EFFECTS OF CHEWING KHAT ON CARDIO RESPIRATORY FITNESS RECOVERY TIME OF MALE FOOTBALL PROJECT TEAM PLAYERS IN CASE OF GUNCHIRIE TOWN, GURAGHE ZONE, SOUTH NATIONS, NATIONALITIES AND PEOPLES REGIONAL STATE,ETHIOPIA

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Effects of chewing khat on cardio respiratory fitness recovery time of male football project team players in case of Gunchirie town, Guraghe zone, South Nations, Nationalities and peoples Regional state, Ethiopia

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We hereby certify that we have read and evaluated this thesis titled, **Effects of chewing khat on cardio respiratory fitness recovery time of male football team players in case of Gunchirie town, in Guraghe zone, South Nations Nationalities and peoples Regional state**

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As members of the board of examiners of the MEd thesis open defense examination, we certify that we have read and evaluated the thesis prepared by Anteneh Alemu Wudineh and examined the candidate. We recommend that the thesis be accepted as fulfilling the thesis requirement for the degree of **Master of Education in physical education**.

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DEDICATION

I dedicate this thesis manuscript to my mother Yezebnesh Teshale and my sister Emebet Alemu, who passed away in recent years.

STATEMENT OF THE AUTHOR

I undersigned, hereby declare that this thesis is my original work and all sources of materials used for this have been duly acknowledged. This thesis has been submitted in partial fulfillment of requirements for an advanced MEd degree in Physical Education at Haramaya University and is deposited at the university library to be made available to borrowers under rules of the library. I solemnly declare that this thesis is not submitted to any other institution anywhere to the award of any academic degree, diploma or certificate.

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BIOGRAPHICAL SKETCH

The researcher was born on January 24th 1990 GC at Dembecha at Yesheboch kebele. He attended elementary school from 1up to 8 in Arbegnoch Elementary School and from 9-12 at Dembecha Preparatory and Secondary School. He then joined Bahir Dar University in November, 2010 and graduated with BSc degree in Sport Science in August, 3, 2012GC. After his graduation, he joined Mike Preparatory and Secondary School in Guraghe Zone in South Nations, Nationalities and Peoples Regional State in March 2013. In July 2015 he joined Haramaya University to pursue his MEd program in Physical Education.

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ACRONYMS ANDABBREVIATIONS

Bpm	beats per minute
CG	control group
EG	Experimental group
μ CG	Mean of control group
μ EG	Mean of experimental group
ETB	Ethiopian birr
HA	Alternative hypothesis
HO	Null hypothesis
IRERC	Institutional Research Ethics Review Committee
MoE	Minster of Education
POT	post training test
PRT	pre training test
SNNPR	South Nations Nationalities and Peoples Regional State
US	United States
Vo2max	maximum oxygen consumption
WHO	World Health Organization
WHOEC	World Health Organization Expert Committee
YMCA	Young Men Christian Association

TABLE OF CONTENTS

LIST OF TABLES

LIST OF TABLES IN THE APPENDICES

LIST OF FIGURES IN THE APPENDICES

Effects of chewing khat on cardio respiratory fitness recovery time of male football project team players in case of Gunchirie town,Guraghe zone, South Nations, Nationalities and peoples Regional state

ABSTRACT

The main *purpose of this study was to investigate the effects of chewing khat on cardio respiratory fitness recovery time of Gunchire project football players. A field study (experimental) method was employed in this study. The total sample of the study was 24 active Sport participants in football sport. Since the researcher had closed relation with the team and players, he tried to identify their life style and leisure time activity. At this time 11 of them was chewing khat three days per week if there was no training session at least for two hours and 13 of them were not. Based on this he categorized khat chewers as experimental group and the rest as control group. Most of the study participants were reached by field testing (experiment) which they were expected to rates their efforts on factors that affect the cardio respiratory fitness of football players due to Chewing Khat. Quantitative data were collected, through cardio respiratory fitness tests. Thus the data were tabulated and expressed using paired samples t-test. Finally, the study come up with the major findings: during three minutes step test the average pulse rate of experimental group before 3minutes step test was 73.36bpm and after the test 80.62bpm. The average pulse rate of control group before the test was 72.2bpm and after the test 77.62bpm. This implies that the average pulse rate of experimental group before 3minutes step test was 1.16bpm greater than control group. The average pulse rate of experimental group after the test was 2.37bpm greater than control group. This difference of pulse rate was comes from the effect of chewing khat on cardio respiratory fitness of football players. Again during the second test that was 1.5mile (2.4km) running test the experimental groups finished the given distance 34 seconds slower than the control groups before any training. Again after their training the experimental group finished 2.4 km distance 35 seconds slower than control group. This implies that chewing khat has effects on cardio respiratory fitness of football players. This paper will help by creating awareness about the effects of khat on cardio respiratory fitness on football players.*

Key words: khat, pulse rate, cardio respiratory fitness, players.

1 INTRODUCTION

In this section the researcher discussed about the background of the study, statement of the problem, scope of the study, significance of the study, objective of the study.

1.1Background of the study

Now a day many people addicted by different types of habits such as; alcohol, khat, cigarette etc that may harm the health and wellbeing of individuals.

According to Nasir(2011), drug abuse occurs in all sports and at most levels of competition. Athletic life may lead to drug abuse for a number of reasons; including for performance enhancement, to self treat otherwise untreated mental illness, and retirement from sport. Drug abuse in athletes' population may involve doping in an effort to gain a competitive advantage. Alternatively, it may involve use of substances such as alcohol and khat without the intent of performance enhancement, since athletes may develop substance use disorders just as any non athlete may.

Athletes may turn to substances to cope with numerous stressors, including pressure to perform, to minimize injuries, physical pain, and retirement from a life of sport(which happens much earlier than retirement from most other careers);additionally, athletes may be significantly less likely to receive treatment for underlying mental illness such as depression. Athletes receive comprehensive treatment and rehabilitation for physical injuries, but this may be less often the case for mental illness, because their sometimes viewing mental illness as a sign of weakness. Untreated mental illness is often associated with substance use, perhaps in an effort to self treat. Alternatively, substance abuse may cause mental illness. Al Motarreb (2012).

According to US Department of Health and Human Services monitoring the future National survey on drug use (2003), when a person uses drugs, many changes occur in his/her body, both physically and psychologically. Some of these changes occur immediately, while others only happen over time. Every side effect of drug use has the potential to being sever, but the physical effects can be especially dangerous. A person should therefore try to avoid combining drug use with any type of physical activity.

Physical exercise makes the body's system work faster and harder and drugs also interact with the body physically in several ways. Some side effects of drug use are; change in appetite, confusion, dilated pupils, distortions in perception, dizziness, dry mouth, flushing of skin, impaired coordination and balance, increased energy and alertness, increased heart rate, blood pressure, body temperature, nausea, kidney damage, liver disease, cancer. http//www.foundations recovery network.

Khat(Catha edulis) is a large green shrub that grows naturally at elevations of 1200-2500m.In the region extending from eastern to South Africa, as well as Arabian Peninsula. Khat leaves are crimson-brown and chewing of khat leaves is widely practiced in East Africa and parts of the Middle East, such as Yemen, (Abdu 2013).

In Ethiopia khat is used for direct consumption, local sale and for export. The habit of khat chewing is believed to affect a large segment of the Ethiopian population, especially the productive age group that means it has negative impact on health, fitness, productivity of the people. In different parts of our country khat is producing largely and most people consume it. Even though most consumers have awareness about the side effects of chewing chat, most of them can't stop it and they gravitated to other drug abuse,(Bizuayehu and Muluken 2014).

From the researcher's life experience some athletes, coaches, physical education teachers and sport families consume khat and during practical session some football players that take khat show the difficulty of completing the tasks, they feel tiredness, difficulty of breathing, sweating and show the physical signs of fatigue. Due to this the researcher had tried to assess the effects of khat on athletes' cardio respiratory fitness recovery time of Gunchire football project.

1.2. Statement of the problem

Even though, different scholars, researchers, physicians agreed that chewing khat has impact on individual's physical, mental, social, health and wellbeing, but a lots of people now a day addicted to this drug. (Fekede 1994).

Enemor and Ener woreda is the largest woreda that is found in Guraghe Zone; khat, coffee, enset, wheat, maize, fruits and vegetables are the major items used for consumption and source of income. Khat is largely produced and the majority of the society especially males chewing it daily. Most of their children adapt chewing khat from their family. In this woreda there is a football project called Gunchirie football project that have 24 players and a coach. The researcher observes those players during training and competition. Again the researcher assesses the players' leisure time activity. After assessing the leisure time activity of players approximately half of them chewing khat and others do not that means from 24 players 11 of them take khat three days per week if there was no training session at least for 2 hours per day. Then players that chew khat feel tiredness, difficulty of breathing, and other physical signs of fatigue before they complete the tasks during competition and training whereas their teammates that do not take khat perform their activities and trainings with a little stress. Due to the above point of view the researcher hypothesized that this fatigue may comes from the effects of khat chewing on cardio respiratory fitness of athletes in Gunchirie male football players.

Based on the above perception the researcher assessed the following hypothesis:

1. Chewing khat has an effect on cardio respiratory fitness of Gunchire male football project players. (HA)
2. Chewing khat and cardio respiratory fitness have no relationship. (HO)
3. Chewing khat has an effect on Gunchire male football players' recovery time. (HA)
4. Chewing khat has no an effect on Gunchire male football players' recovery time. (HO)

1.3. Scope of the study

In different regions of Ethiopia a lots of people consume khat regularly. Again many athletes take khat. Conducting this study in all athletes that consume khat including players that participate in any sport is difficult because; it needs large amount of money, time, energy, man power, equipment etc. Because of these reasons the researcher tried to assess the effects of chewing khat on cardio respiratory fitness of athletes in Gunchirie town football players that is nearer to the researcher's work place.

1.4. Significance of the study

Many sport participants are gravitated towards different addictions from those the major one is chewing khat. Due to this the effectiveness of athletes during training and competition decreases due to the decreasing of cardio respiratory fitness as the uptake of khat. La Revue(2007).

This study showed the cardio respiratory fitness effects of chewing khat on athletes in Gunchire football team by using different cardio respiratory fitness test. It help players to minimize (avoid) the habit of chewing khat by observing their cardio respiratory fitness test comparing with a certain standards or norms. And it is useful for athletes to perform different activities with less stress and for extended period of time. To indicate this problem and give awareness about the side effects of chewing khat on their cardio respiratory fitness as a result the decreasing of their sport performance.

It may used as a secondary data source for other researchers in the same field of study.

1.5. Objectives of the study

1.5.1. General objectives;

The general objective of this study is;

- To assess the effects of chewing khat on cardio respiratory fitness recovery time of Gunchire male football project team players.

1.5.2. Specific objectives

The specific objective of this study is;

- To test the effects of khat on cardio respiratory fitness of players.
- To test the effect of khat on resting pulse rate and recovery pulse rate of players.

2. REVIEW OF RELATED LITERATURE

2.1. Drug Abuse in Athletes

When a person uses drugs, many changes occur in his/her body both physically and psychologically. Some of these changes occur immediately, while others only happen over time. Every side effect of drug use has the potential to be served, but the physical effects can be especially dangerous. A person should therefore try to avoid combining drug use with any type of physical activity. http//www. foundations recovery network (2015).

Drug abuse in athletes' population may involve doping in an effort to gain a competitive advantage. Alternatively, it may involve use of substances such as alcohol (marijuana) and khat without the intent of performance enhancement, since athletes may develop substance use disorders just as any non athlete may. http//www.foundations recovery network (2015).

Athletes may turn to substances to cope with numerous stressors, including pressure to perform, to minimize injuries, physical pain, and retirement from a life of sport(which happens much earlier than retirement from most other careers).Additionally, athletes may be significantly less likely to receive treatment for underlying mental illness such as depression. Athletes receive comprehensive treatment and rehabilitation for physical injuries, but this may be less often the case for mental illness, because their sometimes viewing mental illness as a sign of weakness. Untreated mental illness is often associated with substance use, perhaps in an effort to self treat. Alternatively, substance abuse may cause mental illness. http//www. foundations recovery network (2015).

Saba (2010) lists several common effects of drug use like; change in appetite, confusion, dilated pupils, distortions in perception, dizziness ,dry mouth, flushing of skin, impaired coordination and balance, increased energy and alertness, increased heart rate, blood pressure and body temperature, nausea. Physical exercise makes many of the body's systems work faster and harder and drugs also interact with the body physically in several ways.

2.2. History of khat (chat) (*Catha edulis*)

Khat is found in the evergreen tree or large shrub, consists of whole fresh leaves and buds of a plant knownas Catha edulis. It is an indigenous tree to Ethiopia, Kenya, and Yemen and more than 20 different compounds are found in khat. Bizuayehu and Muluken(2014).

The khat plant (*Catha edulisForsk*), is a flowering perennial green tree which is primarily found wild in many parts of Africa and the Arabian Peninsula for centuries. In Africa the khat tree is specifically grown from Cape to the mountains of North-east Africa and Madagascar. Whereas in the Arabian Peninsula the leaves of *Catha* edulis Forsk is found in Yemen and regions of the Saudi-Arabia or in other words South-western Arabian Peninsula. It favours to grow with in altitudes between 5000 and 8000 feet. Although when cultivated is kept at around 20 feet to allow for ease of harvesting, the tree grows to heights in excess of 50 feet. In terms of the taste, Thekhat chewers often describe its taste as bitter. Although most consumers assert that higher quality khat has a sweeter taste, some consumers also like bitter taste as it quickly stimulates the mood of the chewer. Andersson& Carrier(2009): Favrod *et al(*2010).

Now a day, Catha edulis is widely cultivated in all parts of the country and neighbouring regions like Somalia, Malawi, Uganda, Tanzania, Congo, Zambia, Zimbabwe, Afghanistan and Madagascar. Khat is consumed regularly with the young generations. The total area of land under khat cultivation in Ethiopia of theyear 1997/98 was estimated at 78.57 hectares. Oromia, mainly East and West Hararghe zones, is the most important centre of khat production and is considered to be the leading producer of khat in the world and Bahir Dar, the capital of Amhara regional state is the place that 3% of Ethiopian's total production of khat is originated from. In Ethiopia khat is used for direct consumption, local sell and for export. It is estimated that 85-90% of khat production is for sell; the rest is used for local consumption. The habit of chewing khat isbehaviours that strongly affect the magnitude of the effect khat chewing on human beings. Zeleke A *etal* (2013).

Harvesting methods of the khat tree vary throughout the countries known for khat production in Yemen; for instance, only the succulent larger leaves are chewed, in Kenya smaller leaves and the bark of stems are also harvested. In Ethiopia, smaller and larger leaves at the top part of the

plant are chewed. Nevertheless, consumers of khat are highly well-informed about khat varieties, their seasonal availability, and fluctuations in price relating to both quality and supply. Kassim (2010).

The Khat plant is known by a variety of names by the people of the regions where it is originated from. All these names describe *Catha edulis*Forsk, the khat tree. In Yemen and Somalia, theterm*'Qat'* or '*Qaat and Jaad'* is widely known. In Ethiopia, the term 'Chat or Jat' is commonly recognized, while in Kenya it is known as *'Miraa'* or '*Murungi*'. However, among these names the term khat is being the most popular name given to the plant and this appears mostly from the international market and studies conducted on this area Apps, *et al(2011*).

The author of this thesis was born and brought up at the heart of the Horn of Africa, in the Ogaden region of Ethiopia; and was interested to write about khat and he was pleased to have got this opportunity. Basically, this is because he had the feeling that khat consumption depletes the economies of his community, creates family discords and social disorder and more importantly is responsible ill-health outcomes that individual users encounter always. On the other hand, the khat using communities at the countries in the Horn of Africa such as Kenya, Ethiopia, Djibouti and republic of Somalia are mainly Somalis. Thus, this thesis focuses largely on immigrants from the Horn of Africa particularly Somalis who consume khat leaves on daily basis or intermittent. The aim of the study this study is to explore Somalis men's perceptions of using khat. I recognize that this is a complex situation and a simple thesis as this will have a limited influence on the present reality on the ground. Nevertheless, it is my hope that at least itwill achieve its aim to shed light on some of the issues related to khat use and thereby contribute to the future research. Bashir (2011).

Catha edulis(khat, belonging to family: Celastraceae) is an evergreen plant having Psycho active substances such as cathinone and cathine, which have central stimulation effecanalogs to amphetamine. The psycho stimulant khat is an herbal drug cultivated and chewed as a recreational and socializing drug in East Africa and the Arabian Peninsula for centuries. Increased consumption of khat has serious socio-economic and health consequences. Khat chewing causes adverse effects on health, reduced production of economy, loss of working

hours, malnutrition and diversion of income for the purchase of khat, resulting in absenteeism and unemployment .The proportion of people chewing khat in Ethiopia has significantly risen over the years. It was believed that khat use was originated from Ethiopia and previously, it was grown and chewed in the eastern part the country. Nowadays, it is cultivated and chewed in all regions among religious and ethnic groups. The percentage of khat chewing practice among regions of Ethiopia ranges from 1.1% to 53.2% with the overall prevalence of 15.3%. Ethiopia is the world's largest producer of khat with perhaps a third exported to Djibouti and Somali land, and the bulk consumed within the country. Even though studies conducted among the community and students are available in different regions, no studies were done among khat chewers alone. Therefore, this study was undertaken in khat chewers in Mekelle town, Northern Ethiopia to investigate socio-economic and health-related effects of khat chewing. ijpprhuman journals.

As National Institute of Health (2011); khat(Catha edulis) is a plant grown commonly in the horn of Africa. The leaves of khat are chewed by the people for its stimulant action. Its young buds and tender leaves are chewed to attain a state of euphoria and stimulation. Khat is an evergreen shrub, which is cultivated as a bush or small tree. The leaves have an aromatic odor. The taste is astringent and slightly sweet. The plant is seedless and hardly growing in a variety of climates and soils.

As N.A.G.M. Hassan,A.A,Gunaid and I.M.Murray.Lyon(2007) khat is chewed daily by a high proportion of the adult population in Yemen and Ethiopia for the mild stimulant effect. Cathinone is believed to be the main active ingredient in fresh khat leaves and structurally related and pharmacologically similar to amphetamine. The habit of khat chewing is wide spread with a deep rooted socio cultural tradition in some countries and causes public health problems.

Eastern Mediterranean Health Journal (2007), said the khat plant (Catha edulisforsk) is a tree of the family celastracea that is frequently cultivated in certain areas of East Africa and Arabian Peninsula. The leaves of khat plant contain Alkaloids structurally related to Amphetamine. They are chewed daily by a high proportion of the adult population in different countries for the pleasant mild stimulant effect. Khat appears to have been used first as a drink prepared from dry

leaves, but its effect was weak. It was found latter that drying the leaves results in loss of some active constituents and therefore the habit of chewing the green leaves was adopted.

2.3. Chemistry of khat

Khat contains more than forty Alkaloids, glycosides, tannins, amino acids, vitamins and minerals. The environment and climate conditions determine the chemical profile of khat leaves. The major alkaloids in khat are phenylalkalamines and Catha edulis. Phenylalkalamines contain cathinone and cathine. Cathinone is found in young leaves of khat plant As Nasir(2011).

Cathinone which is the main active ingredient in Khat leave is responsible for the pharmacological properties of Khat. The khat plant *(*CathaedulisForsk*)* is a tree of the family Celastraceaethatis frequently cultivated in certain areas of East African the Arabian Peninsula. The leaves of the khat plant contain alkaloids structurally related to amphetamine. They are chewed daily by a high proportion of the adult population in Yemen for the pleasant mild stimulant effect. Kalman S (1983).

Khat chewing practice has increased over the years and chronic khat use is associated with adverse health and socioeconomic effects, this study was under taken among khat chewers in Mekelle town. Yerra R *etal* (2016).

The study conducted at Jimma University, Ethiopia showed a significant negative effect of khat use on students' academic performance, which is proportional the extent or dose use of khat. The result of this study cigarette smoking and coffee drinking accompany khat chewing in order to get excitement while alcohol is used to neutralizing the stimulating effect and sleeplessness caused by khat. Zeleke A *etal* (2013).

Bahirdar is a town that 3% of Ethiopian's total production of khat is originated from. There is no community based study that has been done in Bahir Dar city to determine effects of khat chewing behaviours on self rated oral health status and risk on elevated blood pressure. This study aimed to determine the effects of khat chewing behaviours on ooral health and blood pressure on chewers. The effects of khat (Catha edulis) chewing on blood pressure among male adult chewers in Bahir dar. Bizuayehu W*etal*(2014).

Khat chewing may disturbance of mood (anxiety, depression, insomnia). It aggravates thought disturbances (hallucination, delusions); it induces aggressive behavior and creates difficulties. It cause elevation of arterial blood pressure and pulse rate with subsequent increased cardio vascular risks. It is common cause of stomatitis. It increased risk of carcinoma of the mouth and oesophagutitis; it cause anorexia. It interfere with absorption of some orally administered antibiotics; Causes constipation. It has a toxic effect on the liver, possibly as a result of pesticides used in khat cultivation. It increased the risk low birth weight infants in khat chewing pregnant women. WHOEC (1963).

Khat appears to have been used first as a drink prepared from dry leaves, but its effect is weak compared with coffee. It was found later that drying the leaves results in loss of some active constituents and therefore the habit of chewing the green leaves was adopted. For many hundreds of years the custom of chewing khat leaves has been practiced for the resulting central stimulant effects in Yemen, the habit is widespread with a deep-rooted socio cultural tradition. The pleasurable central stimulant properties of khat are commonly believed to improve work capacity and are used on journeys and by students preparing for examinations and to counteract fatigue.Inrecentyears,becauseofimprovedairtransport,theconsumptionoffreshkhatleaveshasexpan dedconsiderablyevento communities inEurope.Recent work on healthy Yemeni adult volunteers provided evidence that khat chewing induced a significant rise of arterial systolic and diastolic blood pressure andpulse rate in comparison with the baseline values. The peak effect on the arterial blood pressure and pulse rate was reached 3hours after starting to chew, followed by a decline 1 hour after spitting the leaves out. These changes run parallel with changes in plasma cathinone levels during and after khat chewing. Similar blood pressure changes have also been observed in smaller numbers of subjects when pure cathinone in gelatin capsules was taken orally or when khat leaves were chewed. These observations support the suggestion that cathinone is the constituent that is mainly responsible for the increase in arterial blood pressure and pulse rate during khat chewing. A possible mechanism is the release of catecholamines from pre synaptic storage sites. Alem(1999).

The role of khat chewing as a risk factor for acute myocardial infarction in Yemen was investigated by an experimental and clinical study. In the guinea pig, cathinone induced

vasoconstriction of the coronary vascular bed which, unlike amphetamine, was not related to a sympathomimetic effect. In humans, the circadian rhythm of the timing of acute myocardial infarction was shown to be influenced by khat chewing. As N.A.G.M. Hassan,A.A,Gunaid and I.M.Murray.Lyon

2.4. Effects of khat

Khat contains many different compounds and therefore khat chewing may have many different effects. The major effects include those on the gastrointestinal system, nervous system, constipation, urine retention, and acute cardiovascular effects may be regarded as autonomic (peripheral) nervous system effects include increased alertness, dependence, tolerance and psychiatric symptoms on the central nervous system. Cathine and cathinone are responsible for those effects Nasir(2011)

Chronic khat use is associated with adverse health effects such as hypertension, heart rhythm disorders, insomnia, liver toxicity, oral cancer, hypertension, spermatorrhoea and hemorrhoids, loss of appetite and gastrointestinal effects. Medical problems associated with khat intoxication include psychiatric manifestations such as deterioration of psycho physical function and schizophreni form psychoses. Some other khat chewers also experience anxiety, tension, restlessness, hypnogogic hallucinations, hypomania and aggressive behavior or psychosis. http//www.ijpprhuman journals.

Habitual khat chewing renders certain influence on the physical and psychological well being of the community and it can cause more serious psychiatric, cardio- vascular, dental and gastrointestinal adverse effects. During khat chewing session, initially there is atmosphere of cheerfulness, optimism and a general sense of wellbeing. After khat chewing cessation, the individuals perceive some health problems where tension, emotional instability and irritability begin to appear, later leading to feelings of depression, confusion, insomnia and sluggishness. Different studies evidenced that psychological impacts of chewing khat are hazardous both to the individual and the community. Gastrointestinal adverse effects of khat chewing include anorexia, constipation and stomatitis. Anorexia leads to malnutrition and increased susceptibility to infectious diseases, especially tuberculosis. The recent sharp increase in khat consumption may

not only affect the health of individuals but could also have serious socio-economic consequences for the countries involved in khat consumption. Khat chewing practice leads to loss of working hours, decrease of economic production and incurrence of a direct cost to Khat by neglecting family needs, leading to family discord and divorce and increasing likelihood to commit crimes. This is indirectly linked to absenteeism and unemployment, which may in turn result in a fall in overall national economic productivity.

2.5. Cardio vascular effects of khat

Cathinone has vasoconstrictor activity in isolated per fused hearts from guinea pigs. The effect was unlikely to be due to an indirect action by release of nor adrenaline from sympathetic nerve endings or due to a direct action on alpha-1-adrenoreceptors.Increased incidence of myocardial infarction occurring during khat sessions (during the khat effective period and associated with heavy khat chewing). The diastolic and systolic blood pressures were elevated for about three hours after chewing and heart rate increased. The risk of blood pressure already started before the risk of alkaloids. The main toxic effects of khat include increased blood pressure, tachycardia, insomnia, anorexia, constipation, general malaise, irritability US National Institute of Health.

As a plant containing amphetamine –like substances, the main effects of chat are on the cardiovascular systems, gastrointestinal systems, and nervous system WHO (2006). Accordingly, this implies that the effects of khat are seen on the active sport participants in their health.

Khat has direct effects on the cardiovascular system causing clear increases in heart rate and blood pressure in humans. As an illustration of the cardiovascular effects the results of Brenneisen*et al,* (1990) are reproduced in more detail. Khat: a literature review A general population survey of approximately 4000 urban Ethiopians reports current khat chewing to be significantly associated with elevated mean diastolic blood pressure Tesfaye*et al* (2008).

Effects of khat chewing associated with elevated diastolic blood pressure Khat typically is ingested while chewing the leaves. After ingesting Khat, the chewer experiences an immediate increase in blood pressure and heart rate. Various reasons have been given for chewing Khat.

Most chewers used Khat to gain good level of concentration for prayer. Some chewers reported that Khat intake results in increased energy levels and alertness, enhances imaginative ability and the capacity to associate ideas, and improves the ability to communicate. International journal of pharmacy and pharmaceutical sciences.

Recent work on Yemeni adult volunteers provided evidence that khat chewing induced a significance rise of arterial systolic and diastolic blood pressure and pulse rate in comparison with the base line values. The peak effect on the arterial blood pressure and pulse rate was three hours after starting to chew, a decline one hour after spitting the leaves out. These changes run parallel with changes in plasma cathinone levels during and after khat chewing. Similar blood pressure changes have also observed in smaller numbers of subjects when pure cathinone in gelatin capsules was taken orally or when khat leaves were chewed. These observations support the suggestion that cathinone is the constituent that is mainly responsible for increase in arterial blood pressure and pulse rate during khat chewing. After ingesting khat, the chewer experiences an immediate increase in blood pressure and heart rate. Various reasons have been given for chewing khat. Most chewers used khat to gain good level of concentration for prayer. Some chewers reported that khat intake results in increased energy levels and alertness, enhances imaginative ability and the capacity to associate ideas and improves the ability to communicate. WHOEC (1963).

2.6. Health related physical fitness

A. Body composition

The relative percentage of fat compared to lean body masses (muscle, bone, water, etc). As you become physically fit, the percentage of lean mass increases and the percentage of fat tissue decreases.

B. Cardio respiratory fitness

It is the ability of heart and blood vessels to distribute blood and lungs to make the blood oxygenated and transport towards working muscles during exercise.

C. Flexibility

It is the ability to move joints and use muscles through their full range of motion.

D. Muscular strength

Is the amount of force that can be produced by a single contraction of a muscle.

E. Muscular endurance
It is the ability of a muscle group to continue muscle movement over a length of time.

2.7 Guidelines for fitness test

Fitness assessment tests need to be administered properly and in a structured manner in order to achieve accurate and consistent results. In addition, the athlete's health should get top priority and tests therefore need to be safely conducted. The following subsections provide various guidelines that will ensure tests are administered safely and in an organized manner Freeman (2009).

2.7.1. Test preparation

Players need to be properly warmed up prior to conducting any test in order to avoid injuries and to improve the reliability of the tests results. On days with multiple tests, a general warm up of jogging and dynamic stretching prior to the first test should be adequate. However, if there is a long waiting period between tests, the athlete may need to repeat the warm up procedure Freeman (2009).

2.7.2 Test sequence

Ideally, tests that assess anaerobic and aerobic endurance should be conducted on separate days from the other tests. In many situations however, all assessments are all completed on the same day. In such an event, the tests should be ordered in a way that gives the most reliable results. Indeed, assessments that required skilled movements and coordination should be administered before ones likely to induce fatigue Getcheel (1979).

The researcher was used tests that help to measure cardio respiratory fitness. Those are; three minute step test and 12 minute (1.5 mile) (2.4km) run (cooper test). The tests were performed in different days to minimize the load of activities and to get the expected out come. The two tests were performed after enough instruction of the researcher based on their procedures.

3. MATERIALS AND METHODS

In this section description of the study area, experimental materials, source of data, treatment and study design, description of the population, sampling methods, methods and procedures of data collection, experimental measurement, method of data analysis, data quality control and protocols and ethical considerations were discussed.

3.1 Description of the study Area

Gunchire is located 260 km away from Addis Abeba and 100km from Guraghe zone capital town Wolkite. It has woynadega climate and most of its population speak Guragigna language. The well known land mark in this woreda is Ener Amanuel Mosque that is found around 30 km from Gunchirie town. Because of its woynadega climate a lots of animals, croups, vegetables, khat, coffee, wheat, maize, enset are largely produced.

3.2. Research design

The study design for this research was experimental (field testing). In this study the researcher used cardio respiratory fitness tests implemented on purposively selected (n=11) experimental group (EG) and (n=13) control group (CG).

There are 24 players in this team. They are doing training and participate in competitions for three consecutive years by the help of a coach. The researcher implemented cardio respiratory fitness test for 12 consecutive weeks.

3.3. Population of the study

The source of population for this study was selected 24 Gunchire male football trainees. From those the researcher classified 11 as experimental group and 13 control group based on the habits of chewing khat; on both EG and CG (all subjects) the researcher used cardio respiratory fitness tests. The age of those players were ranges from 18 up to 26 years old.

3.4. Experimental materials

Different materials that were used to perform experiments are; recording sheet, box, stop watch, whistle, cones, diary book, pen, meter.

3.5. Source of the data

In this study the researcher used both primary and secondary data sources that means primary data were collected from fitness tests whereas, secondary data sources were observation and assessments that the researcher took to attend players' leisure time activity.

3.6 Methods of data collection

The researcher used quantitative data collection method from the subjects by using different cardio respiratory fitness tests such as; 3 minutes step test and 1.5 mile (12 minutes) (2.4km) run test (cooper test). The researcher took both tests two times both after and before their training period. After this he condensed their result by taking the average result so that to make the data simple for analysis. The researcher recorded and collected the data with the help of assistant by instructing him how he records data from the subjects during the tasks. Tests were takes place at Gunchire town football field before and after training periods of the team.

3.7 Data collection instruments

Medical examination Even though athletes are spending long period by training , before applying the test the researcher was prepared questionnaires to identify the current cardio respiratory fitness status of players and writing format to get confirmation to participate in the study willingly. The types of tests the researcher used to test the hypothesis were;

3.7.1. Three minute step test

The purpose of this test was to assess the cardio respiratory fitness of the subjects.

Procedures and analysis

Demonstrate the stepping up, up and down, down on 30cmx30cm (12”x12”) box for subjects after a warming up and appropriate instruction. The subjects face towards the block, start the timer when participants start stepping, check the rhythm and correct if necessary, inform subjects time pass 1minute,2minute etc, remind subjects to prepare to sit quickly 20 seconds,15 seconds remaining count remaining cadence, count beats for a minute, record beats in one minute(bpm). http//www.topendsport.com

3.7.2.. Cooper 1.5 mile (2.4km) run test

The objective of the test is to measure the cardio respiratory fitness of the participants. Procedures and analysis as any performance based test, the subjects should perform a structured warm up to prepare for the assessment. After the warming up exercise, ensure that the subjects clearly understand that the objective of the test is to complete the 1.5 mile (2.4 km) distance in as little time as possible.

Measuring a distance, have each subject complete a structured warm up of 10 minutes, prior to starting the test, clearly explain that each individual should run 1.5 mile (2.4 km) distance as fast as possible; start a stop watch as the same time that the run is initiated ; when a subject

completes the distance, his time of completion should be recorded; after completing the assessment, each tested individuals should perform a cooling down exercise consists of slow walking followed by stretching. Dallas,Tx (2006).

3.7.3. Safety considerations

All athletes get medical clearance before being allowed to partake in physical activity and fitness assessment procedures. In addition, coaches should be able to identify hazardous testing conditions. These include extreme weather (very hot, very humid) and slippery or uneven running surfaces. Examiners should consider the symptoms associated with adverse health outcomes like; chest pain, dizziness, nausea, light headache, shorten of breath, and seek medical attention if necessary. In those cases, test should not be carried out.

3.8 Method of data analysis and interpretation

The collected data about the cardio respiratory fitness of the subjects presented in the form of simple statistical operation by comparing the results of the subjects individually and compare their results with the standards (norms).Again the researcher compared the results of experimental groups with control group by using paired samples t-test method.

3.9 Data quality control

The data were collected and handled carefully. The researcher used assistant to collect data and gave direction (training) to him about how he collects data to minimize error of collecting data.
Additionally, the researcher created awareness for subjects about the objectives of the test and preconditions needed for the test. The researcher does not created awareness about the outcomes (end results) of the study before the overall tests are completed. During tests enough instruction and demonstration was needed for the subjects.

3.10. Ethical considerations

This study dialed the ethical issue related to the investigation. It protected the privacy of research participant and can make guaranty and confidentiality of the information that was given to the study, and risk harm due to participation. Participation of subjects in this study purely a voluntary based activity and their right not to participate and can resign at any time of training session will be respected. So, the study conducted all action based on the university rule, code of

conduct and policies concerning research ethics. Since the subjects were volunteers they were refraining from the situation if they are not ready or not feel comfort at any time they want. Ethical approval was obtained from institutional research ethics review committee (IRERC) of Haramaya University College of health science. The protocol was approved by the university guidelines and written consent was given and informed the concerned bodies.

4 RESULTS AND DISCUSSION

4.1. Effects of chewing khat on cardio respiratory fitness recovery time of male football project players (on three minutes test)

According to the above information or data; the researcher analyzed by taking the average of their results. The average resting pulse rate of experimental group during was 69.9bpm and the average resting pulse rate of control group was 67.38bpm. During this the average pulse rate of experimental group 2.52bpm higher than the control group.

1. The average resting pulse rate for EG=69.9 bpm and CG=67.38 bpm
2. The average pulse rate before three minutes step test for EG=73.36 bpm and CG=72.2 bpm
3. The average pulse rate after three minutes step test for EG=80.09 bpm and CG=77.62 bpm.

Depending on the above information before taking any test or during recovery period, the researcher compared the average pulse rate of the subjects. This was the average pulse rate of the experimental group was 73.36bpm; whereas, the average pulse rate of control group was 72.2bpm.This implies that the pulse rate of experimental group was higher than the pulse rate of control group by 1.16bpm. This means the pulse rate of khat chewers is higher than non khat chewers.

When a person becomes endured, the pulse rate decreases due to training effect and the heart muscles strengthen and endured so that it can pump much amount of blood in a single contraction. Therefore, khat chewers have less cardio respiratory fitness than non chewers or this incensement of pulse rate of experimental group was due to the result of chewing khat.

Again after taken three minutes step test, the researcher compared the pulse rate of experimental group and control group. During this comparison the average pulse rate of experimental group was 80.09bpm and the average pulse rate of control group was 77.62bpm.When the researcher compared the average pulse rate of experimental group with control group, the average pulse rate of experimental group was2.37bpm higher than the control group. That means khat chewers have high pulse rate than non chewers. This increscent of pulse rate is due to the effect of chewing khat.

After this comparison the researcher also compared the average pulse rate of experimental group and control group with three minutes step test norm (standard) according to the age level and sex. This reference for male football players aged from 18-25 years old; from 50-76bpm implies excellent,79-84bpm indicates good,88-93bpm shows above average,95-100bpm implies average,102-107bpm is below average,111-119bpm is poor, and 124-157bpm is very poor. According to the above information the subjects of this study were 18-26 years old male football players. The average pulse rate of experimental group was 80.09bpm which is ranked as good and the average pulse rate of control group was 77.62bpm which is ranked between good and excellent grade (above good and below excellent).

Therefore; the average pulse rate of experimental group is a little bit higher than the average pulse rate of control group due to the effects of chewing khat and they had different ranks with a standard (a norm).

4.2. Effects of chewing khat on cardio respiratory fitness recovery time of male football project players (on 1.5 mile run test)

1. The average time taken to finish 1.5 mile run test before training for EG=11:14 and CG=10:40

2. The average time taken to finish 1.5 mile run test after training for EG=11:18 and CG=10:43.

After this finding (result), the researcher analyzed that the average time taken of experimental group to finish 1.5mile distance before doing additional training was 11 minutes and 14 seconds; whereas the time taken of control group to finish the distance before training was 10 minutes and 40 seconds. This shows that experimental group finishes the distance 34 seconds slower than the control group. Therefore; football players that chew khat finish the distance slower than the non chewer teammates. This is because of the effects of khat on cardio respiratory fitness.

Again the researcher took similar test on subjects after their training. During this the average time taken for experimental group to finish 1.5mile distance was 11 minutes and 18 seconds; whereas, the average time taken for control group to finish this distance was 10 minutes and 43 seconds. When the researcher compared their results the control group finish the distance 35 seconds faster than experimental group. Accordingly football players that chew khat slower to finish 1.5mile distance than non khat chewers. Additionally, the researcher compared their test

results with cooper test standard or norm. This standard is put as percentile with their age level and sex.

The average time taken for control group is found by adding the time taken of control group to finish the distance before additional training plus the time taken of control group after training divided by two=10:40+40:43 ÷2=10:41which is above 70% compared to the standard. Whereas, the average time taken for experimental is calculated as the sum of experimental group before training and after training divided by two= 11:14+11:18÷2=11:16 this is above 60%.

The difference between the time taken by control group and experimental group is due to the effects of chewing khat on cardio respiratory fitness of football players in Gunchire football team. That is why khat chewers in this team feel fatigue, stress, etc during training and competition.

5 SUMMARY, CONCLUSIONS AND RECOMMENDATINS

5.1 Summary

The main objective of this study was to assess the effects of chewing khat on cardio respiratory fitness. This study had specific objectives like testing the effects of khat on cardio respiratory fitness of football players in Gunchire. Additionally to test the effect of khat on cardio respiratory fitness of football players during and recovery time and to assess why khat chewers feel fatigue during longer period of training than non chewers. To test the effects of chewing khat on cardio respiratory fitness of project players during their recovery time and training time. This study used two cardio respiratory fitness tests on both football players that are taking khat and do not taking it.

Football players that took khat considered as experimental group and football players that do not took khat are considered as control group. The two cardio respiratory fitness tests were three minutes step test and 1.5mile (2.4km) (cooper test). These tests applied on both control group and experimental group and the data resulted from those tests were collected carefully. After the data collection, the researcher compared the results of control group and experimental group. Again the researcher compared their results with cardio respiratory fitness test standards or norm. The major finding from this study was football players that took khat regularly had a little bit less cardio respiratory fitness than their teammates.

During the first test that is three minutes step test the average pulse rate of experimental group is higher than the average pulse rate of control group because of the effect of chewing khat. Before taking three minutes step test, the researcher measured the pulse rate of the subjects again the average pulse rate of experimental group is higher than the average pulse rate of control group during their recovery time.

During the second test that was 1.5mile (2.4km) running test the experimental group finish the distance slower than control group. Both before training and after training the researcher took test. Additionally when the researcher compared their results with a standard (norm) control groups had better rank than experimental groups this indicates us football players that took khat regularly had less cardio respiratory fitness than their teammates that do not take khat.

5.2 Conclusions

Conclusions were drawn based on the findings of data analysis. The cardio respiratory fitness of football players in this football team was identified as follow.

The pulse rate of khat taker players was higher than their teammates during their recovery time.
The pulse rate of khat taker players was higher than non takers after doing three minutes step test.
The time taken to finish the given distance (1.5mile distance) was longer than the time taken by non khat takers both before any training and after their training.
Finally, when compared the results of khat chewers than non chewers khat chewers had less grade than non chewers based on the given standard (norm).

5.3 Recommendations

Further investigation should be needed to determine the effect of chronic khat chewing on the human health and detailed experimental work on the cardio respiratory fitness effects of khat before and after training.

Health education and creating awareness about the adverse health effects of chewing khat should be delivered to the community specifically to active sport participants.
Additionally; other investigation should needed to obtain the chemical contents of khat in blood and urine of football players that may take khat regularly and its effects with regarding to different physical qualities and fitness levels.

The main effects of khat are on cardio vascular system, gastro intestinal systems and nervous system this implies that the effects of khat are seen on the active sport participants in their health status. Chewing khat affects physiological, psychological, sociological etc impacts on sport participants and reduces the development of sport in general. Khat consumption decreases the rate of sleep and rest. Rest and sleep help the body to rebuild itself and reenergize. While you sleep several changes occur in your body. Your heart rate slows by about 10-15bpm, your blood pressure decreases and you take fewer breaths per minute, your muscles loss tension, growth hormone is released into the blood, you actually growing while sleep and rest. Therefore, taking khat has different health effects especially active sport participants.

Additionally football players need high cardio respiratory fitness to sustain (spent) extended period of time training without fatigue. They spent more than 90 minutes during training and competition this needs high cardio respiratory fitness. Khat chewers decrease their cardio

respiratory fitness because of the adverse health effects of khat. So minimizing or if possible avoiding taking khat is important for football players to be effective in their event.

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7. APPENDICES

Table 1, Three minutes step test fitness records of Experimental group

Code of the subjects	Resting pulse rate(bpm)	Records before the test (bpm)	Records after the test (bpm)
EG1	72	75	81
EG2	66	68	73
EG3	75	80	87
EG4	76	79	85
EG5	74	80	90
EG6	65	66	72
EG7	67	69	76
EG8	75	83	89
EG9	70	73	80
EG10	69	70	78
EG11	60	64	70

Table 2, Three minutes step test fitness records of Control group

Code of the subjects	Resting pulse rate(bpm)	Records before the test (bpm)	Records after the test (bpm)
CG1	67	70	78
CG2	72	76	84
CG3	76	81	86
CG4	62	67	74
CG5	64	68	78
CG6	59	63	70
CG7	63	69	76
CG8	70	72	77
CG9	61	64	69
CG10	63	65	71
CG11	73	77	80
CG12	71	74	81
CG13	75	79	85

Table 3, 1.5mile (2.4km) fitness test records of Experimental group

Code of the subjects	Test result before training (time)	Test result after training (time)
EG1	11:18	11:21
EG2	10:45	10:47
EG3	11:04	11:06
EG4	11:25	11:24
EG5	11:25	11:28
EG6	11:30	11:34
EG7	11:14	11:20
EG8	11:35	11:39
EG9	11:24	11:28
EG10	10:50	10:55
EG11	11:09	11:14

Table 4, 1.5mile (2.4km) fitness test records of Control group

Code of the subjects	Test result before training (time)	Test result after training (time)
CG1	10:44	10:48
CG2	10:52	10:54
CG3	10:49	10:53
CG4	10:53	10:57
CG5	11:02	11:01
CG6	10:07	10:10
CG7	10:13	10:15
CG8	10:32	10:35
CG9	10:47	10:50
CG10	10:06	10:09
CG11	11:05	11:04
CG12	11:00	11:03
CG13	10:39	10:42

Table 5, three minutes step test standard rating for men, based on age

Age	18-25	26-35	36-45	46-55	56-65	65+
Excellent	50-76	51-76	49-76	56-82	60-77	59-81
Good	79-84	79-85	80-88	87-93	86-94	87-92
Above average	88-93	88-94	88-92	95-101	97-100	94-102
Average	95-100	96-102	100-105	103-111	103-109	104-110
Below average	102-107	104-110	108-113	113-119	111-117	114-118
Poor	111-119	114-121	116-124	121-126	119-128	121-126
Very poor	124-157	126-161	130-163	131-159	131-154	130- 151

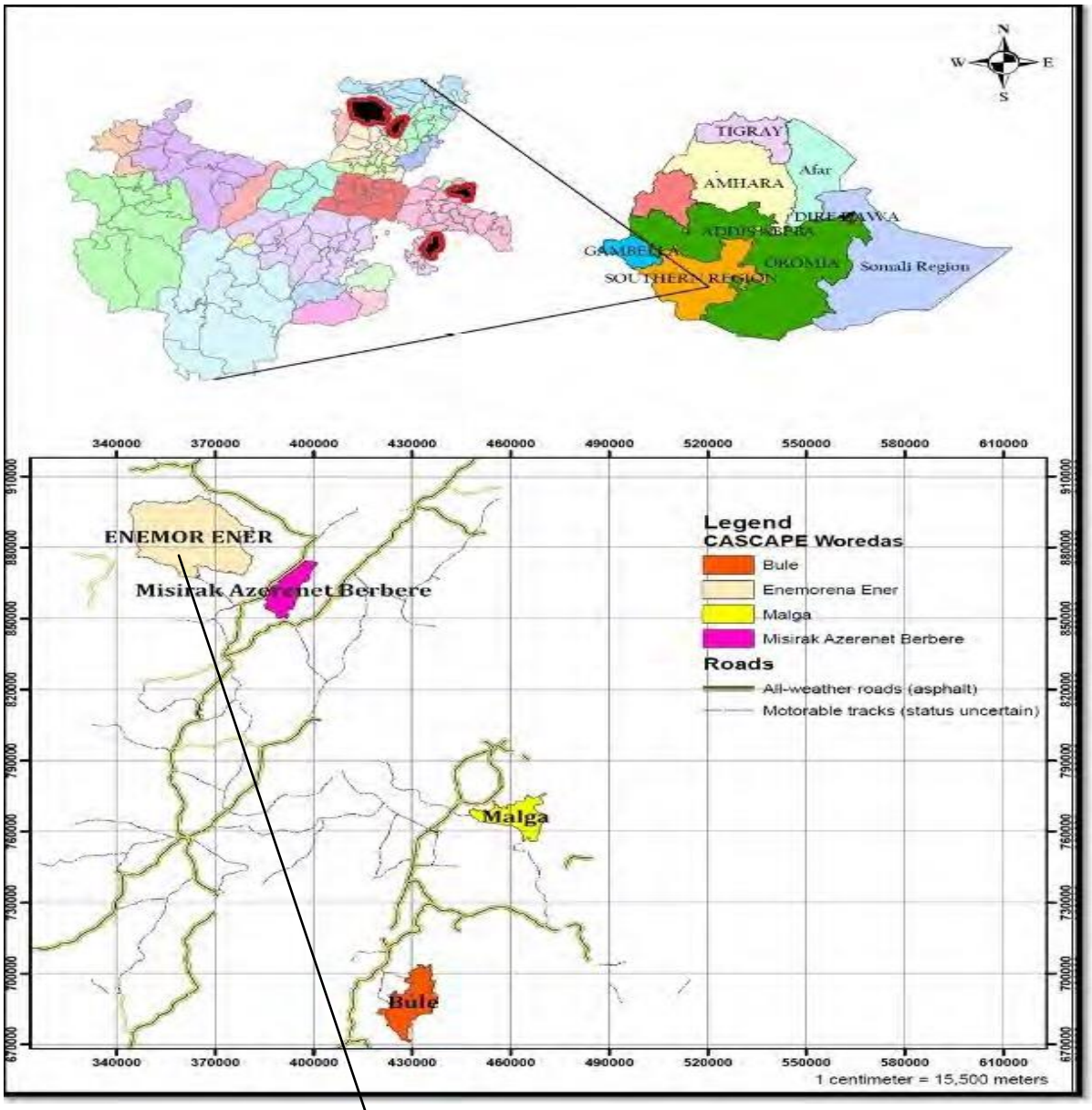
The YMCA 3-minutes bench step assessments

Table 6, 1.5 mile (2.4km) cooper test standards/norms

Age(y)	20-29		30-39		40-49		50-59		60-69	
Percentile	men	Women	Men	Women	Men	women	men	women	men	women
90	9:34	10:59	9:52	11:43	10:09	12:25	11:09	13:58	12:10	15:32
80	10:08	11:56	10:38	12:53	11:09	13:38	12:08	15:14	13:25	16:46
70	10:49	12:51	11:09	13:41	11:52	14:33	12:53	16:26	14:33	18:05
60	11:27	13:25	11:49	14:33	12:25	15:17	13:53	17:19	15:20	18:52
50	11:58	14:15	12:25	15:14	13:05	16:13	14:33	18:05	16:19	20:08
40	12:29	15:05	12:53	15:56	13:50	17:11	15:14	19:10	17:19	20:55
30	13:08	15:56	13:48	16:46	14:33	18:26	16:16	20:17	18:39	22:34
20	13:58	17:11	14:33	18;18	15:32	19:43	17:30	21:57	20:13	23:55
10	15:14	18:39	15:56	20:13	17:04	21:52	19:24	23:55	23:27	26:32

Percentile ranks for 1.5 mile run time/minutes Physical fitness assessments and norms for adults and law enforcement (Dallas,TX:The Cooper Institute.)

Figure 1; Map of the Study Site



Source; case cape innovation team; Enamor and EnerWoreda (Gunchire) (2014)