4.24, DF = 24 n = 25, p<0.05). From this, it can be deduced that Endurance is one of the central factors of endurance performance. From table 2 above, variables 3 and 4 (Vertical and Broad Jump), the result of independent t-test conducted to determine to look at the difference between regular and summer female students mean scores of their explosive muscular power has been discussed as follows. The result exposed that there was an extremely statistically significant difference between regular t (M= 26.24, SD = 5.81) and summer (M= 20.52, SD = 4.38) at the. 05 level of significance (t=3.64, df = 24 n=25, p<0.05) and t (M= 1.74, SD =.09) and summer (M=1.54, SD =.09) at the 0.05 level of significance (t=6.84, df = 24 n=25, p<0.05) respectively. From this it can be deduced that vertical jump and broad jump performances are one of the crucial factors of explosive muscular power.

Similar study conducted in Nekemte Teachers College indicates that significant differences were revealed in performing strength, speed and flexibility amongst the two groups (Berhanu, 2017) [2]. In agreement with this findings, the significant result was observed amongst the two subjects in performing strength, speed and flexibility test that were exposed by means of computing independent “t” test. Either or significant differences might occur due to the contribution of physical fitness factors including heredity, living standard, nutrition, hygienic conditions, environmental and climate factors etc. (Sallis and Patrick K, 1994) [23]. On the contrary, the second variable (speed) from the table above had been calculated in the following way: t (M= 8.16, SD =.38) and summer (M = 8.29, SD = .41) at the 0.05 level of significance (t= -1.37, df = 24 n=25, p>0.05). The result of independent t-test showed that there was statistically insignificant difference between regular and summer female students mean scores of their speed. Despite the insignificant difference between the two groups, the regular female students were found to be good at speed performance.

**Conclusions**

The study reveals that there were statistically significant differences between regular and summer female students in their age, weight, height, BMI, endurance, vertical jump performance and broad jump performance. But insignificant difference was also observed on their speed performance. This intern suggests that summer in-service female students have lower levels of fitness compared with regular female students. In addition, physical fitness performance was better in regular female students.

**References**