



Chronic Energy Deficiency and its Predictors Among Older Adults in Addis Ababa, Ethiopia: a Cross-Sectional Study.

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ADDIS ABABA UNIVERSITY
COLLEGE OF HEALTH SCIENCES
SCHOOL OF PUBLIC HEALTH

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This thesis by Obsa Abebe Bekele is accepted in its present form by the board of examiners as fulfilling for the degree of Masters of Public Health with a Specialty in Public Health Nutrition.

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List of Abbreviations and Acronyms

AOR	Adjusted Odds Ratio
BMI	Body Mass Index
BMR	Basal Metabolic Rate
CED	Chronic Energy Deficiency
COPD	Chronic Obstructive Pulmonary Disease
COR	Crude Odds Ratio
CSA	Central Statistical Agency
DDS	Dietary Diversity Score
FANTA	Food and Nutrition Technical Assistance
FAO	Food and Agricultural Organization
GDS	Geriatric Depression Scale
GPAQ	Global Physical Activity Questionnaire
HFIAS	Household Food Insecurity Assessment Scale
IDECG	International Dietary Energy Consultative Group
IRB	Institution Review Board
METs	Metabolic Equivalent Tasks
MNA	Mini Nutritional Assessment
MUAC	Mid-upper Arm Circumference
PAL	Physical Activity Level
PCA	Principal Component Analysis
PEM	Protein Energy Deficiency
SDGs	Sustainable Development Goals
SGA	Subjective Global Assessment
SPSS	Statistical Package for Social Science
TEE	Total Energy Expenditure
UNU	United Nations University

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Abstract

Background: The likelihood of malnutrition grows as individuals age and as their need for care becomes more intensive. Approximately 40% of fatalities in developing nations are associated with chronic energy deficiency. However, studies on chronic energy deficiency (CED) which is one form of nutritional deficiency and an important public health problem are quite limited in Ethiopia, which makes it difficult to identify their nutritional need. **Objectives:** This study aimed to assess chronic energy deficiency and its predictors among the population of older adults (defined as 50 years and above) in Addis Ababa, Ethiopia.

Methods: A Community based cross-sectional study was conducted among older adults 50 years and above from February 12-22, 2025. Data from 635 individuals were collected through interviewer-administered questionnaires using the open-source mobile based Kobo toolbox. Data were downloaded, merged and cleaned on Excel 2019 and then exported to SPSS V27. A bi-variable and multivariable logistic regression model was used to determine associations between the outcome variable and its predictors.

Result: A total of 635 older adults were interviewed with mean age of the participants was 64.7 (50 to 91 years) years with higher percentage of males (58.4%) represented. The study revealed that prevalence of chronic energy deficiency (CED) in older adult population was 10.1% (CI:7.9%-12.6%). Respondents in the age between 50 and 65 [AOR=3.9, 95% CI:(1.6,9.3)], those having infrequent meal [AOR=3.9, 95% CI: (1.7,8.8)], irregular meal pattern [AOR=2.4, 95% CI:(1.3,4.6)], insomnia [AOR=3.1, 95% CI:(1.5,6.6)], Inadequate or poor dietary diversity [AOR=2.8, 95% CI:(1.5,5.3)] and household with food insecurity [AOR=6.2, 95% CI (3.2,12.2)] were significantly more likely to have CED compared to their counterparts. Additionally, the study revealed that 1.4% of population were mis-classified on their CED status whenever physical activity level of the population was not considered for classification of chronic energy deficiency

Conclusion: The prevalence of chronic energy deficiency was substantial in the study area. It was significantly associated with age between 50 and 65, poor dietary diversity score, infrequent meal and irregular meal pattern, insomnia and household food insecurity at 95% CL and P value<0.05. Therefore, efforts to combat CED should focus on supporting the most vulnerable groups identified in this study. Raising awareness within communities on meal frequency and meal pattern is also crucial.

Keywords: Chronic Energy Deficiency, Body mass Index, Physical Activity Level

1. Introduction

1.1. Background

The rate of population aging is accelerating more rapidly than in previous decades and by 2050 it is projected that 80% of older individuals will reside in low- and middle-income countries. In 2020, there were more individuals aged 60 and above than there were children under the age of five and by 2030, it is estimated that one in six people globally will be aged 60 years or older. Furthermore, from 2015 to 2050, the share of the global population over the age of 60 is expected to nearly double, increasing from 12% to 22%.[\(1\)](#)

The older population faces increased risks nutritional issues, including both under nutrition and over nutrition due to aging and chronic diseases associated with aging and also largest demographic group that faces a heightened risk of poor diet and malnutrition.[\(2–4\)](#) and also the likelihood of malnutrition grows as individuals age and as their need for care becomes more intensive.[\(5\)](#) Because aging involves physiological changes that impact body composition, energy expenditure, and physical activity levels, which can in turn affect nutritional status.[\(6\)](#)

In other statements aging is a complex biological process that affects various physiological functions, including appetite regulation and nutrient absorption. As individuals age, several factors contribute to a reduction in food intake, which can lead to inadequate energy and nutrient consumption.[\(7\)](#) So, studies recommended addressing the dietary and nutritional needs of older adults is essential for preserving their health, functional independence, and overall quality of life.[\(2\)](#)

The report from the Joint FAO, WHO, and UNU defined chronic energy deficiency (CED) in adults does not indicate a continuous or prolonged reduction in body weight and energy like acute energy deficiency. Instead, CED is characterized as a “steady state” where an individual maintains an equilibrium between energy intake and expenditure. In this scenario, even though individuals may have low body weight and reduced energy reserves, their caloric intake aligns with their caloric expenditure. As a result, those experiencing CED may not achieve normal body size or might have experienced one or more episodes of energy deficiency. They tend to maintain lower body weights along with potentially limited physical activity levels, which enables their decreased basal metabolic rate (BMR) and lower activity levels to correspond with their reduced caloric consumption.[\(8\)](#) Energy deficiency which is

chronic (CED), is also defined as one form of nutritional problem occurs when the body receives less energy than it needs over an extended period of time.(9)

In contrast to protein energy deficiency, which hinders tissue repair, enzyme synthesis, immune system performance, and various other physiological functions, insufficient energy consumption disrupts overall energy balance. This balance is crucial for maintaining essential metabolic activities, engaging in physical exercise, and supporting cellular functions.(10) This condition, characterized by a stable underweight status, occurs when an individual maintains energy balance despite a reduction in body weight or energy reserves. Such a stable underweight condition may be linked to various health issues or other physiological and functional challenges.(11) This condition is especially pronounced among those over the age of 50.(12)

It is difficult, and likely impossible, to create a one-size-fits-all diet for individuals aged 50 to 80, as the nutritional requirements of a physically active 50-year-old differ significantly from those of a more fragile 80-year-old. However, consuming high-quality proteins, calcium, vitamin D, antioxidant-rich foods, adequate water, and nutrient-dense meals with appropriate energy intake remains essential.(13)

1.2. Statement of Problem

Faulty nutrition is connected to various negative outcomes, including weakened immune function, reduced muscle strength, impaired cognitive abilities, anemia, lower bone density, delayed surgical recovery, poor wound healing, higher chances of hospital readmission, declining physical capacity, and an increased risk of mortality. [\(14,15\)](#) Approximately 40% of fatalities in developing nations are associated with chronic energy deficiency.[\(16\)](#) A prospective cohort study conducted to assess the effect of malnutrition on the length of stay (LOS) in hospitals, utilizing the subjective global assessment (SGA) as a tool for evaluating nutritional status indicated that the rate of malnutrition and the length of hospital stay are higher among patients older than 60 years compared to those aged 18-60 years, as well as compared to well-nourished individuals.[\(17\)](#)

Nutritional status is a key factor in the development of frailty, which is a clinical syndrome marked by reduced physiological reserves and heightened susceptibility to stressors, potentially resulting in negative health consequences. This condition is especially common among older adults and affects multiple areas of functioning, including physical, psychological, and social dimensions.[\(18\)](#)

The most recent data from the 2022 WHO Global Health Observatory indicates that the prevalence of chronic energy deficiency, as measured by age-standardized estimates of adults with a low body mass index (BMI), varies significantly across different countries. This issue is particularly severe in developing nations; for instance, Ethiopia and Eritrea report notably high rates of 24.3% and 32.3%, respectively in the world. In contrast, developed countries like Tonga exhibit much lower rates, with underweight prevalence as minimal as 0.3%.[\(19\)](#)

A cohort study has shown that the risk of mortality is 2.5 times higher in individuals with severe chronic energy deficiency compared to those without this condition.[\(20\)](#) Patients who were malnourished experienced an average hospital stay that was 6.7 ± 22.8 days longer compared to those who were well-nourished. Furthermore, the hospital expenses for malnourished patients were as much as 308.9% greater.[\(21\)](#)

A proper diet is crucial in both the prevention and treatment of depression, particularly among the elderly, where depression rates are rising significantly. This population has unique challenges different from the general population and may result in increased feelings of isolation and hopelessness, making ideal nutrition strategy imperative. An ideal diet supports mental wellness by being capable of eradicating symptoms of depression as well as serving a

fundamental role in the overall improvement of well-being. In addition to its advantages for mental health, ideal nutrition will increase energy levels and improve the immune system. To the elderly, a healthy immune system is crucial because they are prone to infection and long-term illnesses. Also, a nutritious diet has been found to reduce the number and severity of exacerbations of chronic obstructive pulmonary disease (COPD), a phenomenon particularly prevalent among them.[\(22,23\)](#)

Poorly nourished population showed a twofold increase in the prevalence of osteoporosis, with 22% experiencing issues in the femoral neck and 31% reporting a fracture after the age of 50.[\(24\)](#) Starting at the age of 50 slight decrease in serum levels of both vitamin A and carotene in both men and women which leads them to blindness.[\(25\)](#) Poor nutrition significantly impacts the health outcomes of patients hospitalized for acute myocardial infarction by increasing the prevalence of comorbidities, as well as the rates of inpatient mortality, prolonged hospital stays, readmissions, and poor prognosis.[\(26\)](#)

Starting at age 50, the incidence of anemia which is particularly related to poor nutrition increases as individuals grow older, reaching over 20% in those who are 85 years or older and among the elderly population diagnosed with anemia, about one-third show indications of deficiencies in iron, folate, or vitamin B12. Numerous studies have found a correlation between anemia and lower survival rates in older adults, highlighting the serious implications of this condition on their overall health and longevity.[\(27\)](#)

Both the WHO via its “Double Duty Action for Malnutrition initiative”, and the United Nations, through the Sustainable Development Goals (SDGs), aim to reduce various forms of malnutrition across all age groups by 2030.[\(28,29\)](#)

The World Health Organization (WHO) classifies the percentage of Chronic Energy Deficiency (CED) in a population that makes it a public health problem as of 5–9% indicates low prevalence and serves as a warning sign of a potential public health problem; 10–19% reflects medium prevalence, denoting a poor situation; 20–39% signifies high prevalence, representing a serious situation; and 40% or more indicates very high prevalence, which is considered a critical public health issue.[\(30\)](#) This makes situation critical in many areas of South Asia, affecting over 50% of the population, and in sub-Saharan Africa, where the impact ranges from 6% to 48%.[\(31,32\)](#)

1.3. Significance of the Study

Ethiopia has been developing a series of policies, programs, and interventions to improve the nutrition and health of its people with the overall thematic focus of improving the well-being of mothers, adolescents, and children. Undernutrition's needs in the older group tend to be ignored, and undernutrition not only goes unremedied but comes also to be erroneously assumed as a natural process of aging. Such tracking of CED among the elderly is critical, raising severe public health concerns that require additional research and advocacy to increase awareness and involve policymakers.

CED among elderly people has been reported to lead to increased health complications, impaired quality of life, and excessive healthcare expenditures. There is scant research on the nutrition issues of this age group, and therefore making it difficult to ascertain what their nutritional needs are.

With the increasing number of elderly Ethiopians and increasing life expectancy, it is now more important than ever to take a look and react to some of the nutritional problems that can plague their health. It is vital to enhance research work in this area in an effort to assist in addressing the particular nutritional problems of individuals over the age of 50 years in order to enhance overall health outcomes and their way of life is lengthened. Addis Ababa Ethiopia has a population that is socioeconomically heterogeneous, and this heterogeneity presents different issues that put the population at risk of nutrition issues, undernutrition and overnutrition. Thus, measurement of CED is extremely critical in this region. As Ethiopia's and Addis Ababa population ages, understanding and addressing the specific health needs of older adults becomes increasingly important for shaping effective healthcare services.

1.4. Research Question

What is the prevalence of chronic energy deficiency within population above 50 years of age in Addis Ababa and its possible predictors?

1.5. Research Hypothesis

The prevalence of chronic energy deficiency (CED) in older adults above 50 years age in Addis Ababa Ethiopia is substantial.

2. Literature review

2.1. Prevalence of Chronic Energy Deficiency Among Older Adults

In India, where this issue is studied more extensively than in other regions globally, it is estimated that between 36% and 44.8% of older adults and the elderly are affected by chronic energy deficiency (CED), with the risk of developing CED increasing as individuals age. This condition is particularly prevalent among older women compared to men.[\(32–34\)](#) Additionally, a separate study focused on evaluating the nutritional status of adults aged 18 and above has found significant results regarding chronic energy deficiency, especially among those aged 51 years and older, with a reported prevalence rate of 51.3%.[\(35\)](#) The findings of survey conducted in England and aimed to assess the prevalence of chronic protein-energy under nutrition revealed that just about 3% of the subjects fell below BMI threshold.[\(36\)](#) This indicated that chronic energy deficiency is more problematic in developing countries than developed and serious nutritional challenges are faced by older adults and the elderly.

A comprehensive evaluation of nutritional and health conditions, which included subjective global assessment (SGA), anthropometric measurements, biochemical analysis, dietary intake evaluation, and considerations of social and health factors, conducted on 820 elderly individuals from four rural regions in Peninsular Malaysia indicated that 20.3% of the participants were identified as experiencing chronic energy deficiency.[\(37\)](#)

The recent European Seneca survey revealed that protein-energy malnutrition (PEM), often coupled with micronutrient deficiencies, remains a significant issue for elderly people in poor health. Severe PEM has been documented in 10–38% of older outpatients, 5–12% of homebound seniors, 26–65% of elderly hospital patients, and 5–85% of those in care institutions.[\(38\)](#)

The review study among adults and older from various tribes in West Bengal, found that the rates of Chronic Energy Deficiency (CED) ranged from 27.0% to 55.0% which could be indicated serious to critical public health problem of the area. The findings demonstrated that the males from these tribes were experiencing significant or critical levels of nutritional stress.[\(39\)](#) Study conducted on rural-dwelling older adults during a period of severe drought showed, the prevalence of CED among older males was 51.1%, while among older females, it was 48.5%. In comparison to individuals aged 60–69 years, the prevalence was higher in the 70 years and older age group.[\(32\)](#)

The rate of undernutrition among the elderly population in Ethiopia varies significantly, with estimates ranging between 15.7% and 27.6%. This indicates that a notable portion of older individuals in the country are experiencing nutritional deficiencies, which can have serious implications for their health and well-being.(40–47)

The cross-sectional study in Ethiopia, reveals a 17.6% prevalence of chronic energy deficiency and strongly associated with being female, older age, low dietary diversity, illness-related loss of appetite, household food insecurity, and low socioeconomic status.(41) Although data concerning individuals over the age of 50 is limited in demographic and health surveys the 2016 survey revealed that 26.8% of men aged 50-59 are chronically energy deficient. (48) According to a study conducted in the region of Fogera Zuriya, the frequency of malnourished adults over 65 is 26.8%.(49) According to a systematic review and meta-analysis study, the combined prevalence of undernutrition among Ethiopia's senior citizens is 20.6%, and it is linked to the country's aged population's low dietary diversification practices.(50)

A community-based cross-sectional study conducted in Addis Ababa assessed the nutritional status of older adults using the Mini Nutritional Assessment (MNA) tool indicates prevalence of malnutrition at 26.6% among older adults in Addis Ababa, with significant associations found between malnutrition and factors such as depression, occupation type (particularly low-income jobs), and advanced age.(40)

2.2. Predictors of Chronic Energy Deficiency Among Older Adults

Inadequate dietary intake can be regarded as the principal factor contributing to chronic energy deficiency(CED).(51) A systematic review encompassing thirty studies identified several potentially modifiable factors that contribute to malnutrition. These factors include hospitalization, dependence on others for eating, poor self-perceived health, diminished physical function, and a lack of appetite.(52)

Informal education emerged as a critical predictor for being at risk of malnutrition, and low-income individuals were found to be 3.7 times more susceptible to malnutrition issues. Additionally, a lower wealth index was significantly linked to an increased risk of malnutrition, particularly among older adults experiencing depression and chronic pain.(33,53,54)

A cross-sectional study revealed that both men and women involved in farming faced a higher risk of chronic energy deficiency (CED) compared to those in other forms of paid

employment. Furthermore, regardless of age, unemployed men exhibited a heightened risk compared to their employed counterparts. Additionally, men with lower family incomes were found to be at an increased risk of CED, independent of their employment status. Notably, 40% of individuals over the age of 55 were identified as chronically energy deficient.(55)

Other factors have been identified as potential predictors of this issue, including being female, advancing age, having a lower level of education, reporting more chronic diseases, and having been hospitalized in the past year. Additionally, poor nutrition is associated with several unhealthy lifestyle factors, such as smoking, alcohol use, and prolonged sitting. (56)

Excessive alcohol intake can disrupt normal nutritional processes, leading to overall malnutrition or deficiencies in essential micronutrients like zinc. This occurs because alcohol can hinder the absorption of these nutrients or cause their increased excretion from the body.(57) Smokers generally consume smaller amounts of various foods, especially fruits, vegetables, grains, and dairy products. As a result, their intake of vital vitamins, minerals, and photochemical is reduced, and they also engage in less physical activity compared to non-smokers.(58)

A cohort study indicates that depression, functional status, and smoking each has an independent association with a higher risk of malnutrition.(59) and also research demonstrated compelling evidence that family income had a notable correlation with BMI and the occurrence of CED.(60)

An observational study conducted in Indonesia shows low frequency of meals during fasting is associated with an increased risk of CED.(61) In addition to impacting physical health, mental health conditions like depression can also affect the nutritional well-being of older individuals.(62) The likelihood of malnutrition is found to be higher in individuals with a greater number of geriatric syndromes. Poor nutritional status is linked to depression, dementia, and the presence of multiple co-existing health conditions.(63) In other ways chronic illnesses, cognitive impairments, and hospital stays increase emotional distress and elevate levels of depression.(64) Depression has been linked to a decline in nutritional health among older individuals, and it is particularly common among those belonging to lower socioeconomic groups.(65)

As cited by Sonya B of 2006 depression and other health issues can lead to symptoms such as nausea, anorexia, and challenges with meal preparation. Chemosensory impairments and loss of dexterity, coordination, and mobility can also occur. Additionally, there may be an

increased metabolic rate, which can impact the ability of older individuals to maintain proper nutrition and may result in nutritional deficiencies.[\(4\)](#)

In general most studies highlighted modifiable determinants or factors associated with chronic energy deficiency as inadequate dietary intake, frequent hospitalization, dependence on others for eating, poor self-perceived health, diminished physical function, low literacy level, lower socioeconomic backgrounds, depression, chronic pain, alcohol and tobacco, fasting, poor dietary diversity, diseases, low physical activity and non-modifiable factors as sex and age.[\(51–54,56–65\)](#)

2.3. Causes and Potential Mechanisms of Chronic Energy Deficiency

Nutritional deficiency in older individuals can stem from a variety of causes and may be a result of physical and physiological limitations, such as a decrease in lean body mass, an increase in fat stores, and a reduced ability to store water at a cellular level. Changes in the gastrointestinal tract like oral disorders like poorly fitting dentures, gingivitis, and loss of teeth, and reduced gastrointestinal motility, atrophic gastritis, and a reduction in digestive juices volume can also contribute to this deficiency and the digestive organs begin to undergo atrophy, which results in a reduction in the secretion of saliva due to the shrinking of the salivary glands, resulting in a reduction in amyloid breakdown. These physiological changes have a profound effect on food consumption and frequently are responsible for poor nutritional status among elderly persons.[\(66\)](#)

Decreased sensory function is significant in food consumption among older adults, both quality and quantity. Taste and smell loss can modify the perception of food among the elderly. Anosmia, or a reduced sense of smell, is frequently observed in older individuals due to modifications in olfactory epithelial cells. Likewise, hypogeusia, which refers to a diminished sense of taste, is common among the elderly and may result from a decrease in the number and sensitivity of papillae or taste buds on the tongue.[\(67\)](#) Long-term health conditions and the natural process of getting older are commonly connected to a deterioration in nutritional well-being.[\(68\)](#)

A recent narrative review has indicated that various mechanisms, categorized as modified, age-related, and related to inflammaging, contribute to malnutrition in older adults through distinct physiological processes. Aging is associated with a gradual but persistent rise in inflammation levels. This chronic, non-infectious inflammation seen in older individuals is termed inflammaging. Inflammaging can trigger a cytokine storm and autoimmune reactions

during infections among elderly patients, which may elevate the risk of malnutrition. The inflammatory and immune processes commonly observed in older adults are significantly linked to an increased likelihood of experiencing malnutrition.[\(69\)](#)

2.4. Chronic Energy Deficiency Assessment among Older Adults

Body Mass Index (BMI)

The Body Mass Index (BMI) is a widely recognized anthropometric measurement utilized in numerous studies to assess chronic energy deficiency in adults and the elderly. It serves as a straightforward yet objective indicator of nutritional status within the adult demographic and appears to have a strong correlation with their dietary intake levels. It is responsive to socioeconomic factors and seasonal variations in food consumption, particularly concerning physical activity levels. (32–36,41,70) Chakraborty R and colleagues (2009) noted in their article that a BMI is commonly recognized as an effective indicator of chronic energy deficiency.[\(11\)](#)

Though WHO BMI cut-offs are widely used, there are some limitations when these cut-offs are used in older individuals. Firstly, there are alterations in body composition with age, i.e., in fat distribution. With progression of age, there is the rise and redistribution of the fat mass and loss of lean body mass, primarily due to sarcopenia. Therefore, a single set of BMI cut-offs may not be appropriate for all adults. Secondly, the accurate measurement of height is required to determine BMI but this among elderly individuals can be problematic since deformity of the spine or the failure to stand up straight as a result of joint disease results in underestimation. In well-resourced settings, more accurate body composition-measuring techniques such as Dual-energy X-ray absorptiometry (DEXA) are employed. Nonetheless, in resource-poor environments, BMI is still favored since it is the cheapest and least complicated measurements. [\(71\)](#)

Height Measurement among Older Adults

Assessing the erect height of older individuals who have skeletal deformities and struggle to stand upright is challenging. Consequently, relying on body mass index (BMI) to evaluate nutritional status in these cases is not appropriate. Instead, height can be estimated using linear body measurements such as arm span, knee height, forearm length, and demi-span (also known as half arm span), which have proven to be effective alternative indicators of stature.[\(72\)](#)

Physical Activity Level (PAL) Assessment

There are several tools available for assessing physical activity, which can be categorized into different types based on their measurement methods. Report-based measures which include diaries, self-reports, and interviewer-administered surveys. While these methods are considered subjective and cost-effective, they tend to lack the validity and reliability of other measurement types. They typically rely on individuals recalling their physical activity over 1 to 3 days. The next is monitor-based measures, the category includes devices such as pedometers, heart rate monitors, and accelerometers. These tools offer moderate feasibility and validity in measuring physical activity levels. The other is criterion measures which encompass direct observation, indirect calorimetry, and doubly labeled water techniques. Although these measures provide high levels of validity, they are often costly and less feasible for widespread use. while report-based measures are economical but less reliable, monitor-based measures strike a balance between feasibility and validity, whereas criterion measures offer the highest validity at a higher cost.(73)

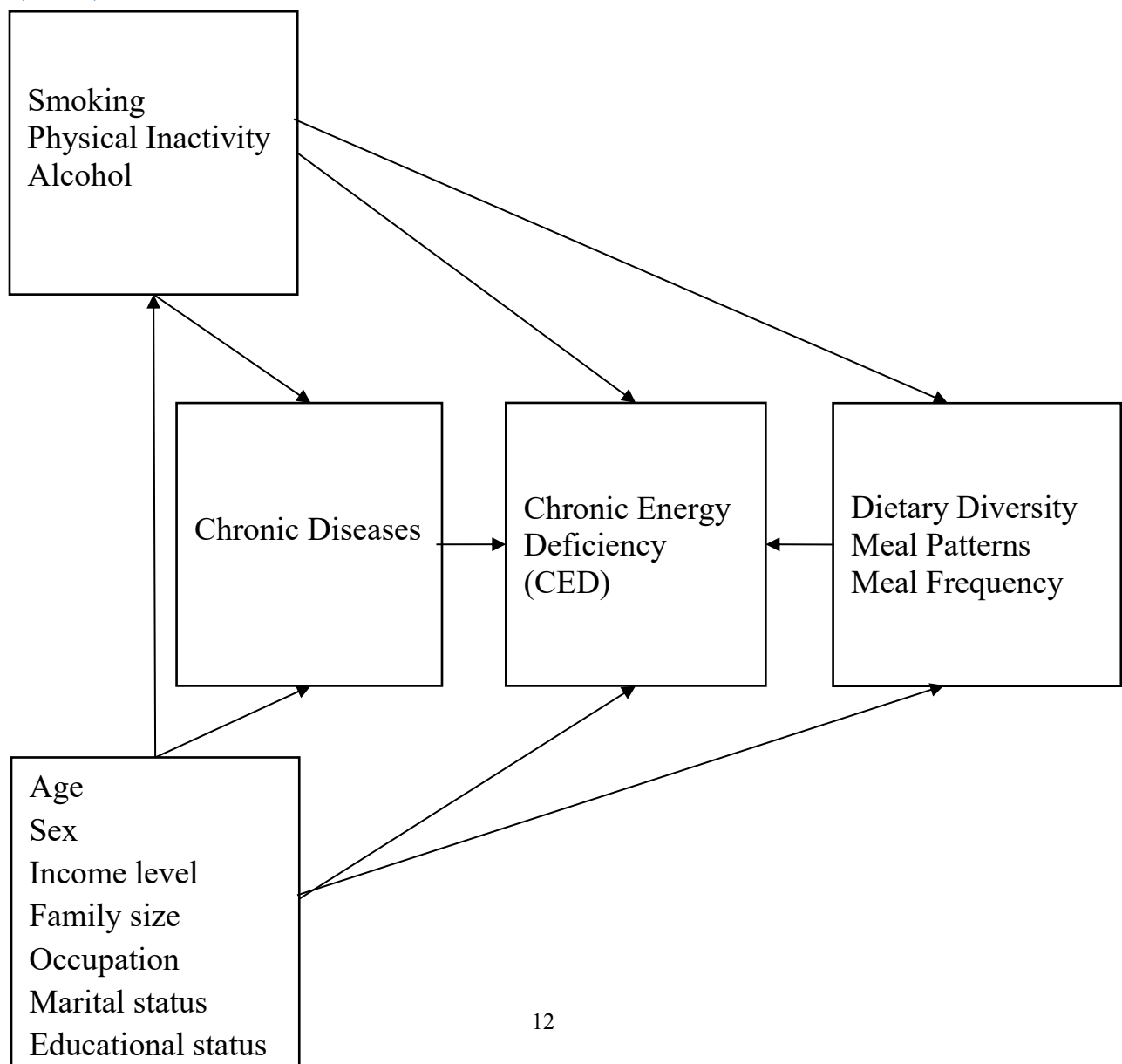
Among these tools one of the most widely utilized is the Global Physical Activity Questionnaire (GPAQ) which was developed by the World Health Organization (WHO). This questionnaire is designed to monitor physical activity across different countries. It gathers data on physical activity participation across three key domains, as well as information on sedentary behavior, consisting of a total of 16 questions. The three domains are activity at work, travel to and from places and recreational activities. Each domain includes inquiries regarding the frequency and duration of various activities, such as how many days per week an individual engages in each type of activity and the average time spent (in minutes) on these activities daily. Furthermore, activities are classified according to their intensity into two categories moderate-intensity activities, which result in a slight increase in breathing or heart rate, and vigorous-intensity activities, which lead to a significant increase in breathing or heart rate.(74) This instrument is widely recognized, endorsed and is validated in numerous countries including Ethiopia.(75)

It is essential to recognize that the quality of data obtained through recall methods for assessing physical activity can be affected by factors related to memory and subjectivity, which may be considered limitations. Nevertheless, the interviewer-administered 7-day physical activity recall method utilized in GPAQ accounts for all types of activities performed throughout the day, from sedentary to vigorous, making it advantageous for accurately estimating energy expenditure. This method is cost-effective, straightforward, and non-invasive compared to other assessment techniques used for evaluating physical activity

levels. In collaboration with the International Dietary Energy Consultative Group (IDECG), FAO and UNU investigated suitable BMI cut points at the lower end of the scale, as well as the health and functional implications of low BMI. Three categories of Chronic Energy Deficiency (CED) as CED grade III for a BMI less than 16.0, CED grade II for a BMI between 16.0 and 16.9, and CED grade I for a BMI ranging from 17.0 to 18.4. A BMI of 18.5 to less than 25.0 classified as normal and three grades of CED with energy expenditure levels that are either above or below a Physical Activity Level (PAL) of 1.4 times the Basal Metabolic Rate (BMR). The studies suggested using body mass index (BMI) along with energy turnover indices to categorize adult chronic energy deficiency (CED) to address misclassification of BMI due to physical activity. [\(70,76\)](#)

2.5. Conceptual Framework

Figure 1: Conceptual Framework of Chronic Energy Deficiency, Adopted from Different Literature [\(53–65\)](#)



3. Objectives

3.1. General Objective

To determine the prevalence of chronic energy deficiency and its predictors among population aged 50 years and above in Addis Ababa, Ethiopia.

3.2. Specific Objectives

1. To determine the prevalence of chronic energy deficiency among the population aged 50 and above in Addis Ababa, Ethiopia.
2. To identify predictors of chronic energy deficiency among the population aged 50 and above in Addis Ababa, Ethiopia.

4. Methods and Materials

4.1. Study Area and period

The study was conducted in the Ethiopian capital city of Addis Ababa. Located at the country's geographic center at a latitude of 9°2'N and longitude of 38°45'E, Addis Ababa is Ethiopia's political, commercial, and cultural hub. The city lies at an average elevation of 2,400 meters above sea level, with the highest point being Entoto Hill in the north, at a height of 3,200 meters.[\(77\)](#)

Based on the 2007 census, 10% of Addis Ababa population is aged 50 and older.[\(78\)](#) According to the Ethiopian Central Statistical Agency (CSA), Addis Ababa population is projected to be 5,704,000 in 2024. Therefore, there was approximately 570,400 residents aged 50 and above was living in the city by 2024. The study was conducted from 12-22 February 2025.

4.2. Study Design

A community-based cross-sectional study.

4.3. Source Population

All individuals aged 50 years and above living in Addis Ababa, Ethiopia.

4.4. Study Population

All systematically selected individuals aged 50 years and above living in three selected sub-cities of Addis Ababa.

4.5. Inclusion and Exclusion Criteria

4.5.1. Inclusion Criteria

Residents of Addis Ababa who have (Addis Ababa ID card) and aged 50 years and above during the study period.

4.5.2. Exclusion Criteria

Individuals who have difficulty providing information due to confirmed severe cognitive impairment, terminal illness and difficulty of giving consent.

4.6. Sample Size Determination

For the first objective: To determine the prevalence of chronic energy deficiency among the population aged 50 and above in Addis Ababa, Ethiopia. Sample size was determined using the single population proportion formula, based on the prevalence of Chronic Energy

Deficiency (CED), which was 50% since there was no study of the same age before. To achieve a 5% margin of error and a 95% confidence level ($\alpha = 0.05$), the calculation was as follows:

$$n = Z_{\alpha/2}^2 pq / d^2$$

where:

$\frac{Z_{\alpha}}{2}$ is the critical value for a 95% confidence interval (1.96),

p is the estimated proportion (0.5),

q is 1 – P (0.5),

d is the margin of error (0.05)

$$\text{So, } n = 1.96 * 1.96 * 0.5 * 0.5 / 0.05 * 0.05 = 384$$

Since a multistage sampling method is used, a design effect of 1.5 is applied.

$$n = 384 * 1.5 = 577$$

After adjusting for a 10% non-response rate, $n = 577 + (577 * 0.1) \approx 635$

$$n = 635$$

Thus, the final required sample size required was 635.

For the second objective

To identify predictors of chronic energy deficiency among the population aged 50 and above in Addis Ababa, Ethiopia. Sample size for the 2nd objective was determined using double population proportion formula by Epi info statistical calculation considering 80% power and one-to-one ratio based on a predictor identified in study conducted at Aykel town, Amhara region and Metu district southwest Ethiopia. [\(41,53\)](#)

Table 1: Sample Size Determinations for predictors of Chronic Energy Deficiency Among Older Adults of Addis Ababa Ethiopia, 2025.

Variables selected as predictors	Assumptions			Sample size with a 10% non-response rate and design effect of 1.5						
	AOR	P1	P2	Ratio	Power	CL	N	*1.5	10%NR	n
Age (≥ 85 years)	3.25	65	35	1:1	80	95	152	228	22.8	251
DDS (Low)	6.31	53.7	46.3	1:1	80	95	64	96	9.6	106
Wealth status (Poor)	2.53	73.1	26.9	1:1	80	95	274	411	41.1	453

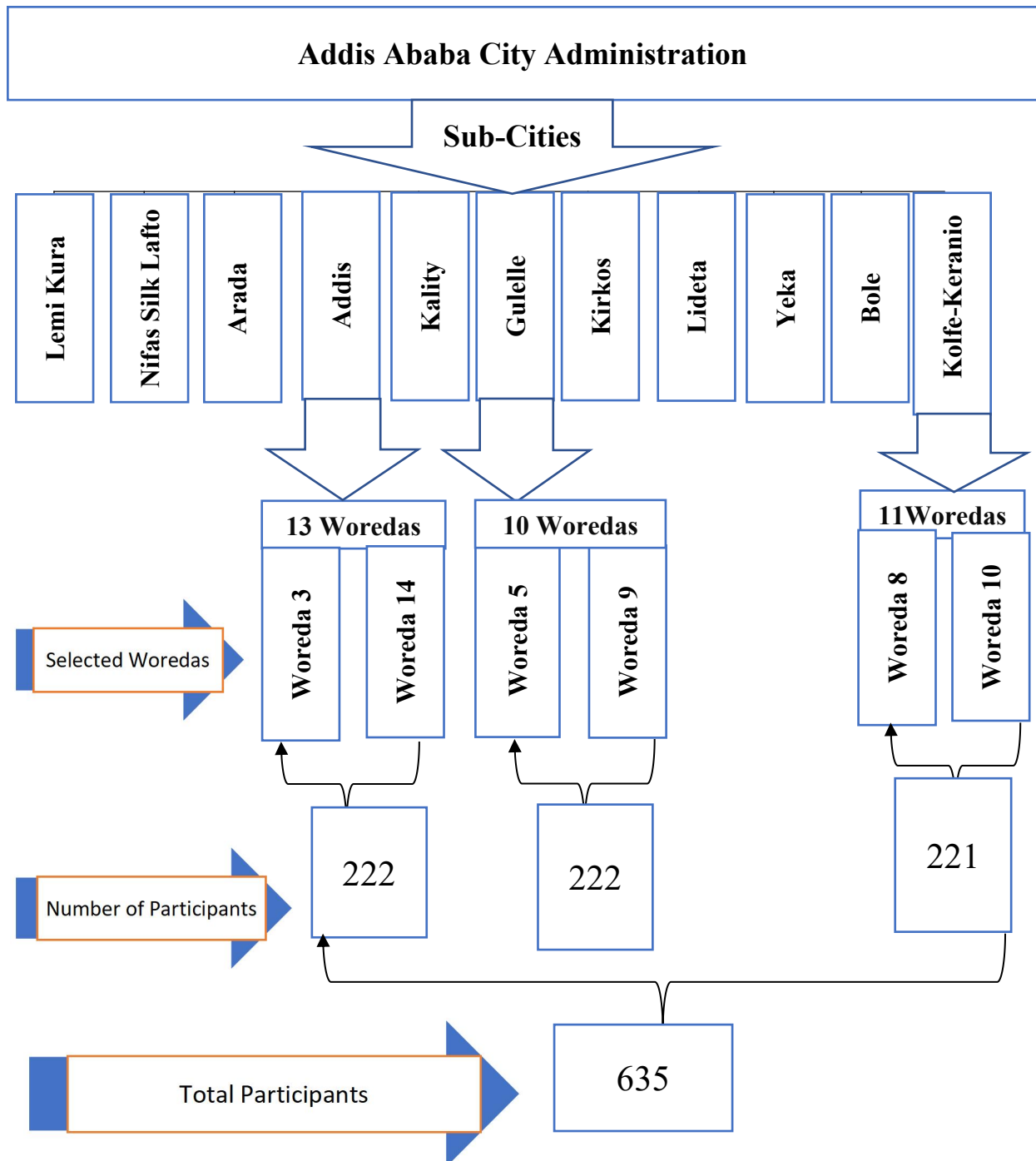
Loss of appetite due to illness (Yes)	3.36	65	35	1:1	80	95	146	219	21.9	241
HFI (Food in -secured)	2.63	69.7	29.3	1:1	80	95	232	348	34.8	383
Smoking (Yes)	5.84	89.8	10.2	1:1	80	95	308	462	46.2	509
Chronic Disease(Yes)	5.56	87.7	12.3	1:1	80	95	260	390	39	429

The sample size of the 1st objective was higher than the second. Therefore, the final sample size for this study was the 1st objective sample size which is 635.

4.7. Sampling Procedures

A multistage sampling approach was employed for this study in which three sub- cities in Addis Ababa (Gulelle sub-city, Addis Ketema sub-city and Kolfe-Keranio) were selected randomly. Next data were collected from two woredas of each subcities which were selected by simple random sampling and from Gulelle sub-city, woreda-5 and woreda-9, from Addis Ketema sub-city, woreda-3 and woreda-14 and from Kolfe-Keranio sub-city woreda-8 and woreda-10 were selected. In the third stage, Individual participant were selected by targeting households within the selected woredas systematically. If a systematically selected household did not contain a participant aged 50 or above, the next consecutive households was selected until an eligible participant was found.

Figure 2: Diagrammatic Presentation of Sampling Procedure of CED among older adults population 50 years and above in Addis Ababa, 2025.



4.8. Data collection procedures

Data collection was conducted using an interviewer-administered, pre-tested, and structured questionnaire adapted and modified from a review of previously conducted studies.(40,41,74) The questionnaire was divided into seven major sections which are socio-demographic and economic factors, co-morbidity and behavioral-related factors, dietary and feeding practices, the household food insecurity access scale (HFIAS), wealth index, global physical activity questionnaire(GPAQ) and anthropometric measurements.

A total of seven data collectors and two supervisors, who were fluent in Amharic and proficient in using the Kobo toolbox for data collection, were recruited for this process. They undergone a three-day orientation that covered the study's objectives, ensure confidentiality, familiarization with data collection tool, and interview techniques. The English and Amharic versions of questionnaire were presented to data collectors. Before the actual data collection begins, a pre-test of the data collection tool was conducted. Data were collected through face-to-face interviews, with responses recorded using phone-based Kobo-collect. Standardization test has been done before data collection to evaluate data collectors understanding of all procedures and techniques.

4.9. Variables of the Study

4.9.1. Dependent Variable

Chronic Energy Deficiency (CED): The measurement of CED typically involves two key measures; namely body mass index (BMI) and physical activity level (PAL).

1. Body Mass Index (BMI): BMI is a widely used indicator of body fat based on an individual's weight and height. It is calculated using the formula: $BMI = \text{weight in kg} / (\text{height in meters})^2$.(71)

2. Physical Activity Level (PAL)

The Physical Activity Level (PAL) is a metric that indicates the amount of physical activity an individual engages in over a specified time period. It is typically expressed as a ratio of total energy expenditure (TEE) to basal metabolic rate (BMR). In this study, the Global Physical Activity Questionnaire (GPAQ) was utilized to gather data on physical activities over a week, adhering closely to GPAQ guidelines.

Energy Expenditure Estimation: First, TEE was estimated by categorizing each type of activity according to its frequency throughout the week and the duration spent on each activity during the day. Each activity is associated with a metabolic equivalent (MET) value: sedentary activities have a MET value of 1, moderate-intensity activities have a MET value

of 4, and vigorous-intensity activities have a MET value of 8. Energy expenditure is then converted into kilocalories by multiplying the MET value (expressed as kcal/kg/hr), the individual's weight in kilograms, and the duration of each activity in hours. Consequently, TEE is calculated by summing the energy expenditures across all three domains of activity, which are determined by the number of days and hours spent on each activity multiplied by their respective MET values.

PAL Calculation: Finally, PAL was calculated by dividing TEE by total hours in the week(168hrs).

4.9.2. Independent Variables

Age: was asked in complete years

Family size: any family member living in one household was asked.

Monthly income: Total estimated monthly income of the household from any source was asked.

Chronic disease: Any confirmed chronic disease like hypertension, diabetes mellitus, asthma, HIV/AIDS and likes was asked.

Smoking: Any history and current smoking status was asked

Alcohol drinking: Any history and current alcohol drinking status was asked.

Dietary Diversity: To assess dietary diversity, the dietary diversity scores of participants was measured using the 7-day recall method. This method involves an open recall where participants listed all foods and drinks consumed in the 7 day preceding the interview. The twelve food groups identified in this method was used to compute the DDS which was categorized as "Low" for a DDS of ≤ 3 , "Medium" for a DDS between 4 and 5, and "High" for a DDS of ≥ 6 .

Household Food Insecurity: The household food security status (HFSS) of participants was evaluated using the FANTA household food insecurity access scale, which measured limited access to food over the previous month. This tool consists of nine questions regarding experiences of food insecurity, each with three response options, resulting in a total score of 27. households was ranked from 1-4 and classified as 1 = food secure, 2=mildly food insecure access, 3=moderately food insecure access, 4=severely food insecure access

4.10. Operational definitions

Chronic Energy Deficiency (CED)

Grade 0 CED/Normal: BMI=18.5-24.9 kg/m²/BMI is 18.4- 17.0 kg/m² and PAL $\geq$ 1.4,

Grade I CED: BMI =18.4- 17.0 kg/m² and PAL<1.4 /BMI is 16.9 -16.0 kg/m² and PAL>=1.4

Grade II CED: BMI=16.9 -16.0 kg/m² and PAL<1.4

Grade III CED if BMI is less than 16 kg/m².

Table 2: Classification of Chronic Energy Deficiency with BMI and PAL of older adult population 50 years and above in Addis Ababa Ethiopia 2025.

BMI		<16	16-16.9	17-18.4	>18.5
PAL	>=1.4	CED Grade III	CED Grade I	Normal	Normal
	<1.4	CED Grade III	CED Grade II	CED Grade I	Normal

Older Adults: Population of aged 50 and older

Dietary Diversity Score: "Good" if DDS is high or ≥ 6 and "Poor" when DDS of ≤ 5 (combination of (medium DDS between 4 and 5, and "low" for a DDS of >3).

Household Food Insecurity: Food secure and Food insecure (combination of mildly food insecure access, moderately food insecure access, and severely food insecure access)

Meal Frequency: "Good" if ≥ 3 and "Poor" if <3 times per day of meals eaten.

Meal Pattern: "Regular"when meals eaten at the time of breakfast, lunch, snack and dinner and "Irregular"when meals eaten at any time she/he get food)

4.11. Data quality management

Anthropometric measurements, such as height, weight, mid-upper arm circumference (MUAC), and waist circumference, were employed. Height was recorded to the nearest 0.1 cm using a portable stadiometer. It was essential that the participant's head is aligned in the Frankfurt plane, with their knees straight and their heels, buttocks, and shoulder blades in contact with the vertical board during measurement. Weight was assessed using a portable digital scale (Seca-Germany), with participants advised to wear lightweight clothing and remain still on the scale's platform. Weight measurements was recorded to the nearest 0.1 kg. All flagged values or outliers were checked. The mid-upper arm circumference was also be measured accurately to the nearest 0.1 cm at the midpoint between the acromion process and the olecranon process of the elbow.

To minimize technical error of measurement (TEM), all equipments were calibrated prior to conducting any measurements. All measurements were tried to be performed in a controlled environment to reduce external factors that may influence results. Measurement area was tried to became free from distractions and maintained at a comfortable temperature as much

as possible so that participants are not affected by discomfort or anxiety during the process. Clear instructions were provided to participants before taking any measurements.

4.12. Data Processing and Analysis procedures

4.12.1. Data Cleaning and Management

Initially, the data collected through the Kobo Toolbox survey were downloaded and integrated into Excel 2019. In this stage, the data undergone a cleaning and classification process. For comparative analysis, age was categorized into two groups: individuals younger than 65 years and those aged 65 years or older. Global Physical Activity Questionnaire (GPAQ) cleaned and classified as physical activity level ≥ 1.4 and physical activity level < 1.4 . Dietary diversity score was classified as low, medium and high. In the same way household food insecurity was classified as food secure, mildly food insecure, moderately food insecure and severely food insecure. Then the cleaned data was imported into SPSS version 27 for further statistical analysis.

4.12.2. Data analysis

Univariable analysis: Univariable analysis was conducted, and all variables was described using frequency distribution tables, and graphs.

Bivariable analysis: Logistic regression models to identify independent predictors as sociodemographic factors as age and sex, insomnia, dietary diversity scores, household food insecurity level, meal frequency, meal pattern(regular/irregular) and other factors were included. The crude odds ratio (COR) with a 95% confidence level is reported for the bivariable logistic regression model.

Multivariable Analysis: Multivariable Logistic regression models to identify independent predictors of CED while controlling for potential confounders was used. Variables significantly associated with CED in bivariable logistic regression were included. An adjusted odds ratio (AOR) with a 95% confidence level and a p-value < 0.05 was used to determine associations between the outcome variable and predictors in multivariable analysis.

All assumptions for regression analysis, including model adequacy and multicollinearity of independent variables, were checked by Hosmer-Lemeshow and Variance inflation factor (VIF) respectively.

4.13. Ethical Clearance

The survey was conducted after receiving approval from the Addis Ababa University School of Public Health Research and Ethics Committee (SPH/REC) and Addis Ababa Health Bureau. Permission letter was obtained from administrators of all selected woredas prior to

starting the data collection. Written consent was obtained from respondents after clearly explaining the study's objectives and disclosing all relevant information. To maintain anonymity identifiers like names was not included in the questionnaire. All measure to maintain human rights including informed consent, the right to participate in the study, right to privacy and confidentiality and right to prevention from any type of harm had been taken into consideration.

All Participants were informed that their participation is on voluntarism bases. The benefit of the study and the fact that it has no invasive physical harm were explained for the participants. Respondents were also be informed that they can refuse or discontinue participation at any time. Participants identified as chronic energy deficient were tried to be linked up with nutrition center of health center around.

4.14. Dissemination Plan

The research findings will be shared via various significant avenues to achieve a wide reach, as well as make contribution to impact. The findings will initially be submitted and presented to Addis Ababa University School of Public Health, College of Health Sciences, and shared with research and academic staff for discussion. Furthermore, the results will be shared with the Ministry of Health and Addis Ababa Health Bureau for informing public health practice and policy at the national level. The results will also be submitted in Addis Ababa University, College of Health Sciences libraries, where students, researchers, and teachers will access them. Finally, the study will be published in mainstream nutrition journals so that it reaches more researchers and practitioners in the field of nutrition.

5. Result

5.1. Socio-demographic characteristics

A total of 635 older adults were interviewed, resulting in a response rate of 100%. Among the 635 participants, 371 (58.4%) were male, while 264 (41.6%) were female. The mean age of the participants was 64.68 (50 to 91) years. The majority of the participants, 188 (29.6%), attended college or above.

The predominant religion among participants in this study was Orthodox Christianity with 320(50.4%), followed by Protestant with 148 (23.3%) and Muslim with 140 (22%). While 551 (68.8%) were married, 44 (6.9%) of the participants were divorced and 37 (5.8%) were widowed. Regarding the occupations of participants, 139 (21.9%) were merchants, 136 (21.4%) were retired, and 122 (19.2%) were government employees. (Table 3)

Table 3: Socio-demographic characteristics of older adult population aged 50 years and above of Addis Ababa Ethiopia 2025.

Characteristics	Frequency (N)	Percent (%)
Sex		
Male	371	58.4
Female	264	41.6
Marital Status		
Married	551	86.8
Divorced	44	6.9
Widowed	37	5.8
Single	3	.5
Religion		
Orthodox	320	50.4
Protestant	148	23.3
Muslim	140	22.0
Catholic	17	2.7
Others	10	1.6
Educational Status		

College and above	188	29.6
Primary school(grade1-8)	171	26.9
able to read and write	148	23.3
unable to read and write	77	12.1
Secondary school (grade 9-12)	51	8.0
Occupation		
Merchant	139	21.9
Retired	136	21.4
Government employ	122	19.2
Housewife	95	15.0
Other	93	14.6
Daily labor	50	7.9
Age Classification		
50-65	392	61.7
>=65	243	38.3

5.2. Health related Conditions and behavioral characteristics

From a total of 635 respondents, 522 (82.2%) have no history of any illness or disease in the past three months, and 479 (75.4%) of them have no confirmed history of chronic disease. Regarding behavioral factors, while 33 (5.5%) were current smokers, 129 (20.3%) were current alcohol consumers. (Table 4)

Table 4: Health related Conditions and behavioral characteristics of older adult population aged 50 years and above of Addis Ababa Ethiopia 2025.

Characteristics	Frequency (N)	Percent (%)
Chronic diseases		
No	479	75.4
Yes	156	24.6
Smoking Cigarette		
No	452	71.2

Former	148	23.3
Current	35	5.5
Consuming Alcohol		
No	336	52.9
Former	170	26.8
Current	129	20.3
Insomnia (sleep difficulty)		
Yes	535	84.3
No	100	15.7
Ever Ill in Past Three (3) Months		
No	522	82.2
Yes	113	17.8
Decline Food Intake due to illness		
Not ever ill in past 3 months	522	82.2
No	24	3.8
Yes	89	14.0

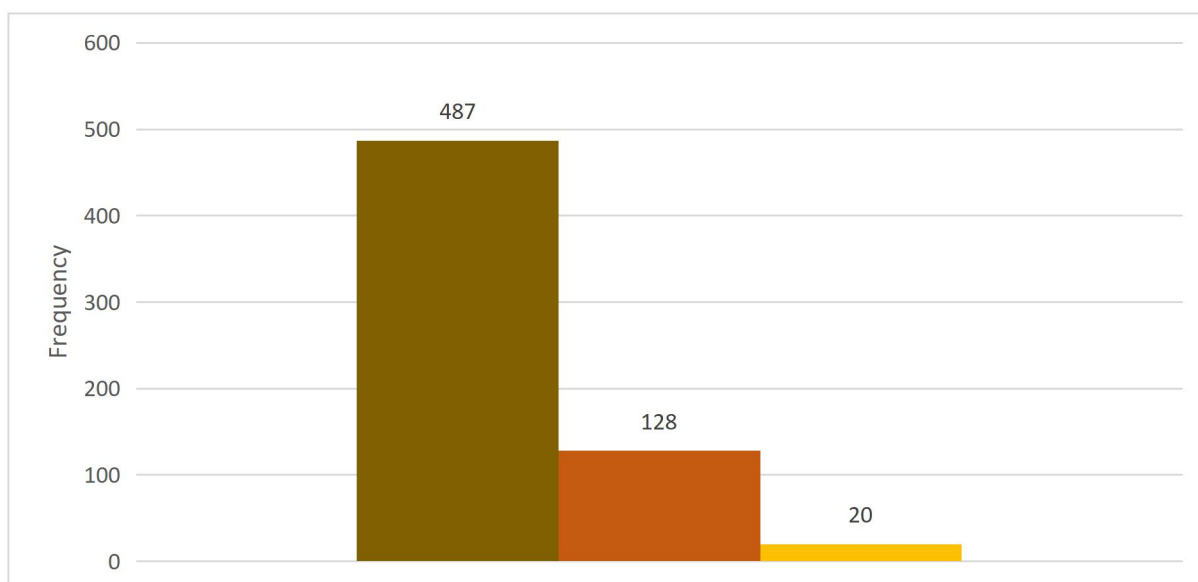
5.3. Dietary Diversity

Regarding dietary diversity, while 76.7%(n=487) of the participants were classified with a high dietary diversity score, 20.2%(n=128) were classified with a medium dietary diversity score, and 3.1%(n=20) were classified with a poor dietary diversity score. (Figure 3 and Table 5)

Table 5: Frequency and percentage of dietary diversity score among older adult population aged 50 years and above of Addis Ababa Ethiopia 2025.

Category	Frequency (n)	Percentage (%)
High	487	76.7
Medium	128	20.2
Poor	20	3.1
Total	635	100

Figure 3: Frequency of dietary diversity among older adult population aged 50 years and above of Addis Ababa Ethiopia 2025.



5.4. Food Groups

While Cereal food groups were consumed highly by 99.1% of respondents milk and milk product and eggs were consumed by only by 56.4% and 55% of the respondents. (Table 6)

Table 6: Percentage of food group consumption among older adult population aged 50 years and above of Addis Ababa Ethiopia 2025.

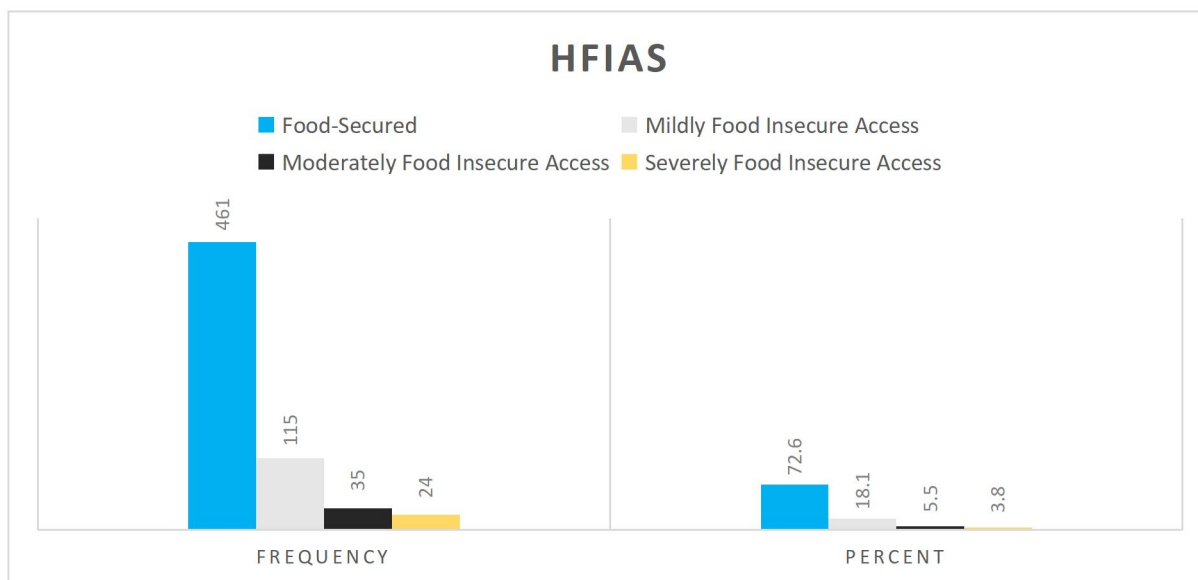
food groups	Response	Frequency	Percentage
Cereals	No	6	0.9
	Yes	629	99.1
Vitamin A rich fruits and vegetables	No	82	12.9
	Yes	553	87.1
White roots and tubers	No	176	27.7
	Yes	459	72.3
Dark green leafy vegetables (DGLVs)	No	213	33.5
	Yes	422	66.5
Other vegetables and fruits	No	158	24.9
	Yes	477	75.1
Organ and flesh foods	No	57.5	42.5
	Yes	365	57.5

Eggs	No	286	45.0
	Yes	349	55.0
Legumes,nuts and seeds	No	72.8	27.2
	Yes	462	72.8
Milk and milk products	No	277	43.6
	Yes	358	56.4
Oils and fats	No	150	23.6
	Yes	485	76.4
Sweets	No	238	37.5
	Yes	397	62.5
Spices,condiments,beverages	No	218	34.3
	Yes	417	65.7
Time to have meal	Irregular	181	28.5
	Regular	454	71.5
Meal frequency	<3	68	9.8
	>=3	573	90.2

5.5. Household food insecurity assess scale

Regarding household food insecurity (HFIAS), while 72.6% of the participants were classified as food secure, 18.1% were classified as mildly food insecure, 5.5% were moderately food insecure, and 3.8% were classified as severely food insecure. (Figure 4)

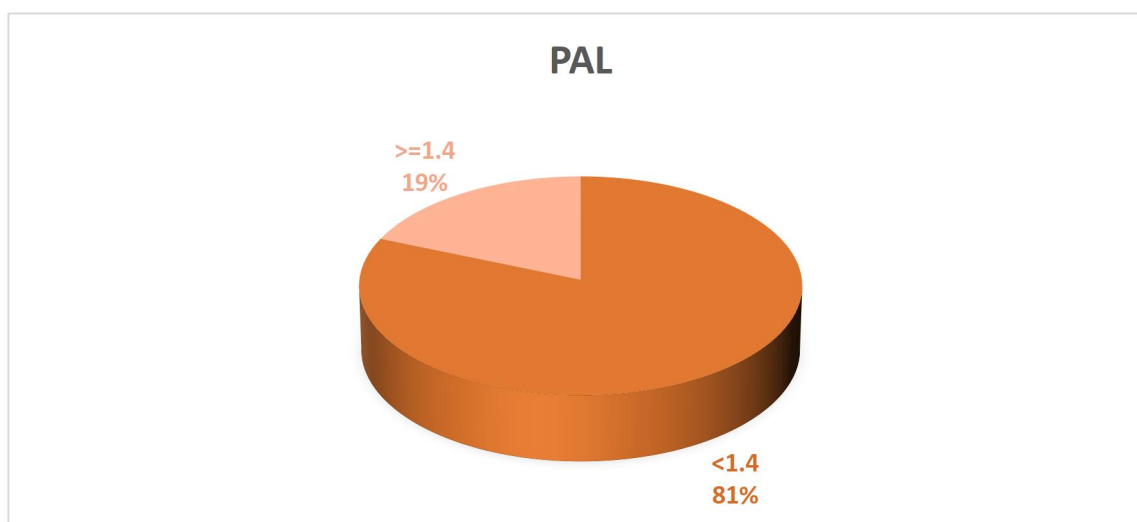
Figure 4:Frequency and percentage household food insecurity of older adult population aged 50 years and above of Addis Ababa Ethiopia 2025.



5.6. Physical Activity Level

According to this study, only 19%(n=120) of older adult populations have a physical activity level (PAL) of 1.4 or higher, while 81%(n=515) have a PAL of less than 1.4. The average PAL observed was 0.71, with a standard deviation of 0.8. (Figure 5)

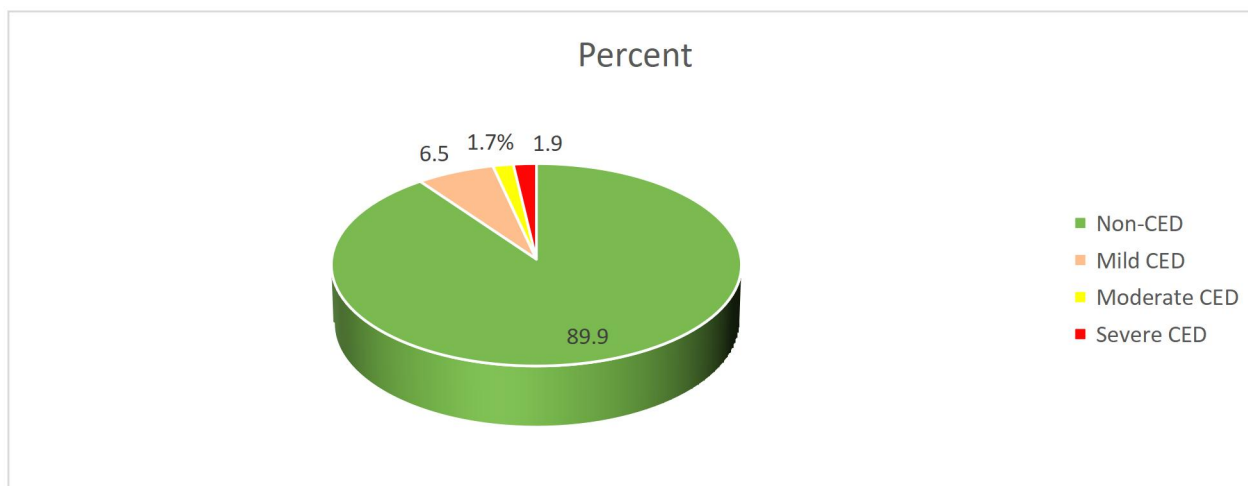
Figure 5: Percentage of physical activity level of older adult population aged 50 years and above of Addis Ababa Ethiopia 2025.



5.7. Chronic Energy Deficiency

Study revealed that prevalence of CED in older adult population was 10.1%(CI:7.9%-12.6%). While 6% of them were mild CED, 2% of them were moderate and 2% were severe CED. (Figure 6)

Figure 6: Prevalence and classification of CED among older adult population aged 50 years and above of Addis Ababa Ethiopia 2025.



5.8. Misclassification Percentage

Chronic energy deficiency was classified by body mass index alone and body mass index along with physical activity level. According to this study it was able to understand from 635 older adult population 10 individuals with percentage of 1.4% were misclassified. Accordingly, 1% of the population were misclassified as chronic energy deficient while they were not and 0.1% and 0.7% of mild chronic energy deficiency and moderate chronic energy deficient were misclassified. (Table 7)

Table 7: CED misclassification percentage among older adult population aged 50 years and above of Addis Ababa Ethiopia 2025.

Outcome	CED Classification (BMI only)		CED Classification (BMI and PAL)	
	Frequency	Percent	Frequency	Percent
Non-CED	566	89.1	571	89.9
Mild CED	42	6.6	41	6.5
Moderate CED	15	2.4	11	1.7
Severe CED	12	1.9	12	1.9
Total	635	100.0	635	100.0

5.9. Predictors of Chronic Energy Deficiency

To identify the association between the CED and predictive variables, bivariate logistic regression analysis was first done for all independent variables. Hosmer-Lemeshow's goodness of fit ($p = 0.515$) and the multicollinearity ($VIF = 1.0-1.2$) were tested, and the model was adequately fit with no multicollinearity among the variables.

In the study, older adults between 50 and 65 age, infrequent meals and irregular meal times, history of insomnia, low dietary diversity, and household food insecurity were determinants of Chronic Energy Deficiency (CED) with varying degrees of strength. Participants aged between 50 and 65 had 3.9 times [AOR=3.9,95% CI:(1.6,9.3)], more likely CED than aged

above 65. Participants with infrequent meals which is defined less than three times per day had 3.9 times [AOR=3.9,95% CI: (1.7,8.8)], the odds of CED compared to those with frequent meals equal to above three meals per day. Respondents with irregular meal patterns defined as eating breakfast, lunch, and dinner at inconsistent times had 2.4 times [AOR=2.4,95% CI:(1.3,4.6)], the odds of CED compared to respondents with regular meal patterns.

Individuals with low to medium dietary variety are significantly more likely to experience chronic energy deficiency (CED) compared to those with a high variety in their diets. Accordingly, the odds of CED for those with low dietary diversity and medium dietary diversity are 2.8 times [AOR=2.8, 95% CI:(1.5,5.3)], higher than individuals enjoying a diverse diet. In this community, people living in households facing varying levels of food insecurity also show increased odds of experiencing CED. Those from food insecure households have odds of 6.2 [AOR=6.2,95% CI:(3.2,12.2)], times more than individuals from food-secure households.

Additionally, the study found that individuals who suffer from insomnia are at a higher risk for CED than those who do not share these conditions. Specifically, respondents with a history of insomnia are 3.1 times [AOR=3.1,95% CI:(1.5,6.6)] more likely to experience CED compared to those without insomnia. (Table 8)

Table 8: Bivariable and Multivariable logistic regression analysis of CED among older adult population aged 50 years and above of Addis Ababa Ethiopia and its predictors of 2025.

Variables	Category	CED		COR (95%)	AOR (95%)	P-Value
		No	Yes			
Sex	Male	320	51	3.1(1.6-5.8)	1.8(0.9-3.8)	0.114
	Female	251	13	1	1	
Age	50-65	336	56	4.9(2.3-10.5)	3.9(1.6-9.3)	0.002*
	>65	235	8	1	1	
Insomnia	Yes	78	22	3.3(1.9-5.8)	3.1(1.5-6.6)	0.003*
	No	493	42	1	1	
Smoking Cigarette	Current/Former	152	31	2.6(1.5 -4.4)	1.6(0.8-3.2)	0.18
	No	419	33	1	1	
Meal Frequency	<3	42	20	5.7(3.1-10.6)	3.9(1.7-8.8)	0.001**
	>=3	529	44	1	1	
Meal Pattern	Irregular	146	35	3.5(2.1-6.0)	2.4(1.3 -4.6)	0.006*
	Regular	425	29	1	1	
DDS	Poor	110	38	6.1(3.6-10.5)	2.8(1.5-5.3)	0.001*
	Good	461	26	1	1	
HFIAS	Food-Insecured	129	45	8.1(4.5-14.4)	6.2(3.2-12.2)	0.001**
	Food -Secured	442	19	1	1	
Confidence Interval(CI) of 95% and * Indicate predictors significantly associated with CED,**P<0.001, COR: Crude odds ratio, AOR: Adjusted odds ratio						

6. Discussion

The study identified chronic energy deficiency (CED) in adults over fifty (50) years and associated predictors. A prevalence of 10.1% was observed, classified by the World Health Organization (WHO) as a medium-level public health concern (30), signaling suboptimal health conditions. This prevalence is lower than the 26.6% reported in a prior study in the same region (40). Methodological variations including sample size, age stratification, study tools, and data collection timelines may explain this discrepancy. Additionally, this finding is also lower than results from a study conducted in the Amhara region focusing on individuals aged over 65 years (42). Furthermore, it is less than findings from various studies conducted in other regions of Ethiopia (41–50). Differences in geographical location, difference in cultural foods commonly eaten, economic development difference between the areas, community awareness on food diversity may contribute to these discrepancies.

Prevalence is less than India (36–44.8%) (32–35) but more than England (3%) (36). This may be due to socioeconomic status and food cultural differences that dictate food consumption patterns as culture of feeding at a particular time regularly/irregularly, diet diversity with most prevalent food groups across countries, food insecurity issues, meal timing, and different feeding regimens across countries.

There were several factors that were associated with this condition in this group's population with different levels of strength. The results of this research show that the probability of Chronic Energy Deficiency (CED) was notably higher in the age group of 50–65 years compared to individuals over 65 years. The outcome is supported by the study that claims the elderly over 51 might have a higher incidence of causes of CED, i.e., changes in lifestyle, metabolic changes, or health disorders felt more sharply at this stage of transition from youth. It should be kept in mind that even though older people beyond 65 years will have their own unique set of issues, what the evidence indicates is that the older age segment previously could especially be vulnerable to energy deficits. This is possibly due to overlap of physiological shift and social determinants within the group. (35)

Individuals with irregular eating habits were chronically more energy deficient than individuals with regular meal patterns. This has been attributed to the physiological as well as the psychological consequences of irregular eating habits. Irregular meal times have been found to undermine the caloric intake, since the individual would skip meals or consume less food during the day, resulting in an unfavorable energy balance in the long term. Besides,

biased dietary habits can disrupt metabolic processes like insulin sensitivity and hunger regulation, which tend to enhance chronic energy deficit. Studies demonstrate that individuals maintaining normal meal schedules exhibit better nutritional status and maintain healthier body weight compared to their counterparts consuming irregular meals. These findings highlight the importance of improving habitual eating as a way to improve overall energy balance and nutritional status.[\(49\)](#)

The findings of the study indicate that there is a high correlation between meal frequency and the prevalence of Chronic Energy Deficiency among the respondents. Specifically, respondents who indicated that they took meals three times or less a day had higher odds of CED compared to respondents whose meal frequency was three times or above. This means that reduced meal frequency may be associated with inadequate energy consumption, which is one of the most significant parameters in maintaining nutrition health. The findings indicate that one probable intervention against CED risk may be increasing meal frequency, thereby increasing the importance of frequent and sufficient food consumption in achieving overall well-being. These results are in keeping with the literature emphasizing meal frequency as a part of nutritional status and emphasizing a public health program intervention to facilitate more frequent intake among high-risk populations.[\(41,44\)](#)

Dietary diversity was positively related with chronic energy deficiency, where individuals with low and medium dietary diversity scores were found more likely to experience CED compared to individuals with high dietary diversity scores. The relationship shows the importance of a diverse diet in the prevention of undernutrition, as established by a systematic review conducted in Ethiopia to explore undernutrition among older adults. The findings from this Ethiopian study confirm the hypothesis that greater dietary diversity is linked to better nutritional status, such that the more varied the foods eaten, the lower the risk of energy and primary nutrient deficiency.[\(50\)](#)

Household food insecurity (HFI) has been identified as a key contributor to Chronic Energy Deficiency. From the studies, individuals who live in food-insecure households are more likely to develop CED compared to individuals who live in food-secure households. This link suggests that the lack of repeated access to abundant and nutritious food can lead to inefficient energy consumption, which is a primary cause of CED. Furthermore, studies have time and again established HFI as a predictor for CED across different populations. The mechanisms for this association can vary from an unsatisfactory level of finances, unavailability of healthy foods, and stress related to food insecurity. These would be equated

to unhealthy eating and an unsatisfactory caloric burden, adding on to the risk of developing CED. Reduction of household food insecurity is, therefore, relevant not just for improving nutritional status but also for overall health outcomes in affected populations.[\(41\)](#)

Chronic Energy Deficiency has been found to be linked with insomnia, in that individuals with insomnia possess higher rates of chronic energy deficiency compared to individuals without insomnia. This indicates the effect of poor sleep on nutritional and overall health conditions. A comparative cross-sectional study conducted in the Metu district also validates this relationship, in that insomnia is found to be central to poor nutrition in older adults.[\(53\)](#)

Among 635 participants, 1.6% (n=10) were misclassified when using BMI alone versus BMI plus physical activity level (PAL). Specifically, 1% of the populations were misclassified as chronic energy deficient when they were not, while 0.1% and 0.7% were misclassified as having mild and moderate chronic energy deficiency, respectively. These findings are similar to those from a study examining how the failure to consider physical activity leads to misclassification of chronic energy deficiency, which reported a misclassification rate of 5%. The conclusion drawn is that considering physical activity level (PAL) does not significantly affect the classification of chronic energy deficiency.[\(79\)](#)

Limitation of the study

While cross-sectional studies may provide valuable information in terms of association between outcomes and predictors at one point in time, they cannot determine directionality or causality of such associations. That is, while the study can show correlations between some of the predictors and the outcomes concerned, it cannot definitely know if predictors lead to the outcomes seen or if other underlying influences are at play.

7. Conclusion and Recommendations

7.1. Conclusion

Our study found that 10.1% of older adults aged 50 and above in Addis Ababa are affected by Chronic Energy Deficiency (CED), making it a moderate public health concern. The research revealed that several factors contribute to this issue, including limited dietary diversity, being between the ages of 50 and 65, experiencing food insecurity at home, eating fewer than three meals a day, and having irregular meal times were also found to be at higher risk. These findings emphasize the need to address both dietary habits and broader socioeconomic challenges to improve the nutrition and overall well-being of older adults in the community.

7.2. Recommendations

Government and policy makers: To reduce the impact of CED, it is essential to promote better dietary diversity by ensuring older adults have access to a wide range of nutrient-rich foods especially of animal sources as their consumption are low as indicated in this study and action against household food insecurity. This involves creating conditions of labor that are sustainable, having a better income at lower energy cost, daily labor old people were promoted, and government actions against inflation. Community awareness is equally critical as their attendants and elderly individuals must be taught the advantages of balanced nutrition and consistency in meal times. Moreover, encouraging older adults to eat regular and frequent meals can significantly improve their nutritional intake, helping to lower the risk of CED and enhance their overall health and well-being.

Non-governmental organizations: In the struggle to mitigate CED, special support must be given to the most susceptible groups, and among them are men, 50 to 65 years adult men, and those facing economic hardships. Tackling food insecurity through stronger social protection programs, such as food assistance, livelihood support and community engagement is also vital.

Researcher and Academician: Future research, particularly longitudinal research to establish causal associations and long-term nutrition patterns, to enable evidence-based policy development and sustainable interventions and also to more accurately establish CED causes and track nutritional trends longitudinally, so that policies and interventions are not merely evidence-based but also sustainable.

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Annex I: Informed Consent Form (English version)

Addis Ababa University, School of public health

Subject Information Sheet

Hello, my name is _____ I am here on behalf of Obsa Abebe, a student in Addis Ababa University School of public health nutrition and dietetics track. He is conducting a research on “Chronic energy deficiency and its contributing factors among population of aged 50 and above in Addis Ababa, Ethiopia”. He has received permission from Addis Ababa university school of public health.

You are selected by systematic sampling technique to participate in this study because you are currently living in the selected woredas on the research conducting period. Your participation on this study will only be on based on your willingness. You have the right to choose not to take part in this study. If you choose to take part, you have the right to stop at any time. If you are willing to participate or refuse or decide to withdraw later, you will not be subjected to any ill-treatment.

If you agree to participate in the study, your weight, height and mid upper arm circumference will be measured. You will also be interviewed about sociodemographic status, health condition, wealth status, household food insecurity status and global physical activity questionnaire (GPAQ). You can stop at any time if you don't feel comfortable during an interview and measurement process. The measurement and filling the questionnaire will take about 30 minutes.

This study will help in designing a policy for Addis Ababa and Ethiopia community in term of nutritional management. The information that you provide will be kept confidential by using only code numbers and locking the data. Your name will not be written on the questionnaire. No one will have access to the non-coded data except the principal investigator and the data will not be used for purposes other than the study. Your willingness and active participation is very important for the success of this study.

Informed Consent Form

Based on the understanding of the above information, are you willing to participate in this study?

A) Yes

B) No

If yes, I will continue and

If no, I will skip to next participant after writing the reasons of refusal _____

Respondent Signature _____ Date _____

Data collector Nam _____ Signature _____

Questionnaires ID number _____

Name of sub-city _____ Woreda _____ Date _____

Complete	
Incomplete	
Refused	

Checked by Supervisor: Name _____ Signature _____

For further explanation, use the Investigator's Address;

Name: Obsa Abebe

Email: obsimanabebe34@gmail.com

Phone No: +251 946838622

Annex II: English version questionnaire

1. Socio demographic and economic factors

S.no.	Questions	Response	skip
101	What is your sex?	1. Male 2. Female	
102	What is your age? (in years)	_____	
103	What is your religion?	1. Orthodox 2. Muslim 3. Protestant 4. Catholic 5. Others (specify _____)	
104	What is your marital status?	1. Single 2. Married 3. Divorced 4. Windowed	
105	What is your educational status?	1. Unable to read and write 2. Able to read and write 3. Primary school(grade1-8) 4. Secondary school (grade 9-12) 5. College and above	
106	What is your occupation ?	1. Merchant 2. Government employ 3. Daily labor 4. Retired 5. Housewife 6. Other (specify _____)	
107	What is total expected household salary/month?	_____	
108	With whom you are living?	1. With family 2. Lives alone 3. Other (specify _____)	
109	What is your house hold family size?	_____	

2. Health condition and behavioral related

201	Have You ever ill for the last 3 months?	1.Yes 2.No	If “No” to 203
202	If Q201 yes could you tell me?	_____	
203	Do you have history of any chronic diseases?	1.Yes 2.No	If “No” to 205
204	If Q202 yes, which one of the following (multiple answers are possible)	1.Hypertension 2.Diabetes Mellitus 3.TB 4.HIV/ADIS 5. Other (specify _____)	
205	Do you have history of insomnia?	1.Yes 2.No	
206	Have you hospitalized last Year?	1.Yes 2.No	
207	Do you smoke cigarette?	1.No 2.Former 3.Current	

208	Do you consume alcohol?	1.No 2.Former 3.Current	
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3. Feeding practices and Dietary information

3a. Feeding Practice			
301	Have you decline food intake because of illness?	1.Yes 2.No	
302	What was your meal frequency practice in the previous 24 hours?	_____ times	
303	With whom you are feeding?	1.Always alone 2.Sometimes alone 3.Always with family Members 4.Sometimes with family members	
304	What is your pattern of time to have meal?	1.Regular (at the time of breakfast, lunch, snack and dinner) 2.Irregular (any time she/he eat when they get food)	

3b. Dietary Information

First ask if yesterday was a special day, like a celebration or feast day or a fast day where anyone in the household ate special foods or more or less than usual or did not eat because they were fasting. If yesterday was not a special day, then ask the respondent about the types of foods that they or anyone else in their household ate yesterday during the day and at night. If yesterday was a special day, then ask the respondent to describe the foods (meals and snacks) consumed the day before yesterday (or the last normal day up to 7 days) during the day and night, whether at home or outside the home.

	Food group	Items	Yes=1 No=0
1	Cereals	Teff, Wheat, Barley, Maize, Rice, corn/maize, sorghum, millet or any other grains or foods made from these (e.g. bread, porridge or other grain products)	
2	Vitamin A rich vegetables and fruits	Carrots, sweet potatoes, orange, avocado, mangoes, papaya, lemon.	
3	White roots and Tubers	white potatoes, yams	
4	Dark green leafy vegetables;	Spinach, avocado, endive, Swiss chard, salad, pepper	
5	Other vegetables, Fruits	Tomato, Onion, garlic, banana, other wild fruits, juice	
6	Organ and flesh	liver, kidney, other organ meats or blood-based foods	
7	Eggs	Raw eggs, roasted eggs	
8	Legumes, nuts and seeds	beans, peas, lentils, nuts, seeds or foods made from these	
9	Milk and milk Products	milk, cheese, yogurt or other milk products	
10	Oils and fats	oil, fats or butter added to food or used for cooking	
11	Sweet	sugar, honey, sweetened soda or sugary foods such as chocolates, candies, cookies and cakes	
12	Spices, condiments, beverages	Spices (black pepper, salt), condiments (soy sauce, coffee, tea, alcoholic beverages, chilies, local	

		beers	
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4. Wealth status questions

Section 2: wealth index for urban		
Number	Question	Response
401	Who is the owner of the house?	1. Me 2. Rental 3. Kebele 4. Other(specify _____)
402	What is the main material of the roof in your house?	1. Corrugated sheet 2. Plastic sheet 3. Other(specify _____)
403	What is the main material of the dwelling floor in your house?	1. Soil/sand 2. Wood 3. Ceramic tiles 4. Cement 5. Stone 6. Other(specify _____)
404	What is the main material of the exterior wall in your house?	1. Soil/sand 2. Bricks 3. Cement blocks 4. Stone 5. Wood 6. Other(specify _____)
405	How many rooms are available in this house?	_____
406	How many rooms in this house are used for sleeping?	_____
407	What is the main source of drinking water for member of your household?	1. Public tap stand 2. Piped to neighbor 3. Piped to yard/plot 4. Piped to dwelling 5. Bottle water 6. Other(specify _____)
408	Do you have a separate kitchen?	1. Yes 2. No
409	What type of toilet facility does this household use?	1. Water flush latrine 2. Ventilated improved pit latrine 3. Pit latrine 4. No latrine 5. Other(specify _____)
410	Does the household have electric power?	1. Yes 2. No
411	What type of fuel does your household mainly use for cooking?	1. Electricity 2. Wood 3. Charcoal 4. Biogas 5. Other(specify _____)
412	Does your household have the following materials?	1. Fixed phone 2. Refrigerator 3. Television 4. Electric mitad 5. Modern bed
413	Does any member of the household	1. Bicycle

	have the following resource?	2. Bajaj 3. Motor cycle 4. Car
414	Does any member of the household have mobile phone?	1. No 2. Smart phone 3. Not smart phone
415	What is the main source of income for the household?	1. Monthly salary 2. Trade 3. Support 4. Other(specify_____)
416	Does any member of this house hold have a bank or microfinance saving account?	1. Yes 2. No

5. Household Food Insecurity Access Scale (HFIAS) for Measurement of Food Access

No.	Question	Response Options
501.	In the past four weeks, did you worry that your household would not have enough food?	0 = No (skip to Q502) 1=Yes
501.a	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)
502.	In the past four weeks, were you or any household member not able to eat the kinds of foods you preferred because of a lack of resources?	0 = No (skip to Q503) 1=Yes
502.a	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)
503.	In the past four weeks, did you or any household member have to eat a limited variety of foods due to a lack of resources?	0 = No (skip to Q504) 1 = Yes
503.a	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)
504.	In the past four weeks, did you or any household member have to eat some foods that you really did not want to eat because of a lack of resources to obtain other types of food?	0 = No (skip to Q505) 1 = Yes
504.a	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)

		weeks)
505.	In the past four weeks, did you or any household member have to eat a smaller meal than you felt you needed because there was not enough food?	0 = No (skip to Q506) 1=Yes
505.a	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)
506.	In the past four weeks, did you or any other household member have to eat fewer meals in a day because there was not enough food?	0 = No (skip to Q507) 1=Yes
506.a	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)
507.	In the past four weeks, was there ever no food to eat of any kind in your household because of lack of resources to get food?	0 = No (skip to Q508) 1=Yes
507.a	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)
508.	In the past four weeks, did you or any household member go to sleep at night hungry because there was not enough food?	0 = No (skip to Q509) 1=Yes
508.a	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)
509.	In the past four weeks, did you or any household member go a whole day and night without eating anything because there was not enough food?	0 = No (skip to Q601) 1=Yes
509.a	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)

6. Anthropometric measurement

S. No	Anthropometric body measurements	Measurements		
		1 st	2 nd	Average

601	Weight of the participant in kilo gram (kg)	[] kg	[] kg	[] kg
602	Height of the participant in centimeter (cm)	[] cm	[] cm	[] cm
603	Mid upper arm circumference in (cm)	[] cm	[] cm	[] cm
604	Waist circumference in (cm)	[] cm	[] cm	[] cm
For only individuals with difficulty in height measurement				
605	Demi-Span in (cm)	[] cm	[] cm	[] cm
606	Knee height in (cm)	[] cm	[] cm	[] cm

7. Physical Activity Level Assessment by Global Physical Activity Questionnaire (GPAQ)

Physical Activity			
Next I am going to ask you about the time you spend doing different types of physical activity in a typical week. Please answer these questions even if you do not consider yourself to be a physically active person. Think first about the time you spend doing work. Think of work as the things that you have to do such as paid or unpaid work, study/training, household chores, seeking employment. In answering the following questions 'vigorous-intensity activities' are activities that require hard physical effort and cause large increases in breathing or heart rate, 'moderate-intensity activities' are activities that require moderate physical effort and cause small increases in breathing or heart rate.			
Questions	Response	Code	
Activity at work			
1	Does your work involve vigorous-intensity activity that causes large increases in breathing or heart rate like [carrying or lifting heavy loads, digging or construction work] for at least 10 minutes continuously?	1.Yes 2.No, If "No" skip to P4	P1
2	In a typical week, on how many days do you do vigorous-intensity activities as part of your work?	___ day/s	P2
3	How much time do you spend doing vigorous-intensity activities at work on a typical day?	___ Hr/s ___ Minutes	P3 (a-b)
4	Does your work involve moderate-intensity activity that causes small increases in breathing or heart rate such as brisk walking [or carrying light loads] for at least 10 minutes continuously?	1.Yes 2.No, If "No" skip to P7	P4
5	In a typical week, on how many days do you do moderate-intensity activities as part of your work?	___ day/s	P5
6	How much time do you spend doing moderate-intensity activities at work on a typical day?	___ Hr/s ___ Minute s	P6 (a-b)
Travel to and from places			
The next questions exclude the physical activities at work that you have already mentioned. Now I would like to ask you about the usual way you travel to and from places. For example to work, for shopping, to market, to place of worship.			
7	Do you walk or use a bicycle (pedal cycle) for at least 10 minutes continuously to get to and from places?	1.Yes 2.No, If "No" skip to P10	P7
8	In a typical week, on how many days do you walk or bicycle for at least 10 minutes continuously to get to and from places?	___ day/s	P8
9	How much time do you spend walking or bicycling for travel on a typical day?	___ Hr/s ___ Minutes	P9 (a-b)
Recreational activities			
The next questions exclude the work and transport activities that you have already mentioned.			
10	Do you do any vigorous-intensity sports, fitness or recreational (<i>leisure</i>) activities that cause large increases in breathing or heart rate like [<i>running or football,</i>] for at least 10 minutes continuously?	1.Yes 2.No, If "No"	P10

		skip to P13	
11	In a typical week, on how many days do you do vigorous-intensity sports, fitness or recreational (<i>leisure</i>) activities?	___ day/s	P11
12	How much time do you spend doing vigorous-intensity sports, fitness or recreational activities on a typical day?	___ Hr/s ___ Minutes	P12 (a-b)
13	Do you do any moderate-intensity sports, fitness or recreational (<i>leisure</i>) activities that causes a small increase in breathing or heart rate such as brisk walking, (<i>cycling, swimming, volleyball</i>) for at least 10 minutes continuously?	1.Yes 2.No, If "No" skip to P16	P13
14	In a typical week, on how many days do you do moderate-intensity sports, fitness or recreational (<i>leisure</i>) activities?	___ day/s	P14
15	How much time do you spend doing moderate-intensity sports, fitness or recreational (<i>leisure</i>) activities on a typical day?	___ Hr/s ___ Minutes	P15 (a-b)
Sedentary behavior			
The following question is about sitting or reclining at work, at home, getting to and from places, or with friends including time spent [sitting at a desk, sitting with friends, travelling in car, bus, train, reading, playing cards or watching television], but do not include time spent sleeping.			
16	How much time do you usually spend sitting or reclining on a typical day?	___ Hr/s ___ Minutes	P16 (a-b)

Annex III: Informed Consent Form (Amharic version)

አዲስ አበባ ዩኒቨርሲቲ ጤና ህይወት ኮሌጅ የህብረተሰብ ጤና አጠባበቅ ትምህርት ክፍል

የተጠያቂው/ የመላሸች የመረጃ ቅፅ

ጤና ይስጥልኝ ስሜ _____ ይባላል የመጣሁት ከአዲስ አበባ ዩኒቨርሲቲ የህብረተሰብ ጤና አጠባበቅ የስነምግባር ትምህርት ክፍል ተማሪ የሆነውን አብሳ አበበን ወክዬ ነው።

ጥናቱ ከምግብ እጥረት አንድ የሆነውና በተለምዶ” Chronic energy deficiency” ተብሎ የሚጠራውንና ተያያዥ ጉዳዮችን በተመለከቱ የሚደረግ ጥናት ስሆን አዲስ አበባ ከተማ ውስጥ የሚኖሩና እድመያቸው ከ50 በላይ የሆኑ ግለሰቦች ላይ የሚሰራ ነው።

እርስዎ በዚህ ጥናት ላይ እንዲሳተፉ የተመረጡት ቀድሞ በተዘጋጀው መስፈርት እና በተቀናጀ ምርጫ በተመረጠው ክፍል ከተማ እና ወረዳ ውስጥ በመኖራቸው ነው። በጥናቱ ላይ ያለ መሳተፍ ሙሉ መብት አለዎት። የእርስዎ ተሳትፎ ሙሉ በሙሉ በእርስዎ ሙሉ ፈቃድኝነት ላይ የተመሰረተ ነው።

ለመሳተፍ ፍቃደኛ ከሆኑ በኋላም በፈለጉት ጊዜ ማቆም ወይም ማቋረጥ ይችላሉ።

በጥናቱ ባለመሳተፍ የሚደርስበት ምንም አይነት ችግር አይኖርም። በጥናቱ ለመሳተፍ ከተስማሙ ከብደት፣ ቁመት እና የላይኛው የእጅ ክንድ ዙሪያ በመሳሪያ እንለካለን። በተጨማሪም የተወሰኑ ጥያቄዎችን እንጠይቃለን።

በመጠይቁ ጊዜ ጥሩ ስሜት ካልተሰማዎት በማንኛውም ጊዜ አቋርጠው መሄድ ይችላሉ። መጠይቁ እና ልኬቱ 30 ደቂቃ ያህል ይፈጃል።

የጥናቱ መጨረሻ ውጤት የአዲስ አበባ እና እትዮጵያ እድመያቸው ከ50 በላይ ለሆኑ ስነ ምግብ ድጋፍ እና ክትትል እንዲደረግላቸው የሚያበረታታ ፖሊሲ ለማዘጋጀት ይጠቅማል ፡ ፡

በመጨረሻም ከእርስዎ የምንሰበስበው መረጃ ከስምዎ ጋር አይያያዝም ስምዎ እንደማይጠቀስና ለማንም አ ካልተላለፈ እንደማይሰጥ ልናረጋግጥልዎት እንወዳለን። የዚህ ጥናት ውጤት ግን ተጠርዞ እና ተዘጋጅቶ ጉዳዩ ለሚመለከታቸው የጤና ድርጅቶች እና ባላድርሻ አካላት ሊሰጥ ይችላል።

የስምምነት መጠየቂያ/ማረጋገጫ ቅፅ ከላይ በሰጠንዎት መረጃ መሰረት በጥናቱ ላይ ለመሳተፍ ፈቃደኛ ነዎት?

ሀ .አዎ አናመስግናለን፤ መጠይቁ ን ቀጥል

ለ .አይደለሁም ወደ ቀጣዩ ተጠያቂ ሂድ

ፈቃደኛ ካልሆኑ ምክንያቱን ፅፈው ወደ ሚቀጥለው ተሳታፊ አለፍ _____

የተሳታፊ ፊርማ _____ ቀን _____

የመረጃ ሰብሳቢ ስም _____ ፍርማ _____

የመጠይቁ ቁጥር _____

የክፍል ከተማ _____ ወረዳ _____

መጠይቁ የተካሄደበት ቀን _____

የመጠይቁ ውጤት

ሙሉ ስም የተሞላ	
በክፍል የተሞላ	
ምንም ያልተሞላ	

በተቆጣጣሪዎች ተረጋግጧል ፡ ስም_____ፋርማ_____ ለ ተጨማሪ ማብራሪያ የዋና አጥኚውን
አድራሻ ይጠቀሙ

ስም፡ አብሳ አበበ በቀለ

ኢሜይል ፡ obsimanabebe34@gmail.com

ስልክ ፡ +251 946838622

Annex IV: Amharic version questionnaire

1. ማህበራዊ፣ ስነ-ህዝባዊ እና ኢኮኖሚያዊ ጥያቄዎች

ተ.ቁጥር	ጥያቄዎች	የመልስ አማራጮች	ወደ ሚቀጥለው ተሻገር
101	የታህ/ሽ ምንድነው?	1. ወንድ 2. ሴት	
102	እድሜህ/ሽ ስንት ነው?		
103	ሐይማኖትህ/ሽ ምንድነው?	1. ኦርቶዶክስ 2. ሙስሊም 3. ፕሮቴስታንት 4. ካቶሊክ 5. ሌላ (ይጠቀስ_____)	
104	የትዳር ሁኔታህ/ሽ ምንድነው?	1. ያላገባ/ች 2. ያገባ/ች 3. የፈታ/ች 4. የሞተችበት/ባት	
105	የትምህርት ደረጃህ/ሽ ምንድነው?	1. መፃፍ ማንበብ የማይችል/የማትችል 2. መፃፍ ማንበብ የሚችል/የምትችል 3. 1ኛ ደረጃ/1-8 ክፍል/ 4. 2ኛ ደረጃ/9- 12 / 5. ዲፕሎማና ከዚያ በላይ	
106	ስራህ/ሽ ምንድነው?	1. ነጋዴ 2. የመንግስት ሰራተኛ 3. የቀን ሰራተኛ 4. ጡረታ የወጣ/ች 5. የቤት እመቤት 6. ሌላ (ይጠቀስ_____)	
107	ግምታዊ የቤተሰብ ወርሃዊ ገቢ ስንት ነው?	(_____)	
108	ከማን ጋር ነው የሚኖሩት?	1. ከቤተሰብዎ ጋር 2. ብቻዎትን 3. ሌላ (ይጠቀስ_____)	
109	የቤተሰብዎ ብዛት ስንት ነው?	(_____)	

2. የጤና ሁኔታ

201	ባለፉት ሶስት ወራት ውስጥ ታመው ያውቃሉ?	1. አዎ 2. አይ	መልስ አይ ካሆነ ወደ 203 ተሻገር
202	ለጥ.ቁ. 201 መልስዎ አዎ ከሆነ ያመመዎ ምንድን ነበር?	ይጥቁሱ.....	
203	ከዚህ በፊት ስር የሰደደ(የቆየ) በሽታ እንዳለብዎ ተነግሮዎት ያውቃል?	1.አዎ 2.አይ	መልስ አይ ካሆነ ወደ 205 ተሻገር
204	ለጥ.ቁ. 203 መልስዎ አዎ ከሆነ ያመመዎ የትኛው በሽታ ነው?	1.ደም ግፊት 2.ስኳር 3.ቲቢ 4.ኤች. አይ.ቪ 5.ሌላ (ይገለፅ)	
205	እንቅልፍ የማጣት ችግር አለብት?	1.አዎ 2.አይ	
206	ከባለፈው አመት ጀምሮ ሆስፒታል ውስጥ ተኝቶ ታከሟል?	1.አዎ 2.አይ	
207	ስጋራ ያጭሳሉ?	1. አይ	

		2.በፊት አጨስ ነበረ 3. አሁንም አጨሳለሁ	
208	አልኮል ያለበት መጠጥ ይጠጣሉ?	1. አይ 2.በፊት እጠጥ ነበረ 3. አሁንም እጠጣለሁ	

3. የአመጋገብ ልማድ

301	በህመም ምክንያት የምግብ ፍላጎትህ ቀንሷል?	1.አዎ 2.አልቀነሰም	
302	ትናንት (በ24 ሰዓት ውስጥ) ስንት ጊዜ ተመግበሃል?	1.አንድ ጊዜ 2.ሁለት ጊዜ 3.ሶስት ጊዜ 4.አራት ጊዜ 5.አምስትና ከዚያ በላይ	
303	ማዕደዎን ከማን ጋር ነው የሚመገቡት ?	1. ሁልጊዜ ብቻዎትን 2. አንዳንድጊዜ ብቻዎትን 3.ሁልጊዜ ከቤተሰብ ጋር 4.አንዳንድጊዜ ከቤተሰብ ጋር	
304	የማዕድ አመጋገብ ጊዜዎ ምን ይመስላል?	1. ሰዓቱን ጠብቆ ቁርስ፣ ምሳ፣ መክሰስ እና እራት 2. በተገኘው ጊዜ ከመመገቢያ ሰዓት ውጭ	

የቤተሰብ አመጋገብ

በመጀመሪያ ቀኑ ሌዩ ቀን መሆኑን ጠይቆ ማለት ለየት ያለ ክብር በዓል፤ የአፅዋማት ቀን መሆኑን፤ ከተለመደው የአመጋገብ ሁኔታ ያነሰ ወይም የበለጠ የተመገቡ መሆኑን ወይም ይህ ልሆን የቻለው እየሾሙ መሆኑን ጠይቅ፡፡

የትናንትና ምርጥ ማዕድ ቀርቦ የሚበላበት ቀን ካልሆነ የቀረው የቤተሰብ አባላት በትናንትናው ቀን እና ማታ የተመገቡትን ጠይቅ?
የትናንትና ቀን ለየት ያለ ቀን ከሆነ ከትናንትና በፊት ወይም ላለፈት ሰባት ቀናት የተመገቡት ምግብ በቤት ውስጥም ሆነ ከቤት ውጪ እንደሆነ እንዲገልፁልህ/እንዲዘረዝሩልህ ጠይቅ?

	የምግብ ምድብ	ዝርዝሮች	አዎ=1 የለም=0
1	እህልና የእህል ዘሮች	ጤፍ፣ ስንዴ፣ ጉበስ፣ ማሽላ፣ በቆሎ፣ ሩዝ፣ ዳጉሳ (ዳቦ፣ እንጀራ፣ ንፍሮ፣ ቆሎ፣ ገንፎ፣ ፓስታ፣ መኮረኒ)	
2	በቫይታሚን ኤ የበለጸጉ ፍራፍሬ እና ስራ ስር ምንጮች	ሰኳር ድንች፣ ፓፓያ፣ ማንጎ፣ ካሮት፣ ትርንጎ፣ አቮካዶ፣ ብርቱካን፣ ሎሚ	
3	ስራ ስሮች	ቀይ ስር፣ ድንች	
4	ጥቁር አረንጓዴ ቅጠል ያላቸዉ የጓሮ አትክልቶች	ሰላጣ፣ ቆስጣ፣ ጎመን፣ ቃሪያ፣ አቮካዶ፣ ጥቅል ጎመን	
5	ሌሎች የጓሮ አትክልቶች እና ፍራፍሬዎች	ቲማቲም፣ ቀይ ሽንኩርት፣ ነጭ ሽንኩርት፣ ዋንዛ፣ እንጀራ፣ ሙዝ፣ የአትክልት ጭማቂዎች	
6	ስጋ እና የስጋ ዉጤቶች	ኩላሊት፣ ጉበት፣ ጥብስ፣ ቅቅል፣ ዶሮ ወጥ፣ ቀይወጥ	
7	እንቁላል	እንቁላል ፍርፍር፣ እንቁላል በስጋ፣ እንቁላል ሳንዱች	
8	ጥራ ጥሬ	ባቄላ፣ አተር፣ ምስር፣ ጓያ፣ ሽንብራ፣ (ሽሮ ወጥ፣ ከክ፣ ምስር ወጥ)	
9	ወተት እና የወተት ምርቶች	ጥሬ ወተት፣ አይብ፣ እርጎ፣ አጓት	
10	ዘይት እና ስብ	ዘይት፣ ቅቤ፣ የአትክልት ቅቤ፣	
11	ጣፋጭ ምግቦች	ሰኳር፣ ማር፣ ለስላሳ መጠጦች፣ ቸኮሌት፣ ከረሚላ፣ ኩኪስ	
12	መጠጦች፣ቅመሞች	በርበሬ፣ ጨዉ፣ ቡና፣ ሻይ፣ የአልኮል መጠጦች	

4. የቤተሰብ የሃብት ምጣኔ ሁኔታ እና ተያያዥ ጥያቄዎች

ተ. ቁ	ጥያቄ	የመልስ አማራጭ
401	መኖሪያ ቤትዎ የማን ነው?	1.የእርስዎ(የግለሰብ) 2.ከግለሰብ ኪራይ 3.የቀበሌ 4.ሌላ (ይገለፅ)

402	የቤቱ ጣራ የተሰራው ከምንድን ነው?	1. ቀርቆሮ ክዳን 2. ላስቲክ ክዳን 3. ለላ(ይገለፅ)	
403	የመኖሪያ ቤቱ ወለል ከምን የተሰራ ነው?	1. አፈር/አሸዋ 2. እንጨት 3. ሰራሚክ 4. በስሚንቶ 4. ድንጋይ 5. ለላ (ይገለፅ)	
404	የቤቱ ግድግዳ የተሰራው ከምንድን ነው?	1. አፈር/አሸዋ 2. ጡብ 3. በስሚንቶ 4. ድንጋይ 5. እንጨት 5. ለላ	
405	ስንት ክፍሎች አሉት?	በቁጥር	
406	ስንት ክፍሎች ለመገኘት ያገለገሉ?	በቁጥር	
407	የቤት ዋና ወሃ ምንጭ	1. የህዝብ ቧንቧ 2. የነሮቤት ቧንቧ 3. የጓሮ ቧንቧ 4. የመኖሪያ ግቢ ቧንቧ 5. ሃይላንድ ወሃ 6. ለላ (ይገለፅ)	
408	ወጥ ቤት ከመኖሪያ ቤት የተለየ ነው?	1. አዎ 2. አይ	
409	ቤተሰብዎ በዋናነት ምን አይነት ሽንት ቤት ነው ምትጠቀሙ?	1. በወሃ የሚወርድ 2. የአየር መተንፈሻ የተጠመለት የጉድጓድ ሽንት ቤት 3. የጉድጓድ ሽንት ቤት 4. መኖሪያ ቤቱ ሽንት ቤት የለውም 5. ለላ (ይገለፅ)	
410	መኖሪያ ቤቱ የእሌክትሪክ ሃይል አለው?	1. አዎ 2. አይ	
411	ምግብ ለማብሰል የምትጠቀሙት ምንድን ነው?	1. ኤሌክትሪክ 2. እንጨት 3. ክሰል 4. ባዮጋስ 5. ሌላ (ይገለፅ)	
412	ቤተሰብዎ የተጥቀሱን ቁሶች አለው?	1. የቤት ስልክ 2. ፍርጅ 3. ቴሌቪዥን 4. የእሌክትሪክ ምጣድ 5. ዘመናዊ አልጋ	
413	ቤተሰብዎ የተጥቀሱን ሃብት አለው?	1. ብስክሌት 2. ባጃጅ 3. ሞተር ሳይክል 4. መኪና	
414	ቤተሰብዎ አባል ስልክ ያለው አለ?	1. አይ 2. ስማርት ስልክ 3. ስማርት ያልሆነ ስልክ	
415	የቤተሰብዎ ዋናው ገቢ ምንጭ ምንድን ነው?	1. የወር ደሞዝ 2. ንግድ 3. እርዳታ	

		4. ለላ(ይገለፅ _____)	
416	ከቤተሰብዎ አባል የባንክ /ማይክሮፋይናስ የቁጠባ ደብተር ያለው አለ?	ሀ. አዎን ለ. የለም	

5 . የቤተሰብ የምግብ ዋስትናን የሚዳስሱ ጥያቄዎች

501	ባለፉት አራት ሳምንታት ውስጥ ቤተሰብዎ በቂ ምግብ አላገኘም ብለው አስበው (ተጨንቀው) ነበር?	ሀ) አዎ ለ) አይ
501.ሀ	መልስዎ አዎ ከሆነ፣ ምን ያህል ጊዜ ተከስቶ ያዉቃል?	1 =አልፎ አልፎ (1 ወይም 2 ጊዜ) 2 =አንዳንድ ጊዜ (ከ 3-10 ጊዜ) 3 =ብዙ ጊዜ (ከ 10 ጊዜ በላይ)
502	ባለፉት አራት ሳምንታት ውስጥ እርስዎ ወይም ከቤተሰብ አባልዎ መካከል በገንዘብ እጥረት ምክንያት የመረጣችሁትን ምግብ ሳትመገቡ የቀራችሁበት ጊዜ ነበር?	ሀ) አዎ ለ) አይ
502.ሀ	መልስዎ አዎ ከሆነ፣ ምን ያህል ጊዜ ተከስቶ ያዉቃል?	1=አልፎ አልፎ (1 ወይም 2 ጊዜ) 2 =አንዳንድ ጊዜ (ከ 3-10 ጊዜ) 3 =ብዙ ጊዜ (ከ 10 ጊዜ በላይ)
503	ባለፉት አራት ሳምንታት ውስጥ እርስዎ ወይም ከቤተሰብ አባልዎ መካከል በገንዘብ እጥረት ምክንያት ውስን የምግብ አይነት ተመግበዋል?	ሀ) አዎ ለ) አይ
503.ሀ	መልስዎ አዎ ከሆነ፣ ምን ያህል ጊዜ ተከስቶ ያዉቃል?	1 =አልፎ አልፎ (1 ወይም 2 ጊዜ) 2 =አንዳንድ ጊዜ (ከ 3-10 ጊዜ) 3 =ብዙ ጊዜ (ከ 10 ጊዜ በላይ)
504	ባለፉት አራት ሳምንታት ውስጥ እርስዎ ወይም ከቤተሰብ አባልዎ መካከል በገንዘብ እጥረት ምክንያት ሌሎች የምግብ አይነቶችን ባለማግኘትዎ መመገብ የማይፈልጉትን የምግብ አይነት ተመግበዋል?	ሀ) አዎ ለ) አይ
504.ሀ	መልስዎ አዎ ከሆነ፣ ምን ያህል ጊዜ ተከስቶ ያዉቃል?	1=አልፎ አልፎ (1 ወይም 2 ጊዜ) 2 =አንዳንድ ጊዜ (ከ 3-10 ጊዜ) 3 =ብዙ ጊዜ (ከ 10 ጊዜ በላይ)
505	ባለፉት አራት ሳምንታት ውስጥ እርስዎ ወይም ከቤተሰብ አባልዎ መካከል በገንዘብ እጥረት ምክንያት በቂ ምግብ ባለመኖሩ ከሚያስፈልግዎ (ከበቂ) ቦታች የሆነ ምግብ ተመግበው ያውቃሉ?	ሀ) አዎ ለ) አይ
505.ሀ	መልስዎ አዎ ከሆነ፣ ምን ያህል ጊዜ ተከስቶ ያዉቃል?	1=አልፎ አልፎ (1 ወይም 2 ጊዜ) 2 =አንዳንድ ጊዜ (ከ 3-10 ጊዜ) 3 =ብዙ ጊዜ (ከ 10 ጊዜ በላይ)
506	ባለፉት አራት ሳምንታት ውስጥ እርስዎ ወይም ከቤተሰብ አባልዎ መካከል በገንዘብ እጥረት ምክንያት በቂ ምግብ ባለመኖሩ በቀን ውስጥ ከሚያስፈልግዎ ጊዜ በታች ተመግበው ያውቃሉ?	ሀ) አዎ ለ) አይ
506.ሀ	መልስዎ አዎ ከሆነ፣ ምን ያህል ጊዜ ተከስቶ ያዉቃል?	1=አልፎ አልፎ (1 ወይም 2 ጊዜ) 2 =አንዳንድ ጊዜ (ከ 3-10 ጊዜ) 3 =ብዙ ጊዜ (ከ 10 ጊዜ በላይ)
507	ባለፉት አራት ሳምንታት በቤተሰብዎ ውስጥ በገንዘብ እጥረት ምክንያት ምግብ ባለማግኘትዎ በቤትዎ ውስጥ ምንም አይነት የሚበላ ምግብ አጥተው ነበር?	ሀ) አዎ ለ) አይ
507.ሀ	መልስዎ አዎ ከሆነ፣ ምን ያህል ጊዜ ተከስቶ ያዉቃል?	1=አልፎ አልፎ (1 ወይም 2 ጊዜ) 2 =አንዳንድ ጊዜ (ከ 3-10 ጊዜ) 3 =ብዙ ጊዜ (ከ 10 ጊዜ በላይ)
508	ባለፉት አራት ሳምንታት ውስጥ እርስዎ ወይም ከቤተሰብ አባልዎ መካከል በገንዘብ እጥረት ምክንያት ምግብ ሳትመገቡ አድራችሁ ታውቃላችሁ	ሀ) አዎ ለ) አይ

508.ሀ	መልስዎ አዎ ከሆነ፣ ምን ያህል ጊዜ ተከስቶ ያዉቃል?	1=አልፎ አልፎ (1 ወይም 2 ጊዜ) 2 =አንዳንድ ጊዜ (ከ 3-10 ጊዜ) 3 =ብዙ ጊዜ (ከ 10 ጊዜ በላይ)
509	ባለፉት አራት ሳምንታት ውስጥ እርስዎ ወይም ከቤተሰብ አባልዎ መካከል በገንዘብ እጥረት ምክንያት ሙሉ ቀንና ማታ ያለምንም ምግብ መመገብ ያሳለፋችሁት ጊዜ ነበር?	ሀ) አዎ ለ) አይ
509.ሀ	መልስዎ አዎ ከሆነ፣ ምን ያህል ጊዜ ተከስቶ ያዉቃል?	1=አልፎ አልፎ (1 ወይም 2 ጊዜ) 2 =አንዳንድ ጊዜ (ከ 3-10 ጊዜ) 3 =ብዙ ጊዜ (ከ 10 ጊዜ በላይ)

6.አንትሮፖሜትሪክ የሰውነት ልኬት ሁኔታ

ተ.ቁ	አንትሮፖሜትሪክ የሰውነት ልኬት	ልኬቶች		
		ልኬት 1	ልኬት 2	አማካይ
601	የተሳታፊ ክብደት በኪሎ ግራም	[_____]ኪ.ግ	[_____]ኪ.ግ	[_____]ኪ.ግ
602	የተሳታፊ ቁመት በሰንጠረዥ	[_____]ሰንጠረዥ	[_____]ሰንጠረዥ	[_____]ሰንጠረዥ
603	የክንድ ዙሪያ ሌኬት	[_____]ሰንጠረዥ	[_____]ሰንጠረዥ	[_____]ሰንጠረዥ
604	የሆድ ዙሪያ ሌኬት	[_____]ሰንጠረዥ	[_____]ሰንጠረዥ	[_____]ሰንጠረዥ
ቁመት ለመለካት ለምክብድ ሰዎች ብቻ(ለምሳሌ ቀጥ ብሎ መቆም ለማይችሉ፣ፍፁም መቆም ለማይችሉ፣ወዘተ)				
605	የእጅ ርዝመት ሌኬት	[_____]ሰንጠረዥ	[_____]ሰንጠረዥ	[_____]ሰንጠረዥ
606	የጉልበት ቁመት ሌኬት	[_____]ሰንጠረዥ	[_____]ሰንጠረዥ	[_____]ሰንጠረዥ

የአካል እንቅስቃሴ			
ከዚህ በመቀጠል የተለያዩ እንቅስቃሴዎች በማድረግ ሰለሚያሳልፉት ጊዜ ጥያቄዎች አቀርብልዎታለሁ። ራስዎን ብዙ የአካል እንቅስቃሴ እንደማያደርጉ ሰው ብቆጥርዎ/ብያሱብም እንኳን ለጥያቄዎቹ መልስ ይስጡ። በመጀመሪያ ስራ በመስራት ሰለሚያሳልፉት ጊዜ ያስቡ። ስራ ስባል በከፍተኛ ወይም ያለከፍተኛ የሚሰሩ እንደ እነ ቤት ውስጥ የሚሰሩ ስራዎች፣መደበኛ ስራዎችን ያጠቃልላል። ጥያቄዎቹ ስመልሱ “ብርቱ ጉልበት የምጠይቅ ተግባር” የሚባለው ከባድ ጉልበት የሚያስወጣ እና የልብ ምት ወይም የመተንፈስ መጠን በብዙ የምጨምር ተግባር ሲሆን “መጠነኛ ጉልበት የምጠይቅ ተግባር” የሚባለው ደግሞ መጠነኛ ጉልበት የሚያስወጣ እና የልብ ምት ወይም የመተንፈስ መጠን በትንሹ የምጨምር ተግባር ነው።			
ጥያቄ	መልስ	መለያ	
ከስራ ጋር የተያያዙ እንቅስቃሴዎች			
1	ስራዎች ብርቱ ጉልበትን የምጠይቅ ተግባር የልብ ምትን ወይም የመተንፈስ መጠንን በብዙ የምጨምር ለምሳሌ ከባድ እቃ መሸከም/ማንሳት፣መቆፈር፣የግንባታ ስራና የመሳሰሉት ሆኖ ተከታታይ በትንሹ ለ10 ደቂቃ የሚሴራ አለው?	1.አዎ 2.አይ, አይ ከሆኑ ወደ P4 ተሻገር	P1
2	መልስዎ አዎ ከሆኑ ዘወትር በሳምንቱ ለስንት ቀናት ብርቱ ጉልበትን የምጠይቅ ተግባር ያከናውናሉ?	___ ቀን/ቀናት	P2
3	ብርቱ ጉልበትን የምጠይቅ ተግባር የሚያከናውኑበት እለት ለምን ያህል ጊዜ ይሰራሉ?	___ ሰአት ___ ደቂቃ	P3 (a-b)
4	ስራዎች መጠነኛ ጉልበትን የምጠይቅ ተግባር የልብ ምትን ወይም የመተንፈስ መጠንን በትንሹ የምጨምር ለምሳሌ ቀላል እቃ መሸከም/ማንሳት፣ፈጣን እርምጃና የመሳሰሉት ሆኖ ተከታታይ በትንሹ ለ10 ደቂቃ የሚሴራ አለው?	1.አዎ 2.አይ, አይ ከሆኑ ወደ P7 ተሻገር	P4
5	መልስዎ አዎ ከሆኑ ዘወትር በሳምንቱ ለስንት ቀናት መጠነኛ ጉልበትን የምጠይቅ ተግባር ያከናውናሉ?	___ ቀን/ቀናት	P5
6	መጠነኛ ጉልበትን የምጠይቅ ተግባር የሚያከናውኑበት እለት ለምን ያህል ጊዜ ይሰራሉ?	___ ሰአት ___ ደቂቃ	P6 (a-b)
ከጉዞ ጋር የተያያዙ እንቅስቃሴዎች			
አሁን ደግሞ ቀደም ብሎ ከገለፁልኝ ተግባራት ለላ ከቦታ ወደ ቦታ ለምሳሌ ወደ ስራ፣ገቢያ፣ቤት ክርስቲያን፣መስጂድና የመሳሰሉት እንደት እንደምንቀሳቀስ እጠይቅዎታለሁ።			
7	ከቦታ ወደ ቦታ ለመንቀሳቀስ ያለማቋረጥ ቢያንስ ለ10 ደቂቃ በእግርዎ ወይም በብስክሌት ይጓዛሉ?	1.አዎ 2.አይ, አይ ከሆኑ ወደ P10 ተሻገር	P7
8	ዘወትር በሳምንቱ ለስንት ቀናት ቢያንስ ለ10 ደቂቃ በእግርዎ ወይም በብስክሌት ይጓዛሉ?	___ ቀን/ቀናት	P8
9	ቢያንስ ለ10 ደቂቃ በእግርዎ ወይም በብስክሌት በሚጓዙ ቀን ምን ያህል ጊዜ በጉዞ ላይ ያሳልፋሉ?	___ ሰአት ___ ደቂቃ	P9 (a-b)
ከዚህ የምከተሉት ጥያቄዎች በትርፍ ጊዜዎች የሚያከናውናቸውን ተግባራት ይመለከታል።ለመዝናናት፣ለአካል ብቃት ወይም ለስፖርታዊ እንቅስቃሴ ሲባል የሚያደርጉትን ተግባራት ያስቡ።በስራ ወይም በጉዞ ላይ የሚያደርጉትና ቀደም ብሎ የተዘረዘሩትን አይጨምርም።			
10	ብርቱ ጉልበትን የምጠይቅ ስፖርት፣አካል ብቃት፣መዝናኛ ተግባር ሆኖ የልብ ምትን ወይም የመተንፈስ መጠንን በብዙ የምጨምር ለምሳሌ ሩጫ፣እግር ኳስ መጫወትና የመሳሰሉት ተከታታይ በትንሹ ለ10 ደቂቃ ያደርጋሉ?	1.አዎ 2.አይ, አይ ከሆኑ ወደ P13 ተሻገር	P10
11	ዘወትር በሳምንቱ ለስንት ቀናት ቢያንስ ለ10 ደቂቃ ብርቱ ጉልበትን የምጠይቅ ስፖርት፣አካል ብቃት፣መዝናኛ ተግባር ሆኖ የልብ ምትን ወይም የመተንፈስ መጠንን በብዙ የምጨምር ለምሳሌ ሩጫ፣እግር ኳስና የመሳሰሉት ተከታታይ በትንሹ ለ10 ደቂቃ ያደርጋሉ?	___ ቀን/ቀናት	P11
12	ቢያንስ ለ10 ደቂቃ ብርቱ ጉልበትን የምጠይቅ ስፖርት፣አካል ብቃት፣መዝናኛ ተግባር ሲያደርጉ ቀን ምን ያህል ጊዜ በተግባሩ ያሳልፋሉ??	___ ሰአት ___ ደቂቃ	P12 (a-b)
13	መጠነኛ ጉልበትን የምጠይቅ ስፖርት፣አካል ብቃት፣መዝናኛ ተግባር ሆኖ የልብ ምትን ወይም የመተንፈስ መጠንን በትንሹ የምጨምር ለምሳሌ ብስክሌት መንዳት፣መዋኘት፣የእጅ ኳስ መቻወትና የመሳሰሉት ተከታታይ በትንሹ ለ10 ደቂቃ ያደርጋሉ?	1.አዎ 2.አይ, አይ ከሆኑ ወደ P16 ተሻገር	P13
14	ዘወትር በሳምንቱ ለስንት ቀናት ቢያንስ ለ10 ደቂቃ መጠነኛ ጉልበትን የምጠይቅ ስፖርት፣አካል ብቃት፣መዝናኛ ተግባር ሆኖ የልብ ምትን ወይም የመተንፈስ መጠንን በትንሹ የምጨምር ያደርጋሉ?	___ ቀን/ቀናት	P14
15	ቢያንስ ለ10 ደቂቃ መጠነኛ ጉልበትን የምጠይቅ ስፖርት፣አካል ብቃት፣መዝናኛ ተግባር ሲያደርጉ ቀን ምን ያህል ጊዜ በተግባሩ ያሳልፋሉ??	___ ሰአት ___ ደቂቃ	P15(a-b)
ከዚህ የምከተለው ጥያቄ ስራ ቦታ/ቤት/ከጓደኞች ጋር በመቀመጥ፣ወዲያ ወድህ በማለት፣አውቶ-በስ/ባብር/ታክሲ ውስጥ በመቀመጥ፣ማንበብ፣ካርታ በመጫወት፣ተሌቪዥን በመመልከትና የመሳሰሉትን በመስራት ሰላሳላፉት ጊዜ ይሆናል። ግን በእንቅልፍ ያሳለፉትን ጊዜ አይጨምርም።			
16	በቀን ምን ያህል ጊዜ በመቀመጥ ወይም በመንጋለል ያሳልፋሉ?	___ ሰአት ___ ደቂቃ	P16 (a-b)

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I. Educational Background

1. Bsc degree of Public Health

Period of study: October 2017-February 2022

Program: Public Health

Institution: Arsi University

2. Ethiopian Higher Education Entrance Certificate

Period of study: October 2015-July 2017

Program: Preparatory Program

Institution: Nunu Preparatory School

3. Ethiopian General Secondary Education Certificate

Period of study: October 2013-July 2015

Program: High School

Institution: Nunu High School

II. Professional Experience

Graduate Assistant-II

Duration of Employment: from October 2022-October 2023

Institution: Arsi University, College of Health Sciences, Asella

Assistant Lecturer

Duration of Employment: Since October 2023

Institution: Arsi University, College of Health Sciences, Asella

Clinical Intern

Duration: October 2020- October 2021

Institution: Shashemene Referral Hospital

Teaching

Lecture undergraduate Nursing students of Arsi University on Human Nutrition

Lecture undergraduate Laboratory students of Arsi University on Human Nutrition

Lecture undergraduate Anesthesia students of Arsi University on Biostatistics

Skills, Interests and Hobbies

Statistical soft-wares as (SPSS,EPI-INFO,EPIDATA,R,STATA,WHO ANTHRO,ANTHRO PLUS, ENA, IMAPP) and Online data collection platforms as Odk, Kobo

Good communication skills

Future Plans and Interests

Upgrade my Level of education

Master on my area of study

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Date of birth: Nov 29, 1975

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Education:

Mar 06, 2012 – Oct 24, 2018: PhD from Maastricht University, The Netherlands.

Sept 2002 – July 2004: Masters Degree in Public Health from Addis Ababa University, Ethiopia.

Sept 1994 – July 2000: Doctor of Medicine from University of Gondar, Ethiopia.

Professional Experience

Sept 28, 2017 – Present: Associate Professor, School of Public Health, Addis Ababa University

Nov 13, 2006 – Sept 27, 2017: Assistant Professor, School of Public Health, Addis Ababa University.

Oct 2019 – Present: PhD Program Coordinator at the School of Public Health, AAU

May 2010 – October 2017 – Head, Nutrition Unit, Department of Reproductive Health and Health Service Management.

Sept 2010 - Nov 2012: Program Coordinator for the Masters program, School of Public Health.

Sept 2007 - Jan 2009: Program Coordinator for a Masters Program in Health Informatics at Addis Ababa University.

Sept 2005 - Oct 2005: Served as a consultant for the Champion Communities Initiative by Health Communication Partnership/USAID-Ethiopia.

Dec 2004 - Oct 2005: - Head of the department of Community Health, and Research and Extension Office- College of Health Sciences, Hawassa University - Ethiopia.

Feb 2001 - Sept 2002: - Lecturer and Community Based Education Coordinator in Dilla College of Teachers' education and Health science - Ethiopia.

Taught the following courses (Epidemiology, Biostatistics, Public Health Nutrition, Health Economics, and Health Education and served as advisor for various student research projects) to students of Masters in Public Health, Medicine, Public Health Officers, Medical Laboratory Technology, and Environmental Health.

Nov-Feb 2000: Worked as a clinician (Medical Doctor) at Kemissie Health Center, Amhara Regional state, Ethiopia.

Ongoing projects:

Performance Monitoring for Action (PMA-Ethiopia) - PMA-Ethiopia is a survey project designed to generate both cross-sectional and longitudinal data

on a variety of reproductive, maternal, and newborn health indicators that can inform both national and regional governments. Support is provided by the Bill & Melinda Gates Institute for Population and Reproductive Health at the Johns Hopkins Bloomberg School of Public Health and funded by the Bill & Melinda Gates Foundation.

Guttmacher Institute/USA – Co-PI for Capacity strengthening partnership in abortion research.

Teaching responsibilities

I teach health research methods (including Systematic Literature Review) and public health nutrition courses to undergraduate medical students and graduate students in Public Health. I advise thesis research projects of MPH and PhD students on various public health issues. I have advised over 90 graduate students in public health and health informatics since 2007.

Publications (peer-reviewed journals)

2024

Magnitude and determinants of early initiation and exclusive breastfeeding at six weeks postpartum: evidence from the PMA Ethiopia longitudinal survey. Addisalem Zebene Armdie, Bedilu Alamirie Ejigu, Assefa Seme, Selamawit Desta, Mahari Yihdego and Solomon Shiferaw. International Breastfeeding Journal (2024) 19:1 <https://doi.org/10.1186/s13006-023-00611-y>

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