**HARAMAYA UNIVERSITY**
**POSTGRADUATE PROGRAM DIRECTORATE**

# EFFECTS OF SELECTED AEROBIC EXERCISE AND STATIC STRETCHING ON ANXIETY OF HARAMAYA UNIVERSITY SPORT SCIENCE ACADEMY STUDENTS

**M.Sc. Thesis**

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**Haramaya University, Ethiopia**

**Effects of Selected Aerobic Exercise and Static Stretching on Anxiety of Haramaya University Sport Science Academy Students**

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**A MASTER OF SPORT MEDICINE**

**Hagos Tsegay**

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## POSTGRADUATE PROGRAM DIRECTORATE

As thesis research advisors, we here by certify that we have read and evaluated this thesis entitled **"Effects of Selected Aerobic Exercise and Static Stretching on Anxiety of Haramaya University Sport Science Academy Students"** prepared under our guidance by Hagos Tsegay. We recommend that it can be submitted as fulfilling the thesis requirement.

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As a member of board of examiners of the M.Sc. thesis Open Defense Examination, we certify that we have read evaluated the thesis work prepared by Hagos Tsegay and examine the candidate. We recommended that the thesis can be accepted as fulfilling the thesis requirement for the Degree of Master of Science in Sport Medicine.

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## DEDICATION

I dedicate this work to my beloved friends and all my families for helping me with affection, love and for their immense contribution in the success of my life.

## STATEMENT OF THE AUTHOR

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## BIOGRAPHICAL SKETCH

The author was born in South Tigray, Alamata Town on January 1,1987. He started his elementary and junior education in Rarhe elementary school and he attended and completed Senior Secondary school in Tadagiwa Ethiopia Secondary and preparatory school in Alamata. Then He joined Haramaya University November 2007 and graduated with B. Ed degree in physical Education and sports. After six years (2010-2015) of service, he has worked as a secondary school teacher in Somali region. And he was worked at Haramaya University Gym master from 2007 up to know. He joined the MSc program in the department of sport science (Sport Medicine) here in Haramaya University.

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## LIST OF ABBREVIATIONS AND ACRONYMS

| | |
|---|---|
| **APA** | American Psychiatric Association |
| **CBT** | Cognitive Behavioral Therapy |
| **CGS** | Council of Graduate Studies |

| | |
|---|---|
| **DGC** | Department of Graduate Committee |
| **G1, 2** | Group1, Group2 |
| **HU** | Haramaya University |
| **MD** | Mean Deviation |
| **MDD** | Major Depressive Disorder |
| **PA** | Physical Activity |
| **PE** | Physical Exercise |
| **ROM** | Range of Motion |
| **SA** | State Anxiety |
| **SD** | Standard deviation |
| **SGC** | School of Graduate Committee |
| **SPSS** | Statistical Package for Social Sciences |
| **SRH** | Sexual and Reproductive Health |
| **SS** | Static Stretching |
| **WHO** | World Health Organization |

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***Effects of Selected Aerobic Exercise and Static Stretching on Anxiety of Haramaya University Sport Science Academy Students***


## *ABSTRACT*

*Selected Aerobic Exercise and Static Stretching are use full for reduction of Anxiety level. This study attempted to find out effects of selected aerobic exercises and static stretching on anxiety of Haramaya University first year sport science academy students. Participants were assigned randomly into two groups (aerobic (34) and (34) static stretching), From the total population of 100 (male 60 and female 40) HU first year sport science academy students. simple random sampling techniques was used to select 68 (male 48 and female 20 students) of age 18-24with MD=21.52 ±1.56 years old). All groups participated in supervised aerobic exercise and Stretching 3 days /week for 8 weeks. Quasi experimental design without control group is used to compare participant groups and measure the degree of change occurring as a result of treatments from December 2017 to January 2018, and 50,60 minutes per month session. The exercise for Aerobic group were: - slow walking and jogging exercise, Aerobics dance, Jumping rope, Floor exercise. For static stretching group, Hand stretching, Lower back stretching, Hip flexor side to side stretching, Quadriceps stretching, Relaxation and stretching exercises. Data were analyzed by using SPSS software, version 20 and Repeated measures one way ANOVA was employed to assess within group change of anxiety on HU first year sport science academy students. And also an independent two sample t-test were employed to Compare the effect of anxiety level of participant between aerobic exercise and static stretching groups at pre, during and post tests for the subjects at α 5%. Overall aerobic and static stretching exercises show positive effect on alleviating the general and test anxiety of students. According to the finding it is recommended that all the students should perform aerobic and static stretching exercise groups regularly to alleviate all anxiety related to their campus life.*


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*Key words: aerobics, anxiety, Static stretching*

# 1. INTRODUCTION

## 1.1. Background of the study

Anxiety is a feeling that exists in people in nature. It occurs under irritating conditions. Excess anxiety may result in abnormal functions for the body. Everybody feels different anxiety, and physiological properties play very important roles in this situation (Silberberg, 1996). Anxiety starts gradually and increases step by step. If it is not controlled, it rises and irritates the people. The main reasons of anxiety are business travel, smoking, alcohol, overweight, failure, inappropriate physical appearance, studying, memorizing large portions of content in small periods of time, grade competition, and rigorous examination periods.

Anxiety indications may be bone pains, being tired, headache, nervous, poor sleeping, forgetting, hesitations, hypochondriacs. (Link, 1993,Misra and McKean, 2000). Anxiety affects the lives of many college-aged students, and its influence is often exacerbated during the academic year. Finding preventive measures or mitigating anxiety can be difficult for college students, and the option of seeking professional help is not always available or realistic. Anxiety, the focus of the present study, is the temporary experience of emotional arousal when encountering situations or demands subjectively interpreted as threatening or dangerous (Schlicht, 1994; Schwarzer, 1997).

Physical activity can have a significant effect on mental health. Tekin (1997 ) found a significant difference between athlete and non-athlete student according to the scores of physical perception and self-esteem. Tekin (1998) administered a physical exercise program to some of students participated in same summer camp and had different psychological outcomes from control and exercise group. Moreover, Zorba, Ziyagil and Tekin (1999) exposed the same results in their research that took up the relation between perceived physical competence, physical exercise, sport age and some psychological parameters.

Aerobic exercise is a type of physical activity that has been found to have a positive relationship with mental health (Sharma et al., 2006). Aerobic exercise is believed to reduce anxiety and panic symptoms through similar processes. Specifically, aerobic

exercise produces many of the same bodily sensations that often elicit anxiety reactions, such as increases in heart rate and respiration. Repeated exposures to anxiety-related interceptive stimuli through exercise may therefore extinguish fear responses, accompanied by changes in how these stimuli are interpreted (de Coverley Veale, 1987).

Stretching is an important therapeutic and exercise training modality for increasing joint range of motion. There has been extensive research on the effects of various stretching programs that have documented the clinical effectiveness of these techniques in modifying flexibility (Knudson et al. 2000; Harvey et al., 2002; Shrier, 2004; Decoster et al., 2005). This study was conducted to determine the effect of aerobic exercise and static stretching on anxiety of Haramaya university sport science academy students.

## 1.2. Statement of the problem

On the relationships between cognition and physical activity, the cognitive processes benefited most from exercise interventions (ColcombeS., and Kramer, A. F. 2003). In general, physical exercise has a significant and clear positive effect on physical health and psychological process in the human body (Blake, H. 2012). A growing body of evidence indicates that aerobic and static stretching exercises are an effective and cost-efficient treatment alternative for a variety of anxiety, stress and mood disorders (Salmon, 2001).

However, the relationship between improvement of mood and exercise does not seem to be universal. Individuals without psychiatric symptoms who regularly exercise experience better moods than those who do not (Kritz and Lee, 1997 and Sexton et al., 2001), however, it should be noted that an association between improvement of mood and medium or long-term physical activity has not consistently been demonstrated for normal individuals Silverstein et al. (2001) and Engels et al. (2002). University students, these days, are not only exposed to the life changing theories and realities but also to a number of problems that can cause anxiety. Physical exercise especially aerobic and static stretching exercises can be used as a contemporary approach to solve anxiety problems of university students (Peluso and Andrade, 2005, Paluska and Schwenk, 2000). Furthermore studies examining the relationship between aerobic exercise as well

as stretching exercise on anxiety of sport science students has not been studied in the current study area.

Therefore this study was conducted to examine the effect of selected aerobic exercise and static stretching on anxiety among Haramaya university first year sport science academy students. The study tried to test the following research hypothesis:

$H_1$- Aerobic exercise have positive effect on anxiety of Haramaya University first year sport science academy students

$H_2$ - Static stretching exercise have positive effect on anxiety of Haramaya University first year sport science academy students

$H_3$- There is a difference on effect of aerobic exercise and static stretching on anxiety of Haramaya University first year sport science academy students

## 1.3. Scope of the Study

The study was conducted on Haramaya University first year sport science academy students with the aim of examining the effect of aerobic exercise and static stretching on anxiety of Haramaya University first year sport science academy students. This study focused only on selected aerobic exercise and static stretching.

## 1.4. Significance of the Study

The main purpose of this study is to examine the effect of selected aerobic exercises and static stretching on anxiety of Haramaya University first year sport science academy students. Additional importance's of conducting this study are written as follows**;-**

- It could serve as a literature for researchers and academicians in the area of sport science in general and aerobic exercises in particular.
- The students would derive a significant lesson from the research findings about the importance of selected aerobic exercises and static stretching for anxiety.

- It could help to judge which one is more important for students either aerobic exercises or static stretching.
- Finally, by focusing on this site, the study is believed to bring sound contribution to the surrounding community by investigating, identifying, documenting and stating the proper time and way on how-to do selected aerobic exercises and static stretching for students' anxiety.

## 1.5. Objectives of the Study

### 1.5.1. General Objective of the Study

The general objective of the study was to assess the effect of selected aerobic exercise and static stretching on anxiety of Haramaya University first year sport science academy students.

### 1.5.2. Specific Objectives of the Study

The specific objectives of this study were to:

1. To examine the effect of selected aerobic exercises on anxiety of Haramaya University first year sport science academy students.
2. To examine the effect of selected static stretching exercises on anxiety of Haramaya University first year sport science academy students.
3. To compare the effect of aerobic exercise and static stretching on anxiety of Haramaya University first year sport science academy students.

# 2. REVIEW OF RELATED LITERATURE

The literature part of this Chapter includes Aerobic exercise, Static Stretching exercise, Anxiety, effect of aerobic exercise on general anxiety, effect of aerobic exercise on test anxiety, effect of static stretching exercise on general anxiety, effect of static stretching exercise on test anxiety and Effect of Aerobic exercises and Static stretching that could be included.

## 2.1. Aerobic Exercise

Aerobic literally means "relating to, involving, or requiring free oxygen"(*Kenneth H and Cooper (1997).* and refers to the use of oxygen to adequately meet energy demands during exercise via aerobic metabolism. *(*McArdle *et al., 2006).* Aerobic exercise is a type of physical activity that has been found to have a positive relationship with mental health (Sharma et al., 2006). Aerobic exercise is believed to reduce anxiety and panic symptoms through similar processes. Furthermore, aerobic exercise reduces generalized arousal, including resting heart rate and muscle tension (Abadie, 1988). Is physical exercise of low to high intensity that depends primarily on the aerobic energy-generating process. Generally, light-to-moderate intensity activities that are sufficiently supported by aerobic metabolism can be performed for extended periods of time *(*Plowman *et al., 2013).*

## 2.2. Static Stretching exercise

Static Stretching is the most well-known forms of stretching (Blahnik, 2013). It occurs when an individual moves his/her body in such a way that a muscle is slowly elongated and then held in that position for a period of time. For example, to statically stretch the hamstrings a seated person with legs straight can bend at the waist and reach for the toes.

The individual holds the position for a length of time, usually between 15 and 60 seconds. The American College of Sports Medicine recommends 2-4 repetitions of stretches totaling 60 seconds per stretch to improve flexibility. The goal of static stretching in Sports Medicine, is to “desensitize tension sensors in the muscle,” and it is believed that when this happens, the muscle is capable of taking on more force before becoming damaged (Okragly, 2011).

### 2.3. Anxiety

Defining anxiety is so difficult because there are so many different issues that explain what anxiety truly is. Anxiety is a complicated condition, and one that most people struggle to explain. It's not exactly something easily defined in the dictionary, and those that have never experienced anxiety may not really understand what it means to have anxiety. The dictionary.com definition of anxiety is "distress or uneasiness of mind caused by fear of danger or misfortune." But this term is a drastic over-simplification. Anxiety can be considered "fear," but in many ways fear is only a part of what it means to have anxiety (Maller and Reiss, 1992).

Anxiety is a normal reaction to certain situations. A small level of anxiety is normal, but severe anxiety can be a serious problem. Academic anxiety can become more detrimental over time. As a student’s academic performance suffers, the anxiety level related to certain academic tasks increases (Huberty, 2012). Anxiety affects the lives of many university students, and its influence is often exacerbated during the academic year. Finding preventive measures or mitigating anxiety can be difficult for university students (Schlicht, 1994; Schwarzer, 1997).

Physical exercise may be a viable treatment because it can be recommended for any patient at any time without suffering a negative social stigma (Nahas and Sheikh, 2011). Physical exercise is an example of alternative and complementary therapy that has received considerable and significant attention in treatment of MDD. In general, physical exercise has a significant and clear positive effect on physical health and psychological process in the

human body. Normal physical health conditions may play a significant role in mental health balance, and maintain bio psychological aspect in the human body (Blake, 2012).

## 2.4. Effect of aerobic exercise on general anxiety

In a study to investigate the effect of aerobic exercise on anxiety of boys and girls in high school in 2009-2010 in Zanjan Experimental group undertook aerobic exercises for two days a week for two months. To test the hypotheses, we assume dependent T-student and ANOVA tests. Results showed that aerobic exercise reduced a significant amount of anxiety in experimental group. But the reduction in the control group is not significant (Heidary et al., 2011).

According to a study to compare the effect of exercise on mental health in the physical dimension, anxiety and mental disorder, social dysfunction and depression health of athletes and non-athletes in Beheshti University.260 (80 individual athletes and 180 non-athletes) patient University students participated in this study who were randomly selected to represent the school. The results show that the significant differences of symptoms of physical anxiety, sleep disorder, social dysfunction and depressions in the two groups were observed between athletes and non-athletes. The problem in all dimensions: physical symptoms of anxiety and sleep disorder symptoms, social functioning and depressive symptoms compared to non-athletes were better $\{p < 0/05\}$. Mental health scores of athletes are very better than non-athletes and According to information found in each of the four scale athletes are a more favorable situation (Kenari, 2014).

Many college students have feelings of state anxiety, a temporary emotional response that is described by subjective, perceived feelings of concern, stress, and apprehension. The present study measured state anxiety across participants separated into a control and experimental

group, which performed an exercise routine. Participants were also designated as regular or non-exercisers. Individuals in the experimental group and those who do not normally exercise were predicted to show larger decreases in state anxiety. All participants completed the Beck Anxiety Inventory, Beck Depression Inventory, and Zung Self-rating Anxiety Scale at three separate sessions over a two-week time span. Results showed no significant effect of group placement, amount of exercise in everyday life, or in the interaction of these variables. (Carruth and Taylor**,** 2009).

In a study to investigate the effect of aerobic exercise on anxiety sensitivity, 54 participants with elevated anxiety sensitivity scores completed six 20-min treadmill exercise sessions at either a high-intensity aerobic level. Results indicated that both high- and low-intensity exercise reduced anxiety sensitivity. However, high-intensity exercise caused more rapid reductions in a global measure of anxiety sensitivity and produced more treatment responders than low intensity exercise. Only high-intensity exercise reduced fear of anxiety-related bodily sensations (JJ Broman-Fulks et al., 2004).

In study to investigate the effect of eight weeks of aerobic exercise on depression, anxiety and sleep disorders in Durdle-aged women, subjects walked for eight weeks, three sessions per week, each session lasting 60 minutes with 60% of maximum heart rate. The results showed that depression symptoms decreased significantly after eight weeks ($p=0.0001$) but eight weeks of aerobic training had no significant effects on reducing anxiety symptoms and sleep disorders ($p=0.090$). According to the results it can be concluded that aerobic exercise can improve mental health and enhance life quality in Durdle-aged women by reducing depression symptoms (Ebrahim et al., 2018).

According to study to assess the effects of physical exercise to eliminate the anxiety in university youth, the result showed the anxiety level of female students was found to be higher comparison to males' depending upon the gender. In addition, the results also showed that participation in physical exercise and physical activities decreased the anxiety level of both sexes. According to the age, a similar level of anxiety was seen at the beginning. It appeared that these activities had a reduction in anxiety levels of all age categories. The reduction

mentioned above was found highest in19–20 age groups. According to fields, the physical exercise activities played a very important role in minimizing the anxiety. This effect was the most reliable on the students of music department (Esenturk et al., 2008).

In clinical trial study aimed at comparing the impact of aerobic and anaerobic exercises on the level of depression, anxiety, stress, and happiness of non athletic male student, sample included the non athletic male students of Zahedan Azad University in 2014. Both aerobic and anaerobic groups participate for a period of 10 weeks (3 sessions a week, each lasted for 60 minutes). The results showed that in both aerobic and anaerobic groups the mean score of depression, anxiety, stress and happiness improved after treatment. However, the improvement in the mean score of anxiety, stress and happiness was more apparent in the anaerobic group. The results also showed that only stress and happiness resulted in a significant difference in different groups (*Kianian et al.,*2018).

According to study to examine whether regular exercise is associated with anxiety, depression and personality in a large population-based sample as a function of gender and age of adolescent and adult twins and their families, the result indicated exercisers were on average less anxious (-0.18 SD), depressed (-0.29 SD) and neurotic (-0.14 SD), more extraverted (+0.32 SD) and were higher in dimensions of sensation seeking (from +0.25 SD to +0.47 SD) than non-exercisers. These differences were modest in size, but very consistent across gender and age (De Moor et al., 2006).

## 2.5. Effect of aerobic exercise on test anxiety

According to study to investigate the effect of performing regular physical activities on test anxiety and procrastination in students, the results of the study indicated that there were significant differences between the mean of test anxiety in athletes and non-athletes. In addition, there was a significant positive correlation between test anxiety and procrastination in subjects. Findings showed that amount of test anxiety among the athlete students is very less than non-athletes. Therefore, suggests that we should motivate the student to doing regular physical activity in order to decrease the test anxiety (Nasiri et al.,2015).

In a study to examine the effects of regular exercise on exam-related stress and anxiety during the final exam period of the semester in undergraduate college students. Male and female college students completed an online exercise log each day for 7 weeks. Exercise type, duration and intensity for each daily exercise was quantified and used to classify students into low, moderate or vigorous exercise groups. Anthropometric (weight, height, body mass index) and fitness measures (Forestry step test for $VO_{2max}$, maximum sit-ups, maximum push-ups, sit and reach flexibility, % body fat, heart rate and blood pressure) were measured prior to and at the end of the 7 week period. Salivary cortisol, anxiety (state-trait anxiety inventory), heart rate and blood pressure were measured at baseline and 30 min prior to a final exam. Anxiety levels, heart rate and systolic blood pressure were significant and also in the final examination of exercise groups (p2max, max push-ups, max sit-ups), Moderate and vigorous exercise groups significantly higher than low exercise group (Coste et al., 2013).

## 2.6. Effect of stretching exercise on general anxiety

On a study to see the effectiveness of relaxation therapy in the reduction of anxiety related symptoms. Relaxation therapy was consisted of different techniques including deep breathe, simple muscle relaxation, walk, recreational activities, like watching favorite TV programs, talking on telephone with friend, doing house hold work and reading books. The whole treatment interventions were consisted of 15 sessions; out of 15 sessions relaxation therapy was applied in 12 sessions. Relaxation therapy showed that relaxation techniques are very effective in the reduction of anxiety and depressive symptoms (Ali, 2010).

The study was intended to determine whether the intensity of yoga practice in minutes and the duration of yoga experience in months would relate with the level of anxiety and health among college students participants with ages between18 and 25 years (group mean age ± S.D., 22 ± 2.80) who were studying in a college in north of India, were included in this study. Participants were assessed for level of anxiety using Spielberger's State Trait Anxiety Inventory. Pearson correlation analyses were performed using SPSS version 18.0) to determine how would be correlated with the daily yoga practice and duration of the yoga experience of the participants.

The results suggest that the duration of yoga practice in months decreases the level of anxiety (Singh and Singh, 2016).

According to study to investigate the effects of acute yoga on anxiety symptoms in response to a carbon dioxide inhalation task in women and it has consequently led to floor effects in a within-subjects design. The subjects were selected randomized and consisted of 40 minutes of guided vinyasa-style yoga and light stretching, respectively. Respiratory measures (i.e., respiration rate, ventilation, tidal volume, CO2 production) and self-reported overall anxiety data were collected via a metabolic cart attached to the mouthpiece during the inhalation task. The result shows that a significant reduction in cognitive anxiety main effect of inhalation (i.e., from pre- to post-inhalation) on the self-reported panic and anxiety symptoms in both conditions ($p<.05$) (Ensari, 2016).

In this study sought to evaluate the influence of yoga in relieving symptoms of depression and anxiety in women who were referred to a yoga clinic. Participants were randomly assigned into an experimental and a control group. The experimental group participated in twice weekly yoga classes of 90 min duration for two months. The control group was assigned to a waiting list and did not receive yoga. Both groups were evaluated again after the two-month study period. The prevalence of experimental group pre and post Yoga intervention was respectively, a statistically insignificant decrease and also the experimental group was compared to the control group, showed a significant decrease in state anxiety. In two-month yoga class can lead to significant reduction in perceived levels of anxiety (Javnbakht et al., 2009).

In a study to investigate the effects of relaxation interventions on depression and anxiety among older adults randomized controlled trials and non-randomized controlled trials undertaken in the past 20 years (1994-2014). The results show that older adults who received relaxation interventions experienced greater reductions in depression and anxiety than controls in most studies. Progressive muscle relaxation training, music intervention, and yoga had the strongest intervention effects on depression. Music intervention, yoga, and combined relaxation training most effectively reduced anxiety symptoms among older adults. Furthermore, the impact of some relaxation interventions remained in effect for between 14 and 24 weeks after the

interventions. Generally, this systematic review provided empirical evidence to support the proposition that relaxation interventions can reduce anxiety and depression among older adults (Piyanee et al., 2015).

## 2.7. Effect of stretching exercise on test anxiety

The study investigated the efficacy of a brief yogic breathing and posing intervention on perceived feelings of test anxiety for elementary students. Effect size of the individual scores indicated the yoga intervention had a large effect of decreasing test anxiety. The control group also decreased test anxiety, but at an inconsistent rate. Group effect sizes indicated lowered levels of test anxiety in both intervention and control groups. The result indicates that yoga intervention was associated with consistent decreased anxiety levels in all three yoga participants (Harrison, 2011).

The purpose of this study was to determine the effect of relaxation or exercise on undergraduates' test anxiety. It was assessed at pretest and posttest. Test Anxiety Questionnaire developed by Sarason undergraduate students self-selected to participate. The subjects in the group who engaged in a non-meditative relaxation exercise and aerobic dance class 3 times per week for 7 weeks showed a significant decline in test anxiety. The control subjects showed no significant change in test anxiety (Topp. 1989).

The study was conducted to determine the effect of progressive muscle relaxation method on test anxiety among nursing students of Isfahan University of Medical Sciences in 2013. The study conducted in male and female nursing students divided into two groups (study and control). The collected data were analyzed by the statistical tests, i.e. $\chi 2$, paired *t*-test, independent sample *t*-test, Mann Whitney and Wilcoxon tests, using SPSS 18. in experimental (study) group the results showed that performing progressive muscle relaxation method was effective in reducing test anxiety among nursing students, were not significant in the control group ($P = 0.083$) (Zargarzadeh and Shirazi, 2014).

The study was to investigate the relationship between anxiety levels and academic achievement among students in selected secondary schools in Lang'ata district, Kenya. The sample size comprised both boys and girls secondary school students. Data was analyzed by using both descriptive and inferential statistics. The choice of the subjects was done by random sampling method. Questionnaires were administered to students. It comprised three parts, that is, Section A, B and C. An Anxiety Personality Self Evaluation Quiz, A test anxiety assessment adopted from Driscoll R (amtaa.org, 2004) was administered to the participants to assess prevalence of test /exam anxiety and Comprised of a set of two questions which sought to find out the causes of anxiety and how students dealt with anxiety while in school. The results showed a presence of high personality anxiety levels at 79%, while the test anxiety indicated a relatively low-normal anxiety level of 27%. The study also established that students' encountered some high anxiety causing challenges which affect their ability to perform effectively, and girls were found to be more prone to high anxiety levels as compared to boys (Syokwaa et al., 2014).

## 2.8. Effect of Aerobic and Static stretching exercises

The aim of this study was to compare the effect of aerobic and aerobic with stretching exercises on fatigue in people with multiple sclerosis. The randomized controlled clinical trial was conducted on the members of the MS Society of Tehran, Iran. randomly assigned to two exercise groups and one control group. The exercises consisted of stretching with aerobic and aerobic exercises. Data were analyzed using SPSS software, version 18.0.Independent *t* test showed that there are significant differences between the two exercise groups in the pretest

(P<0.005). Analysis of Variance showed that there were significant differences between the exercise groups before and after the intervention (P<0.001) Pazokian et al. (2013).

# 3. METHODS AND MATERIALS

This chapter deals about description of study area, operational definition, study design, study population, Sampling Size and Sampling Techniques, Method and procedures of Data Collection, Questionnaire, Procedure of Data Collection, Inclusion and Exclusion Criteria, Methods of Data Analysis, Data quality control, Research Ethics and Exercise Training Protocol.

## 3.1. Description of the Study Area

The research was conducted in Haramaya University main campus. Haramaya University established in 1954, is one of the oldest universities in Ethiopia. Geographically the study area is located approximately 505 km east of Addis Ababa, 5 km away from city Alemaya town in the Misraq Hararghe Zone, about 23 km from the city of Harar and 40 km from Dire Dawa. It is found in Misraq Hararghe Zone, and it has 42° 01' 60.00" E longitudinal and 9° 25' 17.99" N latitudinal coordinates and 1950 meters above sea level. The area receives a bimodal rain fall, long rainy season (July to September) and short rainy season

(March to June). The University is equipped with facilities like swimming pool; gymnasium and soccer stadium were included (www.haramaya.edu.et, 2013).

## 3.2. Definition of Operational Terms

**1. Aerobics**

It refers to how a human body consumes oxygen to adequately meet energy demands during exercise. Or it can be defined as constant moderate intensity work that uses up oxygen at a rate in which the cardio respiratory system can replace oxygen in the working muscles (M Otto, J Smits. and, JAJ Smits, 2011).

**2. Anxiety**; - It is a complex mood displaying continuity and arising when one feels sad, indefinite and uncontrollable dangers in coming events, situations or conditions (Clark and Beck, 2012).

**3. Stretching; -** It refers to the gradual application of tensile force to lengthen a muscle or group of muscles to increase the range of motion of a joint and is often performed as part of a pre-participation routine to aid in preparing the body for activity ( Kees, 2007).

**4.Static stretching; -** is used to stretch muscles or muscle groups while the body is at rest, and is performed by gradually lengthening a muscle or muscle group to an elongated position (to the point of discomfort) and holding that position for 10-30 seconds. While static stretching has long been known for its effectiveness to increase joint range of motion (ROM), its effectiveness to promote optimal performance in high intensity explosive type activities has been debated (Moss, 2002).

## 3.3. Study Design

The study used QUSI-experimental design with two groups; aerobic and static stretching group. Pre, during and post tests were used to compare between groups and within group changes as a result of treatments. Participants were assigned randomly into experimental groups, with exercise three times a weeks, for two months (8 weeks) with 50-60 minutes duration after informed consent was signed. The participants were informed that the selected

aerobic and static stretching exercises were specifically designed for the experimental groups. Pre, during and post-exercise tests were included.

### 3.4. Study Population

Since the researcher was interested to conduct research on both male and female students, the populations of the study were male and female HU first year undergraduate sport science academy students. The total population of this study was 100 Haramaya University first year sport science academy students of; 40 female students and 60 male students. All students had the chance to be included in this research work.

### 3.5. Sampling Size and Sampling Techniques

A random sampling method was used to recruit participants. The following formula was used to determine the sample size from the total population.

$$n = \frac{N}{1 + N(e)^2}$$

(Yemane, 1967)

Where n, is sample size, N, population, e is the level of precision. Here is how the maths, works assuming you chose a 93% confidence level, and a margin of error (confidence interval) of 7%. Where the total population was 100 (60 male students and 40 female students) then using the above formula the sample size was 68 (48 male and 20 female students) were included. And students were randomly identified as participants in the experiment. In the process of recruiting participants, first notice was posted in the campus and registration was followed on students from the department of sport science. Then based on pretest results, students were assigned in to two experimental groups. In each group 34 students were assigned randomly.

## 3.6. Method and procedures of Data Collection

The study involved only primary data analysis. Primary data were mainly Obtained from the experimental variables. And, in order to enrich the data obtained and to solicit information that cannot be obtained through such instruments document analysis was employed to gather supplementary information

Data collection techniques were used in order to successfully address the central research questions. In order to gather data, standardized general and test anxiety questionnaire was employed for this study at pre, during and post for both groups. The questionnaire was strictly administered and standardized in terms of administration, organization and implementation conditions. Up on starting the training programs, pre exercise test was made followed by during test after the intervention and at the end of the two months third test was administered. Questionnaire was used as a data collection instrument. Standardized tests were used for all respondents.

### 3.6.1. Questionnaire

The researcher Adopt Anxiety questionnaires (Spitzer RL et al,, 2006) and (www.ecu.edu/cs-acad/aa/PirateAcademicSuccessCenter/). as the main data gathering instrument because it is standard, simple for respondents to answer with in short period of time. Besides, it allows respondents to express the felling confidentially and enables the researchers to use representative samples as the source of data to avoid biases. The questionnaire contains 8 standardized general anxiety items and 12 test anxiety items which are self-reported instrument with five point Likert scale (Not at All (1)/ Little Bit (2)/ Somewhat (3)/ Quite a Bit (4)/ Very Much (5).

### 3.6.2. Procedure of Data Collection

The data were collected through the data collection tools such as standard questionnaire both before and after introducing the intervention of the aerobic exercise and stretching workout in Haramaya University first year sport science academy students age between 18 -24 years.

The training program was given for 8 consecutive weeks, three days /week and the duration was 50 minutes and 60 minutes respectively a month. The data were recorded by the two

assistant data recorders after they received training for two days about which data and information was collected from the participants. The appropriate aerobic exercise and static stretching workout was given by the researcher. The comparison on the effects of both exercises on anxiety was also done by the researcher.

### 3.7. Inclusion and Exclusion Criteria

Subjects were recruited according to the following inclusion criteria:

- Subjects from both sexes aged from 18-24 were included.
- Student with heart failure and any physical disability were not part of the study.
- the subjects were identified based on the health history and physical readiness questionnaire.

Accordingly the health status questionnaire student who satisfy the inclusion criteria, and willing to participate were included in the study. Those students willing to sign an informed consent before participating were included in this study. Screening was conducted by using the standardized pre exercise questionnaire.

### 3.8. Methods of Data Analysis

The quantitative data obtained from the questionnaire was first checked for their completeness. Hence, some incomplete case answered questionnaires were rejected. After that, the carefully checked and completed questionnaires were coded, registered and ratings were analyzed by using different statistical tools. Relevant statistical tools which are considered to be appropriate in line with the nature of the basic question and the data collected for the study were employed. **Based on this;-**

- To analyze the personal characteristics of the respondents' mean, standard deviation and percentage was used because it was found that it is important to use percentage to determine the relevant characteristics such as age, sex, and educational experiences.

- An independent two sample t-test were employed to Compare the effect of anxiety level of participant between aerobic exercise and static stretching groups at pre, during and post tests for the subjects of HU first year sport science academy students.
- Repeated measures one way ANOVA was employed to assess within group change of anxiety as a result of aerobic exercises as well as static stretching on HU first year sport science academy students.
- For the statistical process data were analyzed by (SPSS) software version 20 program. The level of significance was set at α 5 % .

### 3.9. Data quality control

The subjects of the study were informed of the place the time of tests for the three cases (Pre, During and posttests). They were instructed what they should do before tests were taken. To keep the data in its quality level the data gathering procedures were strictly followed pre, during and posttests. Data that were collected were handled with great care to protect data damage and lose.

### 3.10. Research Ethics

The study was conducted by considering the university rules, codes of conduct, and policies. The protocols were approved by the university guide lines. The protocol was reviewed and approved by institutional reviewers or bodies. The entire participants had clear information about the purpose of the study. Before the beginning of the study the purpose of the procedures to be followed, the potential benefits, and possible risks of participating in this study were explained to the subjects. The subjects did not face any risk of harm. The results of the questionnaires were kept confidentially. Any type of information did not disclose to anyone and finally participants signed informed consent sheet.

### 3.11. Exercise Training Protocol

According to Nelson et al,, (2007) 3-5 days per week and 30 to 60 minutes is needed for minimizing the levels of anxiety through aerobic exercise and static stretching. So, the training

program was carried out for 8 weeks. The researcher used pre, during and posttests to know the change that occurred due to the 8 weeks effect of selected aerobic exercises and static stretching and during test also given to know the progress training.

The dependent variable for this study was anxiety while independent variables were selected aerobic exercises and static stretching. Different types of aerobic and static stretching exercises were performed by the subjects within 8 weeks in order to minimize the level of anxiety of first year undergraduate sport science students of HU. The subjects were divided into two groups. G1 ( aerobic exercise) and G2 (static stretching exercise). G1 /selected aerobic exercises used are;-

- **Warming up: -** slow walking and jogging exercises
- **Main work out: -**
    - Aerobics dance
    - Jumping rope
    - **Floor exercise:** flutter kicks exe, leg liftes, reverse crunch, butt bridge, single leg bridge, knee push up and up down plank
- **Cool down: -** Relaxation and stretching exercises

## And G2 static stretching used are:-

- **Warming up: -** slow walking and jogging exercises
- **Main work out:-**
    - **Hand stretching:** fore arm stretching, overhead triceps stretching, the rest flexor stretching, wrist extensor stretch, tennis elbow stretch
    - **Lower back stretching:** cat or cow stretch, knee to chest stretch, kneeling hip flexor stretch, poodle tail, extended puppy pose, prone leg lifts stretching
    - **Hip flexor side to side stretching exercise**
    - **Quadriceps stretching exe;-** standing quadriceps stretch, quadriceps stretch

side Lying, kneeling quadriceps stretch

- **Cool down:** relaxation and stretching exercises

Participants were trained for three days per week (50-60 minutes per day, for first month 50 minutes from low to moderate intensity and second month 60 minutes from moderate to high intensity) were included for each group. So, group one (**G1**) was on Tuesday and Thursday afternoon 4:00pm-5:00pm, and Saturday morning 6:00am – 7:00am and group two (**G2**) was on Monday morning 6:00am – 7:00am, Wednesday and Friday afternoon 4:00pm – 5:00pm. The schedule was prepared by considering their convenient time for them as they were students. The sessions comprised of various static stretching exercises. Each exercise session had 10 minutes warming up period and the cool down part had 5 minutes duration after the time of intended workouts.

# 4. RESULT AND DISCUSSION

This chapter presents the analysis of data collected from the subjects based on the findings under this study. The purpose of the study was to examine the effect of selected aerobic exercise and static stretching on anxiety of student's age range of 18-24 in HU first year sport science academy students were as sixty eight subjects selected. They were randomly assigned in to two groups of aerobic and static stretching groups with 34 subjects for each group. In this study, field tests were given three times (Pre, during and Posttests). Under this, two

independent variables (aerobic and static stretching exercises) had been evaluated based on training schedule and the results of those variables are discussed as follows.

## 4.1. Analysis of Results

Analysis of the result were carried out by using mean value and standard deviation statistical method in comparing the effect of selected aerobic exercise and static stretching between pre, during and post tests on anxiety level of students. Pre, during and posttests questionnaire was administered to see the progress of the students to the level of anxiety. Analysis was carried out step by step for each question. Accordingly, for the first question the following table was prepared.

## 4.2. Background and Characteristic of the Respondents

The following table summarizes a short review on background of the respondents to give clear picture on the characteristics of students in the study area. The information is obtained from self-administered questionnaire. It portrayed the background of the respondents in terms of sex, age category, and academic level/qualification.

**Table 1: Demographic Characteristics of the Respondents**

| S.N | Variables | | F | % |
|---|---|---|---|---|
| 1 | Sex | Male | 48 | 70.6% |
| | | Female | 20 | 29.4% |
| | | Total | 68 | 100% |

| | | | | |
|---|---|---|---|---|
| 2 | Age category | 18-19 | 26 | 38.24% |
| | | 20-22 | 26 | 38.24% |
| | | 23-24 | 16 | 23.52% |
| | | Total | 68 | 100% |
| 3 | Educational level | Undergraduate(First year students) | 68 | 100% |

From the total amount of respondents were male 48 (70.6%) and the remaining 20 (29.4%) were females. Characteristic of the respondent age wise were grouped in to three categories were classified in 18-19, 20-22, and 23-24 having 26 (38.24%), 26 (38.24%), and 16 (23.52%) respectively. All subjects have the same educational level (undergraduate Haramaya University first year sport science academy students). From the above table can be inferred that all the respondents were in similar age or with minor difference between them, sex wise almost they were equivalent and all are in the same level of educational background.

**Table 2: Descriptive Statistics of general anxiety of aerobic exercise group**

| Aerobic group | Mean | Std. Deviation | N |
|---|---|---|---|
| pre test | 29.5294 | 6.75204 | 34 |
| During test | 25.1471 | 8.56396 | 34 |
| post test | 15.3529 | 6.44267 | 34 |

*Based on estimated marginal means*

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

*a Adjustment for multiple comparisons: Bonferroni.*

According to Table 2, the mean and standard deviation of Pre, During and posttest of the general anxiety score for the aerobic group are 29.5294 (6.75204), 25.147 (18.56396) and 15.3529 (6.44267) respectively.

**Table 3: Mauchly's Test of Sphericity and Sphericity Assumption Tests of Within-Subjects Effects for the general anxiety data of aerobic exercise group**

| Within Subjects Effect | **Mauchly's Test of Sphericity** | | | Sphericity Assumed | |
|---|---|---|---|---|---|
| general anxiety | Mauchly's W | Approx. Chi-Square | Sig. | F | Sig. |
| | .994 | .201 | .905 | 63.463 | .000 |

In table 3 it can be seen that test of Sphericity of the data of general anxiety for aerobic group was not violated as shown in p value (sig=0.905). Therefore the Sphericity assumption was tested for further analysis as can be seen in Table 3which Sphericity assumption was significant as shown in the p value (sig=0.000) which is less than 0.05. This indicates that there was a change somewhere in the three tests of Pre, During and post scores of general anxiety. It can be concluded that there is a statistically significant effect of aerobic exercise program but does not tell which set of test scores differ from one another. Therefore, pair wise comparison of test score was computed.

**Table 4: Pair wise Comparisons of general anxiety of aerobic group**

| (I) | (J) | Mean | Std. Error | Sig.(a) | 95% Confidence Interval for |
|---|---|---|---|---|---|

| general anxiety | general anxiety | Difference (I-J) | | | Difference(a) | |
|---|---|---|---|---|---|---|
| | | | | | Lower Bound | Upper Bound |
| Pre | During | 4.382(*) | 1.245 | .004 | 1.243 | 7.522 |
| | Post | 14.176(*) | 1.333 | .000 | 10.815 | 17.538 |
| During | Pre | -4.382(*) | 1.245 | .004 | -7.522 | -1.243 |
| | Post | 9.794(*) | 1.287 | .000 | 6.549 | 13.039 |
| Post | Pre | -14.176(*) | 1.333 | .000 | -17.538 | -10.815 |
| | During | -9.794(*) | 1.287 | .000 | -13.039 | -6.549 |

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

*a Adjustment for multiple comparisons: Bonferroni.*

Table 4 compares the pair wise comparison which compares mean difference of general anxiety of each pair of test. Accordingly the mean difference of pre and during, pre and post was 4.382 (sig=0.004) and 14.176(sig=0.000). The pair wise mean difference comparison of During and post was 9.794 (sig=0.000). All the mean differences comparisons were significant with p value of less than 0.05. The results of the pair wise comparison of means show that the reductions in the general anxiety due to aerobic exercise intervention program has significantly reduced after 4 weeks of intervention and at the end of the training( 8 weeks).

On the basis of the sample data it may be concluded that the aerobic program significantly affects general anxiety of the subjects. The significant effect has been observed at 4 weeks and at the end of 8 weeks intervention program.

**Table 5: Descriptive Statistics of test anxiety of aerobic exercise group**

| Total anxiety score of aerobic group | Mean | Std. Deviation | N |
|---|---|---|---|
| Pretest | 44.0294 | 10.88364 | 34 |
| During test | 35.6471 | 12.19012 | 34 |
| Posttest | 22.2059 | 9.26963 | 34 |

According to Table 5, the mean and standard deviation of pre, during and posttests of the test anxiety score for the aerobic group are 44.0294 (10.88364), 35.6471 (12.19012) and 22.2059 (9.26963) respectively.

**Table 6: Mauchly's Test of Sphericity and Sphericity Assumption Tests of Within-Subjects Effects for the test anxiety data of aerobic exercise group**

| Within Subjects Effect | **Mauchly's Test of Sphericity** | | | Sphericity Assumed | |
|---|---|---|---|---|---|
| Test anxiety | Mauchly's W | Approx. Chi-Square | Sig. | F | Sig. |
| | .976 | .777 | .678 | 86.456 | .000 |

In table 6 it can be seen that Mauchly's Test of Sphericity of the data of test anxiety for aerobic group was not violated as shown in p value (sig=0.678). Therefore the Sphericity assumption was tested for further analysis as can be seen in Table 6 which Sphericity assumption of test anxiety was significant as shown in the p value (sig=0.000) which is less than 0.05. This indicates that there was a change somewhere in the three tests of pre, during and posts scores of test anxiety. It can be concluded that there is a statistically significant effect of aerobic

exercise program but does not tell which set of test scores differ from one another. Therefore, pair wise comparison of test score was computed.

**Table 7: Pair wise Comparisons of test anxiety of aerobic exercise group**

| (I) Aerobic effect | (J) Aerobic effect | Mean Difference (I-J) | Std. Error | Sig.(a) | 95% Confidence Interval for Difference(a) | |
|---|---|---|---|---|---|---|
| | | | | | Lower Bound | Upper Bound |
| Pre | During | 8.382(*) | 1.611 | .000 | 4.319 | 12.446 |
| | Post | 21.824(*) | 1.799 | .000 | 17.285 | 26.362 |
| During | Pre | -8.382(*) | 1.611 | .000 | -12.446 | -4.319 |
| | Post | 13.441(*) | 1.606 | .000 | 9.392 | 17.491 |
| Post | Pre | -21.824(*) | 1.799 | .000 | -26.362 | -17.285 |
| | During | -13.441(*) | 1.606 | .000 | -17.491 | -9.392 |

*Based on estimated marginal means*

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

*a Adjustment for multiple comparisons: Bonferroni.*

Table 7 compares the pair wise comparison which compares mean difference of test anxiety of each pair of test. Accordingly the mean difference of pre and during, pre and post was 8.382 (sig=0.000) and 21.824 (sig=0.000). The pair wise mean difference comparison of during and post was 13.441 (sig=0.000). All the mean differences comparisons were significant with p value of less than 0.05. The results of the pair comparison of means show that the significant reductions in the test anxiety due to aerobic exercise intervention program has significantly reduced after 4 weeks of intervention and at the end of the training( 8 weeks).

On the basis of the sample data it may be concluded that the aerobic program significantly affects test anxiety of the subjects. The significant effect has been observed at 4 weeks and at the end of 8 weeks intervention program.

**Table 8: Descriptive Statistics of general anxiety of static stretching exercise group**

| Total general anxiety score of static stretching group | Mean | Std. Deviation | N |
|---|---|---|---|
| pre test | 25.8235 | 8.40083 | 34 |
| During test | 23.5000 | 7.85185 | 34 |
| post test | 14.9706 | 5.60025 | 34 |

According to Table 8, the mean and standard deviation of pre, during and posttests of the general anxiety score for the static stretching group are 25.8235 (8.40083), 23.5000 (7.85185) and 14.9706 (5.60025) respectively.

**Table 9: Mauchly's Test of Sphericity and Sphericity Assumption Tests of Within-Subjects Effects for the general anxiety data of static stretching exercise group**

| Within Subjects Effect | **Mauchly's Test of Sphericity** | | | Sphericity Assumed | |
|---|---|---|---|---|---|
| General anxiety | Mauchly's W | Approx. Chi-Square | Sig. | F | Sig. |
| | .911 | 2.970 | .226 | 51.676 | .000 |

In table 9 it can be seen that Mauchly's Test of Sphericity of the data of general anxiety for static stretching exerciser group was not violated as shown in p value (sig=0.226). Therefore the Sphericity assumption was tested for further analysis as can be seen in Table 9 which sphericity assumption of general anxiety of static stretching exercise group was significant as shown in the p value (sig=0.000) which is less than 0.05. This indicates that there was a change somewhere in the three tests of pre, during and post scores of general anxiety as a result of static stretching exercise. It can be concluded that there is a statistically significant effect of static stretching exercise program but does not tell which set of test scores differ from one another. Therefore, pair wise comparison of test score was computed.

**Table 10: Pair wise Comparisons of general anxiety of static stretching exercise group**

| (I) Effect of Static stretching | (J) Effect of Static stretching | Mean Difference (I-J) | Std. Error | Sig.(a) | 95% Confidence Interval for Difference(a) | |
|---|---|---|---|---|---|---|
| | | | | | Lower Bound | Upper Bound |
| Pre | During | 2.324 | 1.037 | .096 | -.293 | 4.940 |
| | Post | 10.853(*) | 1.281 | .000 | 7.623 | 14.083 |
| During | Pre | -2.324 | 1.037 | .096 | -4.940 | .293 |
| | Post | 8.529(*) | 1.037 | .000 | 5.914 | 11.145 |
| Post | Pre | -10.853(*) | 1.281 | .000 | -14.083 | -7.623 |
| | During | -8.529(*) | 1.037 | .000 | -11.145 | -5.914 |

*Based on estimated marginal means*

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

*a Adjustment for multiple comparisons: Bonferroni.*

Table 10 compares the pair wise comparison which compares mean difference of general anxiety of each pair of test as a result of static stretching exercise. Accordingly the mean difference of pre and during, pre and post was 2.324 (sig=.096) and 10.853 (sig=0.000). The pair wise mean difference comparison of during and post was 8.529 (sig=0.000). The pre and post mean differences as well as during and post mean comparisons were significant with p value of less than 0.05. the results of the pair comparison of means show that the significant reductions in the general anxiety due to static stretching intervention program has not significantly reduced after 4 weeks of intervention however the reduction of general anxiety at the end of the training (8 weeks) was found significant.

On the basis of the sample data it may be concluded that the static stretching exercise program significantly affects general anxiety of the subjects. The significant effect has been observed only at the end of 8 week intervention program.

**Table 11: Descriptive Statistics of test anxiety of static stretching exercise group**

| Total test anxiety score of static stretching group | Mean | Std. Deviation | N |
|---|---|---|---|
| pre test | 39.9118 | 13.71875 | 34 |
| During test | 35.2647 | 11.82527 | 34 |
| post test | 27.5294 | 13.10386 | 34 |

According to Table 11, the mean and standard deviation of pre, during and posttests of the test anxiety score for the static stretching group are 39.9118 (13.71875), 35.2647 (11.82527) and 27.5294 (13.10386) respectively.

**Table 12: Mauchly's Test of Sphericity and Sphericity Assumption Tests of Within-Subjects Effects for the test anxiety data of static stretching exercise group**

| Within Subjects Effect | **Mauchly's Test of Sphericity** | | | Sphericity Assumed | |
|---|---|---|---|---|---|
| Test anxiety | Mauchly's W | Approx. Chi-Square | Sig. | F | Sig. |
| | .926 | 2.458 | .293 | 23.047 | .000 |

In table 12 it can be seen that Mauchly's Test of Sphericity of the test anxiety data for static stretching exerciser group was not violated as shown in p value (sig=0.293). Therefore the Sphericity assumption was tested for further analysis as can be seen in Table 12 which Sphericity assumption of test anxiety of static stretching exercise group was significant as shown in the p value (sig=0.000) which is less than 0.05. This indicates that there was a change somewhere in the three tests of pre, during and post scores of test anxiety as a result of static stretching exercise. It can be concluded that there is a statistically significant effect of static stretching exercise program on test anxiety but does not tell which set of test scores differ from one another. Therefore, pair wise comparison of test score was computed.

**Table 13: Pair wise Comparisons of test anxiety of static stretching exercise group**

| (I)static stretching effect | (J)static stretching effect | Mean Difference (I-J) | Std. Error | Sig.(a) | 95% Confidence Interval for Difference(a) | |
|---|---|---|---|---|---|---|
| | | | | | Lower Bound | Upper Bound |
| Pre | During | 4.647(*) | 1.824 | .047 | .046 | 9.248 |
| | Post | 12.382(*) | 2.056 | .000 | 7.197 | 17.568 |
| During | Pre | -4.647(*) | 1.824 | .047 | -9.248 | -.046 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | Post | 7.735(*) | 1.622 | .000 | 3.644 | 11.827 |
| Post | Pre | -12.382(*) | 2.056 | .000 | -17.568 | -7.197 |
| | During | -7.735(*) | 1.622 | .000 | -11.827 | -3.644 |

*Based on estimated marginal means*

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

*a Adjustment for multiple comparisons: Bonferroni.*

Table 13 compares the pair wise comparison which compares mean difference of test anxiety of each pair of test as a result of static stretching exercise. Accordingly the mean difference of pre and during, pre and post was 4.647 (sig=.047) and 12.382 (sig=0.000). The pair wise mean difference comparison of during and post was 7.735 (sig=0.000). The pre and post mean differences as well as during and post mean comparisons were significant with p value of less than 0.05. The results of the pair wise comparison of means show that the significant reductions in the test anxiety due to static stretching intervention program has significantly reduced after 4 weeks of intervention. The reduction of test anxiety at the end of the training (8 weeks) was also found significant. On the basis of the sample data it may be concluded that the static stretching program significantly affects test anxiety of the subjects.

**Table 14: t- tests on general anxiety between aerobic and static stretching exercise groups**

| | | | | | t-test for Equality of Means | | | |
|---|---|---|---|---|---|---|---|---|
| general anxiety | experimental group | N | Mean | S D | Mean difference | SE of mean difference | t value | p value |
| pre | Aerobic stretching | 34<br>34 | 29.5294<br>28.8235 | 6.75204<br>8.40083 | 0.70588 | 1.84840 | 2.005 | .069 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| During | Aerobic | 34 | 25.1471 | 8.56396 | 1.64706 | 1.99258 | .827 | .411 |
| | stretching | 34 | 23.5000 | 7.85185 | | | | |
| post | Aerobic | 34 | 17.4118 | 11.85293 | 2.44118 | 2.24823 | 1.086 | .283 |
| | stretching | 34 | 14.9706 | 5.60025 | | | | |

It can be seen from table 14 the values of mean and standard deviation of aerobic and static stretching exercise groups at pretest are 29.5294 (6.75204) and 28.8235 (8.40083), at during test 25.1471 (8.56396), 23.5000 (7.85185) and posttest 17.4118 (11.85293) and 14.9706 (5.60025). The mean difference of general anxiety at pretest between aerobic and static stretching exercise groups is 0.70588 with p value of 0.069 which indicates that there is no difference between the two groups in general anxiety before starting the training program. The mean difference of general anxiety between aerobic and static stretching exercise groups after four weeks the training program is 1.64706 with p value of 0.411 which indicates that there is no significant difference between the two groups though static stretching group show more reduction than aerobic exercise group. The mean difference of general anxiety between aerobic and static stretching exercise groups at the end of two months were 2.44118 with p value 0.283 which means that the difference is not significant though the reduction of general anxiety in the static stretching is better than the aerobic exercise group.

**Table 15: t- tests on test anxiety between aerobic and static stretching exercise groups**

| | | | | | t-test for Equality of Means | | | |
|---|---|---|---|---|---|---|---|---|
| test anxiety | experimental group | N | Mean | S D | Mean difference | SE of mean difference | t value | p value |
| pre | Aerobic | 34 | 44.0294 | 10.88364 | 4.11765 | 3.00322 | 1.371 | .175 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | stretching | 34 | 39.9118 | 13.71875 | | | | |
| During | Aerobic | 34 | 35.6471 | 12.19012 | .38235 | 2.91263 | .131 | .896 |
| | stretching | 34 | 35.2647 | 11.82527 | | | | |
| post | Aerobic | 34 | 22.2059 | 9.26963 | -5.32353 | 2.75274 | -1.934 | .058 |
| | stretching | 34 | 27.5294 | 13.10386 | | | | |

It can be seen from table 15 the values of mean and standard deviation of aerobic and static stretching exercise groups at pretest are 44.0294 (10.88364) and 39.9118 (13.71875), at during test 35.6471 (12.19012), 35.2647 (11.82527) and posttest 22.2059 (9.26963) and 27.5294 (13.10386). The mean difference of general anxiety at pretest between aerobic and static stretching exercise groups is 4.11765 with p value of 0.175 which indicates that there is no difference between the two groups in general anxiety before starting the training program. The mean difference of test anxiety between aerobic and static stretching exercise groups after four weeks the training program is 0.38235 with p value of 0.896 which indicates that there is no significant difference between the two groups. The mean difference of test anxiety between aerobic and static stretching exercise groups at the end of 8 weeks was -5.32353 with p value 0.058 which means that the difference is no significant though the reduction of test anxiety in the aerobic exercise group is better than the static stretching exercise group.

## 4.3. DISCUSSIONS

The present study was designed to examine the effect of aerobic exercise and static stretching on anxiety of Haramaya university first year sport science academy students.

### 4.2.1. Discussions on effects of aerobic exercise on anxiety

The present study was designed to examine the effect of aerobic exercise and static stretching on anxiety of Haramaya university first year sport science academy students. In

the present study aerobic exercise intervention program has significantly reduced General anxiety of Haramaya university first year sport science academy students. (Table 2) Therefore Hypothesis one ($H_1$) which state as aerobic exercise have positive effect on anxiety of Haramaya University first year sport science academy students is accepted. This result concide with studies conducted by Heidary et al., (2011). result finding aerobic exercises for two months where resulted reduced a significant amount of anxiety in experimental group. And also a Positive effect of aerobic training for 10 weeks on students` anxiety was observed (Arazi et al., 2012). Furthermore the finding of this study were consistent with studies conducted by Carruth and Taylor, 2009 thought the reduction was on state anxiety rather than general anxiety.

Another consistent result was also observed on a study by JJ Broman-Fulks et al.,(2004) comparing high-intensity aerobic and low-intensity with high-intensity exercise caused more rapid reductions in a global measure of anxiety sensitivity. Another study to examine whether regular exercise is associated with anxiety found exercisers were on average less anxious than non-exercisers (De Moor et al., 2006). Another study to assess the effects of physical exercise to eliminate the anxiety in university youth showed that participation physical exercise and physical activities decreased the anxiety level of both sexes (Akandere and Tekin 2008).

The current study also examined test anxiety changes as a result of aerobic exercise. The results show that the significant reductions in the test anxiety due to aerobic exercise intervention program has significantly reduced after 4 weeks of intervention and at the end of the training( 8 weeks). Consistent to the findings this study to determine whether test anxiety could be significantly reduced through regular practice of relaxation exercises or physical exercise a supervised aerobic dance class for 7 weeks declined test anxiety significantly (Topp 1989).

Contrary to the findings of the present, eight weeks of aerobic training had no effects on reducing anxiety symptoms in Durdle-aged women (Khoshnam et al.,2018). In another study to determine whether aerobic and mental exercise would effect on reducing stress in no change was observed (Lorah, 2016).

### 4.2.2. Discussions on effects of static stretching exercise on anxiety

The present study was designed to examine the effect of aerobic exercise and static stretching on anxiety of Haramaya university first year sport science academy students. In the present study significant reductions in the general anxiety due to static stretching intervention program has not significantly reduced after 4 weeks of intervention however the reduction of general anxiety at the end of the training (8 weeks) was found significant(Table 8). Therefore Hypothesis two ($H_2$) which states as static stretching exercise have positive effect on anxiety of Haramaya University first year sport science academy students is accepted. Consistent to the finding of the present study Ali (2010) found drastic decrease in the level of anxiety after twelve session's relaxation therapy.

Another study also found a medium-large effect in the treatment of anxiety due to relaxation training (Mauro et al.,2008). A study conducted by Javnbakht (2009) found that Participation in a two-month yoga class can lead to significant reduction in perceived levels of anxiety in women who suffer from anxiety disorders. In a study to determine whether the intensity of yoga practice in minutes and the duration of yoga experience in months would relate with the level of anxiety results suggest that the duration of yoga practice in months decreases the level of anxiety (Singh and Singh, 2016).

The current study also examined test anxiety changes as a result of static stretching exercise. The results show that the significant reductions in the test anxiety due to static stretching exercise intervention program has significantly reduced after 4 weeks of intervention and at the end of the training( 8 weeks). Consistent to the findings this study a brief yoga intervention on perceived feelings of test anxiety in fifth grade students engaging in a brief yoga intervention decreased test anxiety levels (Jessica, 2011). In a study to determine whether test anxiety could be significantly reduced through regular practice of relaxation exercises or physical exercise non meditative relaxation exercise of 7 weeks showed a significant decline in test anxiety (Topp, 1989). Another study to investigate the effects of muscle relaxation exercise to eliminate the test anxiety among nursing students showed that performing progressive muscle

relaxation method was effective in reducing test anxiety among nursing students (Zargarzadeh and Shirazi, 2014).

### 4.2.3 Discussions on effects of aerobic and static stretching exercises on anxiety

The present study was designed to examine the effect of aerobic exercise and static stretching on anxiety of Haramaya university first year sport science academy students.

The results of comparison of general anxiety and test anxiety between aerobic exercise and static stretching groups at the end of two months training was not significant though the reduction of general anxiety in the static stretching is better than the aerobic exercise group (Table 14). Therefore the hypothesis (H3) which states there is a difference on the effect of aerobic and static stretching exercises is rejected. The result of the present study opposes with study conducted on aerobic and aerobic with stretching exercises on fatigue and result showed there were significant differences between the exercise groups before and after the intervention Pazokian et al. (2013).

# 5. SUMMARY, CONCLUSION AND RECOMMENDATION

This chapter consists of summery, conclusions and recommendations of the research results. The study was intended to examine the effect of selected aerobic exercises and static stretching on anxiety of Haramaya University first year undergraduate sport science students**.** Therefore, to reach at the purpose of the study, the data gathering instrument was standardized questionnaire. The data which was gathered through the above mentioned gathering tools was tabulated analyzed and discussed in chapter four. Based on the analysis and discussion, the following summary, conclusions and recommendations were made.

## 5.1. SUMMARY

The main purpose of the current study was to examine the effect of selected aerobic exercises and static stretching on anxiety of Haramaya university first year sport science academy students. The specific objectives of this study were:

1. To examine the effect of selected aerobic exercise on anxiety of Haramaya University first year sport science academy students.

2. To examine the effect of selected static stretching exercises on anxiety of Haramaya University first year sport science academy students.

3. To compare the effect of aerobic and static stretching exercises on anxiety of Haramaya University first year sport science academy students.

The research was conducted in Haramaya University main campus. The study used an experimental design with two groups; aerobic and static stretching exercise groups. Pre, During and post tests were used to compare between groups and within group changes as a result of treatments. Participants were assigned randomly into experimental groups. Both experimental groups exercise three times a week for two months (8 weeks) with 50-60 minutes duration after informed consent was signed. Sample size was determined by Yemane formula. A simple random sampling method was used to recruit participants.

Totally 68 subjects selected from 100 Haramaya University first year sport science academy students. The data was collected from these subjects by using standardized questionnaire from aerobic and static stretching exercises groups. Standardized general and test anxiety questionnaire was employed for this study at pre, during and post tests for both groups. To analyze the demographic characteristics of the respondents' mean, standard deviation and percentage was used. independent two sample t-test were employed to Compare the effect of anxiety level of participants between aerobic exercise and static stretching groups at pre, during and post tests for the subjects of Haramaya University first year sport science academy students.

Repeated measures one way ANOVA was employed to assess within group change of anxiety as a result of aerobic exercises as well as static stretching on Haramaya University first year sport science academy students. Data were analyzed by (SPSS) software, version 20 program. The level of significance was set at α 5 %. The following major findings were obtained.

- General and Test anxiety has significantly reduced after 4 and 8 weeks of aerobic exercise intervention program.

- General anxiety has not significantly reduced after 4 weeks of static stretching exercise program where as test anxiety has significantly reduced. General and test anxiety has significantly reduced after 8 weeks of static stretching intervention program.

- The comparison of reduction of general anxiety between aerobic exercise and static stretching groups after 4 and 8 weeks of training program was insignificant though static stretching group showed more reduction.

- The comparison of reduction of test anxiety between aerobic exercise and static stretching groups after 4weeks was insignificant. The comparison of reduction of test anxiety after 8 weeks of aerobic and static stretching exercise was not significant but the reduction in aerobic exercise group was better than static stretching exercise group.

## 5.2. CONCLUSIONS

Aerobic exercise intervention program has significantly reduced general anxiety of Haramaya University first year sport science academy students after 4 weeks of intervention and at the end of the training (8 weeks). On the basis of this finding it may be concluded that the aerobic program significantly affects positively general anxiety of the subjects after 4 weeks as well as 8 weeks.

Aerobic exercise intervention program has significantly reduced test anxiety of Haramaya University first year sport science academy students after 4 weeks of intervention and at the end of the training (8 weeks). On the basis of this finding it may be concluded that the aerobic program significantly affects positively test anxiety of the subjects at 4 weeks and at 8 weeks.

Static stretching exercise program has not significantly reduced general anxiety after 4 weeks however the reduction of general anxiety at 8 weeks was found significant. On the basis of this finding it may be concluded that the static stretching exercise program significantly affects general anxiety of the subjects after 8 weeks.

Static stretching intervention program has significantly reduced test anxiety after 4 weeks of intervention and at the end of the training (8 weeks). On the basis of this finding it may be concluded that the static stretching program significantly affects positively test anxiety of the subjects at 4 weeks and at the end of 8 weeks intervention program.

The comparison of reduction of general anxiety between aerobic exercise and static stretching groups after 4 and 8 weeks of training program was insignificant though static stretching group showed more reduction. On the basis of this finding it may be concluded that the reduction of general anxiety was similar in both aerobic and static stretching exercise

The comparison of reduction of test anxiety between aerobic exercise and static stretching groups after 4weeks was insignificant. The comparison of reduction of test anxiety after 8 weeks of aerobic and static stretching exercise was not significant but the reduction in aerobic exercise group was better than static stretching exercise group. On the basis of this finding it may be concluded that the reduction of test anxiety was similar in both aerobic and static stretching exercise.

## 5.3. RECOMMENDATIONS

Based on the finding of this study as well as the summery, and conclusion the following recommendations were forwarded

- Psychiatrist and sport science professional who are involved in advising Haramaya University students particularly first year should consider about creating exercises situation encompassing aerobic exercises as well as static stretching exercises in cooperation with sport science professional

- First year Students who are feeling anxious because of exam may reschedule their time table and give enough time to get involved in exercise especially aerobic and static stretching exercises

- University curriculum should include the needed information and guidelines for aerobic exercise and static stretching for students of all faculties and departments to minimize the level of anxiety

- University students should prepare training which create awareness about the importance of aerobic exercise and static stretching for anxiety reduction

- Physical exercises which were not employed in this study might be conducted.

- As effects of selected aerobic and static stretching exercises on anxiety of students who suffered with symptom of anxiety should considered the positive effect of aerobic and static stretching exercises for minimizing levels of anxiety
- Future researchers may follow the methodology more sophisticated while using more subjects of current study in order to reduce anxiety level by doing different types of exercise for longer training period.

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# 7. APPENDICES

## Appendix -A

**Participants Information Sheet and Informed written consent form**

Study title: Effects of selected aerobic exercise and static stretching on anxiety of HU sport science academy students.

Investigator´s Name: Hagos Tsegay W/giorgis

**Purpose and procedures:**

The purpose of this study is to assess the effect of selected aerobic exercises and static stretching on anxiety of Haramaya University first year sport science students. The finding of this study can be important for students to participate in physical exercise. You will be involved in exercise for 50-60 minutes per session, three days per week for two months. You will be take care all the current standard of your health when you are participating in exercise.

**Risks and Benefit**

The risks of this research study are small. In fact muscle sprain, strain and other injury may be occur if you are not followed proper warming up, gradual progression and safe procedures. There are benefits for participating in this study such as you will be minimized anxiety.

**Confidentiality**

Information of your participation in this study will be kept confidential. Records per training to this study will be recorded secretly in numbers and put in a secured storage area. Results will be reported in such a way that you cannot be identified. The finding of this study will be general for the study subjects and will not reflect any thing particular individuals.

**Rights**

If you agree to engage in this study your participation should be voluntary. You have the right to stop participating at any time. If you decide not to take part, or if you stop participating at any time, your decision will not result in any penalty or loss of benefits which you otherwise are entitled.

**Contact Address**

If you have any questions at any time about this research study, please contact:

Hagos Tsegay _____( 0920460886 )

E-mail; hagostsegay1221@gmail.com

Shemelis Mekonnen (PhD) 0913893850

Wegene Waltanigus (PhD) 0923670360

If you have any questions on your rights as a research subject, you can call the Institutional Research Ethics Review Committee (IRERC) at (+251) 256-66-18-99 or P.O.BOX 235, Harar, for information

## Appendix -B

**Health History and Physical Readiness Question of the Participants**

This questionnaire was applied to obtain information on the health status and physical readiness of the subjects participating for the research study entitled" Effect of selected aerobic exercise and static stretching on anxiety of HU first year sport science academy students.

The information was kept strictly confidential.

Personal information

Sex_____ Age_____

Height_____ m weight_____ kg

Phone_____

**For participants:** please read the following question carefully and indicate your correct response for each question by encircling on the choice letter given below.

1. Has your doctor ever said that you have a heart condition and that you should only do physical activity recommended by a doctor?

A. Yes B. No

2. Do you feel pain in your chest when you do physical activity?

A. Yes B. No

3. In the past month, have you had chest pain when you were not doing physical activity?

A. Yes B. No

4. Do you lose your balance because of dizziness or do you ever lose consciousness?

A. Yes B. No

5. Do you have a bone or joint problem that could be made worse by a change in your physical activity?

A. Yes B. No

6. Is your doctor currently prescribing drugs for your blood pressure or heart condition?

A. Yes B. No

7. Do you know of any other reason why you should not do physical activity?

A. Yes B. No

8. Has a medical doctor ever diagnosed you with a chronic disease, such as coronary heart disease, coronary artery disease, hypertension ( high blood pressure), high cholesterol or diabetes? (If yes, please explain.)

Client's full name---------- Participants' Name ----------

Client's signature---------- Participants' signature----------

# Appendix -C

**General Anxiety (GAD) and Test Anxiety assessment questionnaire**

The General Anxiety GAD and test anxiety questionnaire measures the general anxiety as well as test anxiety experienced by the students. Score is calculated by assigning scores of 1, 2, 3, 4 and 5 to the response categories of Not at All, Little Bit, Somewhat, Quite a Bit and Very Much. Adding together the scores for the first eight questions provides the general anxiety whereas adding together the scores of the rest 12 questions provide the test anxiety. Please read the following questions carefully and indicate your correct response for each question Complete by ticking.

**Not at All = 1**

**Little Bit =2**

**Somewhat=3**

**Quite a Bit= 4**

**Very Much = 5**

**List of Tables in the Appendix 1: General Anxiety (GAD) and Test Anxiety assessment questionnaire**

| No | Questions | Not at all | Little Bit | Somewhat | Quite a Bit | Very Much |
|---|---|---|---|---|---|---|
| 1 | Feeling nervous, anxious or on edge | | | | | |
| 2 | Not being able to stop or control worrying | | | | | |
| 3 | Worrying too much about different things | | | | | |
| 4 | Trouble relaxing | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 5 | Being so restless that it is hard to sit still | | | | | |
| 6 | Becoming easily annoyed or irritable | | | | | |
| 7 | Feeling afraid, as if something awful might happen | | | | | |
| 8 | I have feelings of anxiousness. | | | | | |
| 9 | I think about whether I'm going to pass or fail. | | | | | |
| 10 | I keep wishing the exam were over. | | | | | |
| 11 | I worry that I am not doing well. | | | | | |
| 12 | I can't stop thinking about how nervous I feel. | | | | | |
| 13 | My stomach gets upset. | | | | | |
| 14 | My heart beats very fast. | | | | | |
| 15 | I often freeze up, and my mind goes blank. | | | | | |
| 16 | I feel hot and sweaty. | | | | | |
| 17 | I feel very tense. | | | | | |
| 18 | I forget information that I really know. | | | | | |
| 19 | I often get panicky. | | | | | |
| 20 | I tend to breathe faster. | | | | | |

Subject's full Name: _____ Date:_____

Subject's Signature: _____

Trainer's Name:_____ Date: _____

Trainer's Signature:_____

**Source**

- Spitzer et al. (2006)
- www.ecu.edu/csacad/aa/PirateAcademicSuccessCenter/

# Appendix - D

## Description of the Study Subjects

The creation of daily opportunities for participation in regular practical classes is not always feasible especially in HU i.e. unless they have practical class they do not involve in regular exercise mainly in aerobic exercises and static stretching for the purpose of minimizing the level of anxiety. The students of sport science academy need aerobic exercises as they are involved in various vigorous practical activities during their practical class. As a result the research was done at HU first years sport science academy students.

The sample size was taken from total population for this study were calculated by Yamane's 1967 formula ($n=N/ (1+N(e^2)$. Thus, one hundred (100) HU first years sport science academy students were filled the health status questionnaire while selecting randomly and sixty eight (68) first years sport science academy students of HU were from the study because of health related factors. So; finally sixty eight (68) subjects were participated on this study. Random sampling technique was used to minimize complain and error by giving equal chance for the total population.

**Gender and Age of subjects:** the researcher was selecting both sexes from HU first year undergraduate sport science students and ages from 18 to 24 years old.

**Two Months of Training Schedule; -** According to Jakl (2008) 8 to 12 weeks of training program is essential to minimize individual's anxiety levels. Based on this idea the investigator prepared eight (8) weeks training program. This, the subjects underwent two months (8 weeks) per year that is December 2017 and January 2018. G1 and G2 had different exercises. G1 was included:-

- **Warming up: -** slow walking and jogging exercises

- **Main work out: -**
    - Aerobics dance
    - Jumping rope
    - **Floor exercise:** flutter kicks exe, leg liftes, reverse crunch, butt bridge, single leg bridge, knee push up and up down plank
- **Cool down: -** Relaxation and stretching exercises

**And G2 was included:-**

- **Warming up: -** slow walking and jogging exercises
- **Main work out:-**
    - **Hand stretching:** fore arm stretching, overhead triceps stretching, the rest flexor stretching, wrist extensor stretch, tennis elbow stretch
    - **Lower back stretching:** cat or cow stretch, knee to chest stretch, kneeling hip flexor stretch, poodle tail, extended puppy pose, prone leg lifts stretching
    - **Hip flexor side to side stretching exercise**
    - **Quadriceps stretching exe;-** standing quadriceps stretch, quadriceps stretch side Lying, kneeling quadriceps stretch
- **Cool down:** relaxation and stretching exercises

**Training Days per Week; -** According to Nelson et al, (2007) 3-5 days per week and 30 to 60 minutes is needed for minimizing the levels of anxiety through aerobic exercise. So, the investigator took a minimum of 3 days (50-60 minutes per day, for first month 50 minutes from low to moderate intensity and second month 60 minutes from moderate to high intensity) was included for each group. So, group one (**G1**) that is Tuesday and Thursday afternoon 4: 00pm-5:00pm, and Saturday morning 6:00am – 7:00am and group two (**G2**) Monday morning 6:00am – 7:00am, Wednesday and Friday afternoon 4:00pm – 5:00pm, since they are student the schedule were prepared by considering their convenient time for them.

The researcher was taken Pre, During and posttest to know the change that occurred due to the 8 weeks aerobic and static stretching exercises during test also taken to know the progress training and the dependent variable for this study was anxiety, independent variables is also aerobic and static stretching exercises.

## Appendix - E

**Description of Training for two Months**

The main goal of this study training plan schedule was to minimize anxiety of HU first year sport science academy students through 8 weeks aerobic and static stretching exercise interventions. The schedule was prepared with time frame, intensity and frequency of exercises.

The following table includes different types of aerobic exercise were performed by the subjects within 8 weeks in order to minimize the level of anxiety of HU first year sport science academy students. The exercises involve in this study were included (for G1 warming up exercises, aerobic dance, jumping rope, floor exercises and finally cooling down exercises and (G2 warming up, hand stretching, lower back stretching, hip flexor side to side stretching, quadriceps stretching and cool down exercises which helps to minimize the level of anxiety of first year undergraduate sport science students of HU. The FITT (Frequency, Intensity, Time and Type of exercise) principles of training were included.

In this study the researcher was used low intensity to adapt the exercise to moderate intensity and high for increasing load in the consecutive two moths

The intensity of training was measure;

- Heart rate – Heart rate can be an indicator of the challenge to the cardiovascular system that the exercise represents.

- $Vo_2$ max - the amount of oxygen consumed by the body during exercise

Exercise is categorized in to three different intensity levels. These levels include **Low (40 - 50%MHR), Moderate (50 – 65% MHR), and Vigorous (65 - 85% MHR)**.

## Appendix- F:

**List of Tables in the Appendix 2: First Month Aerobic Training Schedule (December, 2017)**

| **Days Per week** | **Types of exercise** | **Time / 50 mints** | **Rept / rest** | **Intensity** |
|---|---|---|---|---|
| **Tuesday 4:00-5:00 pm** | 1. **Warming up:** Slow walking and jogging exercise | 10minutes | | **Low to moder** |
| | 2. **Main work out:** Aerobics dance | 10minutes | 2Xrep/ 1min rest | |
| | Jumping rope | 3minutes | | |
| | **Floor exercise:** Flutter kicks exe, leg liftes, reverse crunch, butt bridge, single leg bridge, knee push up and up down | 10minute | | |

| | | | | |
|---|---|---|---|---|
| 4:00pm-5:00 pm | plank | s | | **a t e** L o w t o m o d e r a t e |
| | 3. **Cool down-** Relaxation and Stretching exercise | 5minutes | | |
| **T h u r s d a y 4:0 0-5 :00 p m** 4:00pm-5:00 pm | 1. **Warming up:** Slow walking and jogging exercise | 10minutes | | L o w t o m o d e r a t e |
| | 2.**Main work out:** Aerobics dance | 10minutes | 2Xrep/ 1minut rest | |
| | Jumping rope | 3minutes | | |
| | **Floor exe:** Flutter kicks exe, leg liftes, reverse crunch, butt bridge, single leg bridge, knee push up and up down plank | 10minutes | | |
| | 3. **Cool down:** Relaxation and stretching exercise | 5minutes | | |
| **Sat urd ay 6:0 0-7 :00 am** 6:00 am-7:00 am | 1. **Warming up:** Slow walking and jogging exercise | 10minutes | | |
| | 2. **Main work out:** Aerobics dance | 10minutes | 2Xrep/ 1min rest | |
| | Jumping rope | 3minutes | | |
| | **Floor exe:** Flutter kicks exe, leg liftes, reverse crunch, butt bridge, single leg bridge, knee push up and up down plank | 10minutes | | |
| | 3. **Cool down:** Relaxation and Stretching exercise | 5minutes | | |

**List of Tables in the Appendix 3: Second Month Aerobic Training Schedule (January, 2018)**

| Days per week | Types of exercises | Time/ 60minutes | Rept/ rest<br><br>50 mi<br><br>TiTimme /50 minutes<br><br>Rept/ Rest | Intensity |
|---|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| **Tuesday 4:00--5:00Pm** | 1. **Warming up:** Slow walking and jogging exercise | 10minutes | | **Moderate to high** |
| | 2**. Main work out:** Aerobics dance | 12mintes | 2Xrept/1min | |
| | Jumping rope | 3mintes | | |
| 4:00pm-5:00pm | **Floor exe:** Flutter kicks, leg liftes, reverse crunch, butt bridge,<br>single leg bridge, knee push up and up down plank exercise | 16mintes | | |
| | 3. **Cool down:** Relaxation and Stretching exercise | 5mintes | | |
| **Thursday 4:00-5:00Pm** | 1. **Warming up:** Slow walking and jogging exercise | 10mintes | | |
| | 2. **Main work out:** Aerobics dance | 12mintes | 2Xrept/1min | |
| | Jumping rope | 3mintes | | |
| | **Floor exe:** Flutter kicks exe, leg liftes, reverse crunch, butt bridge, single leg bridge, knee push up and ,up down plank | 16mintes | | Moderate to h |
| 4:00pm-5:00pm | 3. **Cool down-**Relaxation and stretching exercise | 5mintes | | |
| **Saturday 6:00-7:** | 1. **Warming up:** Slow walking and jogging exercise | 10mintes | | |
| | 2. **Main work out:** Aerobics dance | 12mintes | 2Xrep/1min | |

| | | | |
|---|---|---|---|
| **00 Am**<br><br>6:00 am-<br>7:00 am | Jumping rope | 3mintes | |
| | **Floor exe;-** Flutter kicks, leg liftes, reverse crunch, butt bridge,<br>single leg bridge, knee push up and up down plank exercise | 16minte | |
| | 3. **Cool down;-** Relaxation and stretching exercise | 5mintes | |

**List of Tables in the Appendix 4: First Month Ss Training Schedule (December, 2017)**

| **Days per Week** | **Types of exercise** | **Time /50 minutes** | **Rept /Rest** | **Intensity** |
|---|---|---|---|---|
| **Monday** | **1. Warming up:** Walking and slow jogging exercise | 10minutes | | **Low** |
| | **2. Main work out**<br>**Hand stretching:** Fore arm stretching, overhead triceps stretching, the rest | 6minutes | | |

| | | | | |
|---|---|---|---|---|
| **(6:00-7:00am)** | flexor stretching, wrist extensor stretch, tennis elbow stretch | | | **oModerate** |
| | **Lower back stretching:** Cat or cow stretch, knee to chest stretch, kneeling hip flexor stretch, poodle tail, extended puppy pose, prone leg lifts stretching | 8minutes | 2Xrep/1min rest | |
| | **Hip flexor side to side stretching** | 3minutes | | |
| | **Quadriceps stretching exe;-** Standing quadriceps stretch, quadriceps stretch side Lying, kneeling quadriceps stretch | 8minutes | | |
| | **3. Cool down:** Relaxation and stretching exercise | 5minutes | | |
| **Wednesday (4:00-5:00pm)** | **1. Warming up:** Walking and slow jogging exercise | 10minutes | | Low to moderate Moderate |
| | **2. Main work out**<br>**Hand stretching:** Fore arm stretching, overhead triceps stretching, the rest flexor stretching, wrist extensor stretch, tennis elbow stretch | 5minutes | | |
| | **Lower back stretching:** Cat or cow stretch, knee to chest stretch, kneeling hip flexor stretch, poodle tail, extended puppy pose, prone leg lifts stretching | 8minutes | 2Xrep/1min rest | |
| | **Hip flexor side to side stretching** | 4minutes | | |
| | **Quadriceps stretching exe;-** Standing quadriceps stretch, quadriceps stretch side Lying, kneeling quadriceps stretch | 8minutes | | |
| | **3. Cool down:** Relaxation and stretching exercise | 5minutes | | |
| **Friday (4:00-5;00 pm)** | **1. Warming up:** Walking and slow jogging exercise | 10minutes | | |
| | **2. Main work out**<br>**Hand stretching:** Fore arm stretching, overhead triceps stretching, the rest flexor stretching, wrist extensor stretch, tennis elbow stretch | 6minuts | | |
| | **Lower back stretching;-** Cat or cow stretch, knee to chest stretch, kneeling hip flexor stretch, poodle tail, extended puppy pose, prone leg lifts | 8minutes | 2Xrep/1min rest | |
| | **Hip flexor side to side stretching** | 3minutes | | |
| | **Quadriceps stretching exe;-** Standing quadriceps stretch, quadriceps stretch side Lying, kneeling quadriceps stretch | 8minutes | | |
| | **3. Cool down;-** Relaxation and stretching exercise | 5minutes | | |

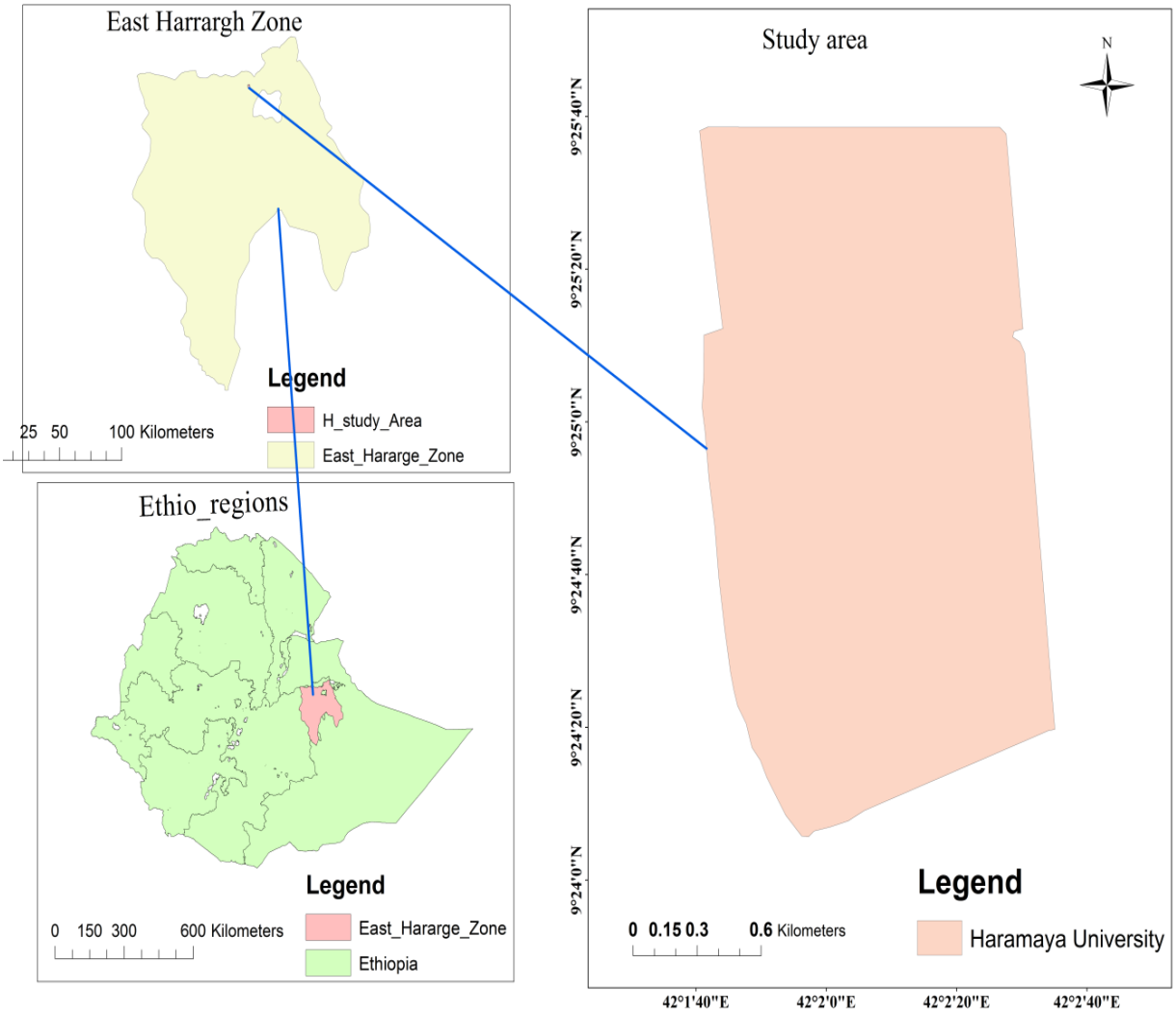
**List of Tables in the Appendix 5: Second Month Ss Training Schedule (January, 2018)**

| Days Per week | Types of exercise | Time / 60minutes | Rept /Rest | Intensity |
|---|---|---|---|---|
| Monday (6:00-7:00 am)<br><br>6:00 am--7:00 am | **1. Warming up;-** Walking, slow jogging exercise | 10min | | Moderate to high |
| | **2. Main work out**<br>**Hand stretching;-** Fore arm stretching, overhead triceps stretching, the rest flexor stretching, wrist extensor stretch, tennis elbow stretch | 8minutes | | |
| | **Lower back stretching:** Cat or cow stretch, knee to chest stretch, Kneeling hip flexor stretch, poodle tail, extended puppy pose, prone leg lifts stretching | 9minutes | 2Xrep/ 1 min rest | |
| | **Hip flexor side to side stretching** | 6mints | | |
| | **Quadriceps stretching exe;-** Standing quadriceps stretch, quadriceps stretch side Lying, kneeling quadriceps stretch | 10minutes | | |
| | **3. Cool down:** Relaxation and stretching exercise | 5minutes | | |
| Wednesday (4:00-5:00 pm) | **1. Warming up:** Walking and slow jogging exercise | 10minutes | | Moderate to high |
| | **2. Main work out**<br>**Hand stretching:** Fore arm stretching, overhead triceps stretching, the rest flexor stretching, wrist extensor stretch, tennis elbow stretch | 8minutes | | |
| | **Lower back stretching:** Cat or cow stretch, knee to chest stretch, Kneeling hip flexor stretch, poodle tail, extended puppy pose, prone leg lifts stretching | 10minutes | 2rep/ 1 min rest | |
| | **Hip flexor side to side stretching** | 6minutes | | |
| | **Quadriceps stretching exe;-** Standing quadriceps stretch, quadriceps stretch side Lying, kneeling quadriceps stretch | 9minutes | | |
| | **3. Cool down;-** Relaxation and stretching exercise | 5minutes | | |
| Friday (4:00- | **1. Warming up;-** Walking and slow jogging exercise | 10minutes | | |
| | **2. Main work out**<br>**Hand stretching;-** Fore arm stretching, overhead triceps stretching, the rest flexor stretching, wrist extensor stretch, tennis elbow stretch | 9minutes | | |
| | **Lower back stretching:** Cat or cow stretch, knee to chest stretch, | 10minute | 2rep/ | |

| | | | |
|---|---|---|---|
| **5:00 pm)** | Kneeling hip flexor stretch, poodle tail, extended puppy pose, prone leg lifts stretching | s | 1 min rest |
| | **Hip flexor side to side stretching** | 4minutes | |
| 4:00 pm-5:00 pm | **Quadriceps stretching exe;-** Standing quadriceps stretch, quadriceps stretch side Lying, kneeling quadriceps stretch | 10minutes | |
| | **3. Cool down;-** Relaxation exe and stretching exercise | 5minutes | |

# Appendix -G

**Map of the Study Site (Haramaya University)**




**Source**: Geographical Information System Software Version 10.