JIMMA UNIVERSITY

COLLEGE OF HEALTH SCIENCE

DEPARTMENT OF BIOMEDICAL SCIENCE

STRESS AMONG POSTGRADUATE STUDENTS AND ITS ASSOCIATION WITH SUBSTANCE USE IN JIMMA UNIVERSITY, SOUTH WEST ETHIOPIA

BY:

ABRIHAM ZEGEYE (BSc)

A RESEARCH THESIS SUBMITTED TO DEPARTMENT OF BIOMEDICAL SCIENCE, COLLEGE OF HEALTH SCIENCE, JIMMA UNIVERSITY; IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE DEGREE OF MASTER OF SCIENCE (MSc) IN MEDICAL PHYSIOLOGY.

JUNE, 2016

JIMMA, ETHIOPIA

STRESS AMONG POSTGRADUATE STUDENTS AND ITS ASSOCIATION WITH SUBSTANCE USE IN JIMMA UNIVERSITY, SOUTH WEST ETHIOPIA

By:

ABRIHAM ZEGEYE (BSc)

ADVISORS

1. Dr.Andualem Mossie (PhD, Associate Prof. of Medical Physiology)
2. Mr.Yohannes Markos (MSc, Lecturer of Medical Physiology)

JUNE, 2016

JIMMA, ETHIOPIA

ABSTRACT

Background: *In today's ultra-competitive environment, students face more stress than ever, be it related to studying, examinations, or peer, teacher or parental pressure. They face multiple stressors such as academic overload, constant pressure to succeed, competition with peers and financial burden as well as concerns about the future. However, its magnitude and association with substance use in postgraduate students is not indicated well in Ethiopia.*

Objective: *The purpose of this study was to assess prevalence of stress among postgraduate students and its association with substance use.*

Methods*: A cross-sectional study design was conducted on a sample of 360 postgraduate students at Jimma University. The study participants were selected by using Computer generated simple random sampling method after stratification and proportionally allocated into colleges. The data were collected by using self-administered structured questionnaires which contain sociodemographic characteristics, the General Health Questionnaire (GHQ-12), Postgraduate Stressor Questionnaire (PSQ-28), and Substance use questionnaire. Data were entered using Epi-Data Version 3.1 and analyzed using SPSS Version 20.0 for Windows. Descriptive statistics, bivariate analysis and multivariable logistic regression analysis were applied and statistically significance was declared at p-value < 0.05.*

Result: *Majority of the respondents 256(74.0%) were males and the mean age of the respondents was 29.34 (SD = 4.7) years. The current prevalence of stress was 46.2% [95% CI 40.75%-51.25%]. Academic Related Stressor domain was the main source of stress 184(53.2%) among postgraduate students. Stress was significantly associated with female sex [AOR=1.90,95% CI(1.12-3.22)], single marital status [AOR=1.74,95%CI(1.09-2.77)], khat chewing[AOR=1.99,95%CI(1.09-3.64)], and cigarette smoking[AOR=2.10,95%CI(1.07-4.38)]. Whereas, alcohol drinking [AOR=0.44, 95% CI, (0.25-0.77)] has protective role for stress.*

Conclusion*: The overall prevalence of stress among postgraduate students was found to be high. Being female in sex, unmarried students, students of College of Agriculture and Veterinary Medicine, khat chewing, and cigarette smoking were factors associated with stress. Whereas, alcohol drinking has protective role from stress in this study. It is recommended that stress needs due attention and remedial action from different concerned bodies on the adverse effect of substance use, academic counseling and stress reduction interventions.*

Key words*: Stress, Postgraduate stressors, Substance use and Jimma University.*

ACKNOWLEDGMENT

I am very grateful to my advisor Dr. Andualem M. (PhD, Associate professor) for his unreserved guidance and constructive suggestions and comments for the development of this thesis to this end. Without his committed contribution, this paper would have been nonexistent. I would take this opportunity to extend my thanks to my co-advisor Mr.Yohannes M. (MSc, Lecturer) for his encouragement and invaluable comments during the whole thesis work.

My honest gratitude also goes to Jimma University for its financial support to conduct this research and College of Health Science, Biomedical Science Department staff for their suggestions from the stage of title approval to this thesis development. I would like also to pass my heart-felt gratitude to all study participants and data collectors who were willing to participate in this study. Lastly but not least, Jimma University main registrar office workers are acknowledged for providing the necessary information to make the study possible.

TABLE OF CONTENT

CONTENTS **PAGE**

ABSTRACT I
ACKNOWLEDGMENT II
LIST OF FIGURES V
LIST OF TABLES VI
ACRONYMS VII
CHAPTER 1:- INTRODUCTION 1
1.1 Background 1
1.2 Statement of the problem 3
1.3 Significance of the study 6
CHAPTER 2:- LITERATURE REVIEW 7
2.1 Pathophysiology of stress 7
2.2. Magnitude of stress 8
2.3 Sources of stress among students 9
2.4 Factors associated with stress 10
2.4.1 Socio demographic factors 10
2.4.2 Substance Use 11
2.5 Conceptual frame work 14
CHAPTER 3:- OBJECTIVES 15
3.1 General Objective 15
3.2 Specific objectives 15
CHAPTER 4:- RESEARCH METHODS 16
4.1 Study Area and Period 16
4.2 Study design 16
4.3. Population 16
4.3.1 Source population 16
4.3.2 Study population 16
4.3.3 Eligibility criteria 16
4.4. Sample size determination and sampling technique 17
4.5 Data collection procedures (Instrument & data collection technique) 19
4.6 Study variables 21
4.7. Operational definitions 21
4.8 Data analysis procedures 23

4.9. Data quality management 24
4.10. Ethical consideration 24
4.11. Dissemination plan 25
CHAPTER 5:- RESULTS 26
5.1. Sociodemographic characteristics and their association with stress 26
5.2 Prevalence of stress 28
5.3 Stressor domains and severity of stress 29
5.4 Stress and Substance Use 32
5.5 Risk Factors for Stress 33
CHAPTER 6:- DISCUSSION 35
6.1 Limitation of the study 39
CHAPTER 7:- CONCLUSION & RECOMMENDATION 40
7.1 Conclusion 40
7.2 Recommendation 40
REFERENCES 42
ANNEXES 48
ANNEX I. WRITTEN INFORMED CONSENT FORM 48
ANNEX II- ENGLISH VERSION QUESTIONNAIRE 49

LIST OF FIGURES

Figure 1:-Shows Conceptual frame work of stress and its association with substance use developed after reviewing different literatures in JU, 2016. 14
Figure 2:-Shows the sampling procedure of the stress and its association with substance use among postgraduate students of JU in 2016. 18
Figure 3:-Different stressor domains as sources of stress and severity of stress among postgraduate students, in JU April 2016. 29

LIST OF TABLES

Table 1:- Sociodemographic characteristics and their association with stress among PG students in JU April, 2016. Bivariate logistic regression analysis, n = 346. 27

Table 2:- Stressor domains rated by participants based on 28 questions listed in the PSQ in JU April, 2016. n=346 31

Table 3:-Association between stress and substance use among PG students. Bivariate logistic regression analysis, n = 346..... 32

Table 4:-Association between stress and predictor variables among PG students in JU April, 2016. Multivariate logistic regression analysis, n= 346. 34

ACRONYMS

ACTH	Adrenocorticotrophic Hormone
ARS	Academic Related Stressors
BCRS	Bureaucratic Constraints Related Stressors
CAVM	College of Agriculture and Veterinary Medicine
CBE	College of Business and Economics
CEBS	College of Education and Behavioral Science
CHF	Congestive Heart Failure
CHS	College of Health Science
CKD	Chronic Kidney Disease
CLG	College of Law and Governance
CNS	Central Nervous System
CNS	College of Natural Science
CRF	Corticotrophin Releasing Factor
CSS	College of Social Science
DASS	Depression Anxiety Stress Scale
DM	Diabetes Mellitus
GHQ	General Health Questionnaire
HPA	Hypothalamus Pituitary Adrenal Axis
HTN	Hypertension
JIT	Jimma Institute of Technology
JU	Jimma University
MDGs	Millennium Development Goals
PG	Postgraduate
PCRS	Poor relationship with Colleagues Related Stressors
PJRS	Poor Job prospects Related Stressors
PNS	Peripheral Nervous System
PPRS	Performance Pressure Related Stressors
PRRS	Poor Relationship with superior Related Stressors
PSQ	Postgraduate Stressors Questionnaire
PVN	Para Ventricular Nucleus
SAM	Sympathetic Adrenal Axis
WFRS	Work Family conflicts Related Stressors

CHAPTER 1:- INTRODUCTION

1.1 Background

According to the World Health Organization (WHO) definition, mental health is a state of well-being in which an individual can realize his or her own abilities, interact positively with others, cope with the stressors of life, work productively and fruitfully, and contribute to his or her family and community (1).

Globally, Mental illness comprised 12% of the Global Burden of Disease and estimated to be 15% by the year 2020 which would make it the second leading cause of health disability in the world (2).

Furthermore, in low and middle income countries, mental illness is currently the leading cause of non-fatal burden when considering all physical illnesses, accounting for approximately 10% of total years lived with disability (1).

In Ethiopia, mental illness is the leading non-communicable disorder in terms of burden. Indeed, in a predominantly rural area of Ethiopia, mental illness comprised 11% of the total burden of disease. These surprising statistics show that mental illnesses have been ignored as a major health priority in Ethiopia, and call attention to the need for public health programs targeting mental illnesses (3).

Stress, as a mental illness, has become a major concern of modern eras as it causes overwhelming harm to a person's health and performance. Stress results when an individual is unable to cope with a perceived past, present or future situation (4). Researchers have shown that if an individual is in extreme stress, the stress can result in cardiovascular system disorders, gastro-intestinal problems, insomnia, headaches, back pain, chronic fatigue and exhaustion, dry mouth, excessive sweating of palms and lymphadenopathy (5). These effects in turn force the affected people to perform inefficiently in a working and learning environment. Moreover, individuals with stress and related disorders experience impaired physical and mental functioning. The disability caused by stress is just as great as the disability caused by workplace accidents or other common medical conditions such as hypertension, diabetes, and arthritis (6).

Stress experiences can be emotionally or physiologically challenging and activate stress responses and adaptive processes to regain homeostasis (5). Examples of emotional stressors include interpersonal conflict, loss of relationship, death of a close family member, and loss of a child. Common physiological stressors are hunger or food deprivation, sleep deprivation or insomnia, extreme hyper- or hypothermia, and substance withdrawal symptoms (6).

While stress is often associated with negative affect and distress, it can include "good stress" which is based on external and internal stimuli that are mild and moderately challenging but limited in duration and results in cognitive and behavioral responses that generate a sense of mastery and accomplishment, and can be perceived as pleasant and exciting (7). Such situations rely on adequate motivational and executive functioning to achieve goal-directed outcomes and homeostasis (6,8). However, the more prolonged, repeated, or chronic the stress, greater the magnitude of the stress response and risk for persistent homeostatic deregulation and increasing risk of maladaptive behaviors such as substance use (9).

The perception and appraisal of stress relies on specific aspects of the presenting external or internal stimuli, personality traits, availability of internal resources (including physiological condition of the individual), prior emotional state (including beliefs and expectancies), and specific brain regions mediating the appraisal of stimuli as distressing, and the resulting physiological, behavioral, and emotional experiences and adaptive responses (10).

Brain regions such as the amygdala, hippocampus, insula, and orbit frontal, medial prefrontal, and cingulate cortices are involved in the perception and appraisal of emotional and stressful stimuli, and the brain stem (locus ceruleus and related arousal regions), hypothalamus, thalamus, striatal, and limbic regions are involved in physiological and emotional responses (7).The locus ceruleus is an area located in the pons of the brainstem that is the principal site of the synthesis of the neurotransmitter norepinephrine, which plays an important role in the sympathetic nervous system's fight-or-flight response to stress (6).

1.2 **Statement of the problem**

Global Burden of Disease Survey by WHO estimates that mental disease, including stress-related disorders, will be the second leading cause of disabilities by the year 2020. According to the survey; mental, neurological and substance use disorders are highly prevalent and burdensome globally. As many as 450 million people suffer from a mental or behavioral disorder and nearly 1 million of them commit suicide every year (1). The number of people who suffer from these diseases is comparable with those who suffer from diabetes mellitus. The gap between what is urgently needed and what is available to reduce the burden is very wide. Therefore, in view of the magnitude of their contribution, improvement in population health is only possible if countries make the prevention and treatment of mental and substance use disorders a public health priority (11).

Chronic Stress is a worldwide serious risk factor to the student's physical and mental condition. Stress may lead to loss of interest among the workers and lead them unfruitful and valueless outputs (12).

Global organization for stress statistics shows that the morbidity and mortality due to stress-related illness is alarming. Emotional stress is a major contributing factor to the six leading causes of death in the United States: cancer, coronary heart disease, accidental injuries, respiratory disorders, cirrhosis of the liver and suicide (13). American Institute of Stress shows that 80% of workers feel stress on the job and nearly half say they need help in learning how to manage stress and 42% say their co-workers need such help (14).

According to a study conducted in USA, anxiety and stress disorders are among the most commonly occurring of all chronic diseases and the prevalence of these disorders are increasing in recent cohorts in many countries. Moreover, these disorders have much earlier ages of onset than other commonly occurring chronic conditions. They are usually very chronic and early. Onset stress disorders have a wide range of adverse effects on secondary outcomes, such as teen childbearing, marital instability, and educational failure that have substantial economic implications. Stress disorders are often associated with substantial impairments in role functioning and co morbidity (15).

Expenses related to treating mental disorders and lost worker productivity are currently estimated to cost low- and middle-income nations $870 billion per year. This is projected

to ascend to $2.1 trillion by 2030. The United Nation's Millennium Development Goals (MDGs) seek to act as a catalyst to end poverty and accelerate development in low- and middle-income countries. Although the MDGs set out specific targets for defeating diseases like HIV and malaria, they failed to call for similar measures to improve mental health outcomes (16).

The findings of several studies elsewhere revealed that students of higher institutions pass through a number of difficulties. Cross-sectional study conducted in Jimma University under graduate students revealed that students face many kinds of problems. The most prevalent problem was found to be psychological problem, which includes attention problem (49.0%), anxiety (41.0%) and depression (23.0%). Besides, the students did face academic, social and economic problems (17). A recent Study conducted in Jimma University medical students also showed that Prevalence of stress accounts 52.4% (18).

In today's ultra-competitive environment, students face more stress than ever, be it related to studying, examinations, or peer, teacher or parental pressure. They face multiple stressors such as academic overload, constant pressure to succeed, competition with peers and financial burden as well as concerns about the future (19).

Common stressful life events are associated with both mental health symptoms and substance use in young adolescents. Therefore, stress should not be considered on its own, but rather should be associated with potential risk behaviors. Moreover, the risk of onset of substance use and related problems is heightened during the university period (20).

Onset of smoking, khat chewing and alcohol drinking during early adulthood is a well-documented and significant public health risk factor, and is linked to a high risk of chronic diseases at older age (21,22). Furthermore, substance use is associated with immediate health problems such as academic difficulties, injuries, interpersonal violence, high-risk sexual behavior, depression, and mental disorders (23).

The findings of various studies shows the effect of khat chewing on body organ systems. For instance, 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 (24).

Several studies showed that the psycho stimulant effects induced by chewing khat include a moderate degree of euphoria and mild excitement resulting in promotion of social interaction and over talking and 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 dysphonic, anxiety, reactive depression, insomnia and anorexia (25).

In recent years khat induced psychosis including mania, paranoia and schizophrenia has become more common (24). Furthermore khat chewing seems to complicate the management of pre-existing serious mental illness (25).

There are many studies which assessed the magnitude of stress among undergraduate students (26–30). These studies indicated that there is a high prevalence of stress among the students. As far as post graduate students are concerned, there are also a number of studies that assessed the magnitude of stress among postgraduate students in several countries except Ethiopia. The findings of these studies indicate that high levels of stress and burnout were detected among the students (31–35). Although the magnitude of stress among postgraduate students is studied well in other countries, its magnitude and association with substance use in postgraduate students of Ethiopia is not indicated well.

One of the overarching issues in the area of neuroscience is the connection between mental disorders and substance use. The rapid development of technical advances in the neurosciences has led to a better understanding of neurotransmitter systems, and neural circuitry involved in mental illness and substance use disorders. Keeping all the above factors in mind; the present study is planned to assess the magnitude of stress and its association with substance use among postgraduate students of Jimma University in order to recommend appropriate preventive interventions to clinical psychologists and policy makers.

1.3 Significance of the study

The purpose of this study is to estimate the magnitude of stress and to review some of the common stressors reported by post graduate students. Post graduate and undergraduate students have some common stressors, yet postgraduate students seem to have more complex stress than undergraduate students due to the increased use of different substances. In order to take action on stress, the magnitude of stress and its relation to substance use to be researched.

It is noteworthy that the stressors may vary between institutions. Therefore, understanding the nature of stressors of postgraduate students may help postgraduate teachers find ways to reduce the unwanted consequences of the stressors on the students' wellbeing in the future.

So, the researcher strongly believed that this study is highly valuable, timely and important in various aspects: Since assessing stress sources and level of stress is useful in view of the scarce data in Ethiopia at postgraduate level and will refine, revise, or extend the existing knowledge on stress.

Finally, the results of this study is expected to help for health sector planning and as baseline for researchers for further investigation.

CHAPTER 2:- LITERATURE REVIEW

2.1 Pathophysiology of stress

The existence of stress depends on the presence of stressors which is defined as anything that challenges an individual's adaptability or stimulates an individual's body or mentality (10). Stress can be caused by environmental factors, psychological factors, biological factors, and social factors and it can be negative or positive to an individual, depending on the strength and persistence of the stress, the individual's personality, cognitive appraisal of the stress, and social support (36).

The body defenses against stressors are mobilized through activation of the Sympathetic Nervous System (SNS). Arousal of the sympathetic nervous system releases hormones (adrenaline) that help prepare the body to meet stress and danger. SNS is highly adaptive short term response to an emergency situation which bring about the fight-flight response. This syndrome is characterized by several behavioral and physiological adaptations, including increased attention, suppression of appetite, increased flow of oxygen and nutrients to the brain, and increased respiratory rate (10).

The second and most studied part of the stress-response system is the hypothalamic Pituitary-Adrenal Axis (HPA). The HPA axis helps prepare the body for action in response to a variety of events, including stressors (4). When the stress response is initiated by the detection of a threatening event, the neurons in the Para Ventricular Nuclei (PVN) of the hypothalamus releases corticotrophin-releasing factor (CRF), among other chemicals. CRF then causes the pituitary gland to release Adrenocorticotrophic Hormone (ACTH), which travels through the bloodstream. Eventually, ACTH reaches the adrenal cortex (located in the adrenal glands on the kidneys), which is responsible for synthesizing and releasing stress hormones (glucocorticoids), particularly cortisol (37).

Cortisol, often called the stress hormone, has a variety of biological functions, including mobilizing energy for action and modulating the cardiovascular and immune systems. Cortisol influences our emotional and cognitive responses to life events (10). The release and circulation of cortisol is necessary for normal functioning, but chronic exposure to

stressors can induce long-term activation of the HPA and subsequent cortisol release, which is associated with a variety of harmful outcomes, including depressive symptoms, memory problems, immune system suppression, and the development of chronic diseases (38).

2.2. Magnitude of stress

There are different findings on the prevalence of stress in different countries. This different prevalence rate is due to different varieties that researchers had been used during their study like different tool, in different socio-demographic variable and different sample size.

Many studies in the world revealed that the prevalence of stress among post graduate students is very high. In India post graduate medical school the prevalence was 52 % (32) , in South Eastern USA 48.9% (39), in Gujarat University (India) 45% (40), 54% among international postgraduate students (41), and 55.1% in Pakistan (42). Similarly multi institution based study conducted in Indian University among post graduate students by using Depression Anxiety and Stress Scale (DASS-42) found that the prevalence of stress was higher than depression and anxiety. They found that the students experienced mildly elevated levels of depression and anxiety (11±5.1 and 8.2±4.1, respectively) and a moderately elevated level of psychological stress (22±5.2) from the general population (43).

Medical education poses many new, challenging and potentially threatening situational demands for the students throughout the world. Several studies have reported the prevalence of psychological stress in medical students of different nationalities. Prevalence of stress was reported to be 63.8% in a Saudi Arabia (34) and 90% in a Pakistani medical school (44).

The other cross-sectional study conducted to determine the prevalence and the factors associated with stress among medical students at Jizan University in Kingdom of Saudi Arabia was 71.9%, with females being more stressed (77%) than males (64%) (45). A similar study which was conducted by Muhammad and his colleagues among Malaysian students of medical science have also found a prevalence of 29.6% with high rates of academic related problems (35). Another study also reported that 71.8% of nursing

students in Greece perceived stress, most of them in mild levels (31.8%). About 12.4% reported very high levels of stress (46).

A comparative cross sectional study done from Medical Pharmacy and non-pharmacy master's students in Malaysia indicate that 65.4% Medical Pharmacy students reported having felt nervous or stressed fairly often or very often in the previous month, while 73% of the Medical Pharmacy students reported feeling confident about their ability to handle their personal problems. On the other hand, 51% of non-pharmacy master's students reported having felt nervous or stressed fairly often or very often in the previous month, while 55% of the students reported feeling confident about their ability to handle their personal problems (47).

In a study conducted in Jimma University, Medical students revealed that they face many kinds of problems. Stress was a significant problem among Medical students and had a negative impact on their academic performance with prevalence of 52.4% (18).

2.3 Sources of stress among students

Various factors were reported to be associated with the development of mental stress among University students. Separation from pre-existing social support, frustration with academic challenges, social problems, and threats due to high expectations from parents (19,48).

Researchers have identified the major academic stressors reported by University students as tests, grade competition, time demands, problematic professors and classroom environment, and concerns about career and future success. Among the major personal stressors identified were difficult intimate relationships, parental conflicts, and interpersonal conflicts with friends (49). Among the University level stressors are overcrowded lecture halls, semester system, and inadequate resources to perform academic work. Moreover, university students have a unique cluster of stressful experiences or stressors (30).

A study done in a Teaching University in Pakistan also showed that from all the stressors, Academic related stressors were found to have the greatest impact and intensity in post graduate programs (42) and from research done in India, top three stressors overall among

the Postgraduate students were examinations and assessments, lack of time for leisure activities, and insecurity regarding professional future (43).

A similar study done in Malaysia among post graduate medical trainees, the top three stressors were tests and examinations, large amount of content to be learnt and time pressure to meet deadlines. Most of the stressors were related to academic and performance pressure (30). However a study done in India physiotherapy students showed that Top ten stressors were the society does not think highly of the profession, unfair assessment by the superiors, unable to make full use of my skill, difficulty in maintaining relationships with superiors, fear of making mistakes that can lead to serious consequences, having difficulty in understanding content, lack of support from the superior, lack of promotion prospect in future, feeling of being underpaid and competition among colleagues (50).

2.4 Factors associated with stress

2.4.1 Socio demographic factors

A cross sectional study done on 511 academic and non-academic staff of Malaysia university showed that the prevalence of stress was higher among females (23.0%) than in males (21.2%), Staff that are single (24.3%) were more stressed compared to those that were married (21.3%) and widowed (22.2 %) (51). However, study done on Bio behavioral Responses to Stress in Females proposed that women's responses to stress are characterized by patterns that involve caring for offspring under stressful circumstances, joining social groups to reduce vulnerability, and contributing to the development of social groupings, especially those involving female networks, for the exchange of resources and responsibilities (52). Another study also showed that Male post graduate students are more stressed than female post graduate students (53). According to different studies, men generally have a hard time dealing with the stigma of stress. They are more likely to deal with their symptoms by drinking alcohol or abusing drugs, and/or pursue other risky behavior. Many men avoid talking about stressed feelings to friends or family (54). Different studies attributed the observed differences to variations in stress among males and females, suggesting that, stress tends to activate the "tend and befriend" due to the hormone oxytocin response in women, men have been found to react to stress more

with the aggressive "fight or flight" response due to the presence of testosterone (52). However, Men with stress often aren't diagnosed, for several reasons. Possible reasons behind male stress includes failure to recognize stress, fatigue, irritability, neglecting signs and symptoms, employment, lack of purpose in life, substance addiction and emphasis on self-control. So men should practice healthy coping skills rather than automatically turning to alcohol. So they need to set realistic goals and prioritize tasks. They should seek emotional support from friends and family members (33). Understanding how men in our society are brought up to behave is particularly important in identifying and treating their stress. Stress in men often can be traced to cultural expectations. Men are supposed to be successful. They should rein in their emotions. They must be in control. These cultural expectations can mask some of the true symptoms of stress in males (53) .

Cross sectional survey done in Adama university students reported family history of mental illness was significantly associated with mental distress and those who had history of Khat chewing were more likely to be mentally distressed. Being in second & above years of education was found to be a protective factors and mental distress was low among those regular religious program attainders, irrespective of what their religion (55). Another supporting research done in Jimma University with the sample of 329 medical students showed that year of study, monthly income, khat chewing, cigarette smoking, and alcohol intake were identified as risk factors of stress (18).

2.4.2 Substance Use

The occurrence of stressors evokes coping behaviors, some of which are adaptive whereas others are maladaptive. Recent research has examined lifetime exposure to stressors and the impact of cumulative adversity on addiction vulnerability after accounting for a number of control factors such as race/ethnicity, gender, socioeconomic status, prior drug abuse, prevalence of psychiatric disorders, family history of substance use, and behavioral and conduct problems (56).

Substance use in the present context means using either of khat chewing, cigarette smoking or alcohol drinking. Khat (*Catha edulis*) is a large green plant that grows at high altitudes in the region extending from eastern to Southern Africa, as well as on the

Arabian Peninsula (57). Khat contains psychoactive substance; cathinone. Cathinone is a highly potent stimulant, which produces sympathomimetic and Central Nervous System (CNS) stimulation analogous to the effect of amphetamine. Cathinone enhances the releases of catecholamine from their storage areas resulting in CNS stimulation (21).

Vulnerability to using alcohol and other drugs increase with an increase in risk factors dominating a person's life which seems to be true for University students. Among those risk factors, stress is a well-known risk factor in the development of substance use and abuse; mild stress may cause changes that are useful; however severe stress may expose individuals to harmful situations such as vulnerability to drug use (58). This explanation is supported by various population based and epidemiological studies. Among these a study which clarify that under certain conditions, most individuals will drink alcohol in response to stress, though drinking in response to stress is dependent on several factors such as possible genetic determinants and usual drinking habits (54). Concerning adolescents joining University is an exciting period but is also the place where they face a number of challenges. Many students often experience for the first time in their lives, a wide range of demands on individual, interpersonal, academic, and societal levels such as leaving home, developing autonomy, making new friends and peer pressure which put them at risk of substance misuse. This notion suggested that there is a strong correlation between stressful life events of students (such as academic, social, financial and interpersonal factors) and substance abuse (59).

Different studies have put different reasons for greater use of substances in males than females. For instance, different studies attributed the observed differences to variations in stress among males and females, suggesting that, women may feel self-critical about their roles and performances in those roles, and were more likely to internalize stress while men tend to externalize it. Therefore exposure to stressful events may increase the chance of man using substances or exhibiting substance related problems (54). In addition various socio cultural explanations had also been given for the possibility of gender differences. Researchers focused on cultural constructs as gender socialization (i.e., the learning of and conformity to appropriate masculine and feminine traits) and stratification (e.g., unequal economic, educational, and social opportunities). They concluded that addiction was related to the individual's pursuit to integrate opposing gender characters,

that is, masculinity and femininity, in an attempt to achieve completeness. For the differences in alcohol drinking patterns, they argued that alcohol consumption both symbolizes and enhances men's greater power relative to women, men drink more than women do because men are generally more willing or motivated to take risks than women (60).

A study which is done in Western Kenya among college students showed that 60.8% of students use substances to relieve stress (61). The research finding from Haromaya University also has shown that 7.5% of the students used substances to get relief from stress (62)**.** A similar study done among Jimma community revealed that mental distress and khat use have significant association (34.7% vs 20.5%, $p<0.001$). There is also significant association between mental distress and frequency of khat use (41% vs 31.1%, $p<0.001$) (63) .

Cross sectional study conducted among Axum University students revealed that, prevalence of khat chewing, alcohol drinking and cigarette smoking were 27.9%, 32.8% and 9.3% respectively, and the commonest reasons for khat, alcohol and cigarette using were to keep alert while reading 40.6%, for relaxation 65.5% and to relief stress 37.7% respectively (64).

2.5 Conceptual frame work

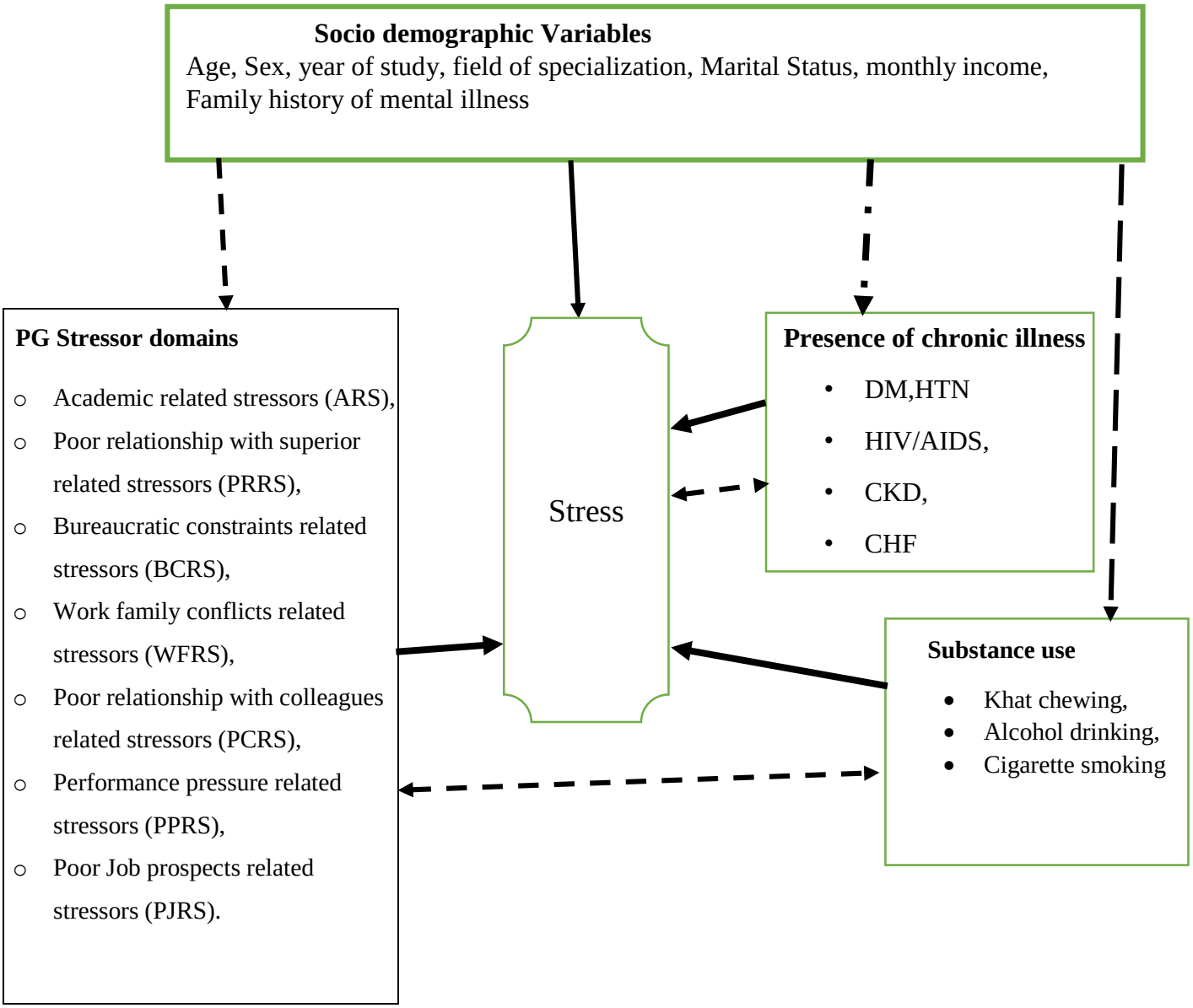

Figure 1:-Shows Conceptual frame work of stress and its association with substance use developed after reviewing different literatures in JU, 2016.

CHAPTER 3:- OBJECTIVES

3.1 General Objective

The main aim of the present study is to assess magnitude of stress among postgraduate students and its association with substance use in JU, 2016.

3.2 Specific objectives

1. To determine prevalence of stress among postgraduate students
2. To estimate severity of stress among postgraduate students
3. To identify the sources of stress among postgraduate students
4. To measure the association between socio-demographic variables and stress among postgraduate students
5. To determine the association between stress and substance use among postgraduate students

CHAPTER 4:- RESEARCH METHODS

4.1 Study Area and Period

The study was conducted from March 20 to April 20, 2016.

Jimma University (JU) is a public higher educational institution established in December 1999 by the amalgamation of Jimma College of Agriculture (founded in 1952) and Jimma Institute of Health Sciences (established in 1983). It is located 352 km South West of Addis Ababa at Jimma town with an Area of 409 Hectares. It has four campuses, namely Jimma University main campus, Jimma University College of Agriculture and Veterinary Medicine, College of Business and Economics and Kito Furdisa (Jimma University Institute of Technology). Jimma University named after the city of Jimma. Currently there are a total of 2116 regular postgraduate students (1900 males and 216 females) within eight colleges and 103 postgraduate programs as obtained from Records and Statistics Units in the Registrar's Office. The University accepts students from all parts of Ethiopia.

4.2 Study design

Institution based cross-sectional study was conducted.

4.3. Population

4.3.1 Source population

All postgraduate students of Jimma University.

4.3.2 Study population

All sampled postgraduate students of JU.

4.3.3 Eligibility criteria

Inclusion criteria

- Postgraduate students who have been studying at least one semester in the study area were included.

Exclusion criteria

- Those students who are critically ill at the time of data collection, Ph.D, summer and distance PG students were excluded.

4.4. Sample size determination and sampling technique

4.4.1 Sample size determination

- The sample size was calculated using single population proportion formula based on the following assumptions:

✓ Since there was no prevalence of stress specific to postgraduate students in Ethiopia, a prevalence of 50% was taken to estimate the sample size.

✓ The level of confidence, α = 0.05 (95%) to conclude that the prevalence of stress.

✓ d = the degree of precision = 0.05 (5%)

$$n = \frac{[Z\alpha/2]\ 2\ p\ [1-p]}{d^2}$$

$$n = \frac{[1.96]2.\ 0.50[1-0.50]}{[0.05]^2} = 384$$

The correction formula was used

$$nf = \frac{n}{1+\frac{n}{N}} = \frac{384}{1+\frac{384}{2116}} = 327$$ samples with 10 % Non-response rate (33 students)

Total of 360 samples were included in this study.

Where:

✓ n = initial sample size

✓ nf=Adjusted sample size

✓ N=Total population

✓ Zα/2 = Z value at 95% CI [1.96]

✓ p = Estimated prevalence rate was 50% [0.50]

✓ d = Margin of error tolerated was 5%

4.4.2 Sampling procedure & Technique

First Number of study subjects were allocated by proportion to population size in to colleges/Strata.

There are 8 colleges in JU. Then, Stratified simple Random Sampling technique was used to select the required study subjects. This was done using computer generated random numbers to select study subjects.

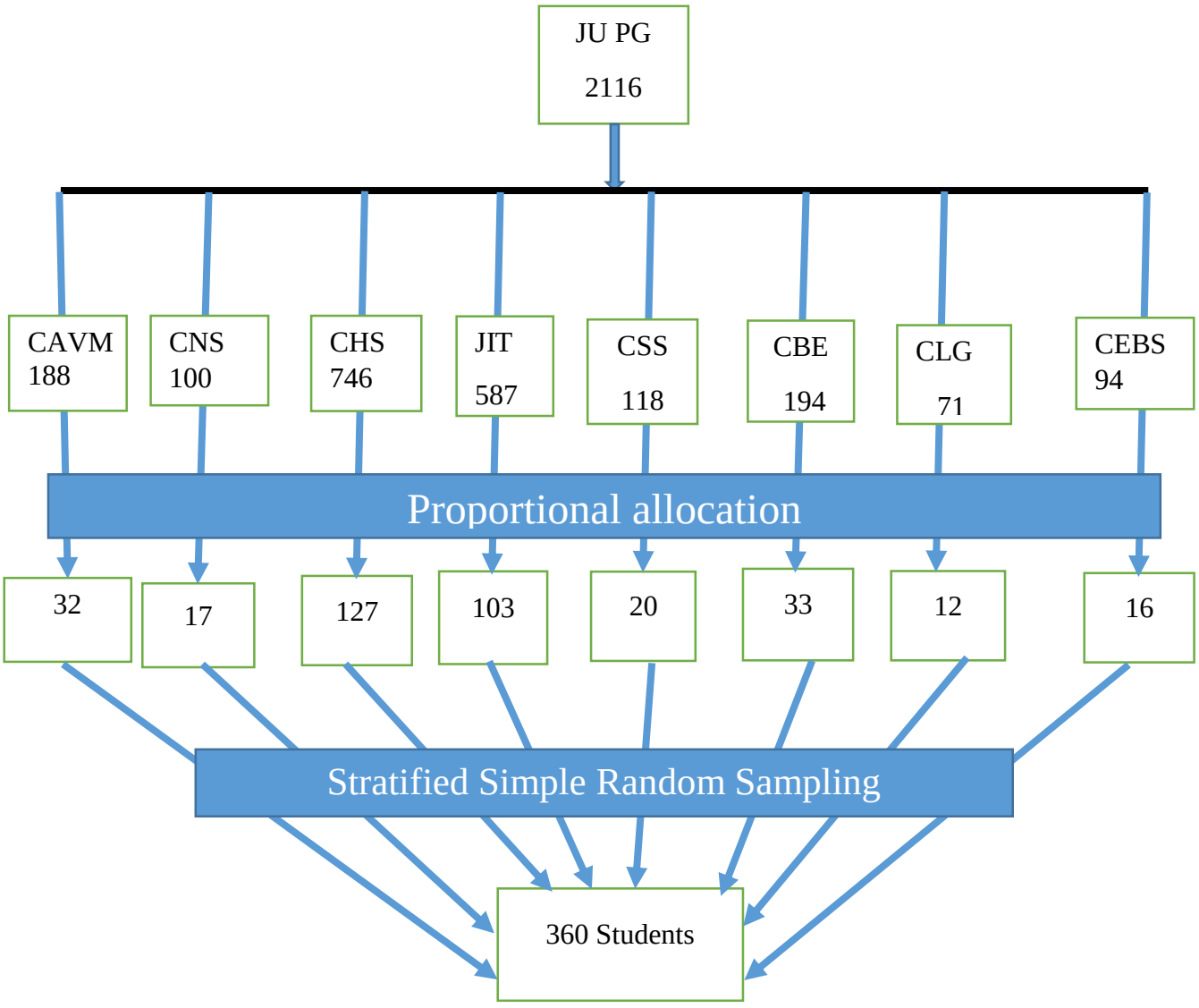

Figure 2:-Shows the sampling procedure of the stress and its association with substance use among postgraduate students of JU in 2016.

JU PG=Jimma University Postgraduate

CAVM= Collage of Agriculture & Veterinary Medicine

CNS= College of Natural Science

JIT= Jimma Institute of Technology

CHS= College of Health Sciences

CBE= College of Business and Economics

CSS= College of Social Science

CLG=College of Law and Governance

CEBS=College of Education and Behavioral Science

4.5 Data collection procedures (Instrument & data collection technique)

4.5.1 Data collection instrument

- Data were collected using structured self-administered questionnaire having the following parts.
  - ✓ Socioeconomic and demographic characteristics of students.
  - ✓ Substance use (khat chewing, alcohol and cigarette smoking habits), and
  - ✓ General Health questionnaire 12 (GHQ-12) and Postgraduate stressors questionnaire (PSQ).

The GHQ-12 was used to determine the prevalence of stress and the PSQ was used to identify sources of stress and intensity of stress.

The GHQ-12 is a well-validated instrument used to measure overall emotional wellbeing and commonly used in studies looking into distress in populations. It is one of the most widely used measurement tool to measure stress prevalence. Reliability coefficients of the questionnaire have ranged from 0.78 to 0.95 in various studies. The items of GHQ-12 represent 12 manifestations of stress and respondents were asked to rate the presence of each of the manifestations in themselves during recent weeks. This was done by choosing from four responses, typically being ‘not at all’, ‘no more than usual’, ‘rather

more than usual' and 'much more than usual'. The scoring method was a binary scoring method where the two least symptomatic answers were score 0 and the two most symptomatic answers were score 1 – i.e. 0- 0-1-1. The GHQ-12 scores range from 0 to 12. The sensitivity and specificity of the GHQ-12 score at cut-off point of 4 were 81.3% and 75.3% respectively with positive predictive value of 62.9% (65). Participants who scored GHQ-12 equal to 4 and above were considered as having significant distress and taken as 'case' in this study (66).

The PSQ is a modified stressor questionnaire developed based on two validated stressor questionnaire designed by Chan et al. (67) and Muhamad et al. (68)**.** The PSQ have 28 items with 7 domains; The seven stressors analyzed were Academic related stressors (ARS), Poor relationship with superior related stressors (PRRS), Bureaucratic constraints related stressors (BCRS), Work family conflicts related stressors (WFRS), Poor relationship with colleagues related stressors (PCRS), Performance pressure related stressors (PPRS) and Poor Job prospects related stressors (PJRS). Each of these domains consists of four items. The items of PSQ was rated under five categories of responses (causing no stress at all, causing mild stress, causing moderate stress, causing high stress, causing severe stress) to indicate intensity of stress caused by them.

English version questionnaire was used to collect the data.

4.5.2 Data collection procedures

All sampled students present on the day of survey were contacted for participation and the study was explained to them. After obtaining written informed consent, the participants were told to follow the instructions written in the questionnaire. An opportunity to ask questions were provided and clarifications were made.

The process to fill in the questionnaire took about 15 minutes to finish and it was returned on the same day. The data were collected in one month that was free of any examination.

4.6 Study variables

Dependent variable

Stress

Independent variables

Sociodemographic variables: Age, Sex, year of study, College of study, Religion, Ethnicity, Marital Status, monthly income, family history of mental illness.

Presence of chronic disease: Diabetes Mellitus (DM), HIV/AIDS, heart disease, hypertension, kidney disease.

Substance use (cigarette smoking, khat chewing and alcohol drinking)

Post graduate stressor domains

- Academic related stressors (ARS)
- Poor relationship with superior related stressors (PRRS)
- Bureaucratic constraints related stressors (BCRS)
- Work family conflicts related stressors (WFRS)
- Poor relationship with colleagues related stressors (PCRS)
- Performance pressure related stressors (PPRS)
- Poor Job prospects related stressors (PJRS)

4.7. Operational definitions

Stress- proportion of participants who scored GHQ-12 equal to 4 and above will be considered as having significant distress and taken as 'case' in this study

Mild stress- the stress have the mean score of 0–1.00 in PSQ is mild stress. It indicates that it does not cause any stress. Even if it does, it just causes minimum stress.

Moderate stress- a mean score of 1.01–2.00 in PSQ is moderate stress. It indicates that it reasonably causes stress. However, respondents can manage it well.

High stress- a mean score of 2.01– 3.00 in PSQ is high stress. It indicates that it causes a lot of stress. In this case, emotion seems to be disturbed and daily activities are highly compromised due to stress.

Sever stress- a mean score of 3.01–4.00 in PSQ is severe stress. It indicates that it severely causes stress. It disturbs emotion badly and daily activities are severely compromised.

Academic related stressors (ARS) -is referred to any scholastic, university, college, educational or student events that cause stress on students.

Poor relationship with superior related stressors (PRRS) - can be described as interpersonal relationship events that can cause distress feelings to a person such as lack of support from superior, uncooperative colleagues, unfair assessment from supervisor and incompetence colleagues.

Bureaucratic constraints related stressors (BCRS) - can be described as organizational working environment that can cause stress feeling to a person such as lack of support from authority, having to do task out of ability, and lack of opportunity in decision making.

Work family conflicts related stressors (WFRS) - can be described as work events that compromise a person's personal and home life that lead to stress feelings such as life is too centered on working, advancing career at the expense of personal or home life and work demands affect personal life.

Performance pressure related stressors (PPRS) - can be described as work demands that cause emotional disturbances to a person such as work overload, short duration given to complete tasks and doing high risk task where any mistake can lead to disastrous consequences.

Poor Job prospects related stressors (PJRS)- can be described as events related to reward and recognition given to an individual that cause distress feelings such as lack of promotion prospect, feeling of being underpaid, and lack of recognition to the job.

Substance use- in the present context means using at least one of among khat chewing, cigarette smoking and alcohol drinking.

Life time prevalence of smoking/ khat chewing/alcohol drinking: the proportion of students who had ever smoked cigarettes, chewed khat, and drink alcohol in their life time.

Current prevalence of cigarette smoking/ khat chewing/alcohol drinking: the proportion of students who are smoking cigarettes, chewed khat and drink alcohol within 30 days preceding the study

Ever smoker/ever khat chewer/ever alcohol drinker: An individual is considered as ever smoker/**ever** khat chewer/ever alcohol drinker even he/she had smoked/chewed/drunk only once in his/her life time

Regular smokers are defined as smoking at least one cigarette per day.

Regular alcohol and khat users are defined respectively as drinking alcohol at least 10 times per month, and using khat at least 10 times per month.

Chronic illness- An illness that can last for an extended period, at least three months, often for life, and cannot be cured.

4.8 Data analysis procedures

After checked the collected data for completeness, the data were entered in to Epi-data version 3.1 and exported in to SPSS version 20.0 for analysis.

Reliability analysis was applied to test the internal consistency (reliability) of the PSQ;

Reliability analysis showed that the Cronbach's alpha value for The PSQ was 0.936 (95% CI). Whereas, Cronbach's alpha values for Academic, Performance Pressure, Work-family Conflicts, Bureaucratic Constraints, Poor relationship with Superior, Poor relationship with Colleagues, and Poor job prospect domains were 0.85, 0.80, 0.81, 0.85, 0.82, 0.81, and 0.80 respectively. The analysis showed the PSQ were a reliable tool in identifying postgraduates' stressors.

Descriptive statistics like frequency distribution, percentages, measures of central tendency and dispersions, tables and charts were applied for description of the Sociodemographic variables, the percentage of stressed students, and stress intensity caused by the stressors.

Bivariate analysis was done to assess the crude association between explanatory variables and outcome variable of the study. All variables with a p- value of < 0.25 in bivariate analysis were included in to multivariable logistic regression model in which odds ratio with 95% confidence intervals was estimated to identify independent predictors of stress. p- Value < 0.05 was employed to declare the statistically significance.

The variables were entered to the multivariate model using the Backward LR regression method. Model fitness was checked using Hosmer and Lemeshow goodness of a fit test (p >0.05).

4.9. Data quality management

To assure the quality of the data high emphasis was given in designing data collection instrument for its simplicity and pretests followed by modifications were made.

Seven BSc nurse data collectors and one supervisor (psychiatric nurse) were recruited and trained for two days about purpose of the research, the time of data collection, timely collection and reorganization of the collected data from respective sites and submission on due time.

The collected data were reviewed and checked for completeness and relevance by the supervisors and principal investigator each day.

To identify potential problems and to make important modifications, the questionnaire was pre tested prior to the actual data collection on about 18 students (5%) of the respondents that were not included in the main survey.

4.10. Ethical consideration

Letter of permission and ethical approval was obtained from the Institutional Review Board (IRB) of Jimma University, College of Health Science prior to data collection.

The purpose of the study was explained and written informed consent was obtained from the study subjects. In addition to this, confidentiality and anonymity was maintained by the investigator and research assistants throughout the study.

4.11. Dissemination plan

The results of this study will be disseminated or communicated to Jimma University, College of Health Science, department of Biomedical Science, department of psychiatry, Federal Ministry of Education as well as ministry of health, Regional health bureau, local institutions and other concerned bodies.

Moreover it will also be presented on seminars, workshops and scientific conferences.

Finally, attempts will be made for publication of findings on peer review journals.

CHAPTER 5:- RESULTS

5.1. Sociodemographic characteristics and their association with stress

There were 346 complete responses from the total of 360 sampled students with the participation rate of 96.1%.

Majority of the respondents 256 (74.0%) were males while 90 (36.0%) were females. Age of respondents ranged between 22 and 48 years old with the mean of 29.34 (SD = 4.7) years old. One hundred eighty eight (54.3%) sampled students were first year and 208 (60.1%) were married. One hundred twenty seven (36.7%) students were from College of Health Science and 89 (25.7%) were from Jimma Institute of Technology. Nighty one (26.1%) had monthly income of 4666-5500ETB (1$USD= 21.00 ETB, Ethiopian Birr).

With regard to ethnicity and religion, 127 (36.7%) of them were from Oromo and 185 (53.5%) of them were Orthodox believers. Seventy four (21.4%) of the respondents have a family history of mental illness and 75(21.7%) had suffered from different chronic illnesses. There was significant association between gender and stress in the present study. Detail description is shown below in ***Table 1*****.**

Table 1:- Sociodemographic characteristics and their association with stress among PG students in JU April, 2016. Bivariate logistic regression analysis, n = 346.

Sociodemographic variables		Total N (%)	Stress		COR 95% CI	p-value
			Yes (n=160) N (%)	No (n=186) N (%)		
Age	20-24	23(6.6)	9(39.1)	14(60.9)	0.69(0.25-1.92)	0.487
	25-29	194(56.1)	88(45.4)	106(54.6)	0.90(0.47-1.69)	0.750
	30-34	81(23.4)	40(49.4)	41(50.6)	1.06(0.51-2.16)	0.872
	>34	48(13.9)	23(47.9)	25(52.1)	1.00	
Sex	Male	256(74.0)	109(42.6)	147(57.4)	1.00	
	Female	90(26.0)	51(56.7)	39 (43.3)	1.76(1.08-2.86)	**0.022**
Year of study	1st year	188(54.3)	90 (47.9)	98 (52.1)	1.15(0.755-1.76)	0.507
	2nd year & above	158(45.7)	70 (44.3)	88(55.7)	1.00	
Religion	Orthodox	185(53.0)	76(41.1)	109(58.9)	1.09(0.40-2.95)	0.857
	Muslim	54(26.0)	37(68.5)	17(31.5)	3.42(1.12-10.35)	0.03
	Protestant	89(16)	40(44.9)	49(55.1)	1.28(0.45-3.61)	0.63
	Others*	18(5)	7(38.9)	11(61.1)	1.00	
Ethnicity	Oromo	127(36.7)	51(40.2)	76(59.8)	0.53(0.19-1.28)	0.15
	Amhara	113(32.7)	55(48.7)	58(51.3)	0.71(0.28-1.82)	0.47
	Tigray	37(10.7)	18(48.6)	19(51.4)	0.71(0.24-2.08)	0.53
	Wolaita	24(6.9)	11(45.8)	13(54.2)	0.63(0.19-2.06)	0.45
	Gurage	24(6.9)	13(54.2)	11(45.8)	0.88(0.27-2.88)	0.84
	Others**	21(6.1)	12(57.1)	9(42.9)	1.00	
College of study						
College of Agriculture &Veterinary		32(9.2)	21(65.6)	11(34.4)	8.90(2.10-37.77)	**0.003**
College of Health Sciences		127(36.7)	54(42.5)	82(64.6)	3.45(0.94-12.61)	**0.061**
College of Law & Govorn.		12(3.5)	6(50.0)	6(50.0)	4.66(0.86-25.13)	**0.073**
College of Business & Econ.		33(9.5)	18(54.5)	15(45.5)	4.66(1.35-23.23)	**0.018**
Institute of Technology		89(25.7)	41(46.1)	49(53.9)	3.98(1.07-14.84)	**0.039**
College of Education & Behav. S		16(4.9)	6(37.5)	10(62.5)	2.800(0.56-13.95)	**0.209**
College of Social Sciences		20(5.8)	11(55.0)	9(45.0)	5.704(1.23-26.25)	**0.025**
College of Natural science		17(4.7)	3(17.6)	14(82.4)	1.00	
Monthly income (ETB)						
1450-3800		90(26.1)	44(48.9)	46(51.1)	1.22(0.67-2.22)	0.513
3801-4665		83(24.1)	41(49.4)	42(50.6)	1.247(0.67-2.30)	0.480
4666-5500		91(26.1)	39(42.9)	52(57.1)	0.958(0.52-1.75)	0.890
5501-9111		82(23.7)	36(43.9)	46(56.1)	1.00	
Marital status	Married	208(60.1)	83(39.9)	125(60.1)	1.00	
	Single	138(39.9)	77(55.8)	61(44.2)	1.190(1.23-2.93)	**0.004**
History Family members suffered from mental illness						
Yes		74(21.4)	41(55.4)	33(44.6)	1.59(0.95-2.67)	**0.076**
No		272(78.6)	119(43.8)	153(56.2)	1.00	
Presence of chronic disease						
Yes		75(21.7)	41(54.7)	34(45.3)	1.54(0.92-2.57)	**0.100**
No		271(78.3)	119(43.9)	152(56.1)	1.00	

Significant at p-value <0.25 Current exchange rate: $1USD = 21.00 ETB. ETB = Ethiopian Birr.
Others*- Catholic, Adventist, and Pagan **Others**-** Hadiya, Dawro and silte

5.2 Prevalence of stress

The proportion of postgraduate students who had symptoms of stress, according to the cutoff point of the General Health Questionnaire (GHQ-12), was 46.2% [95% CI 40.75%-51.25%] as shown in **Table 1**. The distribution of GHQ-12 showed a mean score of 3.40 (SD=2.32) ranging from 0 to 12.

In the present study, the highest Prevalence of stress was observed in the first year students (54.3%) and it is also high in females (56.7%) than males as shown in ***Table 1.*** As presented in **Table 1**, the highest prevalence of stress was observed among College of Agriculture and Veterinary Medicine students (65.6%), followed by Social Science and Humanity students (55.0%), College of Business and Economics students (54.5%), Law and Governance students (50.0%), Institute of Technology students (46.1%), College of Health Science students (42.1%), College of Education and Behavioral Science students (37.5%) and College of Natural Science students (17.6%).

5.3 Stressor domains and severity of stress

According to PSQ, among the seven stressor domains, Academic Related Stressor (ARS) was the leading cause of stress on students. One hundred eighty four (53.2%) postgraduate students had ARS. Of these, 118(34.1%) had high stress, and 66 (19.1%) had severe stress. As shown in ***Figure 3***, Performance Pressure Related Stressors (PPRS) and Poor Relationship with Superior related stressors (PRRS) were the second and third causes of stress. One hundred fifty two (43.9%) Students had PPRS. Of these, 121(35.0%) had high stress and 31(9.0%) had severe stress. Similarly, 133(38.4%) had PRRS. Of these, 104(30.1%) had high stress and 29 (8.4%) had severe stress.

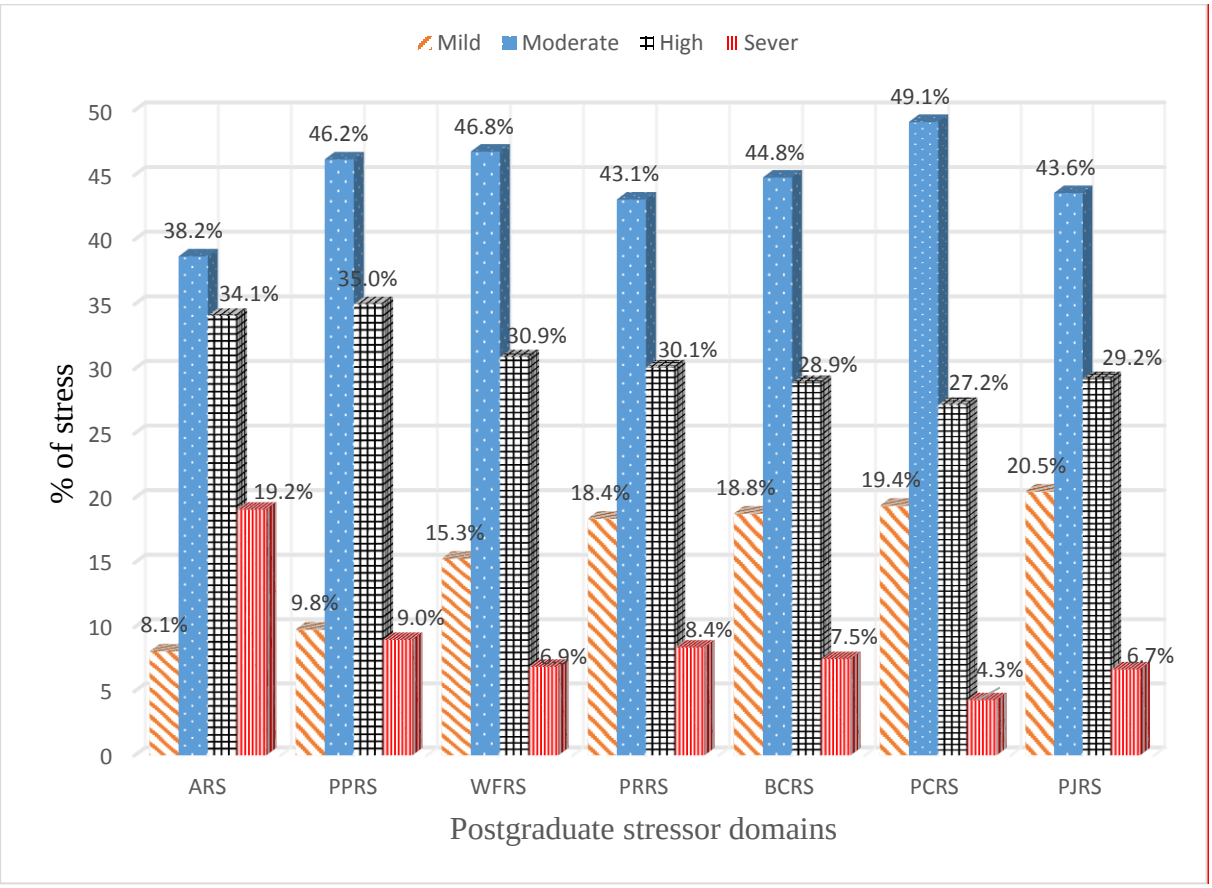

Figure 3:-Different stressor domains as sources of stress and severity of stress among postgraduate students, in JU April 2016.

As shown in ***Table 1***, stressor domains were rated by participants based on 28 questions listed in the PSQ. According to their mean calculated and rated, the top ten stressors were large amount of content to be learned, tests/examinations, lack of time to review what has been learnt, work overload, time pressures and deadlines to meet, difficulty understanding content, Unfair assessment from superiors, fear of making serious mistakes, my life is too centered on my work, advancing a career at the expense of home life.

Table 2:- Stressor domains rated by participants based on 28 questions listed in the PSQ in JU April, 2016. n=346

	VARIABLES	Stress intensity by postgraduate students	
		Mean	**Standard deviation**
Academic related stressors		2.79	0.81
1	Tests/Examinations	2.90	1.24
2	Lack of time to review what has been learnt	2.80	1.16
3	Difficulty understanding content	2.56	1.22
4	Large amount of content to be learned	2.91	1.22
Performance pressure related stressors		2.54	0.70
5	Time pressures and deadlines to meet	2.66	1.12
6	Work overload	2.72	1.07
7	Fear of making serious mistakes	2.48	1.10
8	My work is mentally straining	2.33	1.13
Work family related stressors		2.37	0.70
9	Work demands affect by personal life	2.33	1.05
10	Advancing a career at the expense of home life	2.40	1.04
11	My life is too centered on my work	2.45	1.12
12	Absence of emotional support from family	2.32	1.15
Bureaucratic constraints related stressors		2.33	0.76
13	Lack of authority to carry out my job duties	2.32	1.16
14	Unable to make full use of my skills and ability	2.37	1.17
15	Cannot participate in decision making	2.30	1.15
16	Having to do work outside of my competence	2.35	1.11
Poor relationship with superior related stressors		2.38	0.77
17	Lack of support from superiors	2.40	1.19
18	Difficulty in maintaining relationship with superior	2.32	1.19
19	My beliefs contradict with those of my superior	2.31	1.65
20	Unfair assessment from superiors	2.50	1.25
Poor relationship with colleagues related stressors		2.23	0.70
21	Working with uncooperative colleagues	2.31	1.14
22	Working with incompetence of colleagues	2.23	1.03
23	Relationship problems with colleagues	2.24	1.09
24	Competition among colleagues	2.15	1.12
Poor job prospects related stressors		2.30	0.75
25	Feeling insecure in my job	2.25	1.19
26	Society does not think highly of my profession	2.20	1.12
27	Lack of promotion prospects	2.37	1.19
28	Feeling of being underpaid	2.38	1.21

5.4 Stress and Substance Use

Concerning the association between substance use and stress, khat chewing, cigarette smoking, and alcohol drinking were common practices among students who had stress as presented in Table *3*.

Life time prevalence of khat chewing, alcohol drinking and cigarette smoking were 37.6%, 54.0%, and 15.3% respectively. Of these 66.15%, 77.54%, and 67.92% were current users of khat chewing, alcohol drinking and cigarette smoking respectively and 73.85%, 53.79% and 61.10% of postgraduate students are regular khat chewers, alcohol drinkers and cigarette smokers respectively.

Table 3:-Association between stress and substance use among PG students. Bivariate logistic regression analysis, n = 346.

Substance use	Stress				
	Total N (%)	Yes(n=160) N (%)	No(n=186) N (%)	COR (95%)	p-value
Khat chewing					
Yes	130(37.57)	68(52.3)	62(47.7)	1.47(0.95-2.28)	0.080*
No	216(62.43)	92(42.6)	124(57.4)	1.00	
Alcohol drinking					
Yes	187(54.05)	81(43.3)	106(56.7)	0.77(0.50-1.58)	0.237*
No	159(45.95)	79(49.7)	80(50.3)	1.00	
Cigarette smoking					
Yes	53(15.32)	31(58.5)	22(41.5)	1.79(0.99-3.24)	0.054*
No	293(84.68)	129(44.0)	164(56.0)	1.00	

***** Significant at p-value <0.25

5.5 Risk Factors for Stress

Regarding the factors associated with stress among postgraduate students; sex of the respondents, college of study, marital status, presence family history of mental illness, presence of chronic disease, khat chewing, alcohol drinking and cigarette smoking were significantly associated at bivariate analysis. These variables with $p< 0.25$ were further tested using multivariate analysis. Finally from multivariate analysis: sex of the respondents, marital status, college of study, khat chewing, alcohol drinking and cigarette smoking were significantly associated (***Table 4***). Age, year of study and monthly income were not significantly influence stress among postgraduate students.

Regarding the association between stress and sex, stress was higher among females [AOR = 1.90, 95% CI (1.12-3.22)] than male students as seen in **Table 4**. The odds of single in marital status were also 1.74 times higher [AOR= 1.74 (95% CI 1.09-2.77)] than those married PG students.

There was a significant association between college of study and the stress prevalence. The odds ratios were 16.03 (College of Agriculture and Veterinary Medicine students), 5.18 (College of Health Science students), 4.55 (College of Law and Governance students), 5.00(College Business and Economics students), and 5.67 (Institute of Technology students), 2.71 (College of Education and Behavioral Science students), 5.29 (College of Social Science and Humanity students), respectively, while College of Natural Science students was considered the reference category (**Table 4**).

Regarding the association between stress and substance use: Khat chewer students were 2 times more likely to have stress than non-chewers [AOR = 1.99, 95% CI (1.09-3.64)]. Cigarette smoker students were 2 times more likely to have stress than nonsmoker [AOR = 2.102, 95% CI (1.00-4.38)]. Whereas Alcohol drinkers were 0.44 times less likely to have stress than non-drinkers [AOR = 0.44, 95% CI (0.25-0.77)] as shown in **Table 4**.

Table 4:-Association between stress and predictor variables among PG students in JU April, 2016. Multivariate logistic regression analysis, n= 346.

Predictor variables		Total N (%)	Stress		AOR (95%)	p-value
			Yes(n=160) N (%)	No(n=186) N (%)		
Sex	Male	256(74.0)	109(42.6)	147(57.4)	1.00	
	Female	90(26.0)	51(56.7)	39 (43.3)	1.90(1.12-3.22)	0.017
Marital status	Married	208(60.1)	83(39.9)	125(60.1)	1.00	
	Single	138(39.9)	77(55.8)	61(44.2)	1.74(1.09-2.77)	0.018
College of study						
College of Agriculture & Veteri.		32(9.2)	21(65.6)	11(34.4)	16.03(3.56-72.87)	0.000
College of Health Sciences		127(36.7)	54(42.5)	82(57.5)	5.18(1.36-19.77)	0.016
College of Business and Economics		33(9.5)	18(54.5)	15(45.5)	5.00(1.16-21.51)	0.031
Institute of Technology		89(25.7)	41(46.1)	49(53.9)	5.67(1.46-21.93)	0.012
College of Social Science		20(5.8)	11(55.0)	9(45.0)	5.29(1.10-25.30)	0.037
College of Natural science		17(4.9)	3(17.6)	14(82.4)	1.00	
Khat chewing						
Yes		130(37.57)	68(52.3)	62(47.7)	1.99(1.09-3.64)	0.024
No		216(62.43)	92(42.6)	124(57.4)	1.00	
Alcohol drinking						
Yes		187(54.05)	81(43.3)	106(56.7)	0.44(0.25-0.77)	0.004
No		159(45.95)	79(49.7)	80(50.3)	1.00	
Cigarette smoking						
Yes		53(15.32)	31(58.5)	22(41.5)	2.10(1.00-4.38)	0.048
No		293(84.68)	129(44)	164(56.0)	1.00	

CHAPTER 6:- DISCUSSION

Stress during tertiary education and advanced academic training is inevitable. The present study tried to address four research questions. First, what is the level of stress among postgraduate students in JU? Second, what are the major sources of stress among postgraduate students? Third, is there a relationship between stress and substance use? Fourth, is there any relationship between stress and Sociodemographic variables?

This study found that a high prevalence of stress among postgraduate students which was 46.2%, based on GHQ scores. Although it is slightly lower compared to different studies done in the world, such as in India postgraduate medical school the prevalence was 52 % (32), in South Eastern USA 48.9% (39) , among international post graduate students 54% (41), and in Pakistan 55.1% (42). But It is still higher than the results of a study done in Malaysian (29.6%) (19) and in Nepal (20.9%) (35). The difference could be attributed to the socioeconomic, cultural and environmental factors as well as the different instrument used in other studies. Further, most of these studies were done among medical school students where the medical education environment is thought to be stressful and contributes to emotional and psychological disturbances.

Similarly, the prevalence is relatively lower than to the stress prevalence in undergraduate medical students' population (52.6%) which was done in Jimma University (18). Even though both undergraduate and postgraduate students faced similar training environment, the discrepancy might be due to age maturity of PG students and the amount and complexity of the material to be learned in medical students. This prevalence of stress is also relatively higher among College of Agriculture and Veterinary Medicine students compared to the prevalence of other students. The possible reasons for the variability in the levels of stress among different college students could be due to certain differences in the curricula, teaching facilities, qualification and experience of the instructors, and the levels of care given to the students.

The prevalence of stress in this study was higher among female students as compared to their male counter parts. This finding is consistent with other studies done in Malaysia (51) and Saudi Arabia (45). The possible causes for higher prevalence of stress among female students might be affective nature of their response to stressors, domestic

violence, and hormonal changes during menstruation. Compared to males, females experience much more fluctuation in hormone levels that are associated with symptoms of stress.

First year postgraduate students were found to have high GHQ scores (52.1%) compared to second year & above students. Other studies have also demonstrated a high prevalence of stress among first year students (18,55). It may be due to extended hours of study, increased work load and adjusting themselves to the new environment in first year students may initiate the stress response of sympathetic nervous system. In response to stressors, CRH, Arginine and adrenal medullary hormones are released at higher concentrations and it probably changes the ratio of acetylcholine, adrenaline and serotonin that gives a higher stress score.

According to PSQ in this study, among the seven stressor domains, academic related stressor (ARS) was the leading cause of stress on students. This finding is consistent with the result found in Pakistan (42) and in Indian (43) also showed that from all the stressors, academic related stressors were found to have the greatest impact and intensity on post graduate programs. Major academic stressors in postgraduate Students might be due to tests/examinations, grade competition, time demands, problematic professors and classroom environment, and concerns about career and future success.

Among 28 questions listed under stressor domain of PSQ, the top ten stressors were Large amount of content to be learned, tests/examinations, lack of time to review what has been learnt, work overload, time pressures and deadlines to meet, difficulty understanding content, unfair assessment from superiors, fear of making serious mistakes, my life is too centered on my work and advancing a career at the expense of home life. It is noteworthy that the stressors rated highly by postgraduate were relatively similar to those rated highly by other studies in Malaysia (30) such as tests and examinations, large amount of content to be learnt and time pressure to meet deadlines. Most of the stressors were related to academic and performance pressure. However a study done in India physiotherapy students showed that top ten stressors were the society does not think highly of the profession, unfair assessment by the superiors, unable to make full use of my skill, difficulty in maintaining relationships with superiors, fear of making mistakes that can

lead to serious consequences, having difficulty in understanding content, lack of support from the superior, lack of promotion prospect in future, feeling of being underpaid and competition among colleagues (50). The major stressor was the attitude of the society towards the profession suggesting a lack of awareness of the physiotherapy field in the society which was causing the stress to the students.

This study identified six significant predictor items of stress namely gender, marital status, college of study, khat chewing, alcohol drinking, and cigarette smoking. In this present study, it was found that postgraduate students with a medical history of chronic diseases and family history of mental illness have higher GHQ scores (55.7% & 54.4%) respectively. However, upon multiple logistic regression analysis, the results did not show any significance. Students that are single were more stressed compared to those that were married. This is in line with the academic staff of Malaysia University (51). The extent single individuals experience more frequent and more intense stress than do married individuals, they may exhibit more frequent, more prolonged, and greater activation of the HPA and SAM systems. Consistent with increased HPA and SAM activation, single individuals have been linked with a greater post awakening rise in cortisol (37).

The prevalence of khat chewers among postgraduate students was 37.57% in the present study. Among khat chewer students, 52.3% had manifested stress symptoms. Khat chewer students were 2 times more likely to have stress than none chewers. This finding is consistent with the results from Kenya (61), among Jimma town community (63) and Jimma university Medical students (18). People chew khat to get psychic stimulation effect in the form of euphoria and excitement resulting from the cathionone contents. The sympathomimetic effects of khat induce symptoms such as euphoria and hyperactivity, increased level of alertness, ability to concentrate, confidence, friendliness, pleasure, and flow of ideas. During khat chewing session, initially, there is an atmosphere of cheerfulness, optimism, and a general sense of well-being. After about 2 hours, tension, emotional instability, and irritability begin to appear later leading to feelings of stress and lethargy. Again due to the fact that substance use leads to in efficiency in life function, impaired relationship and sleep difficulty (25). Furthermore, substance use is associated

with increased absenteeism from class and poor academic performance which can further lead to mental distress in students. However, since the study design is cross sectional, it is difficult to ascertain the direction of causality.

The prevalence of cigarette smoking among postgraduate students was 15.32%. This is higher than the result found in Axum University (64). In the present study, among cigarette smokers, 58.5% had stress symptoms. Cigarette smoker students were 2 times more likely to have stress than nonsmoker. This is due to far from acting as an aid for mood control, nicotine dependency seems to exacerbate stress. This is confirmed in the daily mood pattern described by smokers, with normal moods during smoking and worsening moods between cigarettes. The apparent relaxant effect of smoking only reflects the reversal of the tension & irritability that develop during nicotine depletion. Dependent smokers need nicotine to remain feeling normal.

The prevalence of alcohol drinking among postgraduate students was 54.05% and among alcohol drinkers, 43.3% had stress symptoms which is higher than the result found in Axum University (64). In the present study, there was a significant association between stress and alcohol drinking, but with a protective role, indicating that those who drink alcohol are less likely to be affected by stress. Alcohol drinkers were 0.44 times less likely to have stress than nondrinkers. Drinking alcohol in moderate amounts can have positive influences on physical and mental health. While alcohol is one of the most widely abused substances in the study area, it is also one that features certain benefits for drinkers who consume it in safe amounts. For individuals who consume low levels of alcohol, benefits like reduced stress, increased cardiovascular health and decreased risk of developing type 2 diabetes offer a wealth of reasons for consumers to drink in moderation. Low levels of alcohol can trigger stress reduction, easy feelings of anxiety and help consumers to reduce tension. In addition, low levels of alcohol consumption can also cause the consumer to feel more pleasant and relaxed. However, Liver disease and certain cancers are undoubtedly related to alcohol intake, especially heavy drinking (69).

6.1 Limitation of the study

This study has some important limitations that should be kept in mind when interpreting the results.

Due to the cross sectional nature of the study, causal relationships may not be necessarily inferred.

The use of self-administered questionnaire may not be good enough to disclose information from the participants with full honesty concerning topics related to personal issues like substance abuse.

Furthermore, the study was also restricted to include small sample size which it may affect the generalizability of findings.

Finally; reports for some of the questions were past history or encounters which are prone to recall bias.

CHAPTER 7:- CONCLUSION & RECOMMENDATION

7.1 Conclusion

The prevalence of stress among PG students was found to be high. The prevalence of mental stress was relatively high among first year and female students.

Academic related stressor (ARS) was the leading cause of stress on students followed by, performance pressure related stressors (PPRS) and poor relationship with superior related stressors (PRRS) were the second and third causes of stress respectively.

Being female, unmarried students, students of College of Agriculture and Veterinary Medicine, khat chewing, and cigarette smoking were factors associated with stress. Whereas, alcohol drinking has protective role from stress in this study.

7.2 Recommendation

It is recommended that mental stress needs due attention and remedial action from different concerned bodies. Programs aimed at preventing mental stress need to address these identified factors of mental stress against students.

For Jimma University

First year & female students have more burden of stress. So the University have to implement a favorable policy for first year & female students such as flexible studying time and reasonable course loads.

The University should strengthen the existing psychological counseling center that give assistance and intervention for academic staff that has higher indication of distress.

Stress management seminars should be organized to develop coping skill for students to increase their capability to manage stressful working situation in efficient and effective ways.

University management should continually organize a stress assessment program for identification and evaluation about the current level of stress and stressors that might be experienced by students. So this assessment data could be used for implementing prevention or intervention action to reduce stress.

For College officials and Instructors

It is also important to highlight that major stressors were also related to unfair assessment from superiors, difficulty in maintaining relationship with superiors, fear of making mistakes that can lead to serious consequences and lack of support from the superior. It follows that fair assessment, appropriate, clear tasks and support should be given to the students which would reduce their stress level.

Awareness creation about the adverse effect of substance use, academic counseling and stress reduction interventions were also recommended.

For researchers:-

Further investigation on each determinant of stress with wider geographical coverage, large sample size and longitudinal study design were also recommended.

REFERENCES

1. Marcus M, Yasamy MT, Van Ommeren, Chisholm DS. Depression: A Global Public Health Concern. World Heal Organ. 2012;32.
2. McDaid D, Thornicroft G. Mental health II: balancing institutional and community-based mental health care. World Heal Organ. 2005;17.
3. WHO. WHO-AIMS Report on Mental Health System in Ethiopia. WHO Minist Heal Addis Ababa. 2006;24.
4. McEwen BS. Physiology and neurobiology of stress and adaptation: Central role of the brain. Physiol Rev. 2007;87:873–904.
5. Sohail N. Stress and academic performance among medical students. J Coll Physicians Surg Pak. 2013;23(1):67–71.
6. Kalia M. Assessing the economic impact of stress: The modern day hidden epidemic. Metabolism. 2002;51(6):49–53.
7. Paulus MP. Decision-Making Dysfunctions in Psychiatry Altered Homeostatic Processing? Science (80-). 2007;318:602–6.
8. Meaney MJ, Brake W, Gratton A. Environmental regulation of the development of mesolimbic dopamine systems: A neurobiological mechanism for vulnerability to drug abuse? Psychoneuroendocrinology. 2002;27:127–38.
9. Levine S. Developmental determinants of sensitivity and resistance to stress. Psychoneuroendocrinology. 2005;30:939–46.
10. Charmandari E, Tsigos C, Chrousos G. Endocrinology of the Stress Response. Annu Rev Physiol. 2005;67:259–84.
11. Whiteford H, Rehm J, Norman R, Flaxman A, Johns N. Global burden of disease attributable to mental and substance use disorders. Lancet. 2013;382(9904):1575–86.
12. Ahsan N, Alam S. A Study of Job Stress on Job Satisfaction among University Staff in Malaysia : Empirical Study. Eur J Soc Sci. 2009;8(1):121–31.
13. Nielsen N, Cook S. Publication manual of the American psychological association.

Washington, DC Am Psychol Assoc. 2007;

14. Jones J, Hodgson J, Huxtable B, Price M. Self-reported work-related illness: Results from a household survey. Heal Saf Exec. 2003;

15. Kessler R, Greenberg P. The economic burden of anxiety and stress disorders. Neuropsychopharmacol fifth Gener Prog. 2002;67:982–92.

16. Panel UH. A new global partnership: Eradicate poverty and transform economies through sustainable development. United Nations Publ. 2013;30:84.

17. Moges A, Mengistu A. Psychosocial problems of Jimma University students. Ethiop J Health Sci. 2004;14(1).

18. Leta M, Andualem M, Alemayehu N. Stress among Medical Students and Its Association with Substance Use and Academic Performance. J Biomed Educ. 2015;2015.

19. Sreeramareddy CT, Shankar PR, Binu VS, Mukhopadhyay C, Ray B, Menezes RG. Psychological morbidity, sources of stress and coping strategies among undergraduate medical students of Nepal. BMC Med Educ. 2007;7(1):26.

20. Low N, Dugas E, O'Loughlin E, Rodriguez D, Contreras G, Chaiton M, et al. Common stressful life events and difficulties are associated with mental health symptoms and substance use in young adolescents. BMC Psychiatry. 2012;12:116.

21. Kebede Y, Abula T, Ayele B, Feleke A, Degu G, Kifle A. Substances Abuse For the Ethiopian Health Center Team. Ethiop Public Heal Train Initiat. 2005;92.

22. Teshome D, Gedif T. Determinants of alcohol drinking and its association with sexual practices among high school students in Addis Ababa , Ethiopia. J Prev Med. 2013;3(6):420–7.

23. Squeglia LM. Adolescent alcohol use and fMRI BOLD response: A longitudinal Study. Univ Calif - Sian Diago. 2012;

24. Hassan NA, Gunaid AA, Murray Lyon IM. Khat [Catha edulis]: health aspects of khat chewing. East Mediterrenean Heal J. 2007;13(3):706–18.

25. Al-Hebshi N, Skaug N. Khat (Catha edulis)?an updated review. Addict Biol. 2005;10:299–307.

26. Solanky P, Desai B, Kavishwar A, Kantharia S. Study of psychological stress among undergraduate medical students of government medical college, Surat. Int J Med Sci Public Heal. 2012;1(2):38.

27. Agolla J, Ongori H. An Assassment of Academic Stress Among Undergraduate Students: The Case of University of Botswana. Educ Res Rev. 2009;4(2):063–70.

28. Bayram N, Bilgel N. The prevalence and socio-demographic correlations of depression, anxiety and stress among a group of university students. Soc Psychiatry Psychiatr Epidemiol. 2008;43:667–72.

29. Shah M, Hasan S, Malik S, Sreeramareddy CT. Perceived stress, sources and severity of stress among medical undergraduates in a Pakistani medical school. BMC Med Educ. 2010;10:2.

30. Siraj H, Salam A, Roslan R, Hasan NA, Jin TH, Othman MN. Stress and its association with the academic performance of undergraduate fourth year medical students at Universiti Kebangsaan Malaysia. Int Med J Malaysia. 2014;13(1):19–24.

31. Shetty A, Shetty A, Hegde MN, Narasimhan D, Shetty S. Stress and Burnout Assessment Among Post Graduate Dental Students. Nitte Univ J Heal Sci. 2015;5(1).

32. Shete A, Garkal KD. A study of stress, anxiety, and depression among postgraduate medical students. CHRISMED J Heal Res. 2015;2(2).

33. Amr M, Hady EA, El-Hawary A. Does gender predict medical students' stress in mansoura, egypt? Med Educ Online. 2008;13:12.

34. Dorle AS, Hiremath Ld, Ghattargi CH. A study of Psychological stress in undergraduate Medical Students at SN Medical College, Bagalkot, Karnataka. J Clin Diagnostic Res. 2010;4(4):2869–74.

35. Abdulghani HM, AlKanhal A, Mahmoud ES, Ponnamperuma G, Alfaris E. Stress and its effects on medical students: A cross-sectional study at a college of medicine in Saudi Arabia. J Heal Popul Nutr. 2011;29(5):516–22.

36. Volpe J. Overview: normal and abnormal human brain development. Ment Retard Dev Disabil Res Rev. 2000;6:1–5.

37. Kudielka BM, Kirschbaum C. Sex differences in HPA axis responses to stress: A review. Biol Psychol. 2005;69:113–32.

38. Herman JP. Neural pathways of stress integration: relevance to alcohol abuse. Alcohol Res. 2012;34(4):441–7.

39. Wyatt T, Oswalt BS. Comparing Mental Health Issues Among Undergraduate and Graduate Students. Am J Heal Educ. 2013;44:96–107.

40. Yusoff MS, Rahim AF. Prevalanc and Sources of stress among Postgraduate Medical Trainees:initial finding. ASEAN J Psychiatry. 2010;11(2):1–10.

41. Hussein OM, bt Zainal NZ, Abdel-Latif ME. Prevalance of stress among international post-graduate doctors at the University Malaya Medical Centre (UMMC), Kuala Lumpur. J Clin Diagnostic Res. 2012;6(4):859–62.

42. Kasi P, Khawar T, Khan F, Kiani J, Khan U, Khan H, et al. Studying the association between postgraduate trainees' work hours, stress and the use of maladaptive coping strategies. J Ayub Med Coll Abbottabad. 2007;19(3):37–41.

43. Gayathri H. Mental health of postgraduate orthodontic students in India: a multi-institution survey. J Dent Educ. 2012;76(2):200–9.

44. Shaikh BT, Kahloon A, Kazmi M, Khalid H, Nawaz K, Khan N KS. Students, stress and coping strategies: a case of Pakistani medical school. -. Educ Heal Publ Ltd. 2004;17(3):346–53.

45. Sani M, Mahfouz MS, Bani I, et al. Prevalence of stress among medical students in Jizan University , Kingdom of Saudi Arabia. Gulf Med J. 2012;1(1):19–25.

46. Melissa-Halikiopoulou C, Tsiga E, Khachatryan R, Papazisis G. Suicidality and depressive symptoms among nursing students in northern Greece. Heal Sci J. 2011;5(2):90–7.

47. Awadh AI, Aziz NA, Yaseen SN, Abdulameer S, Sahib M, O M E R Qutaiba B. A comparison study of perceived stress and quality of life among Master of Pharmacy and non- pharmacy master ' s students. Pharm Educ. 2013;13(1):22–8.

48. Dyrbye LN, Thomas MR, Shanafelt TD. Medical student distress: causes, consequences,

and proposed solutions. Mayo Clin Proc. 2005;80(12):1613–22.

49. Zaid ZA, Chan SC, Ho JJ. Emotional disorders among medical students in a Malaysian private medical school. Singapore Med J. 2007;48(10):895–9.

50. Rivedi B, Sheth M, Vyas N. Prevalance and Source of stress in Postgraduate physiotherapy students. INDIAN J Phys Ther. 2013;1:3–6.

51. Mukosolu O, Ibrahim F, Rampal L, Ibrahim N. Prevalence of Job stress and its Associated Factors among Universiti Putra Malaysia Staff. Malaysian J Med Heal Sci. 2015;11(1):27–38.

52. Taylor S, Lewis BP, Gruenewald TL, Gurung RA, Updegraff JA, Klein LC. Biobehavioral Responses to Stress in Females :Tend-and-Befriend,Not Fight-or-Flight. Reply to Geary Flinn. 2000;107(3):411–29.

53. Prangya P, Priyadarshini D, Rajkumar S. Stress and Depression among Postgraduate students. Int J ofScientific Res Publ. 2012;2(7):1–5.

54. Armeli S, Carney MA, Tennen H, Affleck G, O'Neil T. Stress and alcohol use: A daily process examination of the stressor–vulnerability model. J Pers Soc Psychol. 2000;78(5):979–94.

55. Dessie Y, Ebrahim J, Awoke T. Mental distress among university students in Ethiopia: a cross sectional survey. Pan Afr Med J. 2013;15:95.

56. Turner RJ, Lloyd DA. Cumulative adversity and drug dependence in young adults : racial / ethnic contrasts. Addiction. 2003;98:305–15.

57. Odenwald M. Chronic khat use and psychotic disorders : A review of the literature and future prospects. Sucht. 2007;53(1):9–22.

58. Arria AM, Caldeira KM, Kasperski SJ, Kevin E, Grady O, Vincent KB, et al. Increased alcohol consumption, nonmedical prescription drug use, and illicit drug use are associated with energy drink consumption among college students. J Addict Med. 2010;4(2):74–80.

59. Unger JB, Yan Y, Johnson CA, Gong J, Chen X, ChaoYang L, et al. Stressful life events among adolescents in Wuhan, China: Associations with smoking, alcohol use, and depressive symptoms. Int J Behav Med. 2001;8(1):1–18.

60. Weber EU, Blais AR, Betz NE. A domain-specific risk-attitude scale: measuring risk perceptions and risk behaviors. J Behav Decis Mak. 2002;15(4):263–90.

61. Atwoli L, Mungla PA, Ndung'u MN, Kinoti KC, Ogot EM. Prevalence of substance use among college students in Eldoret, Western Kenya. BMC Psychiatry. 2011;11.

62. Derese A, Seme A, Misganaw C. Assessment of substance use and risky sexual behaviour among Haramaya University Students , Ethiopia. Sci J Public Heal. 2014;2(2):102–10.

63. Damena T, Mossie A, Tesfaye M. Khat Chewing and Mental Distress: A Community Based Study, in Jimma City, Southwestern Ethiopia. Ethiop J Health Sci. 2011;21(1):37–45.

64. Gebreslassie M, Feleke A, Melese T. Psychoactive substances use and associated factors among Axum University students, Axum Town, North Ethiopia. BMC Public Health. 2013;13(1):693.

65. Yusoff MS. The sensitivity, specificity and reliability of the Malay version 30-item General Health Questionnaire (GHQ) in detecting distressed medical students. Educ Med J. 2010;2(1):12–21.

66. Goldberg DP, Gater R, Sartorius N, Ustun T, Piccinelli M, Gureje O, et al. The validity of two versions of the GHQ in the WHO study of mental illness in general health care. Psychol Med. 2000;27(1):191–7.

67. Chan KB, Lai G, Ko YC, Boey KW. Work stress among six professional groups: The Singapore experience. Soc Sci Med. 2000;50(10):1415–32.

68. Bash E. The development and validity of the Medical Student Stressor Questionnaire (MSSQ). ASEAN J Psychiatry. 2015;11(1):13–24.

69. Ellison RC, Martinic M. The Harms and Benefits of Moderate Drinking : Summary of Findings of an International Symposium. Ann Epidemiol. 2007;17(5).

ANNEXES

ANNEX I. WRITTEN INFORMED CONSENT FORM

JIMMA UNIVERSITY, COLLEGE OF HEALTH SCIENCE, DEPARTMENT OF BIOMEDICAL SCIENCE

DEAR STUDENTS!

My name is Abraham Zegeye. I am working in the research team of Jimma University. This study is proposed to assess the prevalence & sources of stress and its association with substance use which contribute for stress and you are chosen to participate in this study. The choice is made randomly using a lottery method. The questions include various private and personal lives.

In order to attain the goal effectively, we request your willful cooperation. Here under are the questionnaires you to complete. There is no need of writing your name or id number on the format. Confidentiality is strictly protected. It is your right to participate or to refuse in the study.

If you do not want to participate in the study, you can put the format in the table upside down. But your honest participation will have contribution to generate valid information that can be used for intervention designs. So please take these questions to answer. If there is anything that require clarification please don't hesitate to ask the facilitators for clarification.

Do you wish to participate in the study?

Yes I want to participate { }

No I don't want to participate { }

If you want to participate, Please put your signature _____

Thank you!!!

ANNEX II- ENGLISH VERSION QUESTIONNAIRE

PART I- Background information

I would like to know just a little about your background so we can see how different people feel about the topics which you have answered questions. The following are general questions for your responses. Please put your honest response.

S.No	Questions	Coding categories
101	Age	----------years
102	Sex	1. Male 2. Female
103	What is the level of your study year	1.1st year 2.2nd year &above
104	What is your religion?	1.orthodox 2.muslim 3. Protestant 4. Other (specify)
105	What is your ethnicity	1.Oromo 2.Amhara 3.Tigray 4.wolaita 5.Gurage 6.Other (specify)
106	From which college you are?	1.College of Agriculture &Veterinary Medicine 2.College of Natural science 3.College of Health Sciences 4.College of Law & Governance 5.college of Business and Economics 6.Institute of Technology 7.College of Education &behavioral science 8.College of Social science and humanity
107	What is your monthly personal income in Birr?	---------- Birr (ETB)
108	What is your marital status now?	1.Single 2.Married 3. Separated 4. Divorced 5.Widowed
109	Is there any member of your family who is suffered by mental illness?	1.Yes 2.No
110	Do you have any diagnosed chronic disease like HIV/AIDS, kidney disease, heart disease, DM and hypertension?	1.Yes 2.No

Part two –General Health Problems encountered within the last 4 weeks

In the next few questions, I Would like to know if you have experienced any medical complaints, and how your health has been in general **over the past four weeks: Please tick or circle as appropriate.**

S/No	**Encountered health Problem with in the last 4 weeks**	not at all (1)	No more than usual (2)	rather more than usual (3)	much more than usual (4)
201	Have you been able to concentrate on whatever you are doing?	1	2	3	4
202	Have you felt that you are playing a useful part in things?	1	2	3	4
203	Have you felt capable of making decisions about things	1	2	3	4
204	Have been able to enjoy your normal day to day activities?	1	2	3	4
205	Have you been able to face up to your problems	1	2	3	4
206	All things considered, have you been feeling reasonably happy?	1	2	3	4
207	Have you lost much sleep because of worry?	1	2	3	4
208	Have you felt constantly under strain?	1	2	3	4
209	Have you felt you could not overcome your difficulties?	1	2	3	4
210	Have you been feeling unhappy and depressed?	1	2	3	4
211	Have you been losing confidence in yourself?	1	2	3	4
212	Have you been thinking of yourself as worthless person?	1	2	3	4

PART THREE – POST GRADUATE STRESSOR DOMAINS

Please indicate the extent to which you find these aspects of your work stressful using the scale below: Please tick or circle as appropriate

S/N	VARIABLES	No Stress(1)	Low Stress(2)	Average stress(3)	High Stress(4)	Very High Stress(5)
Academic related stressors						
301	Tests/Examinations	**1**	**2**	**3**	**4**	**5**
302	Lack of time to review what has been learnt	**1**	**2**	**3**	**4**	**5**
303	Difficulty understanding content	**1**	**2**	**3**	**4**	**5**
304	Large amount of content to be learned	**1**	**2**	**3**	**4**	**5**
Performance pressure related stressors						
305	Time pressures and deadlines to meet	**1**	**2**	**3**	**4**	**5**
306	Work overload	**1**	**2**	**3**	**4**	**5**
307	Fear of making serious mistakes	**1**	**2**	**3**	**4**	**5**
308	My work is mentally straining	**1**	**2**	**3**	**4**	**5**
Work family related stressors						
309	Work demands affect by personal life	**1**	**2**	**3**	**4**	**5**
310	Advancing a career at the expense of home life	**1**	**2**	**3**	**4**	**5**
311	My life is too centered on my work	**1**	**2**	**3**	**4**	**5**
312	Absence of emotional support from family	**1**	**2**	**3**	**4**	**5**
Bureaucratic constraints related stressors						
313	Lack of authority to carry out my job duties	**1**	**2**	**3**	**4**	**5**
314	Unable to make full use of my skills and ability	**1**	**2**	**3**	**4**	**5**
315	Cannot participate in decision making	**1**	**2**	**3**	**4**	**5**
316	Having to do work outside of my competence	**1**	**2**	**3**	**4**	**5**
Poor relationship with superior related stressors						
317	Lack of support from superiors	**1**	**2**	**3**	**4**	**5**
318	Difficulty in maintaining relationship with superior	**1**	**2**	**3**	**4**	**5**
319	My beliefs contradict with those of my superior	**1**	**2**	**3**	**4**	**5**
320	Unfair assessment from superiors	**1**	**2**	**3**	**4**	**5**
Poor relationship with colleagues related stressors						
321	Working with uncooperative colleagues	**1**	**2**	**3**	**4**	**5**
322	Working with incompetence of colleagues	**1**	**2**	**3**	**4**	**5**
323	Relationship problems with colleagues	**1**	**2**	**3**	**4**	**5**
324	Competition among colleagues	**1**	**2**	**3**	**4**	**5**
Poor job prospects related stressors						
325	Feeling insecure in my job	**1**	**2**	**3**	**4**	**5**
326	Society does not think highly of my profession	**1**	**2**	**3**	**4**	**5**
327	Lack of promotion prospects	**1**	**2**	**3**	**4**	**5**
328	Feeling of being underpaid	**1**	**2**	**3**	**4**	**5**

PART FOUR : SUBSTANCE USE QUESTIONAIRE

The following questions focuses on Khat chewing practices , Alcohol drinking , Cigarette smoking, so you are requested to give answers about your personal behavior on the use of these substances.

S.No	Questions	
The following three questions are specific to Khat chewing Practices in particular		
401	Have you ever used khat in your life?	1.Yes 2.No
402	Have you used Khat in the last 1 month?	1.Yes 2.No
403	How long have you been chewing khat? Years…… months…….	
404	How many days did you chew during the last month? ……(30 days)	
405	What was your reason(s) to use khat?	
	a. To increase work or academic performance	
	b. To get relief from tension	
	c. To combat against exhaustion and hunger	
	d. Due to academic dissatisfaction	
	f. Due to religious practices	
	g. To get acceptance from others / to be like others/	
	h. To be sociable	
	i. To get personal pleasure	
	j. To increase pleasure during sexual intercourse	
	k. Due to peer influence	
2. The following three questions are specific to Alcohol drinking habits or Practices in particular		
406	Have you ever used alcohol drinks in your life /such as Areke, Tela Tej (local liquors) beer, and other alcohol drinks ?	1.Yes 2.No
407	Have you used any kind of alcohol drinks in the last 1 months?	1.Yes 2.No
408	How long have you been drink alcohol? Years…… months	
409	How many days did you drink alcohol during the last month? ...…….	
3. The following three questions are specific to cigarette smoking habits.		
411	Have you ever used cigarette smoking?	1.Yes 2.No
412	Have you used cigarette smoking in the last 30 days?	1.Yes 2.No
413	How long have you been smoking cigarette? Years…….months…...	
414	How many days did you smoke during the last week? ……..	

DECLARATION

I the undersigned, declare that this thesis is my original work, has not been presented for a degree in this or any other university and that all sources of materials used for the thesis have been fully acknowledged.

Name of the student: Mr. ABRIHAM ZEGEYE WONDIFRAW (BSc)

Signature: _____

Name of the institution: JIMMA UNIVERSITY

Date of submission: _____

This thesis has been submitted for examination with my approval as University advisor

Name of the first advisor

Dr. ANDUALEM MOSSIE AYANA (PhD, Associate Professor of Medical Physiology)

Signature_____

Name of the second advisor

Mr. YOHANNES MARKOS (MSc, Lecturer of Medical Physiology)

Signature_____