Addis Ababa University
አዲስ አበባ ዩኒቨርሲቲ

SEEK WISDOM, ELEVATE YOUR INTELLECT AND SERVE HUMANITY !

SCHOOL OF GRADUATE STUDIES

COLLEGE OF HEALTH SCIENCES SCHOOL OF MEDICINE

DEPARTMENT OF PHYSIOLOGY

EFFECT OF CHRONIC KHAT CHEWING ON MENTAL HEALTH, BLOOD PRESSURE AND PULSE RATE IN HOSANNA TOWN, ETHIOPIA

A thesis submitted to the School of Graduate Studies, Addis Ababa University, in Partial fulfillment of the requirements for the Degree of Masters of Science in Medical Physiology

By: FIKIRTE GETACHEW (BSc)

November 11, 2016

Addis Ababa, Ethiopia

ADDIS ABABA UNIVERSITY SCHOOL OF GRADUATE STUDIES DEPARTMENT OF PHYSIOLOGY

EFFECT OF CHRONIC KHAT CHEWING ON MENTAL HEALTH, BLOOD PRESSURE AND PULSE RATE IN HOSANNA TOWN, ETHIOPIA

By: Fikirte Getachew (Bsc)

Advisor: Diresibachew Haile (PhD)

A Thesis Submitted to the School of Graduate Studies, Addis Ababa University, in partial fulfillment of the requirements for the Degree of Masters of Science in Medical Physiology

November 11, 2016

Addis Ababa, Ethiopia

ADDIS ABABA UNIVERSITY SCHOOL OF GRADUATE STUDIES DEPARTMENT OF PHYSIOLOGY

EFFECT OF CHRONIC KHAT CHEWING ON MENTAL HEALTH, BLOOD PRESSURE AND PULSE RATE IN HOSANNA TOWN, ETHIOPIA

CROSS SECTIONAL STUDY

BY

FIKIRTE GETACHEW

DEPARTMENT OF PHYSIOLOGY, COLLEGE OF HEALTH SCIENCES

ADDIS ABABA UNIVERSIT

APPROVED BY EXAMINING BOARD

DR. TESFAYE TOLESSA **DEPARTMENT HEAD OF PHYSIOLOGY**	**SIGNATURE**
DR.DIRESIBACHEW HAILE **ADVISOR**	**SIGNATURE**
PROF .YEKOYE ABEBE **EXAMINER**	**SIGNATURE**

ACKNOWLEDGMENTS

I would like to express my sincere thank and deepest gratitude to my advisor Dr. Diresibachew Haile for his assistance and encouragement from the project conceptualization to the end of the research.

I also thank Addis Ababa University for sponsoring me to join MSc program in the Department of Medical Physiology and for financial support of my thesis work. I want to thank all staff members of Physiology department of Addis Ababa University as I have learned much because of their efforts.

My deepest gratitude also goes to the study participants for their willingness, commitment, volunteer participation and providing all the required information. I would like to thank Hadiya Zone Hosanna town Administration, SNNP for their cooperation during the study.

I extend my heartfelt gratitude to my husband Mr. Teketel Eristu who helped me throughout my Study by providing me unreserved love and cheering me on.

Finally; I am happy to express my heartfelt thank to my family who gave me continuous love, support and moral encouragement throughout my life.

TABLE OF CONTENTS

ACRONYMS AND ABBREVIATIONS

ABP	Arterial blood pressure
APA	Amphetamine
BPM	Beats per minute
C. edulis	*Catha edulis*
CNS	Central nervous system
CVS	Cardiovascular system
CTN	Cathinone
DBP	Diastolic blood pressure
DPRC	Department of physiology research committee
HR	Heart rate
KC	Khat chewer
Kg/m2	Kilogram per meter square
mmHg	Millimeter mercury
NKC	Non-khat Chewer
PR	Pulse rate
SBP	Systolic blood pressure
SNNPR	South nation natioalities and peoples region
SRQ	Self -administered questionnaire

LIST OF TABLES

LIST OF FIGURES

OPERATIONAL DEFINITIONS

Addiction: A physical or psychological craving for higher and higher doses of a drug that leads to bodily harm, social maladjustment, or economic hardship, dependence on a substance, habit, or behavior.

Amphetamines: A class of drugs, similar in some ways to the body‟s own adrenaline (epinephrine) that act as stimulants to the central nervous system.

Cross - tolerance: Increased tolerance for one drug that develops as a result of taking another drug.

Chronic chewer: Use of khat for more than two years.

Current use: History of ingestion of khat in the past 30 days.

Previous use: History of khat use in life time but not in the past 30 days.

Non-use: Person who has never chewed khat in any form.

Delusions: Irrational but firmly held beliefs about the word that have basis in reality.

Euphoria: Exaggerated sense of happiness and wellbeing brought on by some drugs.

Hallucination: A sensory perception without external stimuli.

Insomnia: Sleep abnormalities, including difficulty in falling asleep and wakefulness through the night.

Stimulants: Chemical compounds that elevate mood, induce euphoria, increase alertness, reduce fatigue, and, in high doses, produce irritability, anxiety, and a pattern of psychotic behavior. Stimulants include amphetamines, nicotine, caffeine, and cocaine.

Substance induced psychotic disorder: Condition provoked by large, repeated doses of drug, which resembles schizophrenia and includes hallucinations and delusions.

Withdrawal symptoms: The set of physical symptoms(usually unpleasant) experienced by the user as a result of stopping use of a drug upon which he or she has become dependent; these may include anxiety, insomnia, perspiration, hot flashes, nausea, dehydration, tremors, weakness, dizziness, convulsions, or behavior.

Frequent chewers: Those who chew khat for three and more days a week.

Less frequent khat chewers: Those who chew khat less than three days a week.

Levels of physiological parameters: Level of physiological parameters for adult person is as follows; systolic and diastolic pressure is 120 and 80mmHg respectively; breathing rate:12-16breath/minute; body temperature: 37°C; body mass index: <18 kg/m2 underweight, 18-25 kg/m2 normal and 26-30 kg/m2 overweight; heart rate: 60-100 beat/minute.

Khat sellers: Those who earning money from chewers by prepared a special place and setup for chewers and sold grams of khat for chewers during khat session.

Khat chewing behaviors: Frequency of khat chewing per week, time of the day that spent during khat session, amount of khat chewed within the last 12 months, and grams of khat chewed during khat session.

VI. APPENDICES

ABSTRACT

Khat chewing habit is widespread in Ethiopia with ever increasing socioeconomic and health anomalies. Compared to its acute effects, few studies have been conducted regarding its long-term effects on the mental health, blood pressure and pulse rate. The purpose of this study was, therefore, to assess level of mental distress, blood pressure and pulse rate among chronic khat chewers in Hosanna town, Ethiopia .To this end, data was collected from a total of 576 study participants of which 384 were khat chewers and 192 were non- chewers. Both cluster sampling and systematic random sampling methods were utilized to select study participants from the source population. World Health Organization Self Reporting Questionnaire (SRQ-20) format was used to assess symptoms of mental distress and digital spygmomanometer was used to measure blood pressure and pulse rate among study participants. The result indicated that there were statistically significant differences between the two groups with regards to blood pressure, pulse rate and mental health. The systolic and diastolic blood pressure and pulse rate of khat chewers was greater than non- chewers group.The mean systolic blood pressure was 134.33$\pm$14.33 for chewers and 104.99$\pm$12.48 mmHg for non-chewers group ,($p<0.001$). The mean diastolic blood pressure was 90.77$\pm$ 14.66 for chewers and 68.04$\pm$8.27mmHg for non-chewers group, ($p<0.001$). The mean pulse rate was 104.46$\pm$19.69 for chewers and 72.33+10.39 beats /minute for non-chewers group, ($p<0.001$). Further more, this study found that statistically significant association between chewing khat and mental distress.Chi-square analysis showed that there was a statistically significant association between chewing khat and mental distress ($p < 0.001$).Thus, this study suggestes that khat chewers should stop this habit in order to avoid unnecessary expenditure of money and to maintain positive health.

Key words: chronic khat chewing, mental health, blood pressure and pulse rate.

1. INTRODUCTION

1.1. Back ground of the study

Historically, the original source of khat seems to be obscure. However, there is general agreement that its use was prevalent in Ethiopia and from there, around the fifteenth century, the practice spread to the south-west of the Arabian Peninsula (Peters, 1952 & Radt, 1969). Earliest reference to this plant appears to be dated around 973–1053 AD by Al-Biurni, who meticulously compiled information on all contemporary drugs, what he called qat that was imported from Turkistan. It was used to relieve biliousness and to cool the stomach and liver (Biruni *et al.,* 1973). Haecock and Forrest (1974) mentioned that, it is possible to find a referral to khat as early as 1332 AD in an Arabic manuscript preserved in the Biblioteque National in Paris.

The first account of its effects appeared more than seven centuries ago in an Arabic medical textbook in which the leaves of it were recommended for curing depression (Forskal, 1775). The earliest scientific report on khat presented to a Western country was in the eighteenth century, when the botanist, Peter Forskal, identified the plant in Yemen and called it *Cathaedulis* (Raman, 1983). However, he did not live long enough to publish his finding, which was later edited in 1775 by Niebuhr, the only survivor of the first European scientific expedition to Arabia (Niebuhr, 1792, Kalix and Branden, 1985). Niebuhr labeled khat under the generic name of *Catha edulis* Forsk (Niebuhr, 1792, Kalix & Branden, 1985).

Khat is the most common name for *Catha edulis* plant (Cox and Rampes, 2003), which is consumed for its psycho stimulatory effect. Unfortunately, Khat becomes a serious public health problem in Yemen (Al-Motarreb *et al., 2010*). The chewing of khat leaves have involved at least 80% of adult males (Al-Habori, 2005) and extended to women, too (Kassim *et al.,* 2010). Khat was mentioned in the chronicles of King *Amdatsion* who reigned from 1314-1344 AD (Getahun&Krikohian, 1973). In the earlier days, the chewing of khat was predominantly confined to the Eastern part of Ethiopia and mainly frequented by the Muslim community. But, later on, the habit rapidly spread to the central highlands and to the western parts of the country and crossed over religious and ethnic boundaries. Currently, there is no place in Ethiopia where khat is not chewed (Tefera, 2011).

1.2. Statement of the problem

The improved roads and air transport have allowed a much wider distribution of khat. Thus, the ease of accessibility to the users makes it available everywhere for everyone. Nowadays, there are many places in urban areas known by the name *mekamia bet* or khat chewing houses which offer their customers fresh khat and other services. It has remained a major area of an argument whether the use and distribution of khat be legal or not. It is banned in countries like USA, Canada, France, Switzerland and Sweden while it is not illegal in Ethiopia, Kenya, Somalia, Zimbabwe, Tanzania, Uganda, Malawi, South Africa, United Kingdom and Netherlands as well as Yemen.

The study of its socio-economic effect, pharmacological effect, chronic and acute effects on Physiological systems of the body is a foundation for the understanding of the effect of thePlant‟s active constituents on a human being. These studies can lead to the better solutions internationally and to the better wellbeing, increased health and productivity among the community.

People give different reasons for chewing khat. In situations where khat chewing is associated with some traditional practices and events such as weddings and festivities, chewing usually happens to be part of the ritual in group settings. Some people chew khat to enhance their performance by feeling more energetic and staying awake while farming or studying. But solitary, as well as group chewing, can take place in urban areas as a form of leisure activity.

The chewing of khat usually takes hours.There have been reports of khat causing decreased productivity, deprivation and disruption in family life by diverting the income to buying khat instead of supporting the family in its basic needs (Elmy *et al.,* 1987, Selassie & Gebre, 1996 & Belew *et al.,* 2000).

Khat chewers often drink alcohol to counteract the feeling of anxiety, dysphoria and sleeplessness, an activity known by the name *chebsi*, meaning breaker of the state of khat intoxication (Tefera,2011).Many chewers smoke cigarettes and, nowadays, there is increasing use of hookah (water pipe) during chewing in urban areas in Ethiopia (Nencini, 1989 and Toennes, 2003).It was also implicated in the spread of HIV in Ethiopia by making people engage

in unsafe casual sex which is the most important mode of HIV transmission (Kebede *et al.,* 2005 and Dawit *et al.,* 2006). Khat chewing is the risk of absenteeism from class and poor academic performance of the students (Mulugeta, 2013).

Many adverse effects have been associated with khat consumption (Al-Motarreb *et al.,* 2010). Accordingly, prolonged exposure to khat could result in psychoneurological disturbances such as neurosis (Hoffman and Absi, 2010).In young adults, the chronic use of khat is also associated with hypertension, as well as stomatitis, esophagitis, gastritis, and constipation (Hassan *et al., 2007*).

The effect of khat on the brain has been a subject of interest for many researchers. Khat causes psychological dependence. In chronic khat chewers, withdrawal symptoms that involve frightening dreams which last for one to two nights were reported to occur besides being tired; feeling hot in lower extremities and the desire to chew khat (Al Motarreb, 2002).

More severe psychological reactions such as psychoses were reported as well. In a review published in 2007, reported more than twenty cases of khat-induced psychosis (Warfa, 2007). It was difficult to establish a causal relationship, but the onset of psychotic symptoms was temporally related with khat chewing (Warfa, 2007). A study done at Amanuel Specialized Mental Hospital in Ethiopia described the role of khat in frequent relapse of cases with psychosis (Bimerew, 2007).

1.3. Significance of the study

Studying the effects of khat is a very important area of concern. Because of its rapid wide spread use of khat in the khat producing countries in general and Ethiopia in particular.Khat chewing on regular basis results dependency that leads to certain socioeconomic and health anomalies. Chronic use of khat may lead to various kinds of mental illnesses. WHO (2003, 2006) reported that Khat consumption has become a common problem that affects the health aspects of life (Kassim *et al.,* 2010). Moreover, it has serious social and economic consequences.

Comparably few studies have been conducted regarding its long-term effects on the mental health, blood pressure and pulse rate. Therefore, this study was conducted to assess the effect of chronic consumption of khat on mental health, blood pressure and pulse rate among Hosanna town khat chewers. Following the findings of this study, efforts will be made to create awareness among the community about the health impact of chronic khat chewing and its consequences on the society.

2. LITERATURE REVIEW

2.1. Botanical description of khat

Khat is classified as Kingdom: *Plantae,* Class: *Magnoliopsida,* Order*: Celastrales,* Family: *Celastraceae,* Genus: *Catha,* Species: *C. edulis.*

The khat tree can grow as tall as 15 to 20 meters but usually kept short to facilitate harvesting the fresh leaves. It is drought resistant plant which grows in highlands and can be harvested throughout the year (Getahun & Krikorian, 1973). Khat is an evergreen shrub that is believed to have originated from Ethiopia. It grows in many Eastern and Southern African countries and the Arabian Peninsula. Its fresh leaves are chewed and the juice is swallowed to exert its stimulating effect. It has many names in different countries, such as qat in Yemen, jaad in Somalia and miraa in Kenya and Tanzania ; it is also known as marungi, catha,cat, cot, qat, gaad, African salad, tohai, bushmans tea, flower of paradise, Abyssinian tea,African tea, Arabian tea, chafta, chat. In most scientific literature it is known as khat (Sikiru and Babu, 2012).

In Ethiopia it is widely known by the name *chat* (ጫት) in Amharic and *jima* in Afan Oromo. Based on the place it comes from, there are different varieties of khat in Ethiopia. The price of a bundle varies based on type. Khat shops advertise the types they have on their shops to attract customers. Some of the types include: *abumismar, asano, awoday, baherdar, beleche, gelemso, gurage, kuto, wondo, wollene* and so on. *Awoday* and *beleche* are the most expensive types: a bundle costs 80 and 50 birr, respectively; while, *gurage* and *gelemso* are the cheapest and preferred by the low income chewers (Tefera, 2011).

Figure1**.** A young khat shrub (Sikiru and Babu, 2009 and Lamina, 2010)

2.2. Phytochemical studies of khat

The environment and climate conditions determine the chemical profile of khat leaves. In the Yemen Arab Republic, about 44 different types of khat exist originating from different geographic areas of the country (Geisshusler and Brenneisen, 1987). Its taste varies from one kind to another and depends on the tannic acid content. Khat leaves have an astringent taste and have an aromatic odor. The young leaves are slightly sweet. Many different compounds are found in khat including alkaloids, terpenoids, flavonoids, sterols, glycosides, tannins, amino acids, vitamins and minerals (Cox and Rampes, 2003, Nencini and Ahmed, 1989, Kalix and Braenden, 1985).

Cathinone is also named (–)-alpha-aminopropiophenone. It is considered to be the most active ingredient of khat. It had been isolated and synthesized and its effects has been shown to be Similar to amphetamine, but with a lower potency.Cathinone is estimated to be 7–10 times more potent than cathine. It is difficult to synthesise, hence it is unsuitable for marketing as a pure substance for drug misuse (Nencini *et al*, 1989).

Cathine is also named (+)-norpseudoephedrine and phenylpropanolamine. It was previously isolated from the plant ephedra, which has effects similar to those of khat. Cathine has a milder Psycho stimulant action than cathinone and the effects last for only a short time, so the user must chew leaves almost continuously. It plays only a minor role in the action of khat, but it is responsible for the unwanted systemic effects. Normally, fresh leaves contain a higher proportion of the desirable cathinone. Where the content of cathine is relatively higher, the cathine causes more unwanted systemic effects. On drying, cathinone breaks down into cathine. Khat loses its potency the longer the time interval between cutting and chewing. Therefore, khat chewers prefer fresh leaves that contain a higher proportion of cathinone to cathine, so that they obtain a better stimulation with fewer systemic adverse effects (Cox & Rampes, 2003).

Cathinone is unstable and under goes decomposition reactions after harvesting and during drying or extraction of the plant material (Nencini and Ahmed, 1989, Kalix and Braenden, 1985, WHO, 1980 and Brenneisen and Geisshusler, 1985). Decomposition leads to a „dimer" (3, 6-dimethyl-2, 5-diphenylpyrazine) and possibly to smaller fragments. Both the dimer and phenylpropanedione have been isolated from khat extracts (WHO, 1980). As cathinone is presumably the main psychoactive component of khat, this explains why fresh leaves are preferred and why khat is wrapped up in banana leaves to preserve freshness. The phenylalkylamine content of khat leaves varies within wide limits. Fresh khat from different origin contained on the average 36 mg cathinone, 120 mg cathine, and 8 mg norephedrine per 100 gram of leaves (Brenneisen and Geisshusler, 1987). Toennes *et al.,* (2003) found 114 mg cathinone, 83 mg cathine and 44 mg norephedrine in 100 gram of khat leaves confiscated at Frankfurt airport.Widler *et al*., (1994) found 102 mg cathinone, 86 mg cathine and 47 mg norephedrine in 100 gram of fresh leaves from Kenya confiscated at Geneva Airport (Widler *et al*., 1994). AlMotarreb *et al.*, (2002) reported higher levels of cathinone in fresh leaves: 78 – 343 mg/100 gram (AlMotarreb *et al.*, 2002). Khat leaves also contain considerable amounts of tannins (up to10% in dried material) and flavonoids (AlMotarreb *et al.*, 2002 and Hassan, 2002).

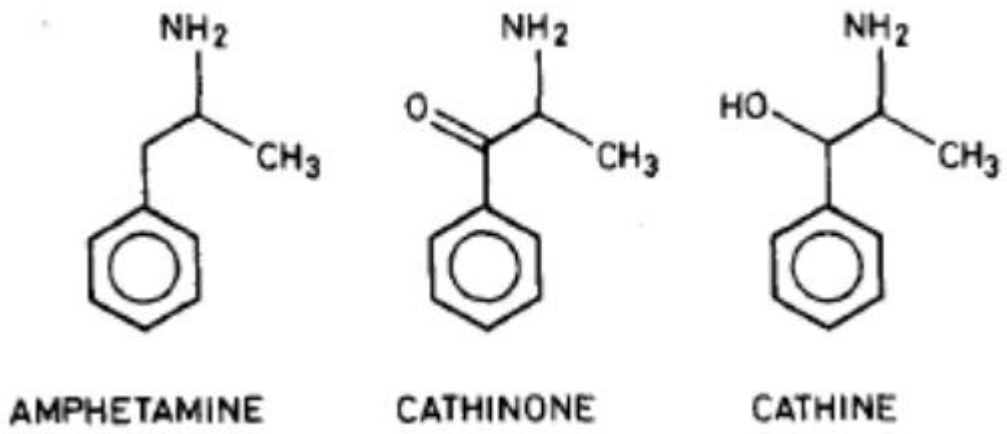

Figure2.The chemical structures of khat alkaloids in comparison with amphetamine (Kalix, 1992)

2.3. Modes of action

The constituents of khat have been shown to exert their effects on two main neurochemical Pathways: dopamine and noradrenaline. It has also been postulated that, like amphetamine, cathinone releases serotonin in the central nervous system. Both amphetamine and cathinone induce release of dopamine from central nervous system dopamine terminals and thus increase the activity of the dopaminergic pathways (Kalix & Braenden, 1985).

Cathinone has a releasing effect on noradrenaline storage sites, which supports the conclusion that cathinone facilitates noradrenalin transmission. The potency of cathinone to release dopamine in the striatum and nucleus accumbens is similar to amphetamine. Because of its higher lipid solubility cathinone has more rapid and intense action than cathine (Numan, 2012).Khat mainly contains cathinone and cathine, naturally occurring alkaloid amphetamines. Whenthe leaves of the plant are chewed, cathinone releases catecholamines from the presynaptic storage sites; this release of cathinone is known to be responsible for the stimulant action (Cox & Rampes, 2003).

2.4. Effect of khat chewing on central nervous system

The CNS stimulating effects are mainly because of the cathinone content in the fresh leaves. Cathinone releases catecholamines (dopamine and noradrenaline) from presynaptic storage sites and has actions similar to that of amphetamines. It has also been postulated that, like amphetamine, cathinone releases serotonin in the CNS (Magdum, 2011).

More specifically, the CNS effects of cathinone are thought to be because of the enhanced release of dopamine from the nerve terminals; the release of dopamine increases the activity of dopaminergic pathway and the effect of cathinone is thought to be dose dependent on the release of dopamines (Magdum 2011, Stefan J, and Mathew B 2005). Increased alertness, dependence, tolerance and psychiatric symptoms are effects of khat on the central nervous system (WHO, 2006). The effect that accounts for the popularity of khat is its central nervous system stimulation, believed to be induced by cathinone, an active ingredient of khat leaves. Cathinone has a more rapid and intense action compared with cathine due to its higher lipid solubility which facilitates access into the central nervous system (Glenice & Hagen, 2003).

Cathinone, like amphetamines, exerts the sympathomimetic effects by penetrating intraneural Sites (Kalix, 1992) and promoting the presynaptic release of neural dopamine (Kalix, 1990).

Studies in human Drugs of abuse activate the dopaminergic neurons that travel in medial forebrain bundle (like natural rewards and brain stimulation reward). All drugs of abuse increase dopaminergic transmission from the ventral tegmental area of basal ganglia to the nucleus Accumbens [but with chronic intake, the dopaminergic system is impaired (Kendel, 2000)].

Association of a drug-induced pleasurable experience increases in dopamine will result in strong conditioning not only to the drug but also to the stimuli that predict the drug (e.g., the house of the drug dealer, the neighborhood, syringes). This could contribute to the enhanced responses to the drug and drug-related stimuli that then overshadow the response to natural rewards (Kendle, 2000).

Several studies showed that the psychostimulant effects induced by chewing khat include a moderate degree of euphoria and mild excitement resulting in promotion of social interaction and loquacity. While attaining a subjective state of well-being, the chewers feel an increase in alertness and energy together with enhanced depth of perception. These effects were found to be

a maximum between 1.5 – 3.5 hours after starting to chew and they were progressively replaced by mild dysphonia, anxiety, reactive depression, insomnia and anorexia or loss of appetite (Hassen et al., 2002; Hassen et al., 2003).

Thinking is characterized by a flight of ideas but without the ability to concentrate. However, at the end of a khat session the user may experience depressed mood, irritability, anorexia and difficulty to sleep **(**Al Motarreb *et al.,* 2002b; Nencini and Ahmed, 1989). Khat chewing induced anorexia and insomnia (delayed bedtime) results in late wake-up next morning and low work performance the next day (Hassan *et al.,* 2002).

Frequent khat chewing is responsible for different disorders including psychotic illness and has harmful socioeconomic consequences (Wabel, 2011). There have been few reports of severe and disabling neurological illness associated with khat chewing reported, Such a case in a 58-years-old Somali man livingin United Kingdom who presented with leucoencephalopathy associated with khat misuse (Morrish *et al.,* 1999). In addition, the CNS stimulating effect of khat has shown to reach the level of acute and chronic toxicity as evidenced by growing reports of psychiatric morbidity associated with khat use (Nielen *et al.,* 2004; Alem *et al.,* 1999). Another study conducted in Yemen on khat use and trait anger show that regular khat chewing is associated with higher trait anger, more pronounced negative responses during stress and less pronounced positive emotional states (Bongard *et al.,* 2011).

In recent years, khat induced psychosis (serious mental illness) has become more common. This may follow consumption of exceptionally potent material, when taken in excess or in a predisposed individual. Psychotic features described in the literature include mania, paranoia and schizophrenia (Pantelis, *et al.,*1989). Use and abuse of khat (*Catha edulis*): a review of the distribution, pharmacology, side effects and a description of psychosis attributed to khat chewing.The problems associated with repeated consumption of *Catha edulis* leaves are becoming evident. Literature surveys and clinical diagnostic studies revealed the presence of a direct relationship between *Catha edulis* chewing and the weighted aggregate lifetime prevalence of the psychiatric morbidity in Ethiopia (Alem and Shibre, 1997 and Awas *et al.,* 1999). Study conducted in Jimma city on khat chewing and mental distress showed that mental distress and

khat use has significant association. There was also significant association between mental distress and frequency of khat use (Damena, *et al.*, 2011)

2.5. Effect of khat chewing on cardiovascular system

In non-chewer volunteers, chewing khat leads to a significant increase in systolic and diastolic blood pressures persisting for between 3 and 4 hours after the onset of chewing (Toennes *et al.,* 2003; Widler *et al.,* 1994). Khat is typically ingested while chewing the leaves. After ingesting khat, the chewer experiences an immediate increase in blood pressure and heart rate (Basker, 2013). In a pharmacokinetic study, diastolic and systolic blood pressures were elevated for about 3 hours after chewing (Wabe, 2012). Recent work on Yemeni healthy adult volunteers provided evidence that khat chewing produced a significant rise in arterial systolic and diastolic blood pressure and pulse rate (Halket, *et al*.,1995)

A significant and progressive rise in systolic and diastolic blood pressure and heart rate was observed during the 3-hour period of chewing fresh *Catha edulis* and levels did not return to baseline 1 h after chewing had ceased (Hassan, 2000). An increased incidence of acute myocardial infarction presenting between 2 PM and midnight, i.e. occurring during khat sessions, has been found **(**Al Motarreb et al., 2002a**).** Chronic use of Catha edulis has also been associated with increased incidence of acute coronary vasospasm and myocardial infarction (Al-motarreb *et al*., 2002). Recently, it has been reported that khat chewing is associated with acute myocardial infarction (Al Motarreb *et al.,* 2005). Khat chewing appears to be an independent dose-related risk factor for the development of acute myocardial infarction with heavy chewers having a 39-fold increased risk (Al Motarreb *et al.,* 2005).

A study conducted on the effects of khat chewing behaviors on health outcomes among male khat chewers in Bahir Dar revealed that those who spent more than 6 hours in a khat session were 7.25 times more likely to have elevated systolic blood pressure compared to those who spent less than 6 hours. It was also found that those who spent more than 6 hours in a khat session were almost 9 times more likely to have elevated diastolic blood pressure compared to who spent less than 6 hours. The risk of elevated systolic blood pressure was more than 5.26 times more likely among male chewers who reported increase amount of khat chewing compared to those reported decrease the amount in the last 12 months, and the risk of elevated diastolic

blood pressure was more than 7 times more likely among chewers who reported increase amount of khat chewing in the last 12 months (Birhane *et al.,* 2014*).*

3. OBJECTIVES OF THE STUDY

3.1. General objective

The aim of this study was to assess the effect of chronic khat chewing on mental health blood pressure and pulse rate among Hosanna town khat chewers.

3.2. Specific objectives

- To describe an association between mental distress and chronic khat chewing.
- To determine the association between systolic and diastolic blood pressure with chronic khat chewing.
- To determine the association between pulse rate and chronic khat chewing.
- To assess the association between BMI and chronic khat chewing.

4. MATERIALS AND METHOD

4.1. Study area

Hosanna town is the administrative and commercial center of Hadiya zone. The town has been declared a model town by the regional state government. The town has got its new administration structure in 2004 and organized in to eight sub-cities. Hosanna town is located south west of Addis Ababa at a distance of 230 km. The absolute geographic location of Hosanna is from 7° 30′ 00′ to 7° 35′ 00″North latitude and from 37°49′ 00″ to 37° 53′ 00″ East longitudes (Hosanna Town Administrative Survey Document, 2013). The altitude of the town ranges from 2140 m to 2400 m above sea level. This shows that the town is mainly characterized by highland temprate climatic condition (Hosanna Town Finance and Economic Development Office, 2014).

4.2. Study period

The study was conducted from April to May 2016.

4.3. Study design

Community based comparative cross sectional study was conducted to assess the effect of chronic Khat chewing on mental health, blood pressure and pulse rate in Hosanna town.

4.4. Population

4.4.1. Source population

Source population for this study is all khat chewers of age 18 years old and above from Hosanna community. Nowadays, Hosanna town has a total population of 100,531 of whom 51,011 aremen and 49,520 are women (Hosanna Town Finance and Economic Development Office, projection 2014/15).The residents of Hosanna are followers of different religion, such as Protestant, Orthodox and Muslim. With regard to ethnic groups, Hadiya, Amhara, Gurage, Silte, Kambata; have been living in the town (Hosanna Town Finance and Economic Development Office projection, 2014/15).

4.4.2. Study Population

The study participants were adults aged 18 years old and above residing in Hosanna town who met the inclusion criteria for the study. In addition, a total of 192 non-chewers were selected randomly from the same area, who were matched in any of the important demographic parameters especially age, weight and height with the study population.Both groups were residents at Hossana town, non-smokers, non- alchol drinkers and no history of mental health problems, hypertension and tachycardia.

4.4.3. Control group

Half the number of the study population. 192 non-chewers, who did not differ from the study group in any of the important demographic parameters especially age, weight and height were selected from the same study area. From these control subjects, 142 were males and 50 females.

4.5. Inclusion and Exclusion criteria

Inclusion criteria:

The study participants were adult residents of Hosanna town who were chronic khat chewers aged 18 years and above, currently living in Hosanna, regularly chew khat (at least three or more days a week) over the preceding 2 years, and willing to participate were included.

Exclusion criteria:

The study excludes those study subjects with history of mental health problems, hypertension and tachycardia. Khat chewers with temporary residency (like visitors and university students) and with linguistic barriers (not speaking Amharic, Hadiyissa or English) were not recruited.

In addition, those who were not willing to avoid using substances like coke, coffee or tea during the study period, smokers, alcohol drinkers, occasional Khat chewers, pregnant women and terminally ill patients were excluded.

4.6. Ethical considerations

The study was carried out after all relevant ethical issues were cleared and approval was obtained from the physiology departmental research Ethics committee (DPRC), Addis Ababa University.

Before performing the actual procedure, verbal and written consents were obtained from the study participants. Participant‟s data was coded, used for the stated objectives alone and was confidential. Participants were also informed that they have a full right to reject or terminate participation at any point of the study period.

4.7. Data collection procedure

Upon submission of letter of support from the college, a meeting was held with the heads of Hosanna town administration to explain the aim of the study. Both cluster sampling and systematic random sampling methods were utilized to select study participants from the source population. Systematic random sampling technique was employed to select samples of khat sellers and cluster sampling technique was used to select eligible khat chewers for the study. The procedures include, identifying the sub-cities where sellers were highly populated, recruitment of khat sellers from a given sub-city and selection of khat chewers from the recruited khat sellers. Sampling was conducted through sellers to sellers‟ survey in which, every second khat sellers were selected through systematic random sampling and all volunteers in the sampled sellers were included in the study.Following identification of khat chewers, they were approached and briefed about the study at the place of khat selling. Finally, khat chewers who agreed to participate were screened and those who met the inclusion criteria were invited to participate in the study.

Before performing the actual procedure, participants were asked to sign pre-made consent forms in (Amharic, English or Hadiyissa). Confidentiality of personal information was maintained. For data collection, a pretested questionnaire related to the study objectives were developed and used. The questionnaire was translated into Amharic and distributed to study participants.

Blood pressure and pulse rate were measured in triplicate and the average was taken. Study participants with hypertension and tachycardia were excluded in order to make comparison among healthy subjects. Two trained nurses were involved in data collection, while supervision was provided by the principal investigator.

4.8. Sample Size and sampling technique

There is no available research finding regarding the prevalence of khat chewing amongst the Hosanna community. Therefore, sample estimation of the current study was based on available data of Butajira as Butajira town has some what near similar cultural, ethnic and socioeconomic characterstics as Hosanna. A large population survey of 10,468 adults from Butajira showed that 55.7% of the sample had used khat at some time in their lives, of which 50% were current users and 17.4% reported using on a daily basis (Alem, Kebede & Kullgren, 1999). Therefore, the sample size (n) for this study was taken by assuming that the prevalence of khat chewing in Butajira (50%), with margin of error (d) of 0.05 between the samples and the population at 95% confidence level.

Hence, the following formula for single population proportion was used:

$$n = \frac{(z_{\alpha/2})^2 \, p \, (1-p)}{d^2}$$

Where n = Sample size,

Z α /2 = confidence level at 95% = 1.96,

d = marigin of error of 5% = 0.05,

P= proportion of khat chewers = 0.5, 1-P= 0.5

$$n = \frac{(1.96)^2 (0.5) (0.5)}{(0.05)^2} = 384$$

4.9. Data Collection methods and instrumentation

4.9.1. Anthropometric data and Physiological Parameters

Anthropometric data

Adult height measuring scale with weighing machine (floor Model) was used. Height was measured without shoes to the nearest one centimeter and weight was also measured with light clothing to the nearest one kilogram. BMI was then calculated as weight over heght in meters square.

Physiological parameters

Digital spygmomanometer was used to measure blood pressure and pulse rate. Study participants rested for 20 minutes up on arrival at the research site. The participants were asked if they ingested coke, caffeine or tea within 30 minutes prior to measurements. Up on conformation, participant's arm was placed on a table with their palm opened; upper arm exposed and relaxed. The deflated cuff was wrapped evenly around the upper arm and measurement was made in sitting position.

4.9.2. Mental distress

World Health Organization (WHO) Self Reporting Questionnaire (SRQ-20) format was translated in to Amharic and was used to measure symptoms of mental distress which was validated in Ethiopia (Kortman, 1990). These 20-item scale questionnaires assess mental distress symptoms that were experienced continuously among study participants. Respondents who had scores of six and above on the SRQ-20 were considered as mentally distressed.

In Ethiopia, where there are great cultural and ethnic diversities, the need for using different cut-off points in different communities was obvious from previous studies. Studies conducted in Addis Ababa, Jimma and Butajira population used SRQ a cut-off point 6 out of 20 to determine whether an individual has mental distress or not (Kortman, 1990). The current study also used the same cut-off point with previous study done in Butajira as the current study area has specifically some what near similar cultural, ethnic and socioeconomic characteristics with Butajira. In addition, World Health Organization (WHO) substance abuse questionnaire was modified and used to make it relevant to the objective of the study (Smart, *et al., 1980).*

4.10. Data management and Analysis

The data collected was cleaned, edited and entered in to computer and analyzed using statistical package for social science (SPSS) software, version 20. Descriptive statistics such as frequency, percentage, chi square, mean and standard deviation were used to describe the data. In addition, in order to assess the mean difference between khat chewers and non-khat chewers on physiological parameters and mental distress, independent sample t-test was employed. A p-value < 0.05 was considered statistically significant.

4.11. Data quality control

Data collectors were trained proffessionals to ensure consistency.Close supervision was done by principal investigators through out the data collection.Collected data were checked for completeness and consistency.

4.12. Dissemination of the study results

The result of the research will be communicated to responsible bodies like government and private health sectors, mass media and civic organizations to create awareness, up grade or take action for intervention purpose on how to modify their polices.

The outcome of this study may be used by:

I. The Hadiya Zone Health Department and Labor and Social Affairs Bureau.
   a. To give health education to the community in general and to chewers, in particular about the adverse effect of khat chewing.
   b. To give education for adolescents and youngsters in high schools and higher institutions about the health and socioeconomic impact of substance abuse.

II. Addis Ababa University department of Physiology College of health sciences school of medicine and post graduate office to use as abase line for further research and investigation.

III. Policy makers to draft rules and regulations about the production, distribution and use of khat.

5. RESULTS

5.1. Socio-demographic characteristics

A total of 576 participants composed of 384 Khat chewers and 192 non- chewers participated in this study. Regarding the age of participants the majority, 50(%) of Khat chewers and 47.4(%) of non-chewers group were in the age range of 18-24 years. Only 7(%) of the Khat chewers and 10.7(%) of non-chewers group were above 45 years old. The majority, 70.3(%) of Khat chewers and 74(%) of non- chewer group were males. Most of Khat chewers 60 (%) and non- chewers group 50.5 (%) were unmarried,whereas 11(%) of Khat chewers and 20.1(%) of non-chewers group were married.

Concerning occupational status of participants, 28.6 (%) of Khat chewers and 30.7(%) of non-chewers group were unemployed. In this study 54.9 (%) of Khat chewers and 55.7(%) of non-chewers group were from Hadiya ethnicity. Regarding educational status of khat chewers group, 19.8 (%), 9.9 (%) and 30.2(%) participants had completed elementory school, high school, college diploma and above, respectively. For non-chewers group, 19.8 (%), 11.5(%) and 31.8(%) had completed elementory school, high school, college diploma and above, respectively. Whereas 40.1 (%) of khat chewers and 37 (%) of non- chewers group were an illiterate. There was no statistically significant difference between khat chewers and non-chewers group regarding socio-demographic characteristics like age, sex, marital status, ethnic group, occupational status and educational level.

Religious group

Religion showed statistically significant association with khat chewing ($p < 0.001$).The majority of khat chewers 47.4 (%) were Musilms and 42.2 (%) of non-chewers were Protestants.

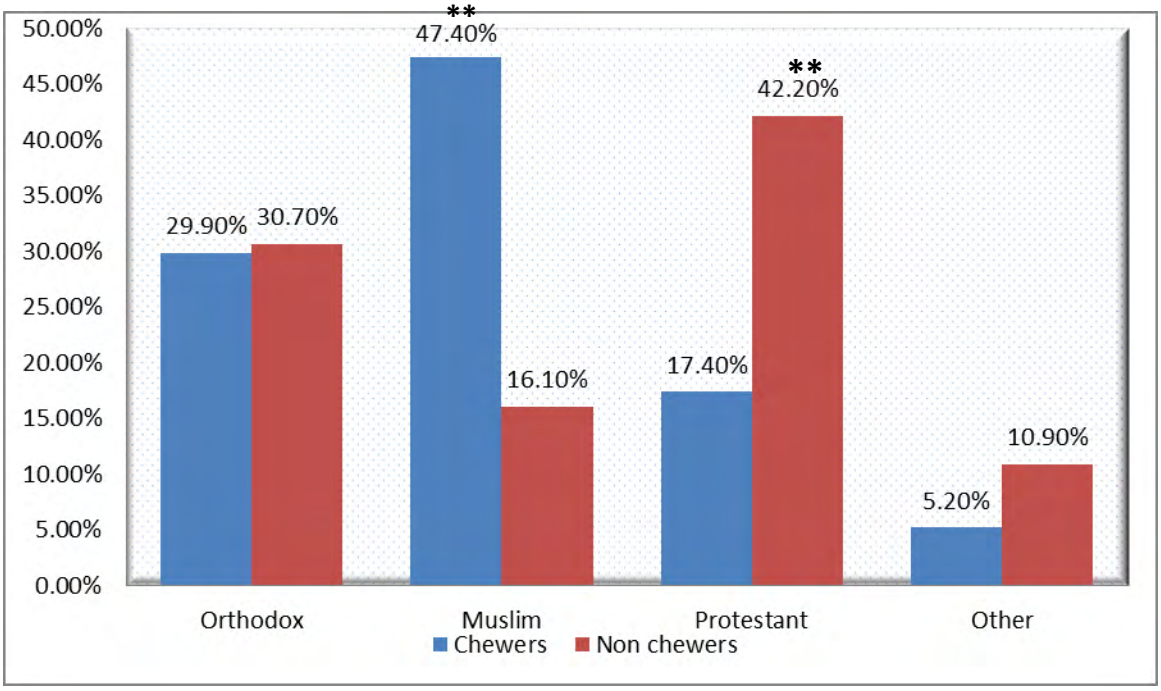

Figure 3, Religious group among khat chewers and non-chewers *in Hosanna town, 2016.*

. Note: ** p<0.001.

5.2. Khat chewing behavior

This section describes the social and behavioral characteristics of khat chewing, frequency of khat chewing, amount of money (in birr) expended for and the reason behind khat chewing.

In this study the majority of participants 96.4(%) chew khat everyday while only few 3.4(%) chew khat 3 or more days per week. With regar to the amount of money spent for khat chewing, 53(%) of khat chewers were spend 100 Ethiopian birr and more during a khat session.The majority 86.5(%), of participants responded that they have been chewing khat for more than 2 years. Most of participants 65.5(%) chewed khat in groups.

Different reasons were reported for chewing khat: 37.4 (%) to avoid unpleasant feelings, 27.8 (%) to increase performance, 17.1(%) to avoid depression, and 2.1(%) means of recreation. Regarding the feeling post use of khat, 26.5(%) reported that they insomnia, 16.9(%) hallucination, 16.1 (%) depression and 4.2 (%) headache.All participants reported that they feel unpleasant symptoms when they are not chewing khat (Table1).

Table 1. Social and behavioral characteristics among Khat chewers in Hosanna town, 2016.

Khat chewers Group			
variables	Categories	Frequeny	Percent
Frequency of chewing per week	Every day	371	96.4
	3 or more days per week	13	3.4
Amount of money (in birr) spent for khat session	20-50 birr	51	13.2
	50-100 birr	130	33.8
	>100 birr	203	53
For how long have you been chewing khat	6 months	14	3.6
	1 year	14	3.6
	2 years	23	6.0
	> 2 years	333	86.5
Khat chewing setting	Alone	107	27.8
	with spouse	19	4.9
	with friend"s	252	65.5
	Parents	6	1.6
Reason for khat chewing	for relaxation	42	10.9
	to increase performance	107	27.8
	for recreation	8	2.1
	to avoid depression	66	17.1
	to avoid unpleasant feelings	144	37.4
	for socialization	9	2.3
	Other reasons	8	2.1
feeling during chewing	Euphoria	77	20.0
	Concentration	172	44.7
	tension relief	34	8.8
	mental alertness/wakeful/strength	5	1.3
	Relaxation	13	3.4
	head ache	6	1.6
	frequent urination	77	20.0
feeling post chewing	Depression	62	16.1
	Hallucination	65	16.9
	Insomnia	102	26.5
	Irritability	33	8.6
	Headache	16	4.2
	Facilitated thinking	48	12.5
	Constipation	38	9.9
	suppressed appetite	20	5.2
feeling unpleasant symptoms when you are not chewing khat	Yes	384	100
Total		384	100

5.3. Levels of physiological parameters

The physiological parameters including SBP, DBP, PR and BMI were considered for analysis in this study. As shown in table 2, independent sample t-test indicated that there were statistically significant differences between Khat chewers and non-chewers group for SBP, DBP, PR, and BMI. ($p<0.001$)

Table 2: Comparison of mean values of *physiological parameters among khat chewers and non-chewers in Hosanna town, 2016.*

Dependent Variable	Group	N	Mean	Std. Deviation	df	t	Sig.
Systolic BP (mmHg)	Khat chewers	384	134.33	14.33	574	25.27	.000**
	Non-chewers	192	104.99	12.48			
Diastolic BP (mmHg)	Khat chewers	384	90.77	14.06	574	24.35	.000**
	Non-chewers	192	68.04	8.27			
Pulse Rate (min.)	Khat chewers	384	104.46	19.69	574	25.63	.000**
	Non-chewers	192	72.33	10.39			
BMI (kg/m2)	Khat chewers	384	17.55	3.51	574	17.04	.000**
	Non-chewers	192	22.88	3.55			

Note: ** $p<0.001$

5.4. Mental distress

Mental distress among khat chewers and non-chewers were analysed in this study.WHO Self Reporting Questionnaire (SRQ- 20) format was used to measure symptoms of mental distress. This 20-item scale questionnaire measures mental distress symptoms that were experienced continuously among study participants. Respondents who had a score of six and above on the scale were considered as mentally distressed. As shown in table 3, independent sample t-test indicated that there was a statistically significant difference between Khat chewers and non-Khat chewers group on mental distress score ($p<0.001$).

Table 3. The Mental distress score difference among Khat chewers and non-chewers group in Hosanna town, 2016.

Dependent Variable	Group	N	Mean	Std. Deviation	df	t	P
Mental Distress	Khat chewers	384	17.22	5.91		551.15	.000**
	Non- chewers	192	3.42	7.42	1,573		

Note: ** $p<0.001$

5.5. BMI and chronic khat chewing

BMI (kg/m2) of khat chewers group was less than non-chewers group. The majority of the participants in the khat chewers group 62 (%) were under weight, whereas most of participants in non-chewers group 67.20 (%) were having normal BMI (Kg/m2). There was stastically significant difference between khat chewers and non- chewers group BMI.Chi-square analysis showed that there was a statistically significant association between chewing khat and BMI,(x^2 = 175.38, df = 2, p <0.001).

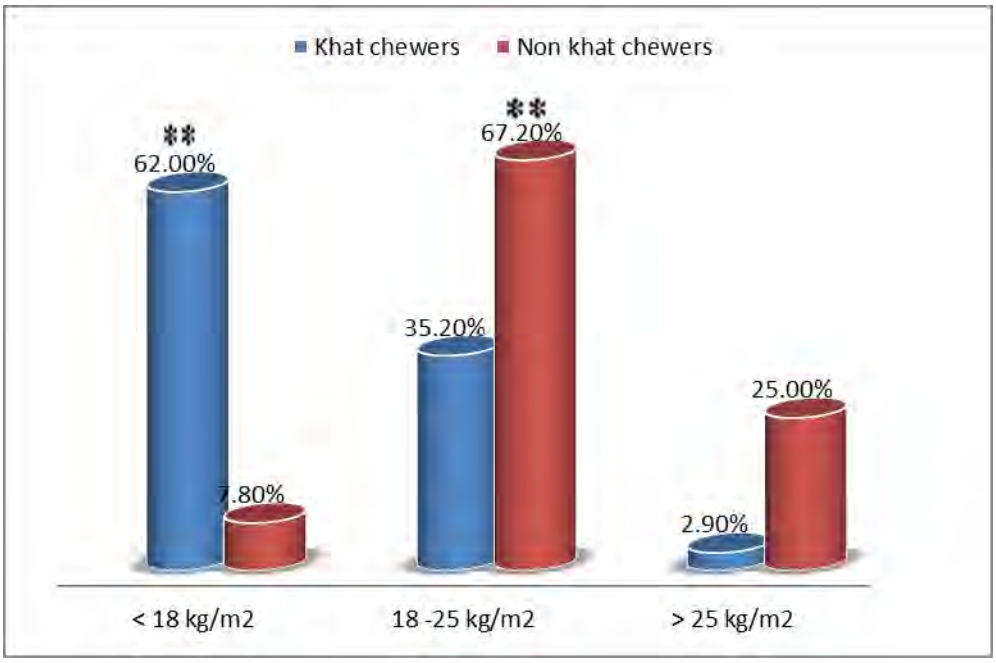

Figure 4, BMI (kg/m2) and chronic khat chewing. Note: ** p<0.001.

5.6. Systolic blood pressure and chronic khat chewing

Systolic blood pressure (mmHg) of khat chewers group was greater than non-chewers group. There was a higher prevalence of prehypertension 50.3(%) and stage 1 hypertension 40.9(%) among khat chewers group, whereas the majority of participants in the non-khat chewers group 85.90 (%) have normal systolic blood pressure (mmHg). Chi-square analysis showed that there was a statistically significant frequency distribution difference between khat chewers group and non- chewers group on systolic blood pressure (there was significant association between chewing khat and systolic blood pressure),($x^2 = 428.33$, df = 5, $p < 0.001$).

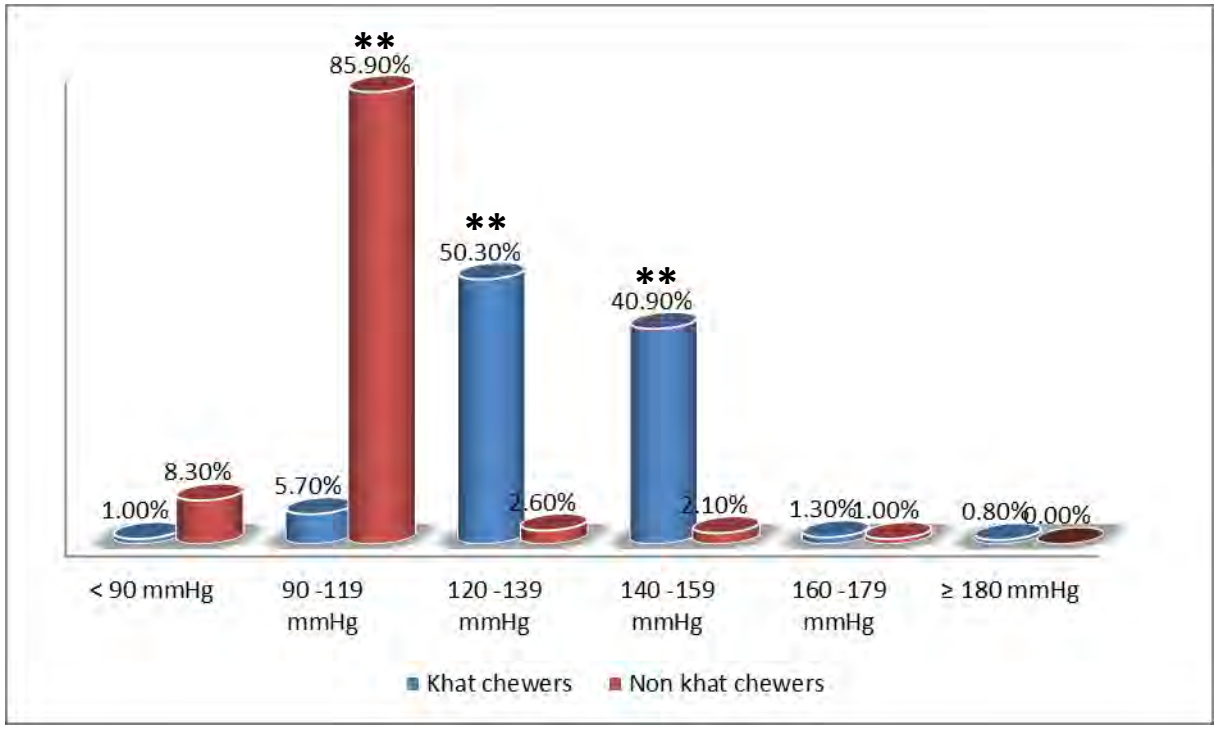

Figure 5, Systolic blood pressure (mmHg) and chronic khat chewing Note: ** p<0.001.

5.7. Diastolic blood pressure and chronic khat chewing

Diastolic blood pressure (mmHg) of khat chewers group was greater than non-chewers group. There was a higher prevalence of stage 1 hypertension 37.5 (%) and prehypertension 32.8 (%) among khat chewers group, whereas the majority of participants in the non-chewers group 87.5 (%) were having normal diastolic blood pressure (mmHg). The difference was stastically significant and chi-square analysis showed that there was a statistically significant association between chewing khat and diastolic blood pressure, ($x^2 = 448.05$, df = 5, $p < 0.001$).

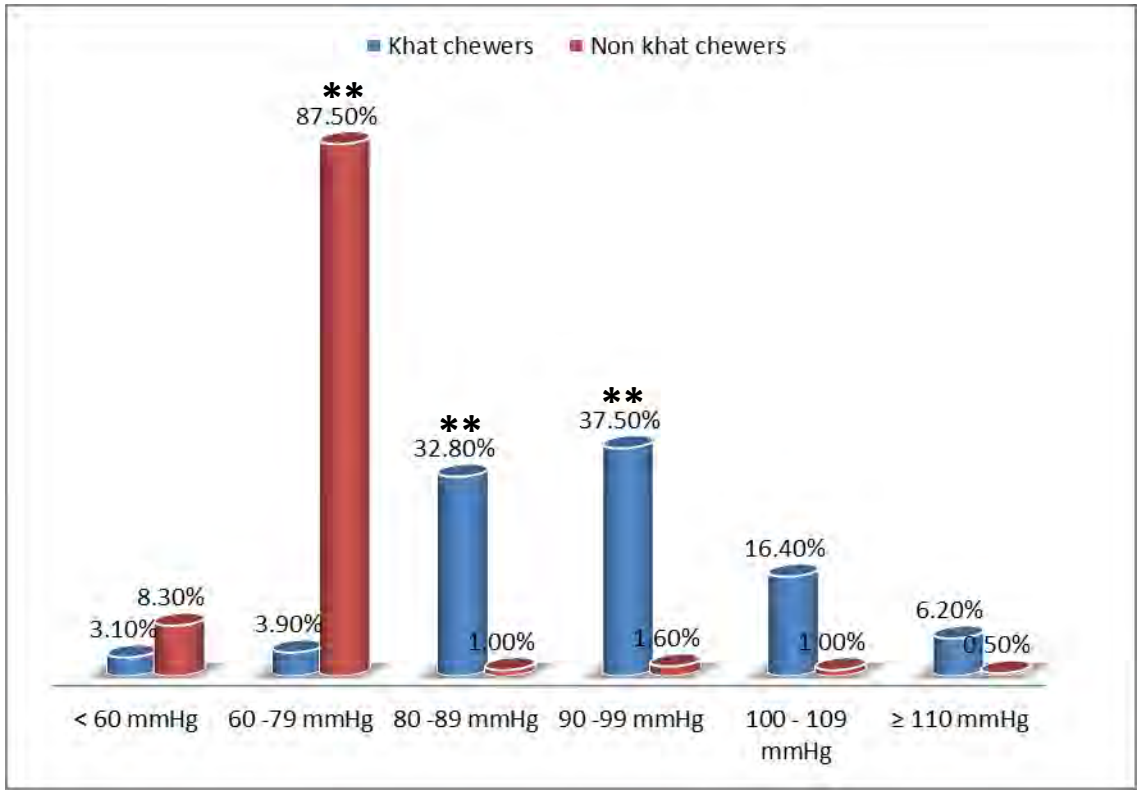

Figure 6, Diastolic blood pressure (mmHg) and chronic khat chewing Note: ** p<0.001.

5.8. Pulse rate and chronic khat chewing

Pulse rate (beats /minute) of khat chewers group was greater than non-chewers group. There was a higher prevalence of tachycardia 66.4 (%) among khat chewers group, whereas the majority of participants in the non- chewers group 91.70 (%) normal pulse rate (beats /min)**.** Chi-square analysis showed that there was a statistically significant frequency distribution difference between khat chewers and non-chewers group on pulse rate ($x^2 = 214.28$, df = 2, $p < 0.001$).

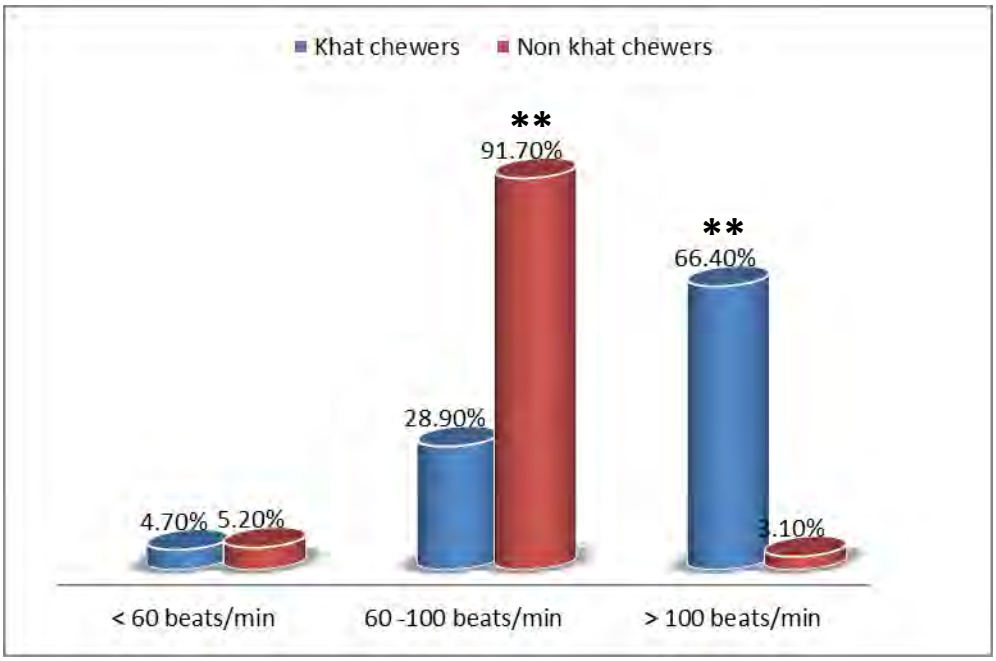

Figure7, Pulse rate (beats/minute) and chronic khat chewing. Note: ** p<0.001.

5.9. Correlation between BP, PR and BMI

Table 4, Pearson correlation between BP, PR and BMI

Correlations					
		Body Mass Index	Systolic B.P	Diastolic B.P	Pulse rate
Body Mass Index (Kg/m2)	Pearson Correlation	1	-.419**	-.431**	-.381**
	P value		.000	.000	.000
	N	576	576	576	576
Systolic B.P (mmHg)	Pearson Correlation	-.418**	1	.660**	.562**
	P value	.000		.000	.000
	N	576	576	576	576
Diastolic B.P (mmHg)	Pearson Correlation	-.431**	.660**	1	.574**
	P value	.000	.000		.000
	N	576	576	576	576
Pulse rate (beats/min)	Pearson Correlation	-.380**	.562**	.574**	1
	P value	.000	.000	.000	
	N	576	576	576	576

Note: ** correlation is significant at the 0.001 level

As it can be seen in table 4, there was a statistically significant correlation among dependent variables. The first strong positive correlation was between systolic blood pressure and diastolic blood pressure, ($r = 0.66$, $p < 0.001$). This positive strong correlation between systolic and diastolic blood pressure implies that as systolic blood pressure increases diastolic blood pressure also increases and vice-versa.Pulse rate was also correlated positively with diastolic blood pressure($r = 0.574$, $p < 0.001$) and systolic blood pressure ($r = 0.562$, $p < 0.001$). BMI have shown moderate negative correlations with both diastolic blood pressure ($r = -0.431$, $p <0.001$), systolic blood pressure and BMI, ($r = -0.418$, $p < 0.001$) and pulse rate ($r = -0.380$, $p < 0.001$).

5.10. Mental distress and chronic khat chewing

The most commonly seen physical symptoms of mental distress reported by khat chewers were: poor sleep, headache, hand shakes, poor appetite and easily tiredness. The most frequent cognitive symptoms were: difficulty in decision making, easily frightened, suicidal idea, trouble in thinking clearly, feeling worthless, becomes nervous, feeling unhappy, difficulty enjoying daily activities and loss of Interest in things.

The majority of participants in khat chewers group 89.1(%) had score of six and above on the SRQ-20 scale, this shows that they are mentally distressed.whereas most of participants in the non-chewer group 82.3 (%) had score of less than six on SRQ-20 scale.Chi-square analysis showed that there was a statistically significant association between chewing khat and mental distress($\chi^2 = 287.53$, df = 1, $p < 0.001$).

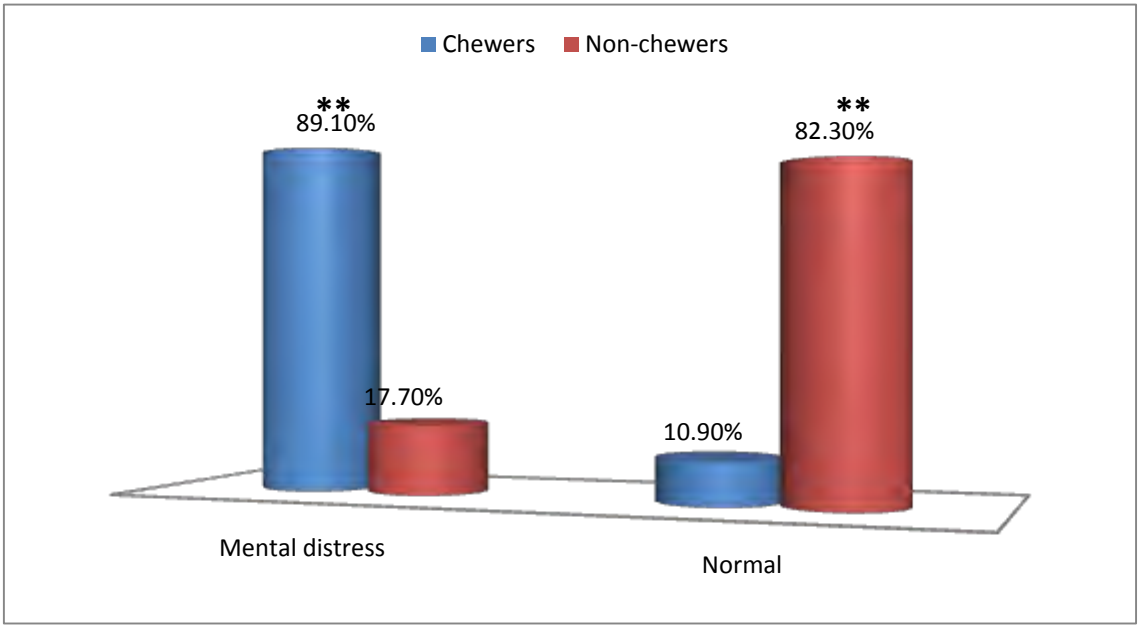

Figure 8, *Mental distress* and chronic khat chewing. Note: ** p<0.001.

6. DISCUSSION

6.1. Khat chewing and body mass index

The current study found that the mean score for BMI of khat chewers was less than that of non-chewers group. In addition there was siginificant association between chronic khat chewing and low BMI.

In consistent with this finding, Al-Sharafi and Gunaid (2015) found that the mean BMI of chronic khat chewers group was less than that of non- chewers group. Similarly, a study conducted by Mahmood and Lindequist (2008) on female rats found that a reduction in body weight when they fed khatfrequently.

The possible explanations for the significant association between weight lose and chronic khat chewing may be related to the loss of appetite after khat chewing. In line with this explanation, some studies (Hassan et al., 2002; 2003; Al Motarreb, Baker, & Broadley, 2002) reported that the psycho stimulant effects induced by chewing khat include loss of appetite which might result in loss of weight. Others suggested that the loss of appetite may be related to the slower whole gut transit time, or the anorexigenic effect of khat secondary to centrally- mediated mechanisms via cathinone (Hassan et al., 2002b; 2003). Another study (Kalix p.1988) also showed that anorexia following khat chewing is mainly due to a delay in gastric emptying.

6.2. Khat chewing and physiological parameters

The current study found that there was a statistically significant difference between khat chewers and non-chewers group on systolic and diastolic blood pressure.The systolic and diastolic blood pressure mean score of khat chewers group were higher than the non-chewers group. For systolic blood pressure, chi-square analysis showed that there was a statistically significant association between chewing khat and prehypertension.For diastolic blood pressure, there was a statistically significant association between chewing khat and stage one hypertension. In addition, this study found that the pulse rate mean score of khat chewers group was also greater than that of non-chewer group.

In consistent with the present finding (Wilder *et al*., 1994) found that chronic khat chewing was significantly associated with that of elevated arterial systolic and diastolic blood pressure and pulse rate. Workineh, Teferi and Fikru (2010) also found that the mean systolic and diastolic blood pressure were significantly higher among khat chewers than non-chewers.

The possible explanation for the increased systolic and diastolic blood pressure and heart rate might be related to sympathetic like action of the psychoactive chemical substance of khat called cathinone (Hassan et al., 2005). In addition, Hassan *et al.,* (2007) also suggested that cathinone is mainly responsible for the increment in arterial blood pressure and pulse rate during khat chewing. A possible mechanism is suggested to be the release of catecholamines from presynaptic storage sites.Hence, it may cause elevation of arterial blood pressure and pulse rate with subsequent increased cardiovascular risk (Hassan et al., 2007).

Moreover, Hassan *et al.,* (2000; 2007) reported that khat chewing induced a significant rise in arterial systolic and diastolic blood pressure and pulse rate in comparison with the baseline values on healthy Yemeni adult volunteers. Three hours after the on set of chewing, the effect of arterial blood pressure and pulse rate reached the highest point. These changes run parallel with changes in plasma cathinone levels during and after khat chewing (Hassan, et al., 2000; 2007).

The present study also shows that the prevalence of hypertension was significantly higher among chronic khat chewers than non-chewers. This finding is consistent with the study conducted by Workineh et al., (2010), who found that the prevalence of hypertension was significantly higher among chronic khat chewers than non-chewers. Workineh et al. (2010) reported that 30.9% of chewers were found to have pre-hypertension; this is an indication of chronic khat chewers are at higher risk of developing hypertension.In addition, significantly high proportion of chewers than non-chewers had sub-optimal diastolic blood pressure (> 80 mmHg), it has been found that regular chewing of Khat is associated with elevated mean diastolic blood pressure, which is described to the peripheral vasoconstrictor effect of cathinone (Hassan et al., 2000; Al Motarreb *et al.,* 2002; Workineh *et al.,* 2010). This effect may be sustained in regular khat chewers.

Furthermore, Andualem *et al*. (2002) hypothesized that cathinone may produce a direct excitatory effect on the central nervous system, especially, on the cerebral cortex, hypothalamus, and the brain stem. These higher centers control the sympathetic supply to the heart and the blood vessels. Therefore, the excitatory effect on the central nervous system may, in turn, produce high systolic and diastolic blood pressure (Andualem *et al.,* 2002). Cathinone has vasoconstrictor activity, increases blood pressure, and has positive ionotropic (increases myocardial contractility) and chronotropic (increases heart rate) actions that affect heart. Heavy khat use is implicated in increased incidences of hypertension and myocardial infarction (Magdum, 2011, Al-Motarreb 2004).

6.3. Khat chewing and mental distress

The current study found that the prevalence of mental distress is higher among khat chewers group than the non-chewers group.Furthermore, there was a significant association between chronic khat chewing and mental distress ($p<0.001$).

This finding is consistent with some other previous research findings by Damena *et al.*, 2011, Odenwald et al., 2005, Dachew, Azale, Berhe 2015). Damena *et al.*, (2011) found that there was also a significant association between mental distress and frequency of khat us. Their findings suggested that those who use khat frequently suffer from higher rates of mental distress. Odenwald *et al.,* (2005) also found a relationship between khat consumption and an onset of psychotic reactions. Their results indicated that not only khat consumption *per se* but rather early onset and excessive khat chewing were related to psychotic symptoms in the city of Hargeisa, Northwest Somalia. In most cases, a pattern of binge chewing (more than two „bundles" per day) preceded the onset of psychotic symptoms (Odenwald *et al.,* 2005).

Similarly, Kalix (1988) reported that psychotic behavior induced by khat use is sufficiently common in the khat-growing areas of eastern Ethiopia to have acquired a designated term *jezba*. However, in many instances, such psychoses disappear within a few days if khat consumption is stopped and/or anti-psychotic treatment is initiated (Kalix, 1988). It has been also suggested that khat chewing exacerbates symptoms in patients with pre-existing psychiatric conditions; possibly caused by the sympathomimetic actions of cathinone on neurons in the central nervous system (Hassan et al., 2002).

In addition, a related study by Asfaw and his colleagues (2014) assessed the level of anxiety and depression among dependent khat users and non-khat users. They found that a statistically significant difference was found in the levels of anxiety and depression between dependent khat users and non-khat users. They suggested that anxiety and depression are determined by the level of dependence, i.e dependent khat users have a higher level of experience as compared to and non-khat users. Therefore, they concluded that it is not only becoming a khat user, but developing the dependency on khat which is associated with anxiety and depression (Asfaw et al., 2014).

7. CONCLUSION

It was found that chronic khat chewers use khat to avoid unpleasant feelings, increase performance and to spend their leisure time. Concerning post-use of khat, they reported feelings of insomnia, euphoria, depression and headache. All participants reported that they feel unpleasant symptoms when they are not chewing khat. The blood pressure and pulse rate values of chronic khat chewers was greater than that of non- chewers. For systolic blood pressure, there was a statistically significant association between chewing khat and pre-hypertension and for diastolic blood pressure; there was a statistically significant association between chewing khat and stage one hypertension. And also, the BMI of khat chewers was less than that of non-chewers group. In addition, there was a statistically significant association between chronic khat chewing and mental distress.

8. LIMITATIONS OF THE STUDY

The study had some limitations. Firstly, there was difficulty in finding participants that are chronic khat chewers and at the same time non-smokers and non-alcohol drinkers.Secondly; sufficient literature was not available on the chronic effect of khat on mental health, blood pressure, and pulse rate. Hence, sufficient comparison of the current study was not made. Finally, financial limitation was also a challenge to make further investigation.

9. RECOMMENDATIONS

- Since chewing khat alters normal body functions; khat chewers should stop the habit in order to avoid unnecessary expenditure of money and to maintain positive health.
- Supporting scientific research on khat in different institutions and Universities to explore the different effects of khat on public health should be appreciated.
- Health education about the adverse effect of khat chewing should be delivered to the community and health institutions using available forum.
- Finally, multidisciplinary research studies may be needed to support more comprehensive evaluation of the observed effect at molecular level.

REFERENCES

Al- Biruni, A.A.A., Abu Reyhan, A.M. EL Saydna, Fi El Tib. Ed. Hakim, Mohammed Said. (1973). In: *The book of pharmacy and materiamedica*. Karachi, Hamdard National Foundation. (In Arabic).

Al-Habori, M. (2005). "The potential adverse effects of habitual use of *Catha edulis* (khat)," Expert Opinion on Drug Safety, 4(6), 1145–1154.

Al-Motarreb, M. Al-Habori, and K. J. Broadley, (2010). "Khat chewing, cardiovascular diseases and other internal medical problems: the current situation and directions for future research," *Journal of Ethnopharmacology, 132, (3): 540–548.*

Al Motarreb, A., Al Kebsi, M., Al Adhi, B., Broadley, K.J. (2002a). Khat chewing and acute myocardialinfarction. Heart; 87:279-280.

Al Motarreb, A., Baker K, Broadley, K.J (2002b). Khat: pharmacological and medical aspects and its social use in Yemen. Phytother Res; 16:403-413.

Al Motarreb, A., Briancon, S., Al Jaber, N., Al Adhi, B., Al Jailani, F., Salek, M.S, Broadley, K.J. (2005). Khat chewing is a risk factor for acute myocardial infarction: a case-control study. British Journal of Clinical Pharmacology; 59:574-581.

Al-Motarreb A (2004). Effect of khat on the heart and blood vessels. Heart Views.5:54–57.

Alem, A., Kebede, D., Jacobsson, L., & Kullgren, G. (1999). Suicide attempts among adults in Butajira, Ethiopia. ActaPsychiatricaScandinavica (Supplement); 397:70-76.

Alem, A., & Shibre, T. (1997): Khat induced psychosis and its medico-legal implication: a case report. *Ethiop. Med. J. 35:137-139.*

Al-Sharafi, B. & Gunaid, A. (2015). Effect of Habitual Khat Chewing on Glycemic Control, Body Mass Index, and Age at Diagnosis of Diabetes in Patients with Type 2 Diabetes Mellitus in Yemen. *Clinical Medicine Insights: Endocrinology and Diabetes: 8*:47–53 doi:10.4137/CMED.S26045.

American Heart Association (2011)" understandind blood pressure readings;"Retrived 30 March 2011.

Andualem, M., Hassen, T., & Yemane, T. (2002). Effect of Khat on blood pressure & heart rate, a community based study. *Ethiopian Journal of Health Development. 16(3): 325-334.*

Asfaw, G., Berhanie, G., Simegn, S., Daniel, T., Teka, Z. (2014). Khat chewing prevalence, cause and its effet on mental health in Behhir Dar, Noth West Ethipia. *European Scientific Journal.10 (23): 234-252.*

Awas,M., Kebede, D., Alem A (1999): Major mental disorders in Butajira, southern Ethiopia. Acta. Psychiatry Scand. Suppl. 397:56-64.

Basker V.G. (2013). A Review on Hazards of Khat Chewing, *International Journal of Pharmacy and Pharmaceutical Sciences*, 5(3), 74-77.

Belew M, Kebede D, Kassaye M, Enquoselassie F (2000). The Magnitude of Khat Use and Its Association with Health, Nutrition and Socio-economic status. *Ethiopian Medical Journal*; 38(1); 11-26.

Brenneisen, R. & Geisshusler, S. (1987). The content of psychoactive phenylpropyl and phenylpentenylkhatamines in Catha edulis Forsk of different origin. *J Ethnopharmacol;* 19:269-277.

Bimerew MS, Sonn FCT, Korlenbout WP (2007). Substance abuse and the risk of readmission of people with schizophrenia at Amanual Psychiatric Hospital, Ethiopia. Curationis; 30:74–81.

Birhane, B. W., Birhane, M. W., &Lebeta, K. R. (2014). Effects of khat chewing behaviours on health outcomes among male khat chewers in BahirDar, North West Ethiopia, *2*(4), 89-97.

Bongard,S.,Khalil,S.&Habori,A.(2011).Khat Use and Trait Anger. Jof Ethnopharmacolog; 14 :285–291.

Brenneisen R, Geisshusler S (1985). Psychotropic drugs. III. Analytical and chemical aspects of Catha edulis Forsk. Pharm Acta Helv; 60:290-301.

Cox G, Rampes H. Adverse effects of Khat: A review (2003). Advances in Psychiatric Treatment, 9:456–463.

Dachew BA, Azale Bisetegn T, Berhe Gebremariam R (2015) Prevalence of Mental Distress and Associated Factors among Undergraduate Students of University of Gondar, Northwest Ethiopia: A Cross-Sectional Institutional Based Study. PLoS ONE 10(3): e0119464. doi:10.1371/journal.pone.0119464.

Dawit, A., Debella, A., Dejene, A., Abebe, A., Mekonnen, Y., Degefa, A., Ketema, L. (2006). Is khat-chewing associated with HIV risk behaviour? A community-based study from Ethiopia. *African Journal of AIDS Research; 5(1):61-69.*

Elmi, A.S., Ahmed, Y.H., Samatar, M.S. (1987). Experience in the Control of Khat chewing in Somalia. Bulletin on Narcotics; 39(2), 51-7.

Eric R.K., James H. S. and Thomas M. J. (2000) .Principles of Neural Science; 4thed. Mc Graw-Hill Companies, New York, USA.

Forskal P (1775). Flora aegyptico-arabico. Havniae.

Getahun A, Krikohian A (1973). Chat: coffee's rival from Harar, Ethiopia, I. Botany, cultivation and use. Economic Botany; 27:353-377.

Geisshusler S, Brenneisen R (1987). The content of psychoactive phenylpropyl and phenylpentenylkhatamines in Catha edulis Forsk of different origin. *J Ethnopharmacol;* 19:269-277.

Getahun, W., Gedif, T. & Tesfaye, F. (2010). Regular Khat (*Cathaedulis*) chewing is associated with elevated diastolic blood pressure among adults in Butajira, Ethiopia: a comparative study, *BMC Public Health*, 10 (390).

Glenice Cox & Hagen Rampes, (2003). Adverse effects of khat: a review: *Advances in Psychiatric Treatment* , 9,456-463

Halket JM., Karusu, Z., &Murray-Lyon.IM. (1995). Plasma cathinone levels following chewing

Hassan, N.A., Gunaid, A.A, Abdo-Rabbo, A. (2000). The effect of Qat chewing on blood pressure and heart rate in healthy volunteers. *TropDoct;* 30:107-108.

Hassan N.A., Gunaid G.M., Khally A.A., Murray-Lyon I.M. (2002). The effect of Khat

chewing leaves on the Human mood. *Saudi Med J vol*. 23(7): 850–853

Hassan, N.A., Gunaid, A.A., El-Khally, F.M, Murray-Lyon. I.M. (2002). The effect of chewing Khat leaves on human mood. *Saudi Med J*, 23(7):850-3.

Hassan, N.A., Gunaid, A.A., Khally, F.M., Murray-Lyon, I.M., (2003). The subjective effects of chewing qat leaves in human volunteers. Ann. Saudi Med. 22, 34–37.

Hassan, A.A. Gunaid, F.M. El Khally, M.Y. Al Noami, I.M., & Murray-Lyon (2005). Khat chewing and arterial blood pressure. A randomized controlled clinical trial of alpha-1 and selective beta-1 adrenoceptor blockade. *Saudi Med J,* 26: 537-541.

Hassan, N.A., Gunaid, A.A., El-Khally, F.M., & Murray-Lyon, I.M. (2007). Khat (Catha edulis): Health aspects of khat chewing. *Eastern Mediterranean Health Journal. 13 (3): 706-718.*

Heacock RA, Forrest JE. (1974). *Khat. Can J Pharm Sci 9, 3.*

Hoffman, R. & Al Absi, M. (2010) "Khat use and neurobehavioral functions: suggestions for future studies," *Journal of Ethnopharmacology*, vol. 132, no. 3, pp. 554–563.

Hosanna *Town Administrative Survey Document*, 2013.

Hosanna Town Finance and Economic Development Office, 2014.

Hosanna Town FinanceandEconomic Development Office, projection, 2014/15

Kassim, S., Islam, & Croucher, R. (2010). "Validity and reliability of a Severity of Dependence Scale for khat (SDS-khat)," *Journal of Ethnopharmacology*,132,(3) :570577.

Kalix, P, Braenden, O. (1985). Pharmacological aspects of the chewing of khat leaves. Pharmacol Rev; 37:149-164.

Kalix,P.(1988).Khat:aplantwithamphetamineeffect.J.Subst.AbuseTreat. 5:163-169.

Kalix, P., Bernneisen, R., Fisch, H., Koelbing, U., &Geisshsler, S. (1990). Amphetamine-like effects in humans of the khat alkaloid cathinone. British Journal of clinical Pharmacy, 30:825-828.

Kalix, P. (1992). Cathinone, a natural amphetamine. Pharmacologic Toxicology; 70:77-86.

Kebede, D. Alem, A. Mitike, G. Enquselassie, F. Berhane, F. Abebe, Y. Ayele, R. Lemma, W. Assefa, T. & Gebremichael, T. (2005). Khat and alcohol use and risky sex behaviour among in-school and out-of school youth in Ethiopia. BMC Public Health; 5:109.

Kortmann, F. (1990). Psychiatric Case finding in Ethiopia: Shortcomings of the Self Reporting Questionnaire. *Culture, Medicine and Psychiatry.* 14:381-391.

Lamina, S. (2010). Khat (Catha edulis): The herb with officio-legal, sociocultural and economic uncertainty. *South African Journal of Science*. 106 (3/4), 1-4.

Sikiru, S.M. Babu (2009). Khat (Catha Edulis): Academic, Health and Psychosocial Effects on "Mature" Students. *African Journal of Drug & Alcohol Studies*, 8(2): 49-56.

Selassie S, Gebre A (1996). Rapid assessment of drug abuse in Ethiopia. Bulletin on Narcotics, 48, 53 63.

Smart RG, Huges PH, Jonsten LD, *et al.,(1980)*. Methodology for student drug abuse survey.

Magdum, June 2011. Addictive Disorders & Their tretment 10:2

Mahmood, S.A. & Lindequist, U. (2008). A pilot study on the effect of *Catha edulis Frosk,* (Celastraceae) on metabolic syndrome in WOKW rats. *AJTCAM*. 2008; 5(3): 271–277.

Morrish, P.K., Nicolaou, N., Brakkenberg, P., & Smith, P.E. (1999). Leukoencephalopathy associated with misuse.*J neurol Neuro Surgery Psychiatry, 67:556.*

Mulugeta, Y. (2013). Khat chewing and its associated factor among College students in Bahir Dar town, *Ethiopia. Science Journal of Public Health, 1*(5), 209–214.

Nencini, P., Grassi, M. C., Botan, A. A. (1989) Khat chewing spread to the Somala Community in Rome. Drug and Alcohol Dependence, 23, 255–258.

Nencini, P. & Ahmed, A.M. (1989). Khat consumption: a pharmacological review. Drug Alcohol Depend; 23:19-29.

Niebuhr, M. (1792). Travels through Arabia and other countries in the East. Vol. II, Edinburgh; p. 224.

Nielen, R.J., van der Heijden, F.M., Tuinier, S., & Verhoeven, W.M. (2004). Khat andmushroom associated with psychosis. World J Biol Psychiatry; 5: 49–53.

Numan N, (2012). The Green Leaf: Khat. World Journal of Medical Sciences 7 (4): 210-223.

Odenwald M, Neuner F, Schauer M, Elbert T, Catani C, Lingenfelder B, Hinkel H, Hafner H, Rockstroh B. Khat use as risk factor for psychotic disorders: a cross-sectional and casecontrol study in Somalia. BMC Medicine 2005; 3:5.

Pantelis, C., Hindler, C. G. & Taylor, J. C. (1989) Use and abuse of khat (*Catha edulis*): a review of the distribution, pharmacology, side effects and a description of psychosis attributed to khat chewing. *Pharmacological Medicine*, 19, 657–668.

Pennings, E. J. M., Opperhuizen, A., & Amsterdam, J. G. C. Van. (2008). Risk assessment of khat use in the Netherlands : A review based on adverse health effects, prevalence, criminal involvement and public order. *Regulatory Toxicology and Pharmacology*, *52*(3), 199–207. http://doi.org/10.1016/j.yrtph.2008.08.005

Peters, D.W. (1952) Khat: Its history, botany, chemistry and toxicology. *Pharm J.* 196, 16–18 &36–7.

Radt,C .(1969).Contribution á i"histoire ethno-botanique d"une plante stimulante. Le Kat au Yemen. J D"Agric Trop et de Bot Appliquée *16:* 215–243.

Raman R. 1983. *Catha edulis Forsk*, Geographical Dispersal, Botanical, Ecological and Agronomical Aspects with Special References to Yemen Arab Repablic. PhDThesis,University of Gottingten: Germany.

Stefan J, Mathew B (2005). Khat chewing: an emerging drug concern in Australia? Aust N Z J Psychiatry.39:842–843.

Teferra, S.A.(2011). Studies on psychotic disorders in rural Ethiopia.Umeå University, Faculty of Medicine, Department of Clinical Sciences, Psychiatry.

Tekalign, D., Andualem, M., & Markos, T. (2011). Khat chewing and mental distress: A community based study in Jimma city, southwestern Ethiopia. *Ethiopian Journal of Health Science. 21(1), 37-45.*

Toennes, S.W., Harder, S., Schramm, M., Niess, C., Kauert, G.F. (2003). Pharmacokinetics of cathinone, cathine and norephedrine after the chewing of khat leaves. *Br J Clin Pharmacol*, 56:125-130.

Veetil, P. K. (2014). Catha edulis deteriorates spatial working memory in rats, but spares reference memory, Indean J PhysiolPharmacol 58 (3):240–250.

Wabel, N. T. (2011). Psychopharmacological Aspects of Catha Edulis (Khat) and Consequences of Long Term Use : A Review, (3), 187–194. http://doi.org/10.5455/jmood. 20111217095840.

Wabe, M.A. Mohammed (2012). What science says about khat (Catha edulis Forsk) Overview of chemistry, toxicology and pharmacology. *Journal of Experimental and Integrative Medicine*, 2(1), 29-37.

Warfa, N., Kleinb, A., Bhuia, K., Leaveyc, G., Craig, T., & Stansfelda, S.A. (2007) . Khat use and mental illness: A critical review. Social Science & Medicine; 65:309–318.

WHO (2006). Expert Committee on Drug Dependence (ECDD). Assessment of khat World, Health Organ Tech Rep Ser. 4:4.

WHO (2003). Expert Committee on Drug Dependence. World Health Organ Tech Rep Ser 915(i-v, 1-26).

WHO (1980) Review of the pharmacology of khat. Report World Health Organ advisory group. Bull Narc 1980;32:8393.

Widler, P., Mathys, K., Brenneisen, R., Kalix, P., & Fisch, H.U. (1994). Pharmacodynamics and pharmacokinetics of khat: a controlled study. Clin. Pharmacol; 55:556-562.

Workineh, G., Teferi, G., & Fikru, T. (2010). Regular Khat chewing is associated with elevated diastolic blood pressure among adults in Butajira, Ethiopia: A comparative study. Retrieved from http://www.biomedcentral.com/1471-2458/10/390

APPENDIX I

REFERENCE VALUES FOR BLOOD PRESSURE

Table 5. Classification of Blood Pressure for Adults above18 Years old (American Heart Association,2011)

Category	Systolic mmHg	Diastolic,mmHg
Hypotension	<90	<60
Normal	90-119	60-79
Prehypertension	120-139	80-89
Stage 1 Hypertension	140-159	90-99
Stage 2 Hypertension	160-179	100-109
Hypertensive Emergency	≥ 180	≥110

APPENDIX II

የጥናቱ ተሳታፊዎች የመረጃ ቅጽ

ስሜ ፍቅርተ ጌታቸው ይባላል፡፡ በአዲስ አበባ ዩኒቨርሲቲ ህክምና ፊዚዮሎጂ ትምህርት ክፍል የድህረ ምረቃ ተማሪ ስሆን የመመረቂያ ፅሁፌን በጫት ዙሪያ ለመስራት አስቤያለሁ፡፡ እርሰዎም በዚህ ጥናት ዙሪያ እንዲሳተፉ ተጋብዘዋል፡፡

ውድ ተሳታፊዎች በጥናቱ ለመሳተፍም ሆነ ላለመሳተፍ ለመወሰን ማብራሪያዎቹን ያድምጡ/ይመልከቱ፡፡

1. **የጥናቱ ዓላማ፡-** የዚህ ጥናት ዓላማ ጫት አዘውትረው የሚቅሙ ሰዎችን ደም ግፊትና የልብ ምት መለካትና ልዩነት ማወቅ፡፡
2. **አጠቃቀም፡-** እርስዎ ጫት ከመቃምዎ በፊት የልብ ምትና የደም ግፊት ይለካሉ፡፡
3. **ሊደርስ የሚችል አደጋ**፤ ምንም የለም፡፡
4. **ከጥናቱ የሚገኝ ጥቅም፡-** በዚህ ጥናት ተሳታፊ በመሆንዎ ጫት መቃወም ያለውን ውጤት ያውቃሉ፡፡
5. **ሚስጥራዊነት፡-** የማንኛውም የጥናቱ ተሳታፊ መረጃ በሚስጥር ይያዛል፡፡
6. **ፈቃደኝነት፡-** እርስዎ በጥናቱ ለመሳተፍ ፈቃደኛ ያለመሆን፣ ማንኛውም መረጃ እና ናሙና ያለመስጠት እንዲሁም ጥናቱን በማንኛውም ጊዜ የማቋረጥ መብትዎ የተጠበቀ ነው፡፡

   - ***<u>ጥናቱን በተመለከተ ማንኛውም ጥያቄ ካለዎት የዋናው ተመራማሪ አድራሻ፡-</u>***

     ፍቅርተ ጌታቸው

     አዲስ አበባ ዩኒቨርሲቲ

     ህክምና ፋኩሊቲ ፊዚዮሎጂ ትምህርት ህክምና ክፍል

     ስልክ 0931 36 31 46

APPENDIX III

PARTICIPANT INFORMATION SHEET

Title of the project:Effect of Chronic Khat chewing on Mental health, Blood pressure and Pulse rate , In Hossana Town, Ethiopia**.**

Principal Investigator: Fikirte Getachew (Bsc)

Supervisor: Diresibachew Haile (PhD)

Coordinating office: Addis Ababa University, School of Medicine, Department of Physiology

Purpose: The objective of this research is to study chronic khat chewing and its effect on Mental Health, Blood pressure and Pulse Rate. This research undertaking is for partial fulfillment of the requirements for the Master Degree in Medical Physiology.

Procedure and Participation: You will be asked for measuring your Blood pressure and pulse rate before chewing khat.

Confidentiality: The use of information for any purpose other than that to which participants consented is unethical to the participants. The information you provide is not disclosed in the way it identified your personal characteristics and privacy.

Risk: The proposed research does not have any inhumane treatment of research participants and any physical harm, social discrimination, psychological trauma and economic loss.

Freedom to withdraw: If you want to participate in the study, you have full right to with draw from the study any time you wish.

Person to Contact: The participant has the right to ask information that is not clear about the research context and content before and or during the research work. You can contact the principal investigator and supervisor.

Principal Investigator name and address: Fikirte Getachew, Department of Physiology, College of Health Sciences, Addis Ababa University, Mobile: 0931363146

Supervisor name and address: Diresibachew Haile (PhD), Department of Physiology, College of Health Sciences, Addis Ababa University.

Appendix IV

የጥናቱ ተሳታፊዎች የስምምነት ቅጽ

የጥናቱ ተሳታፊ መለያ ቁጥር _____

ጥናቱን በተመለከተ በቂ ማብሪያ ተደርጎልኛል፡፡ የጥናቱን ዓላማ በሚገባ የተረዳሁ ሲሆን በጤንነት ላይ ምንም አይነት ጉዳት እንደማያደርስ እና የሚስጥር እንደሚጠብቁ ለተገነዘብኩ በጥናቱ ለመሳተፍ መወሰኔን በፊርማዬ አረጋግጣለሁ፡፡

የጥናቱ ተሳታፊ ስም _____

ፊርማ _____ **ቀን** _____

የመረጃ ሰብሳቢው ስም _____

ፊርማ _____ **ቀን** _____

APPENDIX V

CONSENT FORM

Code No._____

Information about the study has been explained forme by the investigator. I have understood that the objective of the study is to assess the cronic effect of khat on mental health, Blood pressure and pulse rate. This will not hurt my health. It has also explained to me that I have the right to stop. Participation at any time between and there is nothing I will lose if I refuse to participate.

I agree to participate in the study and here by approve my agreement with my signature participant signature _____ Date_____

Investigator‟s signature_____ Date _____

APPENDIX VI

በአማርኛ የተዘጋጀ ቃለ መጠይቅ

ክፍል አንድ

መመሪያ፡- ይህ ፎርማት በአጠቃላይ 26 ጥያቄዎችን የያዘ ሲሆን ጥያቄዎቹም የጥናቱ አላማ የሚመለከቱ ጥያቄዎች ናቸው። በታቻለዎ መጠን በጥንቃቄ ባዶ ቦታዎችን በመሙላት እና ከተሰጡት አማራጮች ውስጥ ተገቢ የሆኑትን መልሶች በማክበብ ሁሉንም ጥያቄዎች እንዲመልሱ ይጠየቃሉ።

I. የመለያ ጥያቄዎች

1. የመለያ ቁጥር _____ቀን፡ _____
2. አድራሻ፡ ሀ. ገጠር ለ. ከተማ
3. የትውልድ ቦታ፡ _____

II. የማህበራዊ እና ስነህዝብ ባህሪያት

4. እድሜ፡ _____
5. ፆታ፡ ሀ. ወንድ ለ. ሴት
6. የጋብቻ ሁኔታ፡ ሀ. ያገባ ለ.ያላገባ
   ሐ. የተፋታ መ. ባለቤቱ/ቷ የሞተችበት/የሞተባት
7. ሀይማኖት ሀ. ኦርቶዶክስ ለ. ሙስሊም ሐ. ፕሮቴስታንት
   መ. ካቶሊክ ሠ. ሌላ (ይግለፁት) _____
8. ስራ ሀ. ተቀጣሪ ለ. የግል ሰራተና ሐ. ንግድ
   መ. ገበሬ ሠ. ተማሪ ረ. ሌላ (ይግለጹት) _____
9. ብሔረሰብ _____
10. የትምህርት ደረጃ ሀ. ያልተማረ ለ. የተማረ
    i. አንደኛ ደረጃ ያጠናቀቀ ii. ሁለተኛ ደረጃን ያጠናቀቀ
    iii. ዲፕሎማና ከዚያ በላይ

III. ዝርዝር ጥያቄዎች

11. ጫት የመቃም ልምድ አለህን? ሀ. አዎ ለ. የለኝም

12.መልስዎ አዎ ከተሆነ ምን ያህል?

ሀ. በየተቀኑ ለ. በሳምንት 3 ቀን እና ከዚያ በላይ

ሐ. በሳምንት አንድ ጊዜ መ. አልፎ አልፎ

13.በአንድ ጊዜ የምን ያህል ብር ጫት ነው የሚቅሙት?

ሀ. 20-50 ብር ለ. ከ50-100 ብር ሐ. ከ100 ብር በላይ

14. ለምን ያህል ጊዜ ጫት ቅመዋል?

ሀ. ለ6 ወራት ለ. ለ1አመት ሐ. ለ2 አመታት መ. ከ2 አመት በላይ

15.አብዛኛውን ጊዜ ከማን ጋር ነው የሚቅሙት?

ሀ. ብቻን ለ. ከባለቤትዎ ጋር ሐ. ከጓደኛዎ ጋር መ. ከወላጅዎ ጋር

16.ለምንድን ነው ጫት የሚቅሙት?

ሀ. ለመዝናናት ለ. ጠንክሮ ለመስራት ሐ. ለመጸለይ መ. ትርፍ ጊዜዬን ለመግደል

ሠ. ድብርት ለማስወገድ ረ. ደስ የማይል ስሜትን ለማስወገድ ሰ. ማህበራዊ ጉዳይ ስለሆነ

ሸ. ሌላ ምክንያት (ይግለፁ) _____

17.ጫት ሲቅሙ ምን አይነት ስሜት ይሰማዎታል?

ሀ. የደስታ ስሜት ለ. ከጭንቀት ነጻ የመሆን ስሜት

ሐ. ድብርት መ. ብስጭት

ሠ. የአእምሮ መነቃቃት (ንቁ መሆን) ረ.ጥንካሬ ሰ. የራስ ምታት

18. ጫት ከቃሙ በኋላ ምን አይነት ስሜት ይሰማዎታል?

ሀ. ድብርት ለ. ብስጭት ሐ. ከፍተኛ የሆነ ጭንቀት

መ. የደስታ ስሜት ሠ. የመዝናት ስሜት ረ. የምግብ መዘጋት

ሰ. አትኩሮት ሸ. ከፍተኛ የሆነ ሀሳብ ቀ. የራስ ምታት

በ. የሆድ ድርቀት

19. ጫት ሳትቅም ስትቀር ደስ የማይል ስሜት ይሰማሃልን?ሀ. አዎ ለ. አይሰማኝም

20.በህክምና ተረጋግጦ ክትትል የሚያደርጉት በሽታ አለብዎት? ሀ. አለ ለ. የለም

ክፍል ሁለት፡ የራስ በራስ መግለጫ ጥያቄ (ኤስአርኪው)

የተጠያቂው ስም፡ _____ ቀን _____

የጠያቂው ስም፡ _____

መመሪያ፡ ይህ ቅፅ በማህበረሰብ ደረጃ ያሉትን 20 የአእምሮ ጭንቀት ስሜት አይነቶችን የያዘ ነው። እያንዳንዱ ጠያቂ ለእያንዳንዱ ጥያቄ አዎ አይደለም የሚሉትን መመላት አለበት።

1. የራስ ምታት አለብዎትን?	ሀ. አዎ	ለ. አይደለም
2. እንቅልፍ አይጠግቡም?	ሀ. አዎ	ለ. አይደለም
3. በቀላሉ ትፈራለህን?	ሀ. አዎ	ለ. አይደለም
4. እጅዎ ይንቀጠቀጣልን?	ሀ. አዎ	ለ. አይደለም
5. ቁጡነት፣ ጭንቀት ወይም ሀሳብ ይሰማዎታልን?	ሀ. አዎ	ለ. አይደለም
6. በግልጽ ማሰብ ያስቸግርዎታልን?	ሀ. አዎ	ለ. አይደለም
7. የደስታ ስሜት ይርቆታልን?	ሀ. አዎ	ለ. አይደለም
8. ከተለመደው በላይ ታለቅሳለህን?	ሀ. አዎ	ለ. አይደለም
9. የእለት ተእለት እንቅስቃሴዎ አስደሳች ሆኖ አግኝተውታልን?	ሀ. አዎ	ለ. አይደለም
10.ውሳኔ መወሰን ያስቸግረዎታልን?	ሀ. አዎ	ለ. አይደለም
11.የእለት ተእለት ስራዎን ስቃይ የሞላበት ነውን?	ሀ. አዎ	ለ. አይደለም
12.በህይወትህ ውስጥ ወሳኝ የሆነውን ነገር ማከናወን ያቅቶታል?	ሀ. አዎ	ለ. አይደለም
13.በነገሮች ላይ ፍላጎት አጥተው ያውቃሉን?	ሀ. አዎ	ለ. አይደለም
14.ምንም ዋጋ የሌለኝ ሰው ነኝ ብለው አስበው ያውቃሉን?	ሀ. አዎ	ለ. አይደለም
15.ራስዎን የማጥፋት ሀሳብ መጥቶበዎት ያውቃልን?	ሀ. አዎ	ለ. አይደለም
16.ሁልጊዜ የድካም ስሜት ይሰማዎታልን?	ሀ. አዎ	ለ. አይደለም
17. በቀላሉ የድካም ስሜት ይሰማዎታል?	ሀ. አዎ	ለ. አይደለም
18. የምግብ መፈጨት ስርዓት ሂደትዎ ደካማ ነውን?	ሀ. አዎ	ለ. አይደለም
19. የምግብ ፍላጎትዎ ደካማ ነው?	ሀ. አዎ	ለ. አይደለም
20. ሆድዎ ላይ ምቹ ያልሆነ ስሜት ተሰምቶት ያውቃል?	ሀ. አዎ	ለ. አይደለም

APPENDIX VII
ENGLISH QUESTIONNAIRE

Part –I

Instructions: This format contains a total of 23 questions, which are pertinent to the research objectives. You are kindly requested to answer all as completely as possible and carefully by filling the blank spaces and encircling one appropriate choice from the alternatives given.

I. Identification

1. Code number of the subject: _____Date_____

2. Address: A. Rural B. Urban

II. Socio demographic characters

3. Age_____

4. Sex A. Male B. Female

5. Marital status: A. Married B. Unmarried C. Divorced D. Widowed

6. Religion: A. Orthodox B. Muslim C. Protestant D. Catholic
E. Others (specify)_____

7. Occupation: A. Employee B. Unemployed C. Merchant
D. Farmer E. Student F. Others (specify)_____

8. Ethnicity _____

9. Education level: a. an Illiterate b. Literate
i. Elementary school complete ii. High school complete
iii. Diploma and above

III. Specific questions

1. Do you have a habit of khat chewing? A. Yes B. No

2. If yes, how often?
A. Every day B. 3-2 days per week C. Once a week D. Occasionally

3. How much you chew at a time per cost in birr?
A.50 birr B. 50-100 birr C. >100 birr

4. For how long have you been chewing khat?
A) 6 months B) 1 year C) 2 years D) > 2 years

5. With whom do you usually chew khat?

A. Alone B. with spouse C. with friend‟s D. Parents

6. Why do you chew khat?

A. For relaxation B. To increase performance

C. For praying D. To kill extra time

E. To avoid depression F. To avoid unpleasant feelings

G. For socialization H. Other reasons (specify) _____

7. What do you feel during you chew khat?

A. Happiness E. Frequent urination

B. Euphoria F. Irritability

C .Tension relief G. Mental alertness/wakeful/strength

D. Depression H. Head ache

8. What do you feel after you chew khat?

A. Depression E. Relaxation I. Head ache

B. Irritability F. Suppressed appetite J. Constipation

C. Insomnia G. Concentration

D. Happiness H. Facilitated thinking

9. Do you feel unpleasant symptoms when you are not chew khat? A. Yes B. No

10. Do you have diagnosed illness in the past? A. Yes B. No

Part-II. Self reporting questionnaire (SRQ)

Instruction: This form consists of 20 symptoms assessing mental distress at a community level. Each interviewer has to fill the Yes/No answer for each question.

1. Do you have headaches?	a) Yes	b) No
2. Do you sleep badly?	a) Yes	b) No
3. Are you easily frightened?	a) Yes	b) No
4. Do your hands shake?	a) Yes	b) No
5. Do you feel nervous, tense or worried?	a) Yes	b) No
6. Do you have trouble thinking clearly?	a) Yes	b) No
7. Do you feel happy?	a) Yes	b) No
8. Do you cry more than usual?	a) Yes	b) No
9. Do you find it difficult enjoy your daily activity?	a) Yes	b) No
10. Do you find it difficult to make decisions?	a) Yes	b) No
11. Is your daily work suffering?	a) Yes	b) No
12 Are you unable to play useful part in life?	a) Yes	b) No
13 Have you lost interest in things	a) Yes	b) No
14 Do you feel that you are a worthless person?	a) Yes	b) No
15 Have the thought of ending your life been in your mind?	a) Yes	b) No
16 Do you feel tired all the time?	a) Yes	b) No
17 Are you easily tired?	a) Yes	b) No
18. Is your digestion poor?	a) Yes	b) No
19. Is your appetite poor?	a) Yes	b) No
20. Do you have uncomfortable feelings in your stomach?	a) Yes	b) No

APPENDIX VIII

SOME PICTURES FROM THE KHAT HOUSES IN HOSANNA TOWN.

Declaration

I the under signed, assert that this Msc research paper is my original paper, has not been Presented for any degree in other university and that all source of material used for the research Paper has been properly acknowledged.

Msc candidate Fikirte Getachew

Advisor- Dr.Diresibachew Haile

Signature _____

Date of submission November, 2016

Addis Ababa, Ethiopia.