

ADDIS ABABA UNIVERSITY
MEDICAL FACULTY
DEPARTMENT OF COMMUNITY HEALTH

**ASSESSMENT OF NUTRITIONAL STATUS OF PEOPLE WITH
MAJOR MENTAL DISORDERS AND THEIR CONTROLS, IN
MESKAN AND MARAKO DISTRICT (BUTAJIRA), ETHIOPIA.**

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By Misganaw Lijalem (B.Sc)

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List of Abbreviations

AAU:	Addis Ababa University
DCH:	Department of Community Health
WHO:	World Health Organization
DALYs:	Disability Adjusted Life lost Years
GBD:	Global Burden of Diseases
PEM:	Protein Energy Deficiency
VAD:	Vitamin A Deficiency
IDA:	Iron Deficiency Anemia
IDD:	Iodine Deficiency Disorder
BMI:	Body Mass Index
CED:	Chronic Energy Deficiency
DHS:	Demographic and Health Survey
BRHP:	Butajira Rural Health Project
MHRP:	Mental Health Research Project
SCAN:	Schedule for Clinical Assessment in Neuropsychiatry
CIDI:	Composite International Diagnostic Interview.
FFQ:	Food Frequency Questionnaire

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Abstract

Nested case-control study was carried out to assess nutritional status and identify other risk factors among people with major mental disorders (schizophrenia and bipolar), in Meskan and Marako district from Dec. 2001 to Feb. 2002. Data were collected on socio-demographic factors, lifestyle, and nutritional, reproductive health and dietary patterns. Complete data obtained from 434 cases and equal numbers of controls matched by sex, age in five years range and residence, on one to one ratio. The cohort list of Mental Health Research Project (MHRP) was used to identify all cases, and controls were selected from the nearest neighbors by frequency matching.

Cases and controls were compared by socio-economic, nutritional, reproductive, and dietary characteristic. Major mental disorders were positively significantly associated with unmarried (OR=1.88 with 95%CI 1.33, 2.66), illiterates (OR=1.91 with 95%CI 1.04,2.29), Muslims (OR=1.50 with 95%CI 1.27,2.88), not having cattle (OR= 2.59 with 95%CI 1.47, 4.55) while owning a radio (OR= 0.66 with 95%CI 0.41,0.88), and spending less time on job (OR= 0.29(0.22, 0.40) were negatively significantly associated. 'Khat' chewing and cigarette smoking were also positively significantly associated (OR=2.68 with 95%CI 1.53,4.69 and OR=2.32 with 95%CI 1.37,3.90) respectively with major mental disorders. Adult malnutrition was positively significantly (OR=4.08 with 95%CI 1.42,11.74) and weight (OR=1.55 with 95%CI 1.08,2.24) associated with major mental disorders. Cases and controls were not different on micronutrient deficiencies, reproductive and dietary characteristics.

The results of this study help the project managers and others in designing effective intervention strategies to improve the health of the community in general and those with mental health problems in particular.

1. Introduction

Adult malnutrition and mental health disorders are the major public health problems often marginalized in most parts of the world as they are underreported by traditionally used reporting systems. On the other hand new summary measures like Disability Adjusted Life Years lost (DALYs) and Global Burden of Diseases (GBD) are showing how these problems are burdensome to the individual, the family, the community and the nation as whole (1). Health and nutrition of adults are of particular importance because it is this age group that is primarily responsible for the economic support of the rest of the society. In developed countries, although an appreciable proportion of adults are still engaged in activities that required physical stamina and strength economic productivity depends to a substantial degree on the intellectual and technical skills of the population. In developing countries, however, agricultural work is the dominant economic activity; physical capacity and endurance are critical to the ability of adults to sustain the socio-economic and cultural integrity of their community (2).

The World Health Organization (WHO) recognized the emergence of mental health problems in the early 1960s and encouraged every member state to include them in primary health care (1). Even after four decades the organization has addressed the issue once again saying "Stop Exclusion and Dare to Care" in the world health day 2001 (3). But mental health problems are still at the bottom in priority setting in most developing countries, including Ethiopia, as infectious and communicable diseases are more prevalent than non-communicable diseases like mental illnesses (4).

The concept of dangerousness is central to mental illnesses and their needs that largely shape public opinions as well as public policy and service resources. World wide epidemiological studies clearly indicate that prevalence and magnitude are significant at an individual and national level. Recent studies on major mental health problems indicated that mental health problems accounted for 12% of all DALYs lost in 1998 globally. Major depression was found to be ranking 5th out of the ten leading causes of Global Burden of Disease (GBD) and this condition is emerging in developing countries (1).

Moreover these problems incapacitate individual productivity, create social disruptions, and hinder economic and other developments.

Among these problems schizophrenia is the most devastating psychiatric illness. It claims its victims at a young age and prevents their participation in socio-economic development. Schizophrenia also creates an enormous economic burden, and costs a society lot of resources.

Bipolar disorders affect the working capacity, interpersonal relationships, education, social interactions and other functions (5).

Studies conducted in developing countries have demonstrated that mental health problems are as prevalent as in the rest of the world (6,7).

In under developed countries where malnutrition and other infectious diseases are common, mental disorders are given very low priorities.

However it is a well-known fact that mental illnesses lead to poverty, malnutrition, infections, and disabilities, consequently increasing the risk of morbidity and mortality. Caring for the mentally ill poses a great burden to the family and the nation. In low-income countries mental disorders contribute 12% of the GBD (1). Similarly, studies done on mental health in this country are also indicating the magnitude mental health problems (8, 9, 10).

The majority of poor people in poor nations enter into adulthood and/or old age with lifetime poverty and deprivation, poor access to health care and a diet that is usually inadequate in quality and quantity. Almost 800 million people in the developing world do not have enough to eat.

Another 34 million people in industrialized countries and countries in

transition also suffer from chronic food insecurity (11). Sub-Saharan Africa is home to almost a quarter of the developing world's hungry people. East Africa has more than twice as many undernourished people as compared to the other developing countries.

Ethiopia is one of the poorest and least developed countries in the world. The economy is based on small landholder agriculture, with more than 85% of the population of 65 million living in rural areas under very poor conditions. Ethiopia is also one of the countries in sub-Saharan Africa with the highest rates of malnutrition (12).

Ethiopia has adopted a health policy that gives priority to the rural population at center of development (13). However the government has given the least priority to this productive force in terms of addressing problems affecting this group of the population. Major mental health disorders most frequently affect this productive force on top of other communicable diseases. The findings on major mental health problems from community based psychopathology studies in Butajira are alarming. These relate to the rural population and as a result, the welfare of the entire country (8).

There is a need to address different issues among people with major mental health problems, including nutritional, social, economic, genetic and others, so that the government have better awareness and give due attention to address the problems.

Adult malnutrition and major mental disorders are among the silent emergencies that have been ignored for a long time because more attention given to communicable and infectious diseases by decision makers. Studies on adult malnutrition are very scarce in this country and none has been reported in people with major mental disorders. Thus the study aims at assessing the nutritional status of people with schizophrenia and bipolar disorders and make comparison with individuals not diagnosed with mental illnesses, in order to elucidate causes, design intervention strategies and evaluate the outcomes. This study will also be a baseline for other studies in the area of nutrition in mentally ill persons.

2. Literature review

Malnutrition is a pathological state resulting from relative or absolute deficiency or excess of one or more essential nutrients, this state being clinically manifested or detected by biochemical, anthropometric, or clinical tests. Protein energy malnutrition (PEM), Vitamin A deficiency (VAD), iron deficiency anemia (IDA) and iodine deficiency disorders (IDD) are the most prevalent forms and the major public health problems in most parts of the world (14). Populations at risk of malnutrition are children, pregnant women and lactating mothers. Adult malnutrition is rarely reported in most developed countries but it is not uncommon in less developed ones. Nutritional problems of people with mental health disorders are understudied and so these problems are often neglected.

Generally under nutrition results from low food intake, low income, poor health status, poor knowledge, bad traditional habits, high fertility and other related factors. Low food intake and infection are the immediate causes of malnutrition. The underlying causes are a combination of unfair distributions of food between and within communities, poor family food security, poor living conditions, inadequate health care, lack of education, heavy physical work and frequent childbearing. Malnutrition can be attributed to basic factors like socio-demographic, ecological and political disruptions (15).

People with major mental health problems are more affected by poor socio-economic factors than the healthy individuals. Approximately 33% of patients with bipolar disorders are unable to work competitively, and about 33% are employed to work below the level expected on the basis of their previous socioeconomic status. Longitudinally

followed patients with bipolar disorders were less likely than matched controls to improve their occupational status, educational status, and income. Patients with bipolar disorder are also less likely than matched control subjects for marriage (16). For those who do marry, marital and family dysfunctions are common. Bipolar disorders in adults may adversely affect the psychosocial functioning of their children. Nearly every family perceives the illness as a moderate to severe burden (5). As a result, the rate of divorce among patients with bipolar disorder is high- two to three times that in control groups. About 33% of patients with bipolar disorders are unable to live independently and among those age 55 or older, only about 50% live in private residences. The overall level of satisfaction and contentment of patients with bipolar disorders is significantly lower than that of matched control subjects (17).

There is some clinical evidence from developed countries for a relationship between type of diet and major mental disorders. For instance Jenner F, have indicated the incidence of schizophrenia is higher in people who consume cereals (18).

Prenatal exposure to famine during the Dutch Hunger Winter was associated with a greater risk of hospital admission for schizophrenia at age 24-48 years for both men and women. In line with this Brown suggests four lines of evidence supporting prenatal nutritional deficiency as a plausible risk factor for schizophrenia (19). Similarly, prenatal nutritional deficiency was found to be associated with a significantly greater risk (RR=2.01, 95% CI 1.02, 3.05) of schizophrenia personality disorders in men at age of 18

years (20). Lack of breast milk may be a risk factor in the neurodevelopment form of schizophrenia. In a study done by McCreadie RG in Scotland, 45 mothers of schizophrenia patients were asked whether or not their offspring had been breast-fed. Those patients, who had not been breast-fed, had more schizoid and schizotypal personality traits in childhood and poorer social adjustment than their sibs (21).

A significant association was found between age at onset of schizophrenia and obstetric complications: the earlier the age of onset, the more likely the history of obstetric complications. Subjects with onset of schizophrenia before age 22 were 2.7 times likely than those with onset at a later age to have had a history of abnormal presentation at birth and 10 times more likely to have had a history of complicated Caesarian section. The association between obstetric complications and early age at onset of schizophrenia indicates that the patho-physiology of early-onset schizophrenia involves neurodevelopment impairment (22).

A meta-analysis of case-control studies looking for etiological associations between exposure to obstetric complications and schizophrenia found significant correlation between schizophrenia and premature rupture of membranes, premature delivery, low birth weight, forceps delivery and use of resuscitation or/and incubator. These findings suggest that the specific obstetric complications etiologically related to schizophrenia might be different from those

associated with early onset. Other case-control and cohort studies recently confirmed this association and showed that a history of obstetric complications as twice as frequent among schizophrenic subjects as among control groups (23).

In line with this, studies done on mental health problems in this country are showing similar results with other countries in the prevalence, distributions and magnitude of the problems. Institution based studies estimated the prevalence of mental disorders range 8-18% from patients attending out patient clinics (24-26). Community based studies with large sample have come up with higher prevalence 11.7-17.4 (27,28,9). Comprehensive cross-sectional surveys on mental health problems on adult psychopathology in Addis Ababa and Butajira have identified the prevalence and socio-demographic correlates of mental distress (27,28 29, 30).

The above studies have also pointed out the socio-demographic, socio-economic, lifestyle and genetic correlates of mental disorders. In these studies major mental illnesses were associated with females, unmarried, illiterates, low socio-economic status, family history and small family size. Even in those married family and marital dysfunctions were more common. In addition substance abuses such as khat chewing and cigarette smoking, were correlated mental disorders, a dose response relationship was reported with former (31, 32, 33,).

A study on course and outcome of schizophrenia and bipolar disorders is currently underway among 846 people with major mental disorders identified from the whole adult population the district by Mental Health Research Project (34). Another study on burden of diseases also showed mental illnesses contributed to 12.45% of GBD in Butajira, Ethiopia (35). These studies have shown that mental and behavioral disorders are important public health problems among adult population.

Several psychiatric illnesses, including schizophrenia, mood disorders, eating disorders and substance abuse, may adversely affect food intake and nutritional status. The drugs used to treat those disorders show adverse effects on the appetite of these patients. Anti-psychotic, antidepressant and monoamine oxidase inhibitors (MAOIs) cause dry mouth, constipation, and weight gain.

Food represents many things other than physical substance to man. What, when, where, how and with whom he will eat is more often determined by his psychological orientation at any given moment than his knowledge on nutritional needs. From early infancy food intake is related to various degrees of pleasure or pain, satisfaction or frustration, acceptance or rejection. The emotionally stable individual, although he may possess definite food preferences, usually has only transient periods in which food is used as a vehicle for maintaining psychological equilibrium.

During mental illnesses, food often becomes a tool for displaying psychological abnormalities. Therefore, it is not surprising that unusual eating habits are frequently one

of the first observable symptoms in mental illness. During mental illness the unconscious meaning of food become intensified. If these meanings are not properly taken into consideration, they can disrupt the therapy and the recovery of the patient as well as his nutritional status. Feeding habits may reflect mental illness in a numbers of ways. Patients may eat too little or nothing at all, for many reasons. They may feel that attempts are being made to poison them through food. They may have feelings of unworthiness or guilt, or a wish to die. They may be unable to make decisions of any nature, including what to eat. Fatigue and physical illness, depression or a desire for attention may also cause them to neglect or refuse foods (36).

Patients may overeat for a variety of reasons. Feelings of insecurity may cause them to eat constantly. A fear that others will steal their share of the available food may cause them to eat everything in sight as quickly as possible, or to hoard food. Patients may also overeat to gain attention or status (36). People with major mental disorders are nutritionally vulnerable for many reasons, including dependence on others for food provision, behavioral problems such as food refusal and altered levels of emotional and physical activities and others.

Alcohol, cigarette smoking and substance abuse are common risk factors for mental illnesses. These risk factors were also found to interfere with the nutritional status of people. Drug abuse and excessive use of alcohol, which are said to be growing problems, have not been sufficiently studied in Ethiopia. Even if abuse of hard drugs is believed to be extremely rare, use of locally growing psycho-stimulants such as khat and cannabis is

rapidly growing. In Addis Ababa only 7.4% of mentally ill patients admitted that they were chewing khat (37). However, in Butajira 55.7 % admitted a lifetime experience of chewing khat and the prevalence of current chewing was 50% of which 17.4% have admitted chewing khat daily (30). In another survey on a representative sample of 1,200 adults from Zeway, Ethiopia, the prevalence of khat chewing was 31.7%. In this study physical illnesses, under nutrition, mental distress, sleep disorders, problems of drinking and heavy smoking were found to be significantly associated with khat chewing (32) as compared with controls. A case report on khat-induced psychosis in Butajira also showed the relationship between with mental illness and using this substance (33).

A case-control study used the “snowball” technique to select untreated cocaine users case and controls matched on sex and age. The main result showed that having a history of alcohol dependence was independently associated with an increased risk of cocaine abuse/dependency (OR=15.0 with 95% CI 3.8-60.20), but no other psychiatric disorders were significantly associated with an increase in the risk after multivariate analysis. An increased risk of cocaine abuse/dependency was also found for those who related suicidal thoughts (OR=3.0 95%CI, 0.91-10.8) suggesting an association between more severe manifestations of depression and cocaine abuse (38).

A study by Allison compared the BMI distribution among individuals with and without schizophrenia to see the effect of anti-psychotic drugs. After age-adjustment, men with schizophrenia had mean BMI similar to those without schizophrenia. In contrast, women with schizophrenia had a significantly ($p < 0.001$) higher mean BMI than did women

without schizophrenia. This study suggests that there may be a small subpopulation of people with schizophrenia who are underweight, suggesting that weight gain induced by anti-Psychotic agents is an important concern for many individuals (39).

Another study on the influence of narcoleptic treatment on different indices of nutritional status in people with schizophrenia showed a prevalence of obesity higher by 10% and 18% in males and females respectively, than in psychotropic free schizophrenic subjects. It further indicated that neuroleptic administration was associated with changes in iron status, plasma protein, high-density lipoprotein and cholesterol (40).

As literatures on nutritional problems of people with major mental disorders are limited so summarizing malnutrition in the general adult population may help to visualize the nutritional problems in the former group. Important health effects have been shown for those with BMI values below 18.5 kg/m^2 and those above 25 kg/m^2 . Adults with low body weight allocate fewer days to heavy labor and are more likely to fail to appear for work owing to illnesses or exhaustion (41).

In developing countries, there is some evidence that individuals with a body mass index (BMI) below 18.5 Kg/m^2 show a progressive increase in mortality and increased risk of illnesses. A recent study among Nigerian men and women has shown that mortality rates among chronic energy deficiency (CED) individuals who are mildly, moderately and severely underweight are 40%, 140% & 150% greater than that of among non CED individuals (42).

Men with a very low BMI ($<16 \text{ Kg/m}^2$) show even lower levels of activity. In an analysis of men and women with anorexia nervosa, the BMI of dying women was 11 Kg/m^2 and of the men about 13 Kg/m^2 . Guatemalan men with low muscle mass who were assigned substantial agricultural workload took a significantly longer time to walk home after work and spent about 3 hours per day sleeping (during the day time), playing cards or other sedentary activities. In contrast, better-nourished age-matched men did not sleep during the daytime, were active at home, and played soccer, and thereby remained physically active for a significantly greater proportion of the day (15).

A literature review on trend of child malnutrition 1983-1998 show that the problem of not declining in Ethiopia. In this study stunting was increased from 59.8% in 1983 to 64% in 1992 and 52% in 1998. The prevalence of underweight increased 37.3% in 1983 to 46.9% in 1992 to 42% in 1998 (43). The prevalence of wasting for all the regions combined had also increased. Studies done on adult malnutrition in Ethiopia indicate a high prevalence of underweight. In a study conducted in rural women 16% ($n=226$) had second to third degree chronic energy deficiency (44). A study on Oromo non-pregnant women show 35% ($n=473$) had BMI less than 18.5 kg/m^2 . The study also identified nearly 20% under 150 cm in height and less than 50 kg in weight (45). According to the Demographic and Health Survey 2000 (DHS), the mean height of Ethiopian women is 156 centimeters. About 4% of women are shorter on 145 centimeters. Three in ten women fall below the cutoff of 18.5 BMI indicating that the level of CED is relatively high in Ethiopia. In general, very young women (15-19) years age, rural women and

women with little or no education are more likely than other women to suffer from CED (46). A study done in Butajira, on the effect of maternal employment on nutritional status of mothers and children showed adult malnutrition of 31.7%(47).

Micronutrient deficiencies are the other public health important problems that are commonly overlooked but cause various degrees of disabilities. Lack of iodine, for example, has been recognized as causing varying degrees of poor mental development, not only goiter and cretinism. Globally about 740 million people are affected by goiter and more than 2 billion (or over 38% of the population living in 130 countries) are estimated to be at risk of IDD. Almost every country in Africa has IDD. Ethiopia is a country with a high prevalence of iodine deficiency disorders, which continues to affect a large number of people.

From a national survey conducted among school children and household members, the national goiter prevalence rate ranged from 0.4 to 66.3%, with the mean value of 35%(48). A baseline survey on goiter endemic and non-goiter endemic areas in this country found the mean prevalence of 21 ± 5.4 (49). On another study in three villages of Gamo Goffa Southern Ethiopia, reported a total goiter rate of 62% while visible goiter was 25%(50).

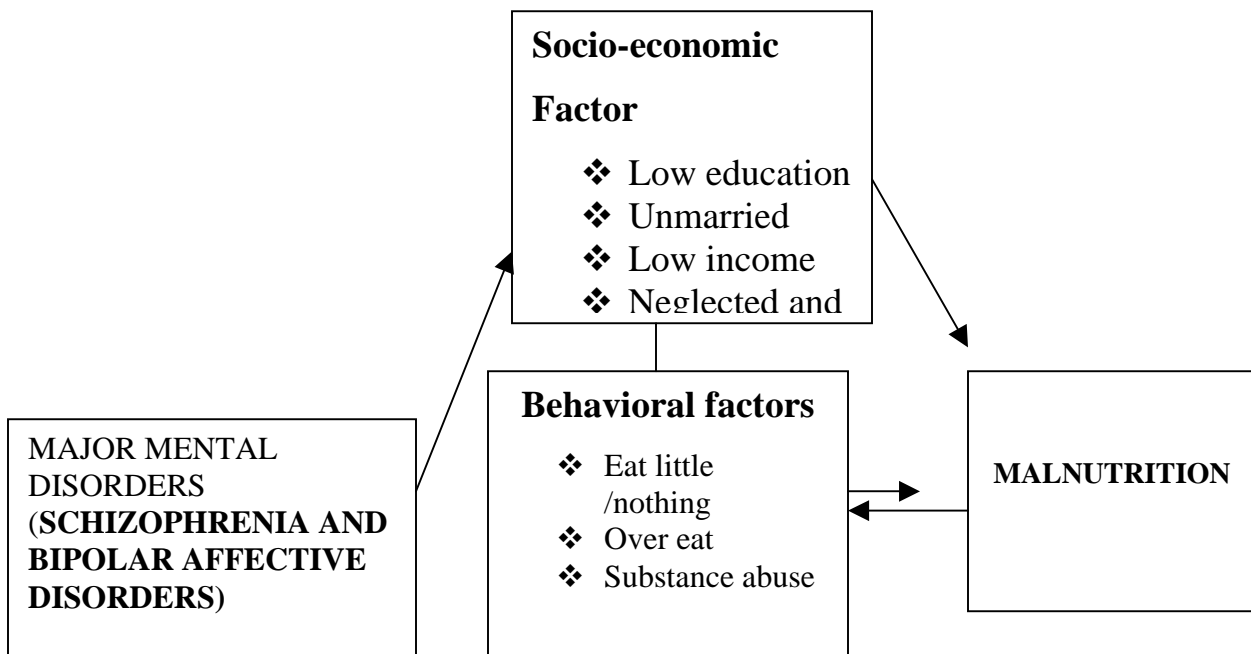
The prevalence of anemia in developing countries is 3 to 4 times higher than that in industrial countries (15). The highly affected population groups in developing countries are pregnant women (56%), school children (53%), non-pregnant women (44%) and preschool children (42%). The prevalence of anemia is low for adult males living in developed countries (5%) but not less than one-third of adults male are anemic in developing countries (15). A study in Northwestern Ethiopia has reported a prevalence of 40.5% anemia and 15% of mothers from Oromyia regional state (51, 52).

Although the importance of nutrition in the field maternal and child health has received attention for a number of decades, its possible importance in people with mental disorders has been understudied. Studies of the relationships between nutrition and mental functioning are required and more knowledge is also needed about the optimal distributions of protein, carbohydrates and fat in the diet of mentally ill people and their requirements of vitamins and minerals.

Malnutrition and major mental disorders are silent emergencies, which have been ignored for a long time as these problems often less fatal as compared to other infectious diseases. Studies on the course and outcome of major mental disorders (schizophrenia

and bipolar disorders) in relation to nutritional status are very limited. These types of studies are very scarce in developing countries and none has been performed in Africa, including Ethiopia. This study aims at assessing the nutritional status of people with schizophrenia and bipolar disorder, which is hoped, will contribute to search related factors, designing intervention strategies and evaluating out comes.

CONCEPTUAL FRAME WORK



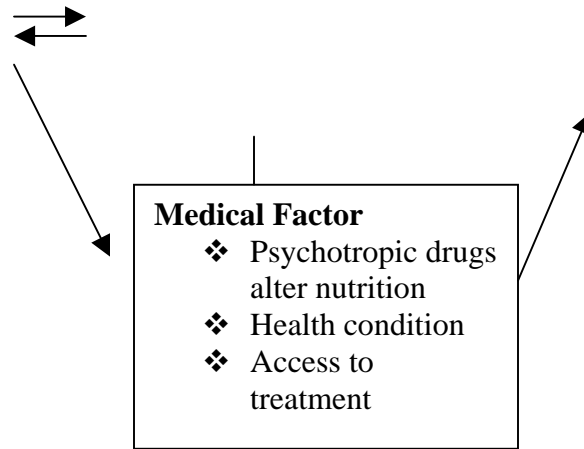


Fig. 1 The conceptual framework on the relationship between mental illness and Malnutrition and other related factors.

3. OBJECTIVE

General objective:

To assess nutritional status of individuals with major mental disorders and identify other possible risk factors.

Specific objectives:

1. To assess and compare socio-demographic characteristics of individuals with major mental illness and their controls.
2. To measure and compare the prevalence of protein energy malnutrition and micronutrient malnutrition (Vit A, goiter, and anemia) among individuals with mental illness and their controls.
3. To describe dietary patterns in mentally ill persons compared to controls.

4. Methodology

1.4 Study area

The study was undertaken between December 10, 2001 and February 15, 2002 in Meskan and Marako district, Ethiopia, within the Mental Health Research Project (MHRP), setting. The MHRP has carried out different activities on mental health problems under the umbrella of Butajira Rural Health Program (BRHP). Butajira town is located about 130 kms south of Addis Ababa. The population is approximately 300,000 based on the projection from the 1994 census projection (53). Forty five percent of the population (i.e.

over 100,000 people) belongs to the age group between 15 and 49 years. The district is administratively divided into 44 kebeles four of which are in the town.

The MHRP has one psychiatric clinic in the newly constructed hospital. The project has one out-reach site at Enseno, some 18 kms east of Butajira town. The clinic is staffed by three medical doctors (one general practitioner and two psychiatry residents), two Psychiatric Nurses (part-time workers), and a secretary. There are 11 village agents, who trace cases and participate on the follow-up of patient at the community level. One of the peculiar features of the MHRP is that it targets the whole district population. The project currently addresses the most common and the most serious types of mental illness such as major depression, schizophrenia, and bipolar affective disorders. Clinicians using the Amharic version of Schedule for Clinical Assessment in Neuropsychiatry (SCAN) evaluated cases of major mental health patients were identified by using the Amharic version of Composite International Diagnosis Interview (CIDI) those potential cases.

The economy of the district is based on agriculture. The district has three health centers and two clinics, one of which is owned by government. The construction of a new hospital has just been completed and it has started to give services. There are also nine private clinics (one medium level and others lower level), three pharmacies, eight rural drug venders and one drug store.

4.2. Study design:

A nested case-control design where study subjects were matched by sex, age and residency was used to assess the nutritional status and other related factors in the study populations.

4.3.1 Source population:

The source population was all adults age 15-49, (as major mental disorders were most prevalent in this age groups) residing in Meskan and Marako district for at least six months, irrespective of their sex, religion, ethnicity and other variables.

4.3.2. Study population:

Selection of cases: The study population includes all cases of schizophrenia and bipolar affective disorders screened by CIDI, and SCAN (34). They were all in the age 15-49 years and residing in the district for at least 6 months. The cohort register was used to identify all cases.

Selection of controls: Controls were all adults age 15-49 years, who were not diagnosed with major mental disorders before May 2001. One control was selected for each case, matched by sex and age within a range of five years. Whenever more than one candidate was found the closest age and nearest neighbor was taken. If two or more candidates were again similar then a lottery method was applied to select one. Controls do not have blood relationship to the cases. Moreover all people who had previous history of mental illness were excluded from being controls.

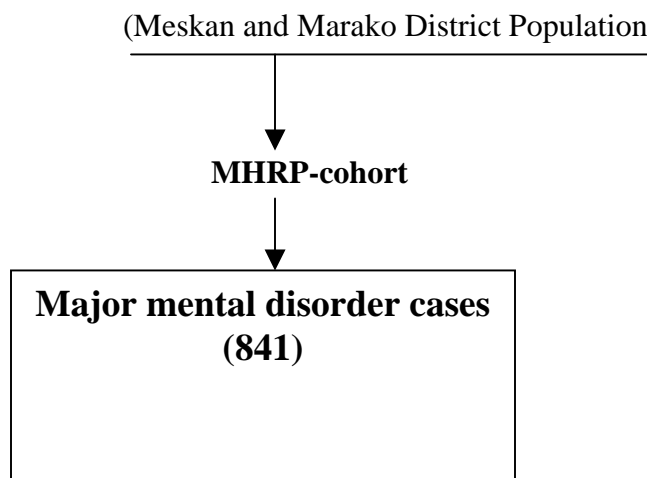
At the time of data collection all cases were checked for the problem in the registration list. Similarly all controls were screened for the absence of major mental disorders before

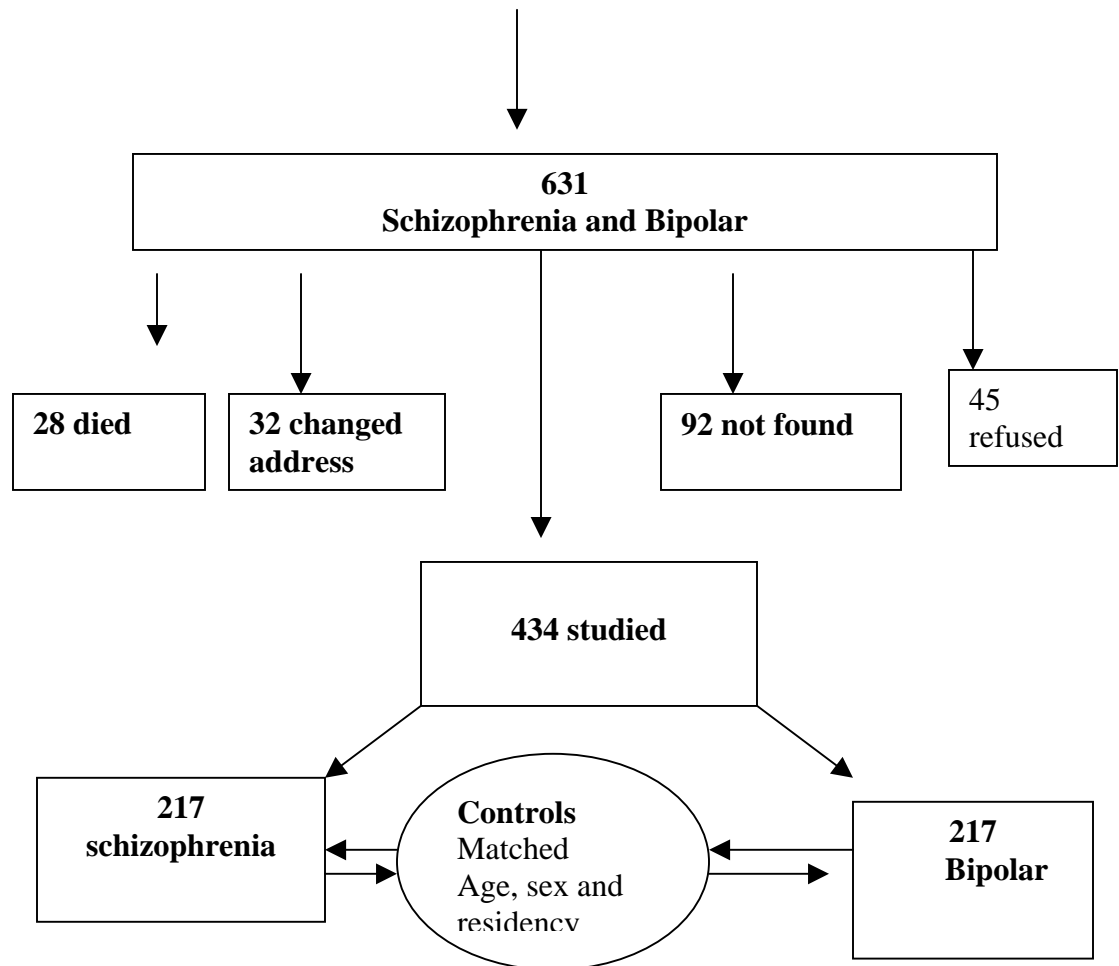
being included in the study. Then data were collected after obtaining verbal consent from all subjects or their kinships. The following schematic diagram presents the overall process of case identification and data collection (figure 2).

4.4. Inclusion and exclusion criteria:

All study subjects were 15-49 years, residing at least 6 months in the district, and from both sexes. All cases of major mental health disorder (schizophrenia or Bipolar disorder) under the MHRP cohorts were included and others were excluded. Controls have the same demographic profiles except not having the of disease interest and lacking blood relationship with a case. Pregnant mothers were excluded from the study because weight will be affected.

Figure 2: **Diagrammatic presentation of selection of the study subjects.**





4.5. Sample size:

Using the sample size estimation for a matched case control study with the 50% assumption of expected prevalence of malnutrition in adult population, (as no previous estimate was found) OR=1.5 (to increase the precision), taking power of 80%, and 95% confidence interval, with 1:1 ratio of cases to controls, then calculated sample size was

814. However, the MHRP cohort consists of only 631 patients with schizophrenia and bipolar disorder and this study took all the cases. Two hundred and ten cases with major depression were not included in the study because the study was linked to schizophrenia and bipolar course and outcome study and time (figure 2).

4.6. Data collection tools and procedures:

Socio-demographic, economic, reproductive, dietary and lifestyle information was gathered using a structured questionnaire administered by trained enumerators. Anthropometric status was measured by taking weight and height of each study subject. Weight was determined using a Bathroom scale placed on a hard board over a flat surface that was calibrated using the known weight of an object before each measurement. Weight was recorded to the nearest 100 gm. For height the subject was asked to stand on the footboard of the stadiometer. Then, the head was positioned to look straight ahead, feet together, knees straight, and heels, buttocks and shoulders in contact with the measuring board (stadiometer). Arms were hanging at the sides in a relaxed manner with palms facing the thighs. Height was recorded to the nearest 0.1 centimeters with the examiner's eyes level with the horizontal bar to avoid parallax error. All subjects were classified as mildly, moderately and severely under weight if BMI is 17-18.49, 16-16.99, and less than 16, respectively. For over weight a cutoff was used by BMI over 24.99 (15,54).

Micronutrient deficiencies (iron, vitamin A and iodine) from each subject were assessed clinically by trained nurses. Thyroid gland enlargement was assessed to determine the goiter rate. The person was in sitting position and head slightly extended during

examination. If enlargement of the gland is not visible then palpation was done. Cases were classified as grade I, II and III for palpable, visible and very big goiter respectively (15). Vitamin A deficiency was estimated by the history of night-blindness (NB) as other indices are not common in adults. Anemia was assessed both clinically and using laboratory test. For the former pallor of conjunctiva, fingernails and oral mucosa were assessed. After getting informed consent, prick on left ring finger was done using sterile lancet for each respondent to take blood for hemoglobin determination. Hemometer method was used to estimate the hemoglobin level. Two ml of 5% hydrochloric acid was added in graduated tube and 5 micro unit of blood (two drops) taken from each subject added in the tube. Waiting for 2-3 minutes, diluted by saline until the color matches to the base. The cutoff point for hemoglobin determination was 12.00 and 13.00 gram% in female and male respectively (15).

For the number of pregnancies and deliveries five number of children was used to separate high and low. For birth interval two years and for the age at first marriage and sexual intercourse 18 years were used based of the risks related.

A semi-quantitative food frequency (FFQ) questionnaire consisting of a list of 44 food items with portion sizes and a set of frequency response options (daily, weekly, monthly, yearly or none) was used to indicate how often each food was consumed (55, 56). All frequency responses were converted into a daily intake. Diets were grouped in broad categories such as cereals, fruits, vegetables etc, for which the daily frequencies were added and each subject was grouped as none (0), low (1-2) and high (≥ 3) per day. In addition the nutrient content of the food items were calculated using the Ethiopian Food

Composition table (57). Daily nutrient intakes as expressed in terms of percent of caloric intake (crude nutrient score divided by total caloric intake score \times 100) were used for grouping both cases and controls into two categories. Using 2100 calories, 75-gram fat and 45-gram protein per day. For daily mean requirements, intake of each was classified as adequate or inadequate for the three main nutrients.

4.7. Data quality assurance:

The questionnaire was translated from English to Amharic and back translated to English for language consistency checking. Five days of training was given to enumerators, nurses, laboratory technicians and supervisors on the respective areas in the process of data collection.

Training was given by the principal investigator and one general practitioner. A training manual was used to acquaint the trainees with needed information so as to assure data quality.

Pre-test was carried out in Butajira, in the study area of the study subjects. The pre-test was done to determine how best the questionnaires and items should be phrased to maximize the likelihood of response, and to estimate the time spent to complete the procedure. Based on the results of the pre-test it was possible to develop a list of food items that were commonly consumed in the study area. The mean time spent was 30-45 minutes for each questionnaire. To evaluate the consistency of valid responses in both the

cases and controls, five questions were selected by connivance from the questioner and asked again.

4.8. Study variables:

Dependant variables were mental status, weight, height, hemoglobin, vitamin A deficiency and goiter. Independent variables include socio-demographic, marital status, religion, income, occupation, education, feeding habit, residency, dietary patterns and parity, gravidity, contraceptive use, age at first marriage and sexual intercourse. In addition smoking, khat chewing, alcohol drinking and use of cannabis were independent variables.

4.9. Data processing and analysis:

After data collection, data were entered into a computer, using the EPI-INFO statistical package in preformed template, and cleaned using the same package. Analysis was done using EPI-INFO, statistical package to get frequencies; rates, and percentages and SPSS used for conditional logistic regression. McNemar matched chi-square, OR and 95% Confidence Interval were used when appropriate. Bivariate analyses were done on marital status, religion, occupation, income, weight, height, VAD, IDD, anemia, and other characteristics. Finally entering all variables at one time did conditional logistic regression.

5. Dissemination of findings.

The findings of this study will be communicated to organizations or institutions or individuals who have direct or indirect input into the project. These include Addis Ababa University, Department of Community Health, World Health Organization, Butajira Mental Health Project, Ministry of Health, Ethiopian Health & Nutrition Institute, Butajira District Health Office.

This can be accomplished through submission of reports, presenting findings at appropriate meetings, seminars, and workshops and it can be published in a scientific journal

6. Ethical consideration

Before the study began, ethical clearance was obtained from the Ethical Committee of Addis Ababa University. Then official letter from the Department of Community Health, AAU, was written to Meskan and Marako District officials. Informed consent was obtained from each respondent or a guardian or next of kin, if the individual concerned was considered truly unable to give consent, before data collection. Any one who was not willing to participate in the study was excluded at the beginning or any stage of the study. Confidentiality was maintained by avoiding the labeling by the names. More over iron and vitamin A were given for all individuals who had anemia or vitamin A deficiency during the data collection period.

7. Definition of terms:

Body mass index (BMI):- the measure of body mass relative to height, calculated as Weight (kg)/height (M²).

Chronic energy deficiency (CED): - Degree of underweight as categorized by BMI less than 18.5.

Underweight: - If BMI is below 18.5 kg/m² and overweight if BMI kg/m² above 25.0

Major mental health disorders:- Any one who has either Schizophrenia or Bipolar disorders.

Schizophrenia:- A serious psychiatric disorder characterized by impaired communication with loss of contact with reality and deterioration from a previous level of functioning in work, social relations or self-care. Clinical types include disorganized, catatonic, paranoid, residual and undifferentiated schizophrenia.

Bipolar disorders- a major affective disorder characterized by episodes of mania and depression.

8. Results

From total of 631 cases registered under MHPR, 321 were schizophrenia and 310 were bipolar disorders of which, 28 had died and 32 had changed addresses. Ninety-two were not found in two consecutive visits and 45 refused to participate. The most common

reason for non-participation was fear of social stigma. Out of 197 non-respondents ninety-six were cases of schizophrenia and eighty-three had bipolar affective disorders. The overall non-response rate was 18.8 percent. Majority of non-respondents were males, residing in rural area, Meskan by ethnicity, illiterate and Muslims. Complete data were obtained from 434 cases that consisted equal numbers of schizophrenia and bipolar disorders.

The mean age of onset for major mental disorders was to be 26.7 years among cases. Majority (62.7%) were on anti-Psychotic drugs mainly neuroleptic (modicate, chlorpromazine) and antidepressant (amytriptline). The mean length and duration treatment time was 3.11 ± 3.48 years. There were no differences in the consistency of responses between case and controls.

Majority of the respondents were Muslims, earning less than one hundred Birr per month, and half of them were farmers by occupation. More controls were married, educated have their own prosperity than mentally ill people. Joblessness was more common in cases than in controls (Table 1)

Socio-demographic factors positively significantly associated with major mental illness were in unmarried (OR= 1.88 with 95% CI 1.33, 2.66), illiterates (OR= 1.90 with 95 CI 1.39, 2.61), being Muslims (OR=1.91 with 95% CI 1.27, 2.88), low perceived economic status (OR=1.49 with 95% CI 1.19, 2.42), and not having cattle (OR=2.59 with 95% CI 1.47, 4.55) while having radio (OR=0.66 with 95% CI 0.41, 0.88) and spending lesser

time on job (OR=0.29 with 95%CI 0.22, 0.40) were negatively associated with mental illness.

Occupation, ethnicity, average family income, water source, toilet facilities and types food were not significantly associated with major mental health disorders. People with major mental disorders were the main source of their family income. As sex, age and residency were used to match cases with controls, these variables were excluded from the above analysis (Table 1).

Table 1: - Comparison of cases and controls for socio-demographic characteristics, Meskan and Marako district, 2002

Variables	Cases (n=434)	Controls (n=434)	*OR (95%CI)	Adjusted OR (95% CI)
Marital Status				
Unmarried	224	128	3.79(2.62,5.60)	1.88(1.33,2.66)
Married	210	306	1.00	1.00

Education				
Illiterate	315	263	1.90(1.39,2.61)	1.50(1.04, 2.29)
Literate	119	171	1.00	1.00
Religion				
Muslim	299	264	1.69(1.19,2.42)	1.91(1.27, 2.88)
Others	135	170	1.00	1.00
Family income				
<100	362	351	1.23(0.84,1.79)	0.95(0.61, 1.47)
>100	72	83	1.00	1.00
Perceived economy				
Poor	236	192	1.49(1.14,1.96)	1.17(0.83,1.63)
Rich	198	242	1.00	1.00
Own radio				
Yes	79	143	0.43(0.30,0.60)	0.66(0.41,0.88)
No	355	291	1.00	1.00
Own cattle				
No	54	78	1.47(1.09,1.99)	2.59(1.47,4.55)
Yes	380	356	1.00	1.00
Time spent on Job				
≤4 hours	152	287	0.24(0.17,0.33)	0.29(0.22,0.40)
>4 hours	282	147	1.00	

- CI= confidence Internal
- *OR= Mental-Hanzhel Matched Odds Ratio
- MecNemar matched analysis was done for all bivariate

Out of 434 cases, 91(20.9%) smoked cigarette, 280 (64.5%) chewed khat, 190(43.7) drunken alcohol and 10(2.3%) used cannabis (hashish) in lifetime. Among controls 56(12.9%) smoked cigarette, 274(63.1%) chewed khat, 194(44.7%) drunk alcohol and only 1(0.2%) hashish have reported practicing in their lifetime. Out of ninety-three current cigarette smokers 56(60.2%) were cases of major mental disorders. More controls than cases

currently chew khat but the two groups were comparable in current uses of alcohol. (Table 2)

From the lifestyle characteristics positively significantly associated with major mental illness in theivariate analysis were smoking (OR=2.68 with 95% CI 1.53,4.96) and khat chewing (OR=2.32, 1.37,3.90) for lifetime. Current khat chewing and alcohol drinking were also found to be associated with major mental disorders after controlling for confounder (OR=3.91 with 95%CI 2.34, 6.51 and OR=2.12 with 95%CI 1.26, 3.58) respectively. But past history of alcohol drinking and current smoking were not significantly associated with major mental disorders (Table 2).

Table 2: - Comparison of cases and controls for lifestyle characteristics, Meskan and Marako district, 2002

Variables	Cases (n=434)	Controls (n=434)	*OR Crude (95% CI)	Adjusted OR (95% CI)
History of Smoking				
Yes	91	56	2.03(1.36,3.07)	2.68(1.53, 4.69)
No	343	378	1.00	1.00
Current smoking				

Yes	56	37	0.77(.05,2.65)	0.93(0.39,2.17)
No	378	397	1.00	1.00
History of khat chewing				
Yes	280	274	1.10(0.78,1.56)	2.32(1.37,3.90)
No	178	160	1	1.00
Current chewing khat				
Yes	178	238	0.77(0.51,1.14)	3.91(2.34,6.51)
No	256	196	1.00	1.00
History of alcohol use				
Yes	190	194	0.96(0.71,1.31)	0.77(0.51, 1.11)
No	244	240	1.00	1.00
Currently taking alcohol				
Yes	102	149	0.73(0.49,1.08)	2.12(1.26,3.58)
No	332	285	1.00	1.00

- CI= confidence Interval
- *OR= Matched Odds Ratio
- McNemar matched analysis was done for all bivariate

Table 3 shows the comparison of cases and controls for micronutrient deficiencies and anthropometric measurements. Out of 434 cases 16.4 % reported history of night blindness, 25.8% had goiter, while 24.4% had anemia on clinical examination. Nearly half of the cases were below the mean weight (56 kg) and 22.1% were below BMI less than 18.5 kg/m². Among all controls 14.6% reported history of night blindness, 20.9% had goiter, 23.9% anemia on clinical assessments. More than half of the controls

were above the mean weight (56 kg) and 23.5% had BMI less than 18.5 kg/m². Severe and moderate forms of chronic energy deficiency (CED) were more in case 23(5.2%) and 14(3.2%) while the mild form of CED there were high number of controls than case 80(18.4%) and 59(13.6%) respectively. In the laboratory examination for hemoglobin more of the cases had anemia in both sexes than their matched controls. The overall adult malnutrition (that is BMI less than 18.5 kg/m²) both in cases and controls was 22.8%, of which 2.6% was over weight (BMI more than 24.99 kg/m²). People with major mental disorders had either severe or moderate forms of chronic energy deficiencies as compared to their controls. The proportions of goiter and Vitamin A deficiencies were more in cases but anemia was similar in both groups (table 3).

Adult malnutrition was found to be significantly associated with major mental disorders on the logistic regression (OR=4.08 with 95% CI 1.42, 11.70). The mean BMI and weight, between cases and controls were not statistically different ((T=1.08 (p=0.27) and T=10.94(p=0.34)) respectively. The two groups were significantly differ in their mean height T=2.38 (p=0.018). Vitamin A deficiency, goiter, and anemia were not significantly associated with major mental disorders (Table 3).

Table 3: - Comparison of cases and controls for micronutrient deficiencies and anthropometrics measurements, Meskan and Marako District, 2002.

Variables	Cases (n=434)	Controls (n=434)	*OR (95% CI)	Adjusted OR (95% CI)
BMI				
<18.5	96	102	0.93(0.67,1.30)	4.08(1.42, 11.74)
≥ 18.5	338	332	1.00	1.00

Mean BMI \pm SD	20.34 \pm 2.29	20.18 \pm 2.05	T=1.08(p=0.276)	
Weight				
< 56 Kg	223	201	1.26(0.94, 1.69)	1.55(1.08,2.24)
\geq 56 Kg	211	233	1.00	1.00
Mean weight \pm SD	55.8 \pm 7.83	56.28 \pm 7.00	T=-0.94(P=0.345)	
Height				
<1.66cm	23	14	0.86(0.31,1.48)	1.75(0.85,3.90)
\geq 1.66 cm	411	420	1.00	
Mean height \pm SD	1.65 \pm 0.088	1.66 \pm 0.085	T=- 2.38(p=0.018)	
Goiter				
Yes	112	91	1.37(0.98,1.93)	0.94(0.64, 1.39)
No	322	343		
Anemia				
Yes	106	104	1.03(0.74,1.42)	0.90(0.61,1.33)
No	328	330	1.00	1.00
Hemoglobin				
Male < 13 gm%	138	131	1.16(0.81,1.46)	1.34(0.85,0.2.03)
\geq 13 gm%	154	161	1.00	1.00
Female < 12 gm%	64	62	1.16(0.85,1.59)	0.70(0.64,1.12)
\geq 12 gm%	78	79	1.00	1.00
Vitamin Deficiency				
Yes	71	62	1.20(0.82,1.77)	0.77(0.49, 1.21)
No	363	372	1.00	1.00

*OR= Mental-Hanzhel Matched Odds Ratio

The mean age at first marriage and sexual intercourse was nearly the same in cases and controls that was 16.0 and 15.8 years respectively. The mean gravidity and parity were similar in the cases and controls 4.1, 3.7 and 4.1, 3.8 respectively either were significantly different between cases and controls. Cases had slightly higher mean number of abortions than their matched controls 1.4 Vs 1.2 respectively. The mean number of stillbirths

was higher in cases than in controls 1.2 and 1.0 respectively. The two groups had similar mean number of children. The mean birth interval was higher in cases than in their matched controls 2.4 and 1.7 years respectively. Contraceptive use in cases was 10(0.7%) lower than in controls 16(11.3%). History of difficult labour was reported more commonly in people with major mental illnesses than their controls 15.7% Vs 12.2% respectively (Table 4).

Reproductive characteristics were not significantly different between the two groups when adjusted for confounding sociodemographic, lifestyle and nutritional variables (Table 4).

Table 4: -Comparison of female cases and controls for reproductive characteristics, Meskan and Marako District, 2002.

Variables	Cases (n=142)*	Controls (n=142) *	*OR (95% CI)	Adjusted OR (95% CI)
Parity (n=276)				
≤ 5	52	42	0.80(0.41,1.55)	06(0.12,2.36)

≥ 5	94	99	1.00	1.00
Gravidity (n=283)				
≤ 5	90	99	0.62(0.32,1.14)	1.49(0.80,2.77)
≥ 5	52	42	1.00	1.00
Age at first Marriage (n=219)				
<18 yrs	20	24	0.77(0.33,1.77)	1.37(0.61,3.03)
>17 yrs	84	91	1.00	1.00
Contraceptive use (n=284)				
Yes	10	16	0.50(0.17,1.32)	1.80(0.71,4.51)
No	132	126	1.00	1.00
Birth interval b/n last two children (n=196)				
< 3 yrs	63	61	1.36(0.68,2.77)	0.76(0.40,1.36)
> 2 yrs	31	41	1.00	1.00

- CI= confidence Interval
- *OR= Mantel-Haenszel Matched Odds Ratio
- McNemar matched analysis was done for all bivariate

Table 5: - Comparison of cases and controls by dietary pattern and nutrient intake,

(Food frequency questionnaire), 2002

Daily frequency	Cases (n= 434)(%)	Controls (n=434)(%)	OR (95%CI)
Cereals			
1-2	121(53.3)	106(46.7)	1.20(0. 87, 1.64)

≥3	313(48.8)	328(51.2)	1.00
Vegetables			
None	229(51.9)	212(48.1)	1.18(0.86, 1.610)
1-2	132(47.8)	144(52.2)	1.00
≥3	73(51.8)	68(48.2)	1.17(0.76, 1.79)
Animal products			
None	344(50.7)	335(49.3)	1.19(0.84, 1.67)
1-2	7(70)	3(30)	2.7(0.6,13.66)
≥3	83(46.4)	96(53.6)	1.00
Fruits			
None	423(49.6)	429(50.4)	1.00
1-2	1(50)	1(50)	1.01(0.0, 37.15)
≥3	10(71.4)	4(28.6)	2.54(0.73, 9.66)
Legumes			
None	310(50.8)	300(49.2)	1.14(0.84,1.55)
1-2	117(47.6)	129(52.4)	1.00
≥3	7(58.3)	5(41.7)	1.54(0.43,5.78)
Total calories/day			
< 2100 cal/day	155(47.1)	174(52.9)	1.00
≥2100 cal/day	279(51.7)	260(48.3)	1.20(0.91,1.60)
Total fat/day			
< 78 gram/day	412(50.4)	405(49.6)	1.34(0.73,2.46)
≥ 78 gram/day	22(43.1)	29(56.9)	1.00
Total protein			
< 45 gram/day	243(52.8)	217(47.2)	1.27(0.79,1.68)
≥ 45 gram/day	191(46.8)	217(53.2)	1.00

(58) Recommended Daily allowances (RDA) for **calorie= 2100k/cal**

Fat = 75 gram

Protein = 45 gram

Table: 6 Comparison of cases and controls by daily mean difference in dietary pattern and nutrient intake, Meskan and Marako District,

(Food frequency questionnaire), 2002

Daily frequency	Cases (n= 434)	Controls (n=434)	T test (P value)
	Mean \pm SD	Mean \pm SD	
Cereals	3.84 \pm 2.16	3.7 \pm 2.12	-1.5(0.12)
Vegetables	2.85 \pm 1.35	2.88 \pm 1.32	- 0.22(0.81)
Animal products	0.74 \pm 1.89	1.4 \pm 1.61	- 0.72(0.47)
Fruits	0.4 \pm 0.81	0.4 \pm 2.24	- 1.67(0.11)
Legumes	0.6 \pm 0.81	0.8 \pm 0.71	0.46(0.64)
Tuber/roots	0.3 \pm 0.73	0.4 \pm 0.6	0.25(0.52)
Total calories/day	2001 \pm 1140	2085 \pm 1120	-1.08(0.27)
Total fat/day	55.87 \pm 75.55	57.94 \pm 62.87	-0.43(0.66)
Total protein/day	32.74 \pm 36.74	36.11 \pm 34.63	-1.64(0.10)

For both the cases and controls cereals (maize) were the staple foods, nearly 3/4th of the them were getting three or more times cereals per day. The majority of cases and controls did not get vegetables, fruit, legumes, tubers and animal products. Only 10(2.3%) and 7(1.6%) of the cases and 4(0.9%) and 5(1.1%) of controls got fruits and legumes in the adequate frequency. The mean frequency of eating legumes, fruits, and animal products were less than 1.5 times per day in both groups. Cases reported getting cereals and vegetables more frequently per day than controls.

More controls (52.9%) got less daily-recommended calories than cases (47.1%) and the mean difference on caloric intake were 2085 ± 1120 and 2001 ± 1140 but the difference was not significant. More cases (52.8%) were reported getting low daily-recommended protein than controls (47.2%). Only 22(5.1%) of cases and 29(6.7%) of controls were getting the daily-recommended fat and more controls than cases were getting protein 50.0% and 43.0% respectively. The mean differences were not statistically significantly by t-test (Table 5, 6)

9. Discussion

Major mental illness can be attributed to different factors. Better understanding of factors related with major mental illnesses could help to address the root causes of the problem and to design intervention strategies at different levels of care for mentally ill people. Major mental disorders can be attributed to different factors that are deep-rooted into the psychosocial, biological, genetic and environmental factors. Major mental disorders could lead to family dysfunction, poor educational achievement, and isolation from the society even from families. In addition, they often interfere employment; interpersonal relationships; nutritional status and other related factors. This study focuses on investigating the association between socio-economic, behavioral and nutritional factors with major mental disorders.

The association between major mental illness socio-economic and socio-demographic characteristics has been cited by different studies (8,9,10,28). These studies have shown that major mental disorders were associated with female sex, family history of mental illness, marital status, education, and economic status. Similarly the present study shows significant associations between major mental health problem and marital status; education and religion. This finding was also consistent with previous studies on mental illness in this country (9, 10,).

As in other studies (9, 10), in this study marital status was significantly associated with major mental disorders. Cases were more likely to be unmarried (single, separated, divorced or widowed) as compared to controls.

The possible explanation could be that people are less likely to get married once they developed mental illness due to the social stigma attached to the problem. Such people are also more likely to encounter marital dissolution (break) due to the same reason. Marriage was protective factor for mental illness after controlling confounding factors (OR=0.33 with 95% CI 0.23,0.47) in this study. The explanation could be those who are married may have less psychosocial stresses as compared to non-married. As stressors are often associated with mental health problems than those who are married may have different coping mechanisms and supportive systems than the unmarried. This finding was consistent with other study in this country (9), which reported stressors were more associated with those unmarried, separated, divorced and with mental distress. Another possible explanation may be the fact that mentally ill individuals do not get married (remained unmarried) only healthy ones do.

Illiteracy is risk factor against different health, social and psychological problems. On the other hand those educated may have a good socio-economic status than non-educated. Increased educational attainment was reported to be protective factor of mental distresses (8, 10). In this study also major mental illness was significantly associated with illiteracy than literacy. Several factors could account for this finding. It is possible that those with major mental disorders may remain non-educated as they may be unable to enroll into school or those enrolled may not succeed due to their health and social problems. Those educated may have relatively better socio-economic status than non-educated; as a result the formers may have better opportunities to overcome factors related to stress and other socio-economic problems as means to improve socio-economic status.

The difference in the prevalence of major mental disorders in Christian and Muslim religion followers was reported (8). Both in matched analysis and logistic regression Muslim religion was significantly associated with major mental illnesses. Khat chewing has been reported to be the risk factor for mental illnesses in others studies. Other studies also pointed out a significant positive association between being Muslim and daily khat chewing (30,32). Likewise in the stratified analysis, lifetime and current khat chewing were both strongly associated (OR=4.69 with 95%CI 3.37, 6.31 and OR=5.95 with 95%CI 4.25, 8.43) with Muslim religion respectively in this study. This association may be of a temporal relationship confounded a behavioral of chewing khat that most commonly being practiced by Muslims as compared to others.

The association between major mental disorders and substance abuses has been reported by different authors (27,30,31,33,38). Similarly the present study shows significant association between major mental disorders with cigarette smoking and khat chewing. Except drinking alcohol, khat chewing and cigarette smoking remained statistically significant after controlling possible confounding factors on socio-demographic and nutritional. The association of mental distress to that of khat chewing and cigarette smoking were also reported by the previous studies in the same area (32).

Many observations reported a negative impact on health and socio-economic conditions in communities where khat chewing is regularly used (32). Some reports indicated that khat consumption has adverse consequences for married life. Spending money to maintain the habit and wasting time at the khat ceremonies lead to family neglect and consequently to divorce. More

over khat chewing was related to psychological problems as insomnia, anxiety, depression on cessation, tension and various psychiatric symptoms reported by different investigators (32,33). Paranoid state, schizophrenia, psychosis, acute schizophrenia like psychosis and mania were the other common problems related with khat chewing. In line with this cases were reported with khat-induced psychosis (33). A strong association of daily khat chewing with cigarette smoking (27,32) may explain the association between the two factors to major mental illnesses and with nutritional status.

The damage induced by abuse of alcohol is not limited to those who drink; others also suffer the consequence because of family disruption, crime, and violence. There was high prevalence (3.7%) of drinking problem reported in the study area (27,31). The problem of drinking was associated with male sex, Orthodox Christians, divorced, and widowed. However, in our study alcohol drinking was not associated with major mental disorders both in the stratified and matched analysis. This could be due to low prevalence of alcohol intake in the present study groups and this has also used a matched case-controls design so that may with relatively small sample size than the former study.

As studies on nutritional status of major mental disorders are very limited so we used related studies to explain this research finding. Our study showed that CED was associated with major mental disorders, after adjusted for socio-graphic and lifestyle factors. The second and third degree chronic energy deficiency was 16.6% in cases and 20.7% in controls were comparable with one reported (16.0%) from Sidamo (45), but it targeted only women and lower than other studies (46, 47). The overall prevalence of

adult malnutrition 22.8% in this study was lower than study done in same area by Nigussie S. (32.2%) (48). The differences with other studies could be from selection subjects and sample size, prevalence of the problems and study designs.

Unlike others, studies our study pointed out 2.5% prevalence of overweight in adult population, that is BMI greater than 24.99. Overweight is most common nutritional problem in developed countries (15) but not in developing nations like Ethiopia. Mentally ill patients are at risk of being overweight due to nutritional or medical reasons. The majority (62.7%) of cases in our study are taking psychotropic drugs (nuerolepitics and antidepressants) therefore overweight should not be over looked in patients with major mental disorders. Other studies also showed overweight in patients with major mental disorders who were taking anti-psychotic drugs (38, 39).

Iodine deficiency disorder is the major cause of irreversible mental retardation in early life unless treated. The prevalence of goiter in this country is reported to be very high according to WHO (35%) in school children. Goiter was more common in the cases (25.8%) than in controls (20.9%) in this study but this difference was not statistically significant. The previous studies in this country targeted school children but not the adult population or the mentally ill people. The present study is comparable with other studies done in this country (49, 50). For instance a baseline survey on goiter endemic reported mean prevalence of 21 ± 5.4 (49) and another study also reported a prevalence of 25% (50).

Using clinical method to assess goiter may underestimate the prevalence, so more objective methods like Urine Iodine Excretion (UIE), water, or food iodine concentration need to be applied.

Anemia prevalence was higher in cases of both sexes than in controls. Anemia was severe according to the WHO criteria of low hemoglobin, prevalence > 40% (57). This finding was consistent to a study done in Northwestern Ethiopia (40.5%) (51). On the other hand a 15% prevalence from Oromiyia Region (52), was lower than this study (24.4% and 23.9% in cases and controls) by clinical method respectively. The differences could be related to variation in selection of study subjects or the sample size. Other possible explanation could be due to differences in diseases, diet, living status, income or other related factors.

Earlier studies done suggested that iron deficiency is not public health major problem in Ethiopia. Some had attributed the situation to consumption of “teff” that is the contamination of ferrous with soil during trashing. However the staple foods in the study area are largely corn and “false banana” which are low in iron contents. On top of this other problem like malaria, intestinal parasitosis, poor hygiene and inadequate access to food would contributed of high prevalence of anemia.

Vitamin A deficiency (VAD) was reported to be more in cases than in controls by history of night blindness. Even if VAD was known to be a public health problem in this country in under five children but in Ethiopia non-has been reported in adults. The methods used

to assess vitamin A deficiency may not be as objective as the clinical examinations. It also peaks up with the most serious cases only but its estimation, as proxy indicator is not undermined. However other objective methods such as serum retinol used.

Generally people with major mental disorders were not different in their micronutrient deficiency status as compared to their matched controls. This may show less nutritional discriminations could be low to mentally ill people. The other explanation could be, when the prevalence of malnutrition is high in the general population then differences in nutritional status between mentally ill and non-mentally ill could be insignificant. Other studies have pointed out the prevalence of adult malnutrition in the same area (47).

Food frequency questionnaires provide mean frequency of foods eaten by individuals and it provides reliable information for both the retrospective and current intake (55). The daily frequency of legumes, fruits, and animal products were inadequate. This could be an indicator for food unavailability, inaccessibility or uneven distributions. The main sources of foods found in the area were targeted in the study so this may underestimate the choices so does the daily frequency.

On the assessment of dietary pattern cereal (mainly corn) was the staple food for the two groups. Even though majority of respondents were getting enough amount of calories per day but they were not getting the minimum fat and protein. As cereals are the most staple foods in the area so the caloric intake could be adequate, on the other hand protein and fat intake were deficient in both groups. Other studies were not found to compare

results of this study but the main limitation could be a one-time measurement from few households may either over or under estimate the actual intakes. However, other studies are needed to investigate the relationship between cereal consumptions and schizophrenia in the future.

10. Strength and limitation of the Study:

Strengths:

- ◆ Using a matching both at design and analysis level helps to control confounding factors.

- ◆ Case-control design helps to identify associations in rare disease like mental health.
- ◆ Finally using conditional logistic regression to control possible confounding factors.

Limitations:

- ◆ Clinical assessments for micronutrients may only peak the most serious cases so it may underestimate the magnitude of the problems.
- ◆ New cases of major mental health disorders were not included in the study and there may be chance to be involved as controls
- ◆ Dietary assessment by semi-quantitative methods may either under or over estimate the quantity.

11. Conclusions:

The conclusions drawn from the finding of this research were:

1. There was high prevalence of adult malnutrition and inadequate intake of foods for a daily bases, in Meskan and Marako district with a significant difference in mentally ill people than in their controls.
2. People with major mental health problems were significantly differ form their controls by socio-economic factors. Marital dysfunctions, low income, illiteracy and poor living conditions were associated with major mental illnesses and that intern had an adverse effects on their nutritional status.
3. Mentally ill people were more frequently practicing khat chewing, cigarette smoking and use of cannabis than their controls.
4. Differences between mentally ill and their controls regarding the reproductive characteristics were not different.

5. The type foods eaten were similar for the two groups but both of them were not getting adequate daily frequencies on vegetables, fruits, legumes, and animal products. So they are at risk of getting nutritional problems

12. Recommendations:

1. To improve the nutritional status of mentally ill people, nutrition education to caretakers, continue treatment and follow up for illness, supplies for micronutrient deficiencies, and collaboratively working with other sectors is mandatory.
2. Factors contributing for malnutrition should be targeted as improving household income, providing educational opportunities, acidity associations, food supplies to those who are very poor etc.

3. The project has to include education on the effects of substance abuses (khat chewing, cigarette smoking, using drugs alcohol drinking) in it is regular activities.
4. Regular nutritional assessment has to be part and parcel of the course and out come study in schizophrenia and bipolar by the projects.
5. . More objective methods like Urinary Iodine Excretion (UIE) and serum retinol should be used in the future to get more reliable information on the micronutrient deficiencies.
6. Other studies are recommended to establish relationships between mental illness and malnutrition.

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Annex I: The conversion of actual intake from food frequency questionnaires

Type	Total	Cal	Protein	Fat	Iron
1	245	153	3.60	1.0	1.8
2	260	155.9	3.4	0.7	14.7
3	245	136.1	2.3	0.5	1.7
4	150	223.4	4.1	2.2	2
5	150	222	6.8	0.8	2.7
6	250	219.4	1	0.2	2.4
7	55	136	1.3	2	3.4
8	45	355.8	8.9	2.2	4.3
9	45	387.2	8.1	4.4	2.4
10	45	362.3	10.3	1.9	7.5
11		**	**	**	**
12	50	157.8	7.5	0.6	1.9
13	50	211.3	7.1	0.90	4
14	210	162	5.3	7.2	2.4
15	170	**	**	**	**
16	210	151.2	3.7	8	3.6
17	210	**	**	**	**
18		**	**	**	**
19	270	283	16.4	18.1	3.5
20	210	237	35.6	9.5	4.4
21	210	283	35.6	9.5	4.4
22	210	283	35.6	9.5	4.4
23	210	67	25	7.8	6.7
24	25	152.9	11.6	10.9	4.3
25		**	**	**	**
26	350	73.7	3.4	5.3	1.0
27	5	132.4	15.2	6.4	2.3
28		**	**	**	**
29	25	48.5	0.4	0.9	0.5
30	35	33.9	0.7	1.1	0.8
31	40	34.9	0.7	0.1	0.5

32	50	27.8	0.4	0.2	0.5
33	210	42.6	1.2	0.2	1.8
34	210	40.1	2.5	0.5	2.2
35	125	30.7	1.3	0.7	0.9
36	5	38.6	3.1	1.4	1.0
37	5	896.4	0.00	99.6	0.00
38	10	131.3	2.2	3.3	3.3
39	110	360.5	0.4	-	-
40	300	95.3	0.5	0.5	0.08
41	350	7.9	0.3	0.3	0.5
42	250	**	**	**	**
43	40	**	**	**	**

Annex II

Questionnaires

Q 001. Would you agree to participate in the study?

1. Yes ()

2. No

Q 002. Serial No.-----

Q 003. Household No.-----

Q 004. Place of study area ()

1. Peasant Association (PA)-----

2. If urban, Kebele-----

3. House number-----

005. Time table for visits by interviews

	Visit 1	Visit 2
Date		
Result		

Results 1. Complete 2. Subject not found 3. Died 4. Changed his/her residence

5. Refused 6. Other specify----- ()

		2. Never married 3. Widowed 4. Divorced 5. Separated 6. other -----	
Q 108	Educational status	1.Unable to write/read 2. Able to write/read 3.If attended formal education grade completed-----	
Q 109	Religion	1. Muslim 2. Orthodox 3. Catholic 4. Protestant 5. Other. (Specify)-----	
Q 110	Occupation	1. I have no occupation 2. Farmer 3. Housewife 4. Government employee 5. Self-employee 6. Student 7. Daily laborer 8. Merchant 9.Other (specify)-----	

PART II ECONOMIC, HEALTH STATUS AND LIFE STYLE VARIABLES

Q201	What is the main source of income to the family?	1. Farming or livestock 2. Trade and private enterprise 3. Government employee 4. Daily laborer 5. Other (specify)-----																
Q 202	Household average income /month in Birr -----Birr/month	1.Less than 50 Birr 2.50-149 Birr 3.150-299 Birr 4.300-499 Birr 5.Greater than 500 Birr 6.No response (unknown)																
Q 203	Who is the source of income?	1. Mentally ill female 2. Mentally ill male 3. Non mentally ill female 4. Non mentally ill male 5. Other specify-----																
Q 204	Does the household Own? "cash crop= khat, coffee, etc"	<table border="1"> <thead> <tr> <th></th> <th colspan="2">Number/ hectors</th> </tr> </thead> <tbody> <tr> <td>1. Crop land</td> <td>Y</td> <td>N</td> </tr> <tr> <td>2. Cattle</td> <td>Y</td> <td>N</td> </tr> <tr> <td>3. Goat/sheep</td> <td>Y</td> <td>N</td> </tr> <tr> <td>4. Horse/mule</td> <td>Y</td> <td>N</td> </tr> </tbody> </table>		Number/ hectors		1. Crop land	Y	N	2. Cattle	Y	N	3. Goat/sheep	Y	N	4. Horse/mule	Y	N	
	Number/ hectors																	
1. Crop land	Y	N																
2. Cattle	Y	N																
3. Goat/sheep	Y	N																
4. Horse/mule	Y	N																

		5. Cash crop	Y	N			
		6. Radio	Y	N			
		7. Other specify					
Q 205	When you compare your living standard with your neighbor what is your status? (Perceived economy)	1.Very poor 2.Poor 3.Average 4.Well-to-do 5.Rich 6.No response					_____
Q206	According to the data collector, what is the living standard of the family?	1.Very poor 2.Poor 3.Average 4.Well-to-do 5.Rich 6.No response					_____
207	Usually with who do you eat food?	1.alone 2. With family members 3. No response					_____
208	In which order are you served foods?	1.Before the family fed 2. After the family fed 3. With the family but alone 4. No response.					_____
Q 209	What is the main source of drinking water for your family?	1. Private pipe 2.Public pipe 3.River 4. Protected spring/well 5. Unprotected spring/well 6.Other specify-----					_____
Q 210	What kinds of toilet facilities do most members of your household use?	1.No facility/bush/field 2.Traditional pit latrine 3. Ventilated improved pit 4.Other (specify)-----					_____
Q 211	How many quintals did you produce last year per crop? (Mention only three crops that you most commonly produce) NB. "Kotcho" per hole Sugar cane per number	Crop	Yield Q/yr	If sold, income in Birr		_____	
		1. Corn					
		2. Teff					
		3. Sorghum					
		4. Wheat					
		5. Barely					
		6. Coffee					
		7. Pepper					
		8. Katch					
		9. "Bulla"					

		10. "Kotcho"			
		11. Beans			
		12. Peas			
		13. Sugar cane			
		14. Others			
Q 212	What is your staple food?	1.Cereals 2.Legumes 3.Tubers and stems 4.Cereals, tubers and stems 5.Animal products 6.other specify-----			_____
Q 213	How much time do you spent on your job per day?	1.None 2.Less than 2 hours 3. 2-4 hours 4. 5-10 hours 5. More than 10 hours 6. No response (unknown)			_____
Q214	Do you smoke cigarette?	1. Never smoked (No) => 216 2. Yes 3. I stopped			_____
Q215	If "Yes" how many cigarettes per day?	1. Less than 5 2. 5-10 3. 11-15 4. 15 and more			_____
Q216	Do you smoke "Gaya"?	1. Never smoked (No) => 218 2. Yes 3. I stopped			_____
Q217	If "yes" how many time per day?	1. 3 and less 2. 4-7 times 3. 8-10 times 4. More 10 times per day			_____
Q218	Do you chew chat?	1. Never chewed chat (No) => 220			_____

		2. Yes 3. I stopped	
Q219	If “Yes” how many days per week?	1. Every day 2. One day per week 3. 2-3 days per week 4. 4-6 days per week 5. Once per month	_____
Q220	Do you take drugs like Mariwana, cocaine, Hashish, etc?	1. Never taken (No) => 222 2. Yes 3. I stopped	_____
Q221	If yes how frequently?	1. Daily 2. Every other day 3. 3-4 per week 4. Once per week 5. Once per month	_____
Q222	Do you drink alcohol (Like Tella, Ariakie, Teji, Beers etc.)?	1. Never drank (No) => 224 2. Yes 3. I stopped	_____
Q223	If “Yes” how many days in a week?	1. Every day 2. One day per week 3. Two days per week 4. Three days per week 5. Four and more days per week 6. One day per month 7. Only on Holy days	_____
Q224	Do you drink coffee?	1. Never drank coffee (No) => 226 2. Yes 3. I stopped	_____
Q225	If “Yes” how many cups per day?	1. 2 or less cups 2. 3-6 cups 3. 7-9 cups 4. 10 or more cups	_____
Q226	Do you drink tea?	1. Never drink tea (No) => 301 2. Yes 3. I stopped	_____

Q227	If “Yes” how many glasses do you take per day?	1. One glass 2. 2-4 glasses 3. 5-8 glasses 4. 9 or more glasses	_____
Part III. Reproductive issues, filled for only females			
Q301	If your are married, what was your first age for marriage?	-----	_____
Q302	Age for fist sexual intercourse?	-----	_____
Q303	How many times you were pregnant? (Gravida)	-----	_____
Q304	How man times you gave births? (Para)	-----	_____
Q305	What are the number of children born alive?	----- M----- F-----	_____
Q306	Numbers of abortions	1. None 2. One 3. Two or more	_____
Q307	Numbers of still births	1. None 2. One 3. Two or more	_____
Q308	Do you have history of difficulty lobar ?	1. No 2. Yes	_____
Q309	Have you ever take modern contraceptives?	1. Never (No) 2. Yes 3. Stopped	_____
Q310	What is the average age difference between the last two of your children?	----- yr(s)	_____
PART IV: ANTHROPOMETRIC MEASUREMENTS			
Q401	Weight	-----kgs	_____

Q4 02	Height	-----cm	
PART V: ASSESSMENT OF MICRONUTRIENT DEFICIENCIES			
Q 50 1	Vit A deficiency Do you have unusual problem to see than other people (night- blindness)?	1. Yes 2. No 3. Other specify-----	
Q 50 2	Iodine deficiency: "Goiter"	1. Yes, Its Grades 1. Grade I (palpable Goiter) 2. Grade II (Visible goiter) 3. Grade III (very large Goiter) 2. No 3 Other specify-----	_____
Q 50 3	Anemia:	1. Yes 2. No 3. Other specify-----	_____
Q5 04	Laboratory:	Hgb-----gm%	_____

Part VI: Usual intake per day

Instruction II: Write the type of foods the respondent was eating 24-hours for each day.

- Q 601. Breakfast-----

- Q 602. Lunch-----

- Q 603. Dinner-----

- Q604. Other (specify)-----

Part VII: Semi-quantitative Food frequency questionnaire (FFQ)

Instruction III: write the number of times each respondent was having on daily, weekly, monthly, yearly or never among the list of foods given below.

How frequently do you eat the following foods?

List of foods		D	W	M	Y	N
1.	Corn "injra" 1pc					
2.	Teff "injera" 1pc					
3.	Sorghum "injra" 1pc					
4.	Corn bread "kita" 1pc					
5.	Wheat bread 1Lf					

6.	“Kotcho” bread 1Lf					
7.	Sweet potato 1 pc					
8.	Barely kolo 1 hf					
9.	Corn 'kolo' 1hf					
10	Wheat 'Kolo' 1 hf					
11	Soya beans “nifro” 1 hf					
12	Peas “nifro” 1hf					
13	Wheat “nifro” 1hf					
14	Beans “wot’ 1 ldl					
15	Kale “wot” 1 ldl					
16	Lintel wat 1 ldl					
17	Peas “shiro” 1 ldl					
18	Other (specify)					
19	Beef “ raw” 1					
20	Beef boiled 1ldl					
21	Meat goat 1ldl					
22	“Sheep meat 1ldl					
23	Meat chicken 1ldl					
24	Egg whole 1					
25	Other (specify)					
26.	Cow’s milk 1 cp					
27	Cheese 1 Tsf					
28	Aguwat 1 cp					
29	Lemon (1)					
30	Orange (1)					
31	Papaya (1)					
32	Carrot (1)					
33	Pumpkin 1ldl					
34	Ethiopian kal 1ldl					
35	Tomato (1)					
36	Butter 1 tsp					
37	Oil 1 tsp					
38	Birds eye 1 tsp					
39	Honey “mar” 1 cp					
40	Sugarcane 1/2 stick					
41	“Tella” 1 gl					
42	Mead “Teji” 1 gl					
43	. “Arakie” 1 sgl					
44	other					

Key= D: Daily W: Weekly M: Monthly Y: Yearly, N: never or rarely

Ldl: ladle, **pc:** pieces, **lf:** loaf, **hf:** handful, **cp:** cup, **tsp:** teaspoonful, **gl:** glass, **sgl:** small glass

Part VIII. Ask again the following questions

Q801. Age ----- yrs ()

Q802. If you chew khat how many times per week? ()

- 1. Every day
- 2. One day per week
- 3. 2-3 days
- 4. 4-6 time per week
- 5. Every month
- 7. Stopped
- 8. Other -----

Q803. If you drink alcohol how many time per week? ()

- 1. Every day
- 2. One day per week
- 3. Two days per week
- 4. Three days per week
- 5. Four and more days per week
- 6. One day per month
- 7. Only on Holy days

Q804. How much time do you spent on your job per day? ()

- 1. None
- 2. Less than 2 hours
- 3. 2-4 hours
- 4. 5-10 hours
- 5. More than 10 hours
- 6. No response (unknown)

Q805. Usually with who do you eat food? ()

- 1. alone
- 2. With family members
- 3. No response

Q806. How man times you gave births? (Para) ----- ()

Q807. Have you ever take modern contraceptives? ()

- 1. Never (No)
- 2. Yes
- 3. Stopped

Q 013. Name of Interviewer and signature -----

Q 014. Date of interview: -----

Q 015. Checked by

Name and siginture ----- Date-----month ----- Year-----

Thank you.

Annex III

የጥንድ ቁ-----

001. ስለዚህ በጥናቱ ለመሳተፍ ይስማማሉ?
 1 አወ ()
 2. አልስማማም

002. ኮድ ቁ -----

003 የቤተሰብ ቁ -----

004. ጥናቱ የሚካሄድበት ቦታ 1.ገበሬ ማህበር-----
 2. ከተማ ከሆነ ቀበሌው----- ()
 3. የቤት ቁ-----

005. የመረጃ ሰብሳቢዎች ፕሮግራም

	ጉብኝት 1	ጉብኝት 2
ቀን		
ውጤት		

ውጤት 1 የተመላ 2 ያልተገኘ 3 የሞተ 4. መኖሪያ የቀየረ 5 ፈቃደኛ ያልሆኑ 6 ሌላ ካለ ይገለጽ -----

()

006. በቀበሌው ለምን ያህል ጊዜ ኖረዋል?

1 ከ6 ወር በታች ()

2 ከ6 ወር በላይ

007 የአእምሮ ሕመምተኛ ከሆኑ የትኛው የአእምሮ መዛባት ችግር ነው ያለባቸው?

(የአእምሮ ሕመምተኛ ካልሆኑ => (101)

1.እስኪፈረሰው 2. ባይ ፖላር ዲስኦርደር ()

008. ይህ ሕመም ሲጀምረዎት ስንት አመተዎ ነበር? ----- ()

008. ላለበዎት የአእምሮ ሕመም መድሀኒት ይወስዳሉ? 1. አወ 2. አልወስድም ()

009. መድሀኒት የሚወስዱ ከሆነ የትኛውን አይነት ?

1. ኒሮሌፕቲክ 2. አንቲ-ዲፕረሳንት ()

010. ህክምናውን ከጀመሩ ስንት ጊዜ ሆነውት? -----

011. መድሀኒት የማይወስዱ ከሆነ ለምን ?

1. በህኪም ትዛዝ
2. በራሴ ፈቃድ
3. የምግብ ፍላጎቴ ስለቀነሰ
4. ሌላ ይገለጽ -----

()

ክፍል አንድ- ማሕበራዊና ሥነ ሕዝብ			
	መጠይቅ	አማራጭ መልሶች	ኮድ
101	እድሜዎ ስንት ነው?	----- አመት	
102	በቤተሰቡ ውስጥ ያለዎት ሀላፊነት ምንድን ነው?	1. ባል 2. ሚስት ----- 3 ልጅ 4. ሌላ ይገለጽ----	
103	ጾታዎ	1 ወንድ 2 ሴት	
104	የቤተሰብዎ ብዛት በፅድሜ	1.ከ5 አመት በታች----- 2. 5-14 አመት----- 3. 15-49 አመት----- ---% 4. 50 በላይ---- 5.ጠቅላላ ብዛት-- 6. ጥገኛ-----	
105	ምኖሪያዎ የት ነው?	1.ገጠር 2 ከተማ	
106	የየትኛው ቢሔረሰብ አባል ነዎት?	1.ወለኔ 2. ሚስካ 3. ሶዶ 4. ማራቆ ሌላ(ይገለጽ)----- 5. ስልጤ 6. አማራ 7. አሮሞ 8.	
107	የጋብቻ ሁኔታ ምን ይመስላል?	1.ባለትዳር የተፋቱ 2. ያላገቡ የተለያዩ 3.የሞተባቸው ----- 4. 5. 6. ሌላ----	
108	የትምህርት ሁኔታ ምን ይመስላል?	1.ማንበብና መጻፍ የማይችል 2.ማንበብና መጻፍ የሚችል 3. ከተማሪ ያጠናቀቀው ክፍል----- --	
109	የየትኛው ሀይማኖት ተከታይ ነዎት?	1.እስልምና 4.ፕሮቴስታንት 2.ኦርቶዶክስ ----- 3.ካቶሊክ 5.ሌላ(ይገለጽ)--	
110	ስራዎ ምንድን ነው?	1.ሥራ የለኝም 2.ግብርና 3. የቤት እመቤት ተቀጣሪ 4. የመንግሥት ሠራተኛ 6. ተማሪ 7. የቀን 8. ነጋዴ	

		5. በግል ሥራ የምተዳደር 9. ሌላ ካለ--			
ክፍል ሁለት- የኤኮኖሚ የጤናና የኗኗር ሁኔታዎች					
201	የቤተሰብዎ ዋነኛው የገቢ ምንጭ ምንድን ነው ?	1. ምንም የለም 2. ግብርና 3. የንግድ 4. የመንግሥት ሥራ 4. የቀን ሠራ 5. ሌላ(ይገለፅ)-----			
202	የቤተሰብዎ አማካይ ገቢ በወር ስንት ነው?	----- ብር/ወር			
203	የቤተሰብዎ ዋነኛው የገቢ ምንጭ ማን ነው?	1. የአእምሮ መታወክ ችግር ያለባት ሴት 2. የአእምሮ መታወክ ያለበት ወንድ 3. የአእምሮ መታወክ የሌለባት ሴት 4. የአእምሮ መታወክ የሌለበት ወንድ 5. ሌላ ከሆነ ይገለጽ-----			
204	የቤተሰብ የራሱ ንብረት የሆኑ ምን ምን አሉት? በቁጥር ይገለጽ? "የሽያጭ ተክሎች ማለት በ-ና፣ጫት፣ወዘተ" " የጋማ ከብቶች ማለት በቅሎ፣ አህያ፣ፈረስ፣ መጋጃ ናቸው"		አለ	የለም	በቁጥር
		1. የእርሻ መሬት			
		2. ከብቶች			
		3. በግ/ፍየል			
		4. የጋማ ከብቶች			
		5. የሽያጭ ተክሎች			
		6. ሬዴዮ			
7. ሌላ ካለ ይገለጽ					
205	ከጎረቤተዎ ጋር ሲያነጻጽሩ የርሰዎን የኑሮ ደረጃ ከየትኛው ይመድቡታል?	1. በጣም ድሃ 2. ድሃ 3. መካከለኛ 4. ደህና 5. ሐብታም 6. መልስ አልሰጡም			
206	በመረጃ ስብሰባው እይታ የቤተሰብ የኑሮ ደረጃ በየትኛው ይመደባል?	1. በጣም ድሃ 2. ድሃ 3. መካከለኛ 4. ደህና 5. ሐብታም 6. መልስ አልሰጡም			
207	አብዛኛውን ጊዜ ምግብ የሚመገቡት ከማን ጋር ነው?	1. ብቻዎን 2. ከቤተሰብ ጋር 3. መልስ አልሰጡም			
208	ምግብ የሚመገቡት በየትኛው ቅደም ተከተል ነው?	1. ከቤተሰብ በፊት 2. ከቤተሰብ በኋላ 3. በቤተሰብ ጋር ግን ብቻውን 4. መልስ አልሰጡም			
209	ቤተሰብ የመጠጥ ዉሀ የሚገኘው ከየት ነው?	1. የግል ቧንቧ 2. ከህዝብ ቧንቧ(ቦኖ) 3. ከወንዝ 4. ንጽህናው ከተጠበቀ ምንጭ/ጉድጓድ 5. ንጽህናው ካልተጠበቀ ምንጭ/ጉድጓድ 6. ሌላ ካለ ይገለጽ -----			
210	አብዛኛው ቤተሰብ የሚጠቀመው መጻዳጃ አይነት ምንድን ነው?	1. ሜዳ/ጫካ 2. ሽታ ያለው ሽንት ቤት 3. ሽታ የሌለው ሽንት ቤት			

		4. ሌላ ካለ ይገለጽ-----		
211	ባለፈው የምርት ዘመን ምን ያህል ምርት በኩንታል፣ ወይም በሌላ መለኪያ አምርተው ነበር? ሸጠው ያገኙትን በብር ስንት ነበር? " በብዛት ያመረቷቸውን የሶስቱን ብቻ ይገለጹ"	የሰብሉ አይነት	መጠን	ክሸጡ ገቢ/ብር
		1.በቆሎ		
		2.ጤፍ		
		3.ማሸላ		
		4.ስንዴ		
		5.ገብስ		
		6.ቡና		
		7.በርበሬ		
		8.ጫት(በጋንፋር)		
		9.ቡላ(በእስር)		
		10. ቆጮ(በጉድጓድ)		
		11.አተር		
		12.ባቄላ		
		13 ሸንኮራ አገዳ		
		14. ሌላ ካለ		
212	አዘውተረው የሚመገባቸው ምግቦች ምን ምን ናቸው?	1.የብፅርና ያገዳ(በቆሎ ጤፍ ወዘተ) 2. ጥራጥሬ(አተር ባቄላ ወዘተ) 3. ሥራሥር(ድንች ቆጮ ጎደሬ ወዘተ) 4. የብፅር ያገዳ እህሎችና ሥራሥሮች 5. የእሰሳት ውጤቶች(ወተት ስጋ ወዘተ) 6. ሌላ ካለ ይገለጽ-----		
213	በቀን ምን ያህል ስአት ይሰራሉ?	1.ምንም አልሰራም 2.ከ2 ስአት በታች 5.ከ10 ስአት በላይ 3.ከ2-4 ስአት 6.መልስ አልሰጠም 4.ከ5-10 ስአት		
214	ሲጋራ ያጨሳሉ?	1. አጭሼ አላውቅም(አላጨስም) => 216 2. አዎ 3. አቁሚለሁ		
215	ሲጋራ የሚያጨሱ ከሆነ በቀን ምን ያህል ሲጋራ?	1. ከ5 በታች	3. 11-15	
		2. 5-10	4. 15 በላይ	
216	ጋያ ያጨሳሉ?	1. አጭሼ አላውቅም(አላጨስም)=>218 2. አዎ 3. አቁሚለሁ		
217	ጋያ የሚጨሱ ከሆነ በቀን ምን ያህል ጊዜ?	1. ከ 3 ጊዜ በታች	3. 8-10	
		2. 4-7	4. ከ 10 በላይ	
218	ጫት ይቅማሉ?	1. ቅሚ አላውቅም(አልቅምም) => 220 2. አዎ 3. አቁሚለሁ		
219	ጫት የሚቅሙ ከሆነ በሳምንት ስንት ጊዜ?	1. በየቀኑ	4. በሳምንት 4-6	
		2.በሳምንት 1 ቀን	5. በወር 1 ቀን	

		3. በሳምንት 2-3	
220	እጽ(መድሀኒቶች) ማለትም ማሪዋና፣ ኮኬን፣ ሆሽሽ ...ወዘተ ይወስዳሉ?	1. ወስጂ አሳቅም(አልወስድም)=> 222 2. አዎ 3. አቁሜለሁ	
221	እጽ የሚወስዱ ከሆነ በየስንት ጊዜው?	1.በየቀኑ 2.በየሳልስቱ 4.በሳምንት1 ጊዜ 3. በሳምንት 3-4 5. በወር አንድ ጊዜ	
222	መጠጥ ይጠጣሉ? ለምሳሌ ጠላ፣ ጠጅ፣ አረቄ፣ ቢራ...ወዘተ	1. ጠጥቼ አሳውቅም(አልጠጣም)=> 224 2. አዎ 3. አቁሜለሁ	
223	መጠጥ የሚጠጡ ከሆነ በሳምንት ምን ያህል ጊዜ ይጠጣሉ?	1. በየቀኑ 2. በሳምንት 1 ቀን 3. በሳምንት 2 ቀን 4. በሳምንት 3 ቀን 5. በሳምንት 4 እና በላይ 6. በወር 1 ቀን 7. በባዕል ቀናት ብቻ	
224	ቡና ይጠጣሉ?	1. ጠጥቼ አሳውቅም(አልጠጣም) =>226 2. አዎ 3. አቁሜለሁ	
225	ቡና የሚጠጡ ከሆነ በቀን ምን ያህል ሲኒ?	1.2 እና ከዚያ በታች 3. 7-9 2. 3-6 4. 10እና በላይ	
226	ሻይ ይጠጣሉ?	1. ጠጥቼ አሳውቅም(አልጠጣም)=> 301 2. አዎ 3. አቁሜለሁ	
227	ሻይ የሚጠጡ ከሆነ በቀን ምን ያህል ብርጭቆ?	1.በቀን 1 3. 5-8 2. 2-4 4. 9 እና በላይ	
ክፍል ሦስት- ስነተዋልዶ በተመለከተ ለሴቶች ብቻ የሚሞላ			
301	በስንት አመተዎ ነው ያገቡት?	-----	
302	በስንት አመተዎ ነው የግብረሥጋ ግኑኝነት የጀመሩት?	-----	
303	ምን ያህል ጊዜ አርግዘዋል ?	-----	
304	ምን ያህል ልጆች ወልደዋል ?	-----	
305	በህይወት የተገላገሏቸው ልጆች ብዛት	-----	
306	በውርጃ መልክ ያለጊዜቸው የተጨነገፉ እርግዝና አጋጥሞት ያውቃል ?	1. የለም 2. አንድ 3.ሁለትና ከዚያ በላይ	
307	ህይወት የሌለው ልጅ ወልደው ያውቃሉን ?	1. የለም 2. አንድ 3.ሁለትና ከዚያ በላይ	

308	በሚወልዱ ጊዜ ምጥ ይጠናበዎታልን ?	1. አዎ 2. የለም	
309	ዘመናዊ የወሊድ መቆጣጠሪያ ወስደው ያውቃሉን ?	1.ወስጄ አላውቅም (አልወስድም) 2. አዎ 3. አቁሚለሁ	
310	በመጨረሻዎቹ ሁለት ልጆቻቸው መካከል የነበረው የጊዜ ልዩነት ባማካይ ስንት ነው?	----- አመት	
ክፍል አራት- የአካል መጠንን (ግዝቦትን) መለካት			
401	ክብደት	----- ኬሎ ግራም	
402	ቁመት	----- በሰንቲ ሜትር	
ክፍል አምስት- የማይከሮኑውትረንት እጥረቶችን ስለማየት			
501	ማታ ማታ ከሌሎች ሰዎች በተለየ የማየት ችግር (ዳፍንት) አለበዎት?	1. አለብኝ 3. ሌላ ካለ ይገለጹ -- --- 2. የለብኝም	
502	የአይወዴን አጥረት (እንቅርት)	1.አለ (ካለ ደረጃው) 1. ሲዳሰስ የሚታወቅ እንቅት 2. የሚታይ እንቅት 3. በጣም ትልቅ እንቅት 2. የለም 3. ሌላ ካለ -----	
503	የደም ማነስ ችግር	1. አለ 3. ሌላ ካለ ይገለጹ ---- --- 2. የለም	---
504	ሂሞግሎቢንን መለካት	----- ገራም%	---

ክፍል ስድስት- አዘውትረው በአንድ ቀን ውስጥ የሚመገቡቸው ምግቦች ምን ምን ናቸው?

601. ቁርስ-----

602.ምሳ-----

603.እራት-----

604.ሌላ ካለ ይገለጹ-----

ክፍል ሰባት- ምግቦችን በየስንት ጊዜው እንደሚመገቡ የሚሞላ መጠይቅ

የሚከተሉትን ምግቦች በየስንት ጊዜው እንደሚያገኙቸው ይገለጹ

28	አጉዋት (1ኩባያ)									
29	ሎሚ (1 በቁጥር)									
30	ብርተካን (1 በቁጥር)									
31	ያ (1 በቁጥር)									
32	ካሮት (1 በቁጥር)									
33	ዱባ (1 ጭልፋ)									
34	ያበሻ ጎመን ወጥ (1 ጭልፋ)									
35	ቲማቲም 1(በቁጥር)									
36	ቂቤ (1ማንኪያ)									
37	ዘይት(1ማንኪያ)									
38	ሚጥምጣ (1ማንኪያ)									
39	ማር (1ሲኒ)									
40	ሸንኮርአገዳ (1በቁጥር)									
41	ጠላ(1ብርጭቆ)									
42	ጠጅ(1ብርሌ)									
43	አረቂ(1መለኬያ)									
44	ሌላ ካለ									

ማሳሰቢያ ቀ-በቀን ሳ-በሳምንት ወ-በወር አ-አመት ም- ምንም ጊዜ የማየገኝ ማለት ናቸው

012. የመረጃ ሰብሳቢው ስምና ፊርም -----

013. መጠይቁ የተሞላበት ቀን ----- ወር----- አ.ም-----

014. መረጃውን ትክክለኛነት ያረጋገጠው ተቆጣጣሪ ስምና ፊርማ -----ቀን-----ወር----- አ.ም-----

አመሰግናለሁ

Declaration

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

Name Misganaw Lijalem

Signature -----

Place: Addis Ababa

Date of submission -----

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

Dr. Fikru Tesfaye

Advisor

