PREVALENCE OF DEPRESSION AND ASSOCIATED
FACTORS IN URBAN AND RURAL POPULATION OF
GILGEL GIBE FIELD RESEARCH CENTER.COMPARATIVE
CROSS SECTIONAL STUDY

BY

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DEDICATION

I would like to dedicate this work to my Father, Sheh Yassin Sirage Who Has Died of Heart failure in the late of April 2016.Dad may your soul/spirit rest in Jennah.

ACKNOWLEDGEMENT

ABSTRACT

Background: Depression is a significant contributor to the global burden of disease and affects people in all communities across the world as a result it is one of the leading causes of disability worldwide. Today, depression is estimated to affect 350 million people. The aim of this study was to determine and comparing risk factors of depression at different residence in GGFRC population.

Methods: A comparative Cross-sectional study was carried out using secondary data identified from a survey conducted between September 2008 to December 2009 from Gilgel Gibe Field Research Center. Data from 982 urban and 2960 rural individuals were extracted for the analysis. Data on depression symptom, socio-demographic, behavioral risk factors and history of chronic diseases was extracted. Prevalence of Depression in respondents based on ICD-10 criteria was estimated and multiple logistic regression analyses were carried out to test associations of potential risk factors with depression, while controlling for potential confounding.

Result: The final sample included 3942 respondents. The prevalence rate of depression episode in the study population was 6.4%, (6.9% for rural and 4.9% for urban). After controlling for all socio-demographic and behavioral variable, in urban resident being female (AOR=2.7, 95% CI: 1.92-9.96), drink alcohol (AOR=2.44, 95% CI: 1.26-4.7),chewing khat (AOR=2.37, 95% CI: 1.2-4.67) and having more than one CNCDs (AOR=11.59, 95% CI: 3.97-33.82),was significant while in rural females (AOR=2.85, 95% CI: 2.0-4.0), being older 45-64 years of age (AOR=1.99, 95% CI: 1.49-2.67) monthly income of <1000 (AOR=1.57, 95% CI: 1.06-2.33), drinking alcohol (AOR=2.65, 95% CI: 1.42-4.9 and khat chewers (AOR=3.1, 95% CI: 2.17-4.3) were identified to be predictors for depressive episodes.

Conclusion: Sex, alcohol drinking and chat chewing for both residents but, age and monthly income in rural while only number of diagnosed chronic non communicable diseases in urban were the most important risk factors for depressive episodes. Empowering by education and financial capacity of women's, those having low income and exposed for khat and alcohol use in both residents will be the primary plan for government officials and other stakeholders in the local areas.

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List of acronyms and abbreviations

CNCDs   Chronic non-communicable disease

CVD   Cardio Vascular Diseases

DALYs   Disability Adjusted Life Years

GGFRC   Gilgel Gibe Field Research Center

HR   Hazard Ratio

ICD-10   International Classification of Diseases tenth revision

JU   Jimma University

OR   Odds Ratio

PTSD   Post-Traumatic Stress Disorder

SSA   Sub-Saharan Africa

SPSS   Statistical Package for Social Science

SNNPR   Southern Nation Nationalities and peoples regional state

WHO   World Health Organization

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1. INTRODUCTION

1.1. Background

Depression is a common mental disorder that presents with depressed mood, loss of interest or pleasure, decreased energy, feelings of guilt or low self-worth, disturbed sleep or appetite, and poor concentration. Depression is one of the leading causes of disease burden and disability across all age groups and is a significant contributor to the global burden of disease and affects people in all communities across the world .Today, depression is estimated to affect 350 million people. The World Mental Health Survey conducted in 17 countries found that on average about 1 in 20 people reported having an episode of depression in the previous year. For these reasons, depression is currently near the top of the global list of disabling conditions in global burden of disease studies.(1, 2)

Depression and depression-related problems are not caused by a single factor. The aetiology of depression is clearly multifactorial in nature, covering biological, psychological and social factors. The onset of depression is influenced by adverse life events, and other factors may increase a person's susceptibility to depression or may precipitate the condition. Several social factors are associated with the existence of depression. Studies have also shown a relationship between low socio-economic status and the occurrence of depression. Unemployment, especially long-term unemployment, is also an apparent risk factor. Current alcohol and substance abuse may be a consequence of depression and also a risk factor (3)

A risk factor refers to any attribute, characteristic or exposure of an individual which increases the likelihood of developing the disorder. Unlike other illnesses or disorders, there is no simple explanation as to what causes depression. In general, depression can be due to a number of factors including stresses which can range from mild to severe, combined with vulnerability to depression that can result from biological, genetic or psychological factors. Each type of depression is associated with different mixtures of causes.(4, 5)

According to the World Federation of Mental Health report of 2012, depression interferes with the daily life of people and causes pain for both patients and those who care about them and it was also most disabling problem that also causes increased risk of other health conditions like substance abuse, HIV/AIDS infection and injury. The Sub-Saharan Africa region, the most conflict-affected region of the world, has seen rates of post-traumatic stress disorder (PTSD), anxiety, and depression range from 20 to 60 percent and alcohol abuse has seen a sharp increase.(1, 6, 7)

1.2. Statement of problem

People should be alert to the early signs of depressive disorder it can affect anyone, from young people to elderly age groups. Among the developed countries, the current economic downturn has resulted in increased unemployment, increased debts and increased insecurity resulting also in an increasing incidence of depression among the population. For middle- to low-income countries, public education on mental health is often inadequate due to limited resources and this makes individuals highly exposed to depression. Worldwide, mental and substance use disorders accounted for 183 · 9 million DALYs (153 · 5 million – 216 · 7 million), or 7 ·4% (6 ·2 – 8 ·6) of total disease burden in 2010. Overall, mental and substance use disorders were the fifth leading disorder category of global DALYs. Within the mental and substance use disorders group, depressive disorders accounted for most DALYs, followed by anxiety disorders, drug use disorders, and alcohol use disorders. According to the World Federation of Mental Health report of 2012, depression interferes with the daily life of people and causes pain for both patients and those who care about them and it was the third leading cause of burden of diseases worldwide; representing 4.3% of the total disability adjusted life years. It is also predicted to become the second leading cause of the global disease burden by the year 2020. In Ethiopia, depression contributes to about 6.5% of the burden of diseases. This is the highest share of burden compared to other forms of mental disorders.(1, 8, 9)

The harmful use of alcohol ranks among the top five risk factors for disease, disability and death throughout the world Thus, harmful use of alcohol accounts for 5.9% of all deaths worldwide. Ethiopia studies showed that the proportion of depression episodes is higher in the group of non heavy drinker and infrequent heavy drinker subjects..(10, 11)

Khat is a strong stimulant that causes mild to moderate psychological dependence, although not as strong as that of alcohol and tobacco, and it can have serious health and economic consequence. It is estimated that as many as ten million people worldwide chew Khat .different studies in Ethiopia showed us khat chewers was significantly associated with depression (12-14).

The prevalence of depression in those with chronic illness in the world is much higher, i.e. 25 % to 33 %. It is well known that chronic illness and depression often occur together. Approximately one in five Australians have a common mental disorder (depression, substance misuse or anxiety disorder), and 43% of people who have a mental disorder will also have a co-morbid chronic illness. Depression can be a risk factor for chronic illness and people with chronic illness often suffer from depression. Research done on medical morbidity and severity of depression in a large primary care sample suggests that people who have chronic illnesses have double the risk for major depression than people who don't have any chronic illnesses.(15-17)

There are gaps in the study on the magnitude of different risk factors with depression. To the investigator's knowledge in Ethiopia, no study has yet been done to compare and identify behavioral, co-morbidity related risk factors associated with depression following comparative cross sectional study design. So that this study aims to identify association between different risk factors with depression in different settings.

2. LITERATURE REVIEW

Depression is one of the leading causes of disease burden and disability across all age groups. Unlike other illnesses or disorders, there is no simple explanation as to what causes depression. In general, depression can be due to a number of factors including stresses which can range from mild to severe, combined with vulnerability to depression that can result from biological, genetic or psychological factors.(2, 5)

2.1. Socio demographic factors of depression disorder

The study in Germany shows that the lifetime and 12-month prevalence of diagnosed depression are highest in large towns (13.7 and 7.6%), followed by mid-sized towns (11.4 and 5.5%) and rural areas (10.5 and 5.7%), while they are lowest in small towns (9.9 and 4.4%). Women (15.4%) report a previously diagnosed depression almost twice as frequently as men with 7.8% (p<0.0001). Prevalence increases with increasing age and is highest among women and men aged 60–69 years (22.9 and 11.6%), after which it falls again. The lowest prevalence is found among young adults aged 18–29 years (8.5 and 4.2%. A cross-sectional study conducted in a   large mall in Riyadh city showed   female   gender and individuals above 45 years are more likely to suffer from depression.(19, 20)

A study done in Nigeria on the association between Depression and Social Demographic Factors in a Nigerian Family Practice Setting, Depression episode was highly significant with the age group 51 - 60 years having strong association between age and depression (p = 0.008) sex being female (p-value = 0.008). , having low income (p-value = 0.001).(21)

A study conducted in Ethiopia on the prevalence of depression and associated factors findings from the National Health Survey showed that The prevalence of depressive episode was 9.1%(95%CI: 8.39-9.90) of which, 8.7% (95% CI 7.66–9.83) of the males suffered from depression episodes, the   proportion among females was 9.5%   (95% CI 8.36– 10.64).The risk factor educational status, being in grade 5–8 had a higher odds (OR=2.6, 95% CI: 1.23-5.43) and 9–12 grade (OR=1.8 95% CI: 1.45-6.12) of attending service for depressive

episodes. Age was risk factor for developing depression episodes: 31–44 years of age group had a higher odds of (OR=1.7,95% CI 1.28–2.18), 45–54 years of age (OR=2.2, 95% CI 1.62–3.01),55–64 years of age group (OR=3.2, 95% CI 2.34–4.46), 65–74 years of age group (OR=4.4, 95% CI 3.09–6.39) and those 75 years of age and older (OR=6.0, 95% CI 3.78–9.65) developing depression episodes compared to those in age between 18 and 30 years overall, the risk was increasing with increasing age. The prevalence of depression among low income individuals (501–999 birr per month) was (11.4%) and >1000 birr per month have (13.5%).In other systematic review study conducted in Ethiopia showed that, the prevalence of depression was varied from 0.6% to 23.6% .The risk factors older people and rural people had higher odds of depression than their counterparts .(11, 22)

2.2. Chat chewing habit

It is estimated that as many as ten million people worldwide chew Khat. It is unclear whether khat causes tolerance, physical dependency, addiction, or withdrawal, but long-term users have reported mild depression. However, WHO classified Khat as a drug of abuse that can produce mild to moderate psychological dependence, beside its dependence, mentally and physically, khat chewing leads to problems like depression and anxiety and psychosis? It is estimated that up to 90% of adult males and 50% of females chew Khat three to four hours daily in Yemen's. Recent study for the World Bank estimated that 73% of women chew Khat leaves more or less frequently. (12, 23)

A study on the prevalence of Khat chewing and alcohol consumption in Jimma zone revealed that Prevalence of Tobacco uses, drinking alcohol, and chewing Khat were, (35.5%), (50%), (68.5%) respectively among these 33.9% of the study subjects chewed khat every days, (21.8%) chewed Khat 2-3 days per week.(13)

A community based study conducted in Jimma city showed that in among Khat users, (34.7%) had mental distress. Daily khat chewers and those who used Khat for the last six months showed mental distress with a prevalence of 41.0% and 39.1%, respectively. Mental distress was 43.8%, 40% and 36.4%among illiterate, farmers and aged above fifty five years, respectively.(24)

A study done in Bahir-dar university students on Khat use prevalence, causes and its effect on mental health, the expense was highly affecting the life of students mainly when they were frequent chewers of khat. Statistically significant difference was found in the levels depression (p<0.05) between khat chewers and in another cross-sectional study conducted in Jimma Town in March, 2012, showed that khat chewers [OR=10.07, CI (5.57-18.25)], was significantly associated with depression.(14, 25)

2.3. Alcohol drinking behavior

High levels of alcohol consumption, alcohol abuse and alcohol dependence are associated with higher levels of depressive symptom .A large, parallel-group, randomized, multicenter, controlled, clinical trial conducted in Spain showed that Moderate alcohol intake within the range of 5 to 15 g/day was significantly associated with lower risk of incident depression (hazard ratio (HR) and 95% confidence interval (95% CI) = 0.72 (0.53 to 0.98) versus abstainers but, in another study on Multi-site, multi wave being conducted at eight Veterans Health Administration showed depressive symptoms were higher in hazardous and binge drinkers than in past and non-hazardous drinkers (OR=2.65; CI=1.50/4.69; p<.001) and similar to those with abuse or dependence.(18, 26)

A study done in Ethiopia based findings from the National Health Survey showed that the proportion of depression episodes are higher in the group of non heavy drinker and infrequent heavy drinker subjects (14.5%) than in the groups whose alcohol consumption is either frequent heavy drinker (12.2%) or life time abstainers (6.2%).(11)

2.4. Illness related factors

Depression is more likely in patients with certain chronic diseases and is associated with increased rates of disability and mortality as many national and international studies have shown. A study conducted in urban Ouagadougou showed that , people who reported one chronic disease have much higher risks of being identified as depressed (OR 2.2,p < 0.001),and the risk is even much higher among those who reported having at least two chronic diseases (OR 6.7, p < 0.001).(27, 28)

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A study conducted in Ethiopia analyses data from the national health survey showed that those study participant who diagnosed for non-communicable diseases (NCDs) showed a significant trend association with depression episodes (P for trend <0.0001),the risk increasing with increasing number of (CNCDs) and having two or more diagnoses of chronic non communicable diseases further increases the likelihood (OR=4.2, 95% CI 3.18 – 5.57) for the presence of depression episodes as compared to those with no life time diagnoses of non-communicable diseases.(11)

2.5. Conceptual frame work

Socio-demographic factors
- ❖ Age
- ❖ Sex
- ❖ Educational status
- ❖ Income
- ❖ Occupation

Behavioral risk factors
- ❖ Alcohol consumption
- ❖ Khat chewing
- ❖ Tobacco smoking

Depression disorder

Co-morbidity
- ❖ History of Diabetes
- ❖ History of epilepsy
- ❖ History of Hypertension
- ❖ History of Asthma
- ❖ History of CVD
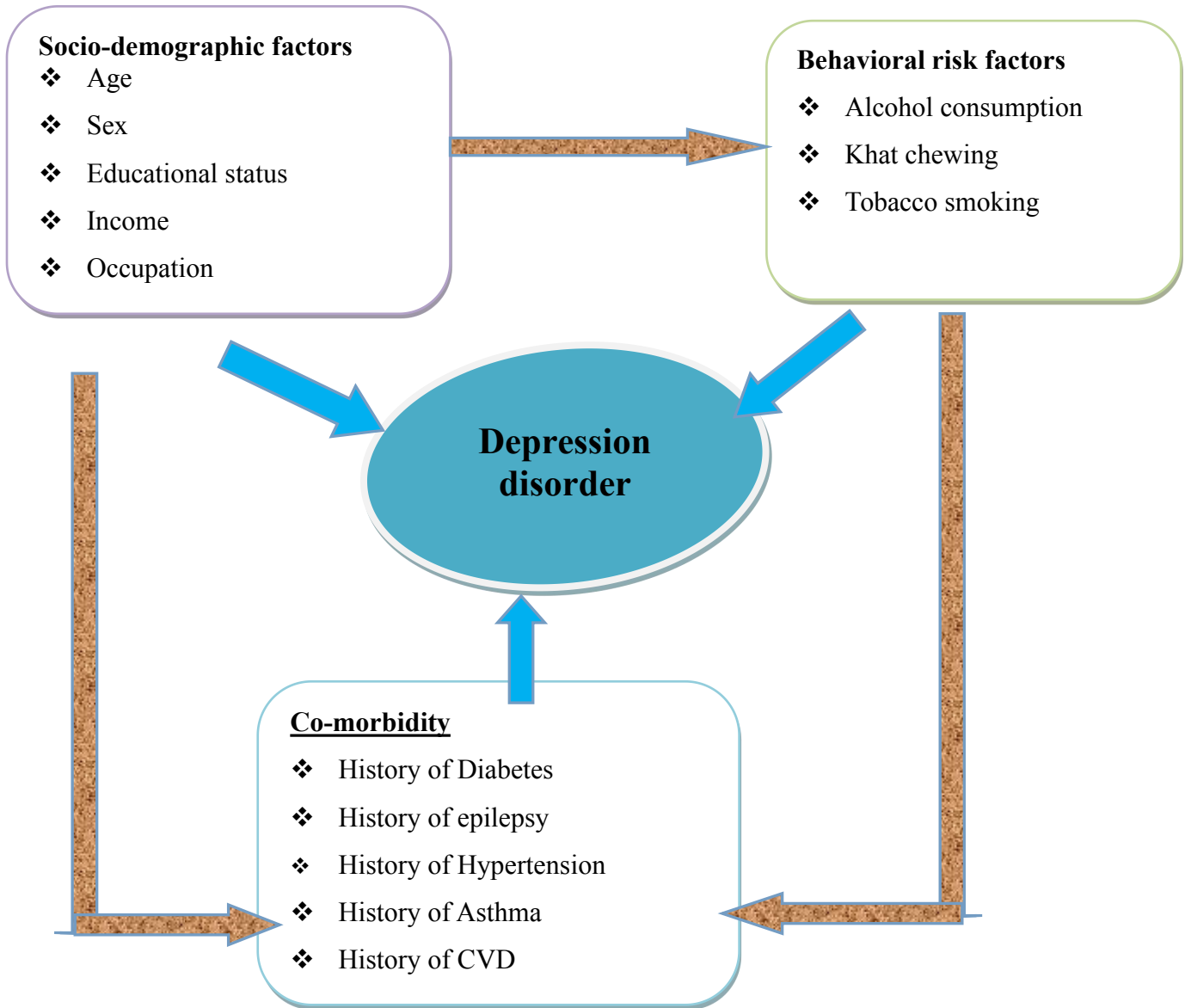
Figure 1 Conceptual framework on risk factors of depression disorder (adapted from WHO stepwise guidelines to identify risk factors of CNCDs),GGFRC,2016.

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3. SIGNIFICANCE OF THE STUDY

Depression is one of the leading causes of disease burden and disability across all age groups and community in the world as well as in our study area. As a result of its complication due to having different risk factors, studying on them and comparing by resident with depression is necessary.

Due to easily accessible of not analyzed large amount of data and the prevalence of substance abuse rate increment in our study area, it is better to study the prevalence and associated risk factors of depression at different geographic area (urban and rural).

Greater knowledge about the socio-demographic, behavioral and history of other CNCDs risk factors could lead to a better evidence based interventions in Ethiopia aimed at reducing morbidity, disability and death related to depression. This study also provides valuable information to the health professionals, researchers, and other stakeholders.

4. OBJECTIVES OF THE STUDY

4.1. General objective

To identify and compare different factors of depression in Urban and Rural population of Gilgel Gibe Field Research Center

4.1.1. *Specific objectives*

1. To determine prevalence of   Depression among rural and urban residents of GGFRC
2. To identify and compare the prevalence of risk factors of depression among Urban and Rural areas.

5. METHOD AND PARTICIPANTS

5.1. Study area and period

The study area GGFRC is located around Gilgel Gibe Hydroelectric Dam, 55 kilometers Northeast of Jimma Town on the way to Addis Ababa. This was mapped, houses numbered and census carried out in August 2005. Since then, there is an ongoing demographic and health surveillance in the center. The study area comprised of about 11,000 households with a total population of 50,000 in the center. Out of the total population, age range of 15 to 64 years comprised of about 49%. Majority of the residents live with subsistence agriculture producing mainly food crops. There were one health center, two health stations and 4 health posts in the center during the study period. There were two trained health extension workers in each Kebele. In the urban kebeles the source of water was either shallow dug well, pipe water or protected springs whereas the major sources of water in rural kebeles were unprotected.(29).This secondary data analysis was conducted from February to April 2008 E.C.
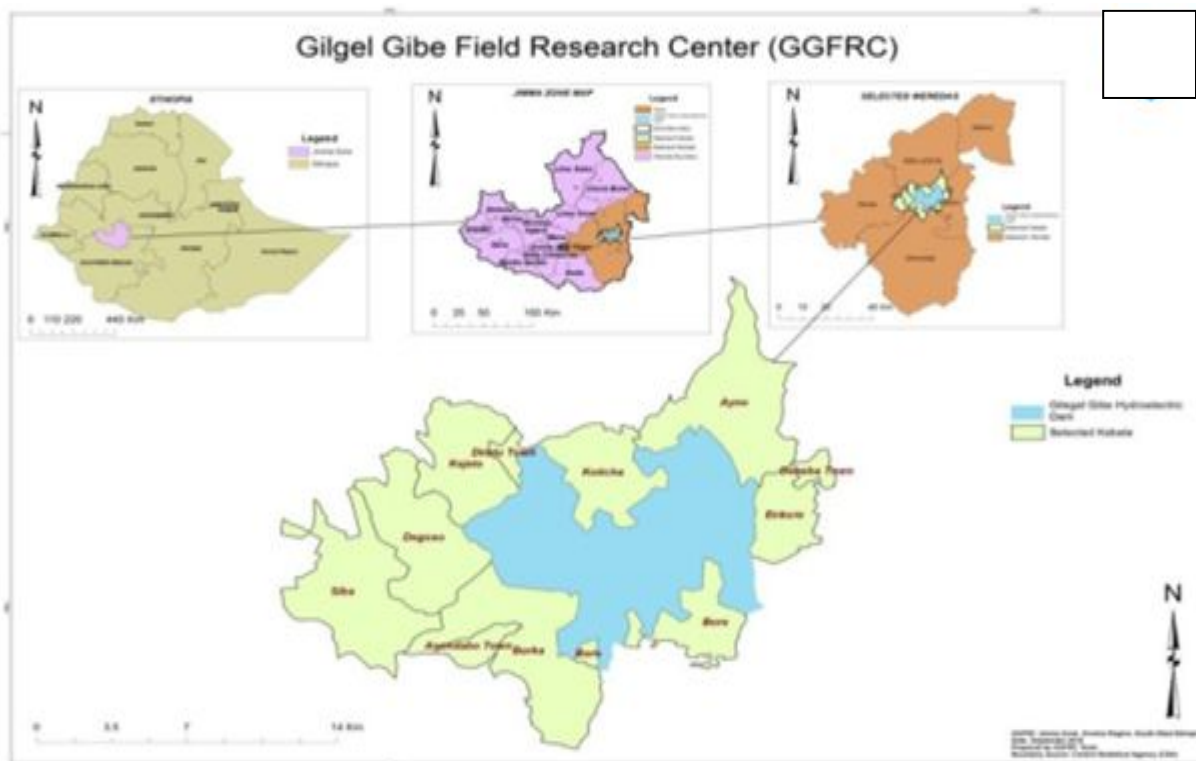
Figure 2 Map of the study area: Gilgel Gibe Field Research Center,2016.

5.2. Data type and source

This study was conducted using a secondary analysis of primary data from Gilgel Gibe Field Research Center (GGFRC) of Jimma University (JU) survey. Data sets from the urban and rural population in the age group of 15–64 years were used for the analysis. The original data were collected according to WHO STEPS guideline and the diagnosis of depression episodes was based on the International Classification of Diseases tenth revision (ICD-10) diagnostic criteria for research for depressive episodes.(30) and was derived from an algorithm that took into account respondents reporting symptoms of depression during the past 12 months. The individual questions used to assess these symptoms were based on the World Mental Health Survey version of the Composite International Diagnostic Interview.(31). The primary objective of the parent study was determination of magnitude of CNCDs, risk factors of CNCDs and biochemical, immunological and hematological value determination of the community at GGFRC. Data Collection and Variable Specification Briefly, study subjects were Individuals aged 15 to 64 years from both sexes, who were residents of the 10 Kebeles under surveillance by the research center, were studied. The GGFRC samples were selected taking by 25% urban and 75% rural population distribution in the center, the total sample was distributed proportionally. Then the sample was distributed to each Kebele proportional to their population size. Using the age and sex stratified sampling frame obtained from the census list, individuals were selected randomly. The detailed methodology is found elsewhere. (29)

5.3. Study design

✧ Community based Comparative cross sectional study was conducted

5.4. Population

5.4.1. *Source population*

➢ All people aged 15-64 years living in GGFRC during the survey

5.4.2. *Study population*

➢ All sampled individuals aged 15-64 years living in GGFRC during the survey

5.5. Eligibility criteria

5.5.1. *Inclusion criteria*

➢ All participants aged 15-64 years living in the study area.

5.5.2. *Exclusion criteria*

➢ Study participants with incomplete records were not included

5.6. *Study variables*

5.6.1. *Dependent Variable*

Prevalence of depression disorder

5.6.2. *Independent variables*

A. **Socio-demographic variables** (Age, sex, residential area, educational level,   income level, occupation, employment history

B. **Behavioral factors**
   - Use of alcohol   Use of cigarette
   - Chewing of Khat

C. **Illness related (co-morbidity) variable**
   ✦ History of CNCDs (diabetes, epilepsy, hypertension, Asthma and CVD)

5.7. Operational Definition

Depression disorder: Depression episodes with at least two of the following 3 symptoms:

I. Depressed, sad, empty present for most of the day and almost every day and sustained for more than two weeks.

II. Loss of interest or pleasure in activities that is normally pleasurable present most of the day and almost every day and Sustained for more than two weeks.

III. Feeling energy decreased that present most of the day and almost every day sustained for more than two weeks

And additional one or more of the following symptoms:

A. Loss in appetite (during feeling energy decreased/ sadness/loss of interest)

B. Noticing in slowing down in thinking (during feeling energy decreased/sadness/loss of interest).

Co-morbidity: The presence of one or more additional disorder (CNCDs) co-occurring with a primary disease or disorder.

Current Alcohol drinker: Reported consumption of alcohol 30 days before the survey.

Current Khat use: Reported consumption of khat at the time of the survey.

5.8. Data extraction

A total of 3942 individuals with 15-64 age populations was included in the analysis, and of which 982 were from urban and 2960 were from rural population extracted for analysis. Based on literature and availability of variables in the GGFRC data: gender, age, occupation, residence, income status, education, alcohol consumption status, Khat chewing status, tobacco smoking status, and co-morbidity (history of other chronic disease) were selected and extracted to be see the association with depression disorder.

5.9. Measurement of outcome variable

The diagnosis of depression episodes was based on the International Classification of Diseases tenth revision (ICD-10) diagnostic criteria for research for depressive episodes (36) and was derived from an algorithm that took into account respondents reporting symptoms of depression during the past 12 months. The individual questions used to assess these symptoms were based on the World Mental Health Survey version of the Composite International Diagnostic Interview.(31) Generally, the magnitude and burden of risk factors of depression on different geographic areas was assessed.

5.10. Data quality assurance

The extracted data was cleaned prior to data analysis. This includes: checking ranges, completeness, consistency, missing data, and outliers. After detecting appropriate handling for each was done accordingly. Different statistical analysis was done appropriately and all their assumptions were checked in order to make the analysis valid.

5.11. Data Analysis

The socio-demographic variables (age, sex, education and employment status, residential area, income level, and occupation), behavioral factors (alcohol consumption, chewing khat and tobacco smoking) and co-morbidity (diabetes, epilepsy, hypertension, Asthma and CVD) were extracted and Statistical Package for Social Sciences (SPSS) software version 20.0 was used to process the data. Descriptive statistics including prevalence and frequency distributions was used to determine the level of depression on individuals having Khat chewing practice, alcohol consumption, smoking cigarette and other illness related factors. The association between depression and covariates was assessed first by bivariate logistic regression. In bivariate logistic regression, the variables with P-value <0.25 were considered candidates for multiple logistic regression. Multiple logistic regression analysis was done controlling for possible confounders and interaction between independent variables was checked using backward likelihood ratio with 0.01 probability removal was used to develop the model both in urban and rural to identify independent predictors of depression in both areas. OR was presented at 95 % CI and P-value < 0.05 was considered statistically significant. During the analysis, the fitness and statistical assumptions of the logistic model was checked to be satisfied and Hosmer-Lemeshow statistic was used to assess the fitness of the model with P value > 0.05 was taken as the level of significance.

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5.12. Ethical consideration

Ethical clearance for the original survey was obtained from Jimma University's Research and Publication Office, for this research we obtain official letter from Jimma University's Ethical Review Board to collect the necessary data from the GGFRC project office.

5.13. Dissemination plan

The final result of this study will be presented to Jimma University, College of health science department of Epidemiology and will be presented to other concerned governmental and nongovernmental organization. The findings also will be presented at different seminars, workshops and conferences. Finally an attempt will be made to publish in different local and international scientific peer reviewed medical journals.

6. RESULT

6.1. Socio demographic characteristics of respondents

A total of 4371 respondents from GGFRC were collected among those subjects, 3942 (90.18%) of the data having age of 15-64 years was used for analysis. Out of the study subjects, (2960) 75.1% were from rural areas while the rest were from urban.52.3% of the respondents were females and 47.7% of respondents were male. The mean age of the study subjects was 38.9 (SD± 13.584) years. Majority of them 2849 (96.2%) self workers and 111 (3.8 %) employed were from the rural participants while 802 (81.7 %) self workers and 180 (18.3 %) employed participants were from the town population.

The assessment of educational status of study participants involved in the survey showed 461 (46.9%) urban and 2338 (79.0%) of rural study participants were illiterate by their educational status. 289 (29.4%) urban and 161 (5.4%) of rural participants attained secondary and higher education. The mean monthly income for the urban and rural participants was ETB 548.82 (SD± 715.41) and 788.58 (SD± 747.1) respectively. (Table 1).

Table 1 Socio-demographic characteristics of respondents by residence,GGFRC, 2016

Variables		Urban (%) (n=942)	Rural (%) (n=2960)	Total (%) (n=3942)
			Place of residence	
Sex	Male	441 (44.9%)	1438 (48.6%)	1879 (47.7%)
	Female	541 (55.1%)	1522 (51.4%)	2063 (52.3%)
Age	15-44	589 (60.0%)	1809 (61.1%)	2398 (60.5%)
	45-64	393 (40.0%)	1151 (38.9%)	1544 (39.2%)
	Don't read and write	461 (46.9%)	2338 (79.0%)	2799 (71.0%)
Education	Primary	232 (23.6%)	461 (15.6%)	693 (17.6%)
	Secondary and above	289 (29.4%)	161 (5.4%)	450 (11.4%)
Occupation	Self worker	802 (81.7%)	2849 (96.2%)	3651 (92.6%)
	employed	180 (18.3%)	111 (3.8%)	291 (7.4%)
Monthly income	<1000	872 (88.8%)	2304 (77.8%)	3176 (80.6%)
	>1000	110 (11.2)	656 (22.2%	766 (19.4%)

6.2. Behavioral risk factors of respondents by resident

Among Behavioral risk factors and CNCDs related variables for depression, 1640 (41.6%) of the respondents were chat chewer at the time of the study, 34.3% were from urban and 44.0% were from rural areas. Current alcohol consumption at the time of study was 7.1% which was higher among urban (19.3%) than rural (3.0%) residents. Among the 3942 respondents only 0.7% of respondents have two or more than two diagnosed CNCDs which were higher in urban 1.8% than rural 0.4%. (Table 2).

Table 2 Behavioral other risk factors of respondents by resident, GGFRC, 2016.

Variables		Place of residence		
		Urban (%) *(n=942)*	*Rural (%)* *(n=2960)*	*Total (%)* *(n=3942)*
Chew khat	No	645 (65.7%)	1657 (56.0%)	2302 (58.4%)
	Yes	337 (34.3%)	1303 (44.0%)	1640 (41.6%)
	Total	982 (100.0%)	2960 (100.0%)	3942 (100.0%)
Alcohol drinkers	No	792 (80.7%)	2872 (97.0%)	3664 (92.9%)
	Yes	190 (19.3%)	88 (3.0%)	278 (7.1%)
	Total	982 (100.0%)	2960 (100.0%)	3942 (100.0%)
	No CNCDs	840 (85.5%)	2826 (95.5%)	3666 (93.0%)
Co-morbidity	Only one	124 (12.6%)	123 (4.2%)	247 (6.3%)
	More than one	18 (1.8%)	11 (0.4%)	29 (0.7%)
	Total	982 (100.0%)	2960 (100.0%)	3942 (100.0%)
Smoking cigarette	No	928 (94.5%)	2641 (89.2.6%)	3569 (90.5%)
	Yes	54 (5.5%)	319 (10.2%)	373 (9.5%)
	Total	982 (100.0%)	2960 (100.0%)	3942 (100.0%)

6.3. Prevalence of depression with different risk factors

The prevalence of depression was high among females 7.6% which was more than one and half time males 5.1%. The observed difference was statistically significant. People from rural suffer from depressive episodes significantly more often than people from urban this difference are statistically significance having a P value 0.027.The distribution of depression was higher among elderly groups having 45 -64 years of age 132 (8.5 %) than the younger groups 15-44 years of age 120 (5.0%).The prevalence also higher for those with monthly income below 1000   which was 216 (6.8%) this difference also significant with P value 0.034. among the behavioral risk factors drinking alcohol for the last twelve month and chat chewers are more likely to develop depression than non drinkers and non chewers ,this difference also Statistically significant. Among history of having chronic non communicable disease those diagnosed one and more than the mentioned types of CNCDs are higher chance of gaining depression with a p value=<0.0001.(Table 3).

Table 3 Prevalence of depression with different risk factors in GGFRC, 2016.

Variables		Depression No	Depression Yes	Crude OR	P value
Sex	Male	1748 (94.9%)	95 (5.1%)	1	
	Female	1906 (92.4%)	157 (7.6%)	**1.54(1.19,2.01)** *	0.001
Age	15-44 years	2278 (95.0%)	120 (5.0%)	1	
	45-64 years	1412 (91.5%)	132 (8.5%)	**1.77(1.37,2.29)** *	<0.0001
Place residence	Urban	934 (95.1%)	48 (4.9%)	1	1
	Rural	2756 (93.1%)	204 (6.9%)	**1.44(1.04,1.99)** *	0.027
Education	Don't read and write	2606 (93.1%)	193 (6.9%)	1.5(0.95,2.4)	0.079
	Primary	655 (94.5%)	38 (5.5%)	1.18(0.68,2.04)	0.540
	Secondary and above	429 (95.3%)	21 (4.7%)	1	
Occupation	Self workers	3412 (93.5%)	239 (6.5%)	1.49(0.85,2.65)	0.166
	Employed	278 (95.5%)	13 (4.5%)	1	
Monthly income	<1000	2960 (93.2%)	216 (6.8%)	**1.48(1.03,2.12)** *	0.034
	>1000	730 (95.3%)	36 (4.7%)	1	
Drink alcohol	No	3440 (93.9%)	224(6.1%)	1	
	Yes	250 (89.9%)	28 (10.1%)	**1.72(1.13,2.6)** *	0.01
Chewing khat	No	2187 (95.0%)	115(5.0%)		
	Yes	1503 (91.6%)	137(8.4%)	**1.7(1.34,2.24)** *	<0.0001
Co-morbidity	No CNCDs	3435 (93.7%)	231 (6.3%)	**1**	
	Only one	233 (94.3%)	14 (5.7%)	**0.89(0.5,1.55)** *	0.691
	More than one	22 (75.9%)	7 (24.1%)	**4.73(2.0,11.19)** *	<0.0001
Smoke any tobacco	No	3342(93.6%)	227(6.4%)	**1**	
	Yes	348(93.3%)	25(6.7%)	1.06(0.69,1.62)	0.79

*Statistically significant at p<0.05

6.4. Bivariate analysis of Depression with different risk factors

The results of binary logistic regression analysis for unadjusted associations between depression status and independent variables separately in both residence with odds ratios (OR) and 95% confidence interval (95% CI), are presented in Table 4. Depression episode was found to be low among the study subjects. Two hundred sixty four (6.4 %) of the respondents report having depression episode .out of which the majority, 204 (6.9 %) were from rural area and the remaining 48 (4.9 %) of them were from urban residents although the observed difference is statistically significant.

In urban resident during bivariate analysis among the potential risk factors drinking alcohol for the last 12 month, frequency of days drink per day and having more than one diagnosed CNCDs. After adjusting for all other variables frequency of days drink per day was no longer significantly associated with depression episode. (Table 4)

In bivariate analysis most of independent variables were statistically significant in rural residents. Among this age, sex, monthly income, drinking alcohol, frequency of participants consume alcohol, khat chewing, number of years individuals practicing khat were statistically significant with depression. Depressive episode was highly significant on those chewing khat for longer than eleven years as compared to those experiencing it below 10 years. (Table 5)
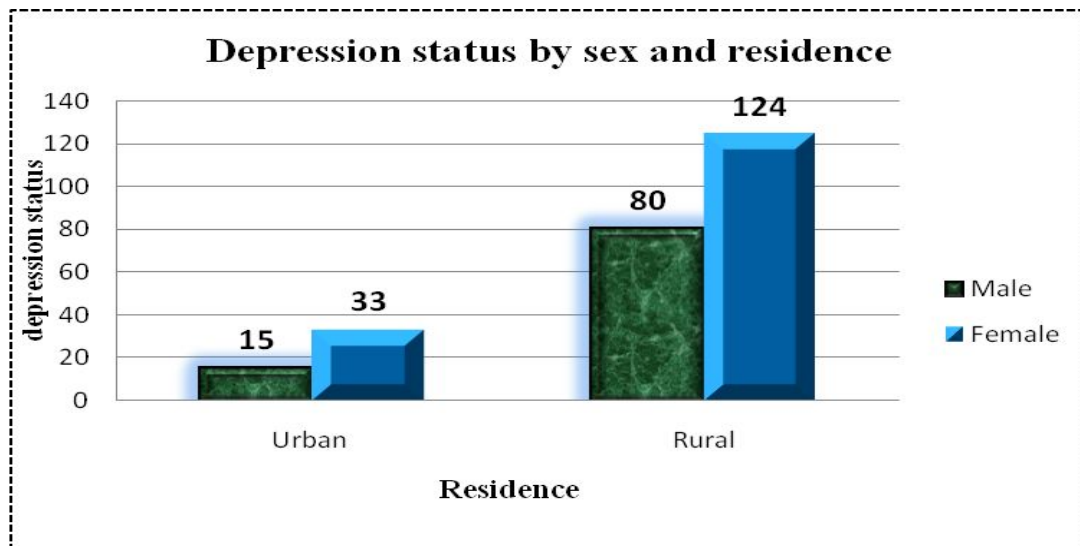
Figure 3 Depression episode by resident and gender, GGFRC,2016.

Table 4 Bivariate analysis of depression with different risk factors, in urban, GGFRC, 2016.

Variables		Depression disorder			
		Urban		Crude OR	P value
		No	Yes		
Sex	Male	426 (96.6%)	15 (3.4%)	1	1
	Female	508 (93.9%)	33 (6.1%)	1.85 (0.98,3.44)	0.054
Drinks alcohol	No	795 (95.8%)	33 (4.2%)	1	1
	Yes	175(92.1%)	15 (7.9%)	**1.97 (1.05,3.71)***	**0.035**
frequency of alcohol drink per week	No drinkers	762 (95.7%)	34 (4.3%)	1	1
	More than 2 days	80 (95.2.0%)	4 (4.8%)	1.12 (0.39,3.24)	0.303
	1-3 days in month	62 (88.6%)	8 (11.4%)	**2.89 (1.28,6.5)***	**0.010**
	< once a month	30 (93.8%)	2 (6.2%)	1.49 (0.34,6.51)	0.593
Currently chew khat	No	617 (95.7%)	28 (4.3%)	1	1
	Yes	317 (94.1%)	20 (5.9%)	1.39(0.77,2.5)	0.213
No of CNCDs	No CNCDs	803(95.6%)	37(4.4%)	1	1
	Only one	119(96.0%)	5 (4.0%)	0.9(0.35,2.4)	0.85
	More than one	12(66.7%)	6(33.3%)	**10.8(3.8,30.5)***	< 0.0001

*Statistically significant at p<0.05

Table 5 Bivariate analysis of depression with risk factors in rural, GGFRC, 2016.

Variables		Depression in Rural No (%)		Crude OR	P value
		No	Yes		
Sex	Male	1358 (94.4%)	80 (5.6%)	1	
	Female	1398 (91.9%)	124 (8.1%)	**1.50 (1.12,2.01)***	**0.006**
Age	15-44 years	1717 (94.9%)	92 (5.1%)	1	
	45-64 years	1039 (90.3%)	112 (9.7%)	**2.01 (1.51,2.68)***	**<0.0001**
Monthly income	<1000	2132 (92.5%)	172 (7.5%)	**1.56(1.07,2.3)***	**0.022**
	>1000	624 (95.1%	32 (4.9%)	1	1
Drinks alcohol	No	2681 (93.3%)	191 (6.7%)	1	1
	Yes	75 (85.2%)	13 (14.8%)	**2.43 (1.33,4.46)***	**0.004**
frequency of alcohol drink per week	No drinkers	2682 (93.3%)	193 (6.7%)	1	1
	More than 2 days	33 (82.5%)	7 (17.5%)	**2.95 (1.29,6.75)***	**0.022**
	1-3 days in month	29 (90.6%)	3 (9.4%)	1.44 (0.43,4.76)	0.553
	< once a month	12 (92.3%)	1 (7.7%)	1.16 (0.15,8.95)	0.888
Currently chew khat	No	1570 (94.7%)	87 (5.3%)	1	1
	Yes	1186 (91.0%)	117(9.0%)	**1.78(1.33,2.37)***	**<0.0001**
Number of years chewed	Not chewing	1599 (94.6%)	91 (5.4%)	1	1
	1-5 years	234 (92.1%)	20 (7.9%)	1.5 (0.9,2.48)	0.113
	6-10 years	206 (93.2%)	15 (6.8%)	1.28 (0.73,2.25)	0.393
	>11 years	717 (90.2%)	78 (9.8%)	**1.9 (1.39,2.62)***	**000**

*Statistically significant at p<0.05

6.5. Multivariate analysis of depression with different risk factors

Multiple logistic regression analysis was performed to detect associations between the dependent and independent variables while adjusting for confounders (Table 5). Covariates candidate during bivariate analysis are used by backward method and those that were not statistically significant were removed from the final model.

The final multiple logistic regression analysis found important statistically significant risk factors for depression from both urban and rural residents. Both urban and rural women were more likely to be depressed than men. The odds of having depression were proportional in both of the residents which are 2.7 times and 2.85 times higher among female respondents than male respondents in urban and rural respectively.

Among the socio-demographic risk factors age of respondents are significantly associated with depression in rural residents than urban. The difference in a rural were higher in those having 45-64 years of age are 112 (9.7%) with (OR=1.99, 95% CI 1.49–2.67) were more likely to develop depression episodes than younger having 15-44 years of age. Similar finding was also found only for rural residents in monthly income of participants, after adjusting for all other variables higher prevalence of 172 (7.5%) was found in those with having below one thousand monthly incomes are 1.57 times more likely to develop depression episode than those have income of more than one thousand in a month.

The prevalence of depression episode was 7.9% among alcohol drinkers for the last 12 month during the survey in urban and 14.8% of alcohol drinkers in rural area. Drinking alcohol was significantly associated for both residents having proportional number of adjusted odds ratio. The odds of depression was 2.44 times (95%CI 1.26, 4.7) and 2.65 times (95%CI 1.42, 4.9) on alcohol drinkers than non drinkers in Urban and rural respectively. Similar finding was also found in both residents among khat chewing participants, after adjusting for all other variables higher prevalence of depression was reported among chewers 20 (5.9%) in urban and 117 (9.0%) in rural residents. The odds of depression were 2.37 times (95% CI 1.20-4.67) and 3.10 times (95% CI 2.17-4.30) higher on khat chewing participants than non chewers in Urban and rural residence respectively. Khat chewers in rural are 1.35 times more likely to develop depression than chewers in urban residents.

Each CNCDs have no any association with depression due to the sample size cannot fulfill the assumption of chi square and removed for analysis. Participant who diagnosed for chronic non-communicable diseases (CNCDs) showed a significant association with depression episodes in urban residents. The adjusted odds of having depression was more than ten times higher among those who diagnosed for more than one chronic non communicable disease which are known in our study than those not diagnosed any CNCDs (OR=11.59 ,95% CI 3.97-33.82) (Table 6)

Table 6 Multivariate analysis of depression with different risk factors GGFRC, 2016.

Variables		Urban		Rural	
		Crude OR	**Adjusted OR**	**Crude OR**	**Adjusted OR**
Sex	**Male**	1	1	1	1
	Female	1.85 (0.98,3.44)	**2.7 (1.92,3.96)***	**1.50 (1.12,2.01)***	**2.85(2.0,4.0)***
Age	**15-44 years**	1		1	1
	45-64 years	1.07 (0.59 ,1.93)		**2.01 (1.51,2.68)***	**1.99(1.49,2.67)***
Monthly income	**<1000**	1.4 (0.49,3.99)		**1.56(1.07,2.3)***	**1.57(1.06,2.33)***
	>/=1000	1		1	1
Drinks alcohol	**No**	1	1	1	1
	Yes	**1.97 (1.05,3.71)***	**2.44(1.26,4.7)***	**2.43 (1.33,4.46)***	**2.65(1.42,4.9)***
Currently chew khat	**No**	1	1	1	1
	Yes	1.39(0.77,2.5)	**2.37(1.2,4.67)***	**1.78(1.33,2.37)***	**3.1(2.17,4.3)***
Number of CNCDs	**No CNCDs**	1	**1**	**1**	
	Only one	0.9(0.35,2.36)	0.89(0.34,2.35)	1.07(0.53,2.14)	
	More than one	**10.85(3.85,30.51)***	**11.59(3.97,33.82)***	1.36(0.17,10.65)	

*Statistically significant at p<0.05

7. DISCUSSION

This study has revealed the correlates of depression with different risk factors especially, among the behavioral risk factors like chewing khat and drinking alcohol, and the existence of having one and more than one chronic non communicable disease among residents by using large scale data from GGFRC project in Jimma zone. Depressive disorder was diagnosed using the standardized composite international diagnostic interview (CIDI) that is based on diagnostic criteria.(30, 31)

The study found that probable Prevalence of depression episode was estimated at two hundred fifty two 6.4% of which two hundred four 6.9% in rural and only forty nine 4.9 % in urban which covers 1.44(1.04,1.99) times higher among rural than urban The difference in our finding which was higher in the rural residence were in line with other study done in Germany showed that the prevalence of current depressive symptom was higher in rural area 7.4% 95% CI; 6.0-9.1 than small town.(20)Our finding also consistent with a study done in Ethiopia analysis from national health survey reported that the prevalence of depression episode was 9.1% (95% CI: 8.39-9.90) and 1.4 (1.04-1.89) times higher among rural than urban.(11) However, the result of our finding was lower than the above two studies and higher than a study conducted in GGFRC was 1.7%, 2.4% in urban and 1.5% in rural.(29) The difference is because they report the prevalence without using any measuring criteria for depression rather they reported individuals during the survey those told to have depression by health professionals. The lower prevalence in our study may be their study area covers different group of individuals with different socio cultural, behavioral, ethnic and economic status groups as compared to us and the other reason will be reporting biases, especially a decreased in rural to urban difference could be due to social desirability bias for reflecting their status on measuring criteria on depression in urbanized society was less. Generally, the prevalence of depression indicates it was the major public health problems of our study area. Thus, initiating and strengthening depression service program in the study population in our area is necessary.

One of the most important determinants for depression in our study was female gender. The odds of depression episode is around three times higher in female respondents both in urban and rural areas. A study done in Germany with women (10.2%) showing a significantly higher prevalence than men (6.1%) having (OR 5.4 95% CI, 4.6–6.3) (23) .This finding is consistent with different studies in the general population done in Saudi Arabia, Nigeria and in our country Ethiopia.(11, 19, 21)Thus, women were more likely to experience depression than men because they carry the double burden of raising children and household work. Gender inequity needs to be regarded as a social determinant of depression. Thus there is a need to pay more attention to gender as determinants of depressive episode.

In our study from the different socio demographic variables age of respondents living in rural residents having a prevalence of 9.7% which was reported significantly higher odds of having depression episodes among age older than 45 years. The finding has been consistent with other studied.(11, 19, 20)

Findings also showed that socioeconomic factors may also play a substantial role in depression episode .Depression are not significantly associated for individuals living in urban. Respondents in rural area having less than one thousand monthly income have 1.57 (95% CI, 1.06-2.33) times higher odds of depression than with better income group having monthly income of above a thousand. This finding in the rural area of our study was consistent with a study done in Germany and Nigeria having low socioeconomic status is linked to depression and not consistent with a study done in Ethiopia that reported that there is no association of depression episode with monthly income of individuals.(11, 21) Income is the most significant social determinants of health, because it determines one's overall living conditions, affect one's psychological condition, and help shape one's basic needs. Individuals with low-income people living cannot afford healthy food, sufficient clothing and good housing all of which are necessary preconditions of good health.

The data obtained in the present study concluded that high prevalence of depression among the behavioral risk factors in both residents chewing khat and alcohol use was significantly associated but not with smoking any type of cigarettes. In urban resident the odds of depression was 2.4 (1.26-4.7) times   on alcohol drinkers than the counterpart but, Respondents who drinks for three days per months were higher prevalence 11.4% of

depression this association was not significant. A higher difference among alcohol drinkers was observed in rural residents having 14.8% 2.65 (1.42-4.9) of respondents was responsible to develop depression. This finding was consistent with a study conducted at eight Veterans Health Administration showed depressive symptoms were higher in hazardous and binge drinkers than non-hazardous drinkers..(26) Depressive symptoms were also associated with the individuals consumed alcohol daily or to the minimum two days per week have a prevalence of 17.5 % which is three times higher than those not drinking, though it was not longer significantly correlated with it. A study based on findings from the National Health Survey also support our finding showed that the   proportion of depression episodes are higher in the group of non heavy drinker and infrequent heavy drinker subjects (14.5%) than in the groups whose alcohol consumption is either frequent heavy drinker (12.2%) or life time abstainers (6.2%).(11)

Among the behavioral risk factors of depression, chat chewing was the main predictor in both of the residents by having a highest prevalence 34.3 % in urban and 44.0% in rural. This highest prevalence of chewing khat was consistent with a study conducted in Jimma zone which was 68.5%.(13) A decrease in prevalence of our study was due to an increasing trend of consumption of khat through time. In urban, the odds of depression was more than two times higher in those chewer than non chewers but, significantly this result also true in rural context of our study area which is three times in chewers than non chewer. This finding was in line with other studies done in our countries.(14, 24, 25) A high prevalence of chewers in our study area as to the observation of the researchers, khat chewer in both settings, since the area was chat producing area, they consume it in a small amount of money and influence of culture makes them highly exposed for it and they hold a positive view about the practice of khat use. They are usually witnessed stating the benefits of khat as: religiously acceptable for Muslims ,a feeling of well-being, increase energy levels, improve   alertness, enhance the ability to concentrate, advances social-skill and make better in work performance. In our study as compared to non chewers, those in rural residence chew for more than eleven years have prevalence of 9.8% which holds two times more likely to develop depression than others. But after adjusting the whole variables in the final model the observed difference was not statistically significant.

The most important predictor's variable found in this study was the number of chronic non communicable disease which is used in our data for analysis (diabetes mellitus, high blood pressure, cardiovascular disease, asthma and epilepsy).There is no association of depression with each of the CNCDs. But in urban residents those study participant who diagnosed chronic non-communicable diseases(NCDs)showed association with depression episodes having two or more diagnoses of chronic non communicable diseases further increases the likelihood (OR=11.6, 95%   CI   3.97–33.82) for the presence of depression episodes as compared to those with no life   time   diagnoses of non- communicable diseases. This study was consistent with a study conducted in urban Ouagadougou that the risk of depression was much higher among those who reported having at least two chronic diseases (OR 6.7, p < 0.001) and a study analyses data from the national health survey showed that having two or more diagnoses of CNCDs was 4.2 times more likely to develop depression than those no life time diagnoses of non- communicable diseases.(11, 28)Strong association between depression and chronic diseases and the evidence that people with two and more CNCDs present worse outcomes for depression episode .The prevalence in our study was much higher than a study from national survey the reason is that our finding was statistically significant only with urban residents. Since our epidemiological transition was changed mostly individuals living in urban was higher tendency to develop CNCDs than rural by practicing majority of the risk factors. (29)

8. STRENGTH AND LIMITATION

8.1. Strength

The study subjects were selected using random sampling technique, which help to avoid selection bias. Both urban and rural respondents were included for the purpose of comparisons and to identify differences in the two settings. GGFRC is a nationwide study that is representative of the general population and that allows generalizations on the distribution of depression among respondents living in Jimma zone.

8.2. Limitation

Since the data was collected to assess the potential risk factors for non-communicable disease, essential predictor variables which will strengthen for analysis like marital status and family history of depression was not included in our extracted data. The prevalence may be underestimated due to social desirability bias and absence of recent symptoms in the cases in which the disease does not express clinical manifestation.

9. CONCLUSION

In our study there is a difference in prevalence of depression episode by residence where, it was higher in rural areas. Among the important risk factors associated with the development of depression in our study area, females are highly exposed in developing depression episode than males in both residents, but, the rate was higher in rural than urban this is because their roles in the family was higher in the rural. Elderly having 45-64 years of age and participants having less than one thousand birr per month were found to be more likely to have depression episode compared to other segments of the population.

Respondents in both residences have highly linked with khat by producing and consuming it. This makes them to practice it well. Though , khat chewer in urban and rural residents are highly exposed to depression than the counterparts and an individual chew khat for more than eleven years was higher to develop depression than less than or not khat chewers. In both the residents alcohol drinkers were more likely to develop depression episode than non drinkers. Having more than one diagnosed case of chronic non communicable disease increases the likelihood to have depression in urban residence than rural.

10. RECOMMENDATION

➢ Amend continuous awareness, information, advocacy and access to all community members about the main risk factors that expose them to be depressed.

➢ Jimma Zone women, children and youth office with other stakeholders should Empower women's in decision making and confirm gender equity.

➢ Jimma zone Health and Education office should strengthen and give continuous health education for all adults on the effect of chewing khat and drinking alcohol correlated with depression.

➢ Health professionals in the residents with other stakeholders should give appropriate message for community living in the resident on the main risk factors of CNCDs.

➢ Jimma Zone Health office should include elderly group in the intervention of CNCDs especially depression disorder in addition to the previously targeted group.

➢ The trend of prevalence of the risk factors for depression is increasing, Similar community based studies with is beneficial to compare results and for the promotion of future research.

➢ The results of this study have indicated that depression as one of the major public health problems of the area. Thus, strengthening depression as well as mental health service program in the study population area necessary.

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12. ANNEX

12.1. QUESTIONER

Questionnaire with variables to be extracted from original data of a survey in <u>GGFRC</u>

Name of Kebele _____(used to identify the resident)

S.no	Question	Response	Code
1. Socio-demographic characteristics			
1	**Sex**	Male Female	
2	How old are you?	_____ 777. Don't know	
3	What is the **highest level of education** you have completed?	Grade ------------ 999. Refused	
4	Which of the following best describes your **main work** over the past 12 months?	1 Government employee 2 Non-government employee 3 Self-employed 4 Student 5 housewife 6 Homemaker 7 Retired 8 Unemployed 999. Refused	
5	Taking the **past year**, can you tell me what the **earnings** of the house hold have been?	1. Per week ....go or 2. Per month.........go or 3. Per year ....go 4. 999. Refused	
2. Behavioral risk factors			
2.1 Alcohol consumption			
6	Have you ever consumed an alcoholic drink such as beer, wine, tella, tejj, katikala?	1. Yes 2. No If No go, question 12	
7	During the past 12 months, **how frequently** have you had at least one alcoholic drink?	1 Daily 2 5-6 days/week	

		3 1-4 days/week 4 1-3 days/month 5 Less than once a month	
8	When you drank alcohol, on average, how many **standard alcoholic drinks** did you have drinking in a day?	Number _____ Don't know 777	
9	Have you consumed alcoholic drink **within the past 30 days?**	2. Yes 2. No If No go,--------------	
10	During each of the past 7 days, how many standard alcoholic drinks did you have each day?	Monday -------- Tuesday -------- Wednesday ------ Thursday -------- Friday -------- Saturday -------- Sunday -------- Don't know 777	
11	During the past 12 months, what was the **largest number** of standard alcoholic drinks you had on a single occasion, counting all types of alcoholic drinks together?	Largest number _____ Don't know 777	
2. 2 Khat chewing			
12	Have you ever chew khat?	1. Yes 2. No If No go, question 21	
13	For how long time does you chew khat?	Year------- Month --------- Week----------- Don't know 777	
14	Do you currently chew khat?	1. Yes 2. No	
15	In a week for how many days you chew Khat?	No of days---------------	
16	When you chew khat, on average, for how many times you chew in a day?	Hour ----------- Minutes-----------	
17	When you chew khat, how much khat did you consume?	Content of khat in *zorba* -----------	

18	How old were you when you **first started** chewing khat?	Age --------------- Don't know 777	
19	If you remember, for how long time did you chew khat?	Years---- Months ------- Weeks -------------- Don't know 777	
20	When you stopped chewing khat?	Years---- Months ------- Weeks -------------- Don't know 777	
2.3 Tobacco smoking			
21	Do you currently **smoke tobacco products**, such as cigarettes, cigars or pipes?	1. Yes 2. No If No go,25	
22	If yes, do you currently smoke tobacco products **daily**?	2. Yes 2. No If No go,25	
23	How old were you when you **first started** smoking daily?	Age (year)------ Don't know 777	
24	Do you remember **how long ago** it was?	Year------- Month --------- Week----------- Don't know 777	
25	In the past, did you **ever** smoke **daily**?	1.Yes 2. No If No go,28	
26	How old were you when you **stopped** smoking **daily**?	Age (years) _____ Don't know 777	
27	How **long ago** did you stop smoking daily?	Years ago ------------- Months ago--------------- Weeks ago--------	
3. Co-morbidity			
3.1 History of hypertension			
28	Have you ever had your blood pressure measured by a doctor or other health worker?	1. Yes 2. No If No go, question 48	
29	If you have been measured, did they tell you that you have raised blood pressure or hypertension?	1. Yes 2. No If No go, question 48	

30	Have you been told in the past 12 months?	1. Yes 2. No	
31	Are you currently receiving any treatments/medication for high blood pressure prescribed by a doctor or other health worker?	1. Yes 2. No	

3.2 History of Diabetes

32	Have you ever had your blood sugar measured by a doctor or other health worker?	1. Yes 2. No If No go, question 48	
33	Did they tell you that you have raised blood sugar or diabetes?	1. Yes 2. No	
34	Have you been told this in the past 12 months?	1. Yes 2. No	
35	Are you currently receiving any treatments for diabetes prescribed by a doctor or other health worker? (insulin, other drugs)	1. Yes 2. No	

3.3 History of cardiovascular disease

36	Did a doctor tell you that you have **cardiovascular disease**s?	1. Yes 2. No	
37	Have you been told this in the past 12 months?	1. Yes 2. No	
38	Are you currently receiving any treatments for cardiac prescribed by a doctor or other health worker?	1. Yes 2. No	

3.4 History of Asthma

39	Did a doctor tell you that you have **asthma diseases**?	1. Yes 2. No	
40	Have you been told this in the past 12 months?	1. Yes 2. No	
41	Are you currently receiving any treatments for **asthma** prescribed by a doctor or other health worker?	1. Yes 2. No	

3.5 History of Epilepsy

42	Did a doctor tell you that you have **epilepsy disease**s?	1. Yes	2. No	
43	Have you been told this in the past 12 months?	1. Yes	2. No	
44	Are you currently receiving any treatments for **epilepsy** prescribed by a doctor or other health worker?	1. Yes	2. No	
Criteria for measuring depression disorder				
45	Have you had a period lasting several days when you felt sad, empty or depressed?	1. Yes	2. No	
46	Have you had a period lasting several days when you lost interest in most things you usually enjoy?	1. Yes	2. No	
47	Have you had a period lasting several days when have been feeling your energy decreased?	1. Yes	2. No	
48	Was this period (of sadness/loss of interest/low energy) more than 2 weeks?	1. Yes	2. No	
49	Was this period (of sadness/loss of interest/low energy) most of the day, nearly every day?	1. Yes	2. No	
50	During this period did you lose your appetite?	1. Yes	2. No	
51	During this period did you notice any slowing down in your thinking?	1. Yes	2. No	