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Undernutrition and Associated Factors Among Prisoners in Bahr Dar Zone Prison Center, North West Ethiopia, 2021

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BAHIR DAR UNIVERSITY

COLLEGE OF MEDICINE AND HEALTH SCIENCES

SCHOOL OF PUBLIC HEALTH

DEPARTMENT OF NUTRITION AND DIETETICS

**UNDERNUTRITION AND ASSOCIATED FACTORS AMONG PRISONERS
IN BAHR DAR ZONE PRISON CENTER, NORTH WEST ETHIOPIA, 2021.**

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**A THESIS SUBMITTED TO DEPARTMENT OF NUTRITION AND
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Study area	Bahir Dar Zone prison center
Study period	October 1 to 30, 2021 G.C.
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ACRONYMS & ABBREVIATIONS

AIDS.....	Acquired Immuno Deficiency Syndrome
AOR.....	Adjust Odd Ratio
BMI.....	Body Mass Index
CI.....	Confidence Interval
COR.....	Crud Odd Ratio
EAR.....	Estimated Average Requirements
EDTA.....	Ethylene Diamine Tetra Acetic Acid
HIV.....	Human Immuno deficiency Virus
ICPR.....	Institute for Criminal Policy Research
OR.....	Odds Ratio
OSS-3.....	Oslo-3 Social Support Scale
PLHIV.....	People Living with Human Immuno Deficiency Virus
SPSS.....	Statistical Package for Social Sciences
UDHR.....	Universal Declaration of Human Right
WHO.....	World Health Organization
WPB	World Prison Brief
HTN.....	Hypertension
DM.....	Diabetes Mellitus
TB.....	Tuberculosis

ABSTRACT

Background:- Adequate food and nutrition is a central component of life in correctional institutions. Prisoners usually comprise marginalized sections of society and they are risk groups nutritionally due to inadequate diet intake, interims of quality and quantity. However, there is no adequate studies on the nutritional statuses of prisons in Ethiopia including the study area.

Objective:- To assess undernutrition and associated factors among prisoners in Bahir Dar Zone prison center, Ethiopia, 2021 GC.

Methods:- An institution based cross-sectional study was conducted among randomly selected 582 prisoners from october 1 to oct 30,2021. Interviewer-administered sumi-structured questionnaire was used to collect the required data. Body mass index(BMI) was assessed to determine the nutritional status of prisoners. Data were entered to Epi-info statistical soft ware Version 7 and exported to SPSS version 23 for analysis. Both bi-variable and multi-variable logistic regression analysis were used to identify factors associated with undernutrition. In multi-variable binary logistic regression analysis variables with p value <0.05 were considered as significant. Adjusted odds ratio (AOR) and 95% confidence intervals (CI) were used to measure the strength of association.

Results:-The prevalence of undernutrition was 17.5%(95%CI:14.3, 21). Imprisonment history(AOR:4.98,95%CI:2.80,8.86), history of cigarret smoking (AOR:5.38,95%CI:2.86,10.13), imprisonmentduration(AOR:1.82,95%CI:1.04,3.19),diarrhealdiseases(AOR:1.98,95%CI:1.15,3.41),depression(AOR:3.23,95%CI:1.88,5.57), socialsupport (AOR:7.09,95%CI:3.57,14.05) were factors significantly increases the odd of undernutrition.

Conclusion: The magnitude of undernutrition was found to be 17.5% . Imprisonment history,duration of imprisonment, history of cigarret smoking,depression, social support and experiencing of diarrheal diseases were factors associated with undernutrition. Thus,appropriate social support and depression reduction intervention are essential to reduce undernutrition.

Key words:- Undernutrition, Prison, Bahir Dar prison center, Ethiopia

1.INTRODUCTION

1.1 Background

Undernutrition denotes insufficient intake of energy and nutrients to meet an individual's needs to maintain good health(1).

Prisoners are persons confined in prison after being convicted of crimes; are entitled, under the Due Process Clause of the constitution, to be free from unauthorized and intentional deprivation of their personal property by prison officials(2). The basic rights of prisoners include right to food and water, right to have an attorney to defend himself, protection from torture, violence and racial harassment(3).

Adequate nutrition is a basic human right and those in prison should be provided with healthy food choices to optimise health(4). The quality and amount of food offered in a prison has a significant impact on a prisoner's quality of life; the supply of safe and nutritious food is vital to maintaining and improving the health of inmates & aid in the prevention of diet-related diseases(5). Food provided must be adequate to maintain good health and nutrition, and it also must, if medically necessary, meet the needs of prisoners with conditions requiring special diets, such as diabetics, prisoners who have had heart attacks(6). .

In the prison settings prisoners gained food from institutionally-run catering services, self-cook facilities, prison shops or canteens, and informal food preparation among inmates which may take place in spite of institutional rules that prohibit such activities & it also include opportunities for incarcerated people to cook and eat with their visitors and participate in garden or farming programmes(7).

In Ethiopia, prisoners primarily acquire their food from the prison. Food in Ethiopian prisons is inadequate in both quality and quantity for those confined, and there are no nutritional criteria set down in state or federal laws or policies.(8). In all of the prisons, the main food is injera (local bread) and stew, which is mainly made with beans and contains no meat(9).

Prisons typically comprise marginalized sections of society and at high nutritional risk due to lack of diet diversity, as these prisoners depend on few kinds of food for a long time and in a situation, adequacy of nutritional requirement is a great issue of concern(10).

Prisoners may not eat due to; for religious reasons, as a part of specific religious festivals or if food is served that is not prepared in accordance with religious precepts; because of somatic problems such as dental problems, ulcer, obstructions of the digestive tract, very poor general health and fever; mental disorders and anorexia nervosa & most hunger-striker prisoners follow dietary fasts with consumption small amounts of food containing of certain vitamins, trace minerals(11). However, a prolonged hunger strike poses a substantial risk of permanent damage to the nervous system(12).

In 2013, WHO and the United Nations Office on Drugs and Crime (UNODC) published a policy brief on the organization of prison health, Good governance for prison health in the 21st century, with the main findings of; states have a special, sovereign duty of care for prisoners: they are accountable for all avoidable health impairments to prisoners caused by inadequate health care measures or inadequate prison conditions with regard to hygiene, catering, space, heating, lighting, ventilation, physical activity and social contacts; and also prison health services should be integrated into national health policies and systems(13).

According to the 2021 report by World Prison Brief (WPB) and Institute for Criminal Policy Research (ICPR) report, in Ethiopia, the total prison population was 112,361 since 2010 E.C with prison population rate of 127 per 100,000, which is roughly increases to 113,727 by 2013/2014 EC(14). According to Article 25 (1) of the Universal Declaration of Human Rights (UDHR), one of the basic human rights that prisoners must have is access to enough and healthy food choices to suit their nutritional demand(15).

Ethiopia has developed food and nutrition policy, since 2018, with the direction of food security is sustainably ensured when all people, at all times, access to sufficient, safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life; through the implementation of development of legal and accountability framework from national up to kebele level, and involvement of multi sectoral integration at all level(16); while there is no policy & specific strategy developed, which focus on prevention of under nutrition in prisoners.

1.2 Statement of problem

Globally more than 462 millions people are suffering from undernutrition(17). Through out the world more than 10.74 million people are imprisoned, in Africa more than 1.16 million people are imprisoned and in Ethiopia more than 113 thousand people are imprisoned(14).

Nutritional problems in prison can result in severe adverse outcomes and also increase the risk of developing acute and chronic nutritional deficiency diseases(18). Prisoners are at increased risk of undernutrition and the consequences of undernutrition are significant, which includes; reduced muscle and tissue mass, decreased mobility and strength, and an increased risk of chest infection and respiratory failure, delay recovery from sickness, slower immune response, difficulty staying warm(hypothermia), poor libido, fertility problems,& it also increases the rate of mortality(4, 19). Apart from the serious consequences for a person's health, undernutrition has an economic impact that hinders economic development and perpetuates poverty, both directly and indirectly, through lost productivity due to poor physical condition and poor cognitive function and learning deficits; furthermore, undrnutrition raises health-care costs(20).

The living conditions in most prisons of the world are unhealthy due to conditions like overcrowding, violence, lack of light, fresh air and clean water, lack of food and infection-spreading activities such as tattooing are common and also rates of infection with TB, HIV/AIDS and hepatitis are much higher than in the general population(21). Prison conditions not only contribute to the risk of transmission, it also hastens the progression of HIV and deterioration in the health of prisoners living with HIV/AIDS(22).

The literature indicates that factors that leads prisoners to undernutrition includes old age, male sex, history of previous incarceration, long duration of incarceration, lack of financial support, sleeping in group, depression, taking two meals a day instead of three meal(10, 23-25).

The prisons' health system is inadequate in almost all developing countries and, particularly in Sub-Saharan Africa (SSA) including Ethiopia, and high prevalence of energy depletion infectious diseases, like pulmonary tuberculosis and HIV/AIDS which leads to malnutrition(24).

The Ethiopian government has developed national nutrition program(NNP) I; in order to provide optimal nutrition for all citizens, with special attention and priority given to the vulnerable groups such as pregnant and lactating women, infants and U5children, people living with HIV/AIDS, food insecure households ,refuges, the elderly, prisoners, and boarding school students(26). Though some challenges faced in the implementation of NNP I; those are adolescent nutrition and lifestyle related malnutrition initiatives, including communicable and non-communicable diseases, were not implemented or monitored & existing structure is not strong enough to coordinate NNP implementation with clearly defined responsibilities and accountabilities(27). To address these challenges, the socond NNP developed with the main aim of maintaining the achievements of the first phase and addressing challenges; which has focused on life cycle approach and multisectoral integration & nutrition governance but also it has challenges of implimentation which makes difficult to bring effective change & to achieve expected goals(28).

Ethiopia also recently developed Food and Nutrition Policy, since 2018, with the main objective of ensure availability, accessibility and utilization of diversified, safe and nutritious foods in a sustainable way to all citizen, at all time(16);inspite of this, prisoners in low- income country,like Ethiopia, are common with undernutrition(24).

Nutritional problems are frequently neglected in low-income countries, particularly among vulnerable groups such as prisoners(25); in most cases, government agencies & stakeholders give little attention & priority to the nutritional status of prisoner(10). Previously few studies were conducted in Ethiopia but focused on nutritional status of prisoners with comorbidities such as: HIV/AIDS and respiratory tract infection and those studies were not include participants with problem of spinal curvature/kyphosis & leg deformities(25, 29).

So this study was assessed undernutrition and associated factors among prisoners in general and includes variables; such as experience of diarrheal disease in the last two week and febrile illness in last two week, respiratory illness in the last two week, number of toilet, availability of Shower services were included, which were not include in the previous studies. This helps assess the gap in the study area in relation to undernutriton

1.3 Significances of the study

This study will be an important impute for policymakers/ human right watching groups , prison administration, and other stakeholders to intervene & to improve the nutritional status of prisoners.

The findings of this research will be helpful / serve as a bench mark for other Comprehensive study both in the study area & other part of Ethiopia and for meta -analysis study at national level.

It will provide insight to the community with prisoners are part of the community & they need diversified food as the general population to maintain their health & to prevent diet related disease to make them productive within the prison & after they release.

2. LITERATURE REVIEWS

2.1 Magnitude of undernutrition among prisoners

A cross-sectional study which was done in India found that 57.5% of prisoners were undernourished (30). Another cross-sectional study done in Papua, New Guinea revealed that 5% of the prisoners were underweight (BMI < 18.5) (31).

A cross-sectional study which was conducted in Pakistan found that 39.7% were underweight (32). Likewise another study which was done in Bangladesh stated that 22.11% undernourished (33). Another research which was done in Madagascar, Antanimora prison on nutritional status of female prisoners showed that 38.4% of women prisoners were undernourished (BMI < 18.5 kg/m²) (34).

A study which was done in Nigeria showed that 4% of prisoners were underweight (35). A research which was done on Democratic Republic of Congo revealed that 51.3% of prisoners were undernourished (36).

A cross-sectional study which was done in North Gondar showed that 38.8% of prisoners were undernourished (24) and another similar study conducted in Mizan Tepi prison institute showed that the magnitude of undernutrition was 18.6% (10). Other cross-sectional study conducted in North Showa revealed that 19.3% of prisoners were undernourished (23).

2.2. Factors associated with undernutrition of prisoners

2.2.1. Demographic and socioeconomic characteristics of prisoners

A study conducted in India revealed that undernutrition in women prisoners was higher than men(37). Other study which was done in Madagascar, Antanimora prison on nutritional status of female prisoners conclude that lack of financial assistance from family were increase the odd of undernutrition(34).

A cross-sectional study conducted in Tigray region conclude that longer duration of incarceration was significantly increased risk of underweight while those who had family support decreases the odd of under nutrition and farmer participant occupation lowers the risk of underweight(25). Other cross-sectional study conducted in Mizan Tepi revealed that being in the age category of 18–29 years, imprisonment history and longer duration of imprisonment were factors significantly increased the risk of undernutrition while have family support decreases the odd of undernutrition(23).

A cross-sectional research conducted in North Showa reflected that older/age group ≥ 40 yrs, participants who were unable to read and write and having poor social support were increases the risk of undernutrition but respondents who were divorced negatively associated with undernutrition(23). Another study done in North Gondar found that prisoners who were incarcerated ≥ 12 month were more underweight than shorter incarcerated period ≤ 12 month (26.8% Vs 22.8%)(24).

2.2.2 Known chronic illness /morbidity related factors

HIV/AIDS and malnutrition independently cause progressive damage to the immune system and increased susceptibility to infection(22). A study which was done in Democratic Republic of Congo on nutritional status of inmates revealed that presence of tuberculosis, human immunodeficiency virus increased the odd of undernutrition(36).

A cross-sectional study conducted in North Gondar revealed that participants who had self reported diseases/ any illness in the past 15 days had more likely under nutrition; illness has an effect on nutritional status of an individual(24).

A cross-sectional study conducted in Mizan Tepi revealed that having depression was significantly increased the risk of undernutrition(10). Likewise a research conducted in North Showa replied that depression disorder & HIV/AIDS were factors significantly increase the risk of developing undernutrition(23).

2.2.3 Work related factors of prisoners

A cross-sectional study conducted in North Gondar found that having work in the prison was decreases the odd of undernutrition (24).

2.2.4 Behavioural characteristics of prisoners

A cross-sectional study done in Pakistan showed history of smoking, addicted to Naswar, pan, gutka and heroin, ganja (cannabis), charas (hashish form of cannabis), and opium ,which was increases the odd of undernutrition(32).

The study which was conducted in Nigeria revealed that smoker prisoners were increases the risk of undernutrition as compared to non smokers(30). Other study conducted in Tigray region revealed that prisoners who chewed khat were increases the risk of undernutrition (25).

2.3 Conceptual frame work

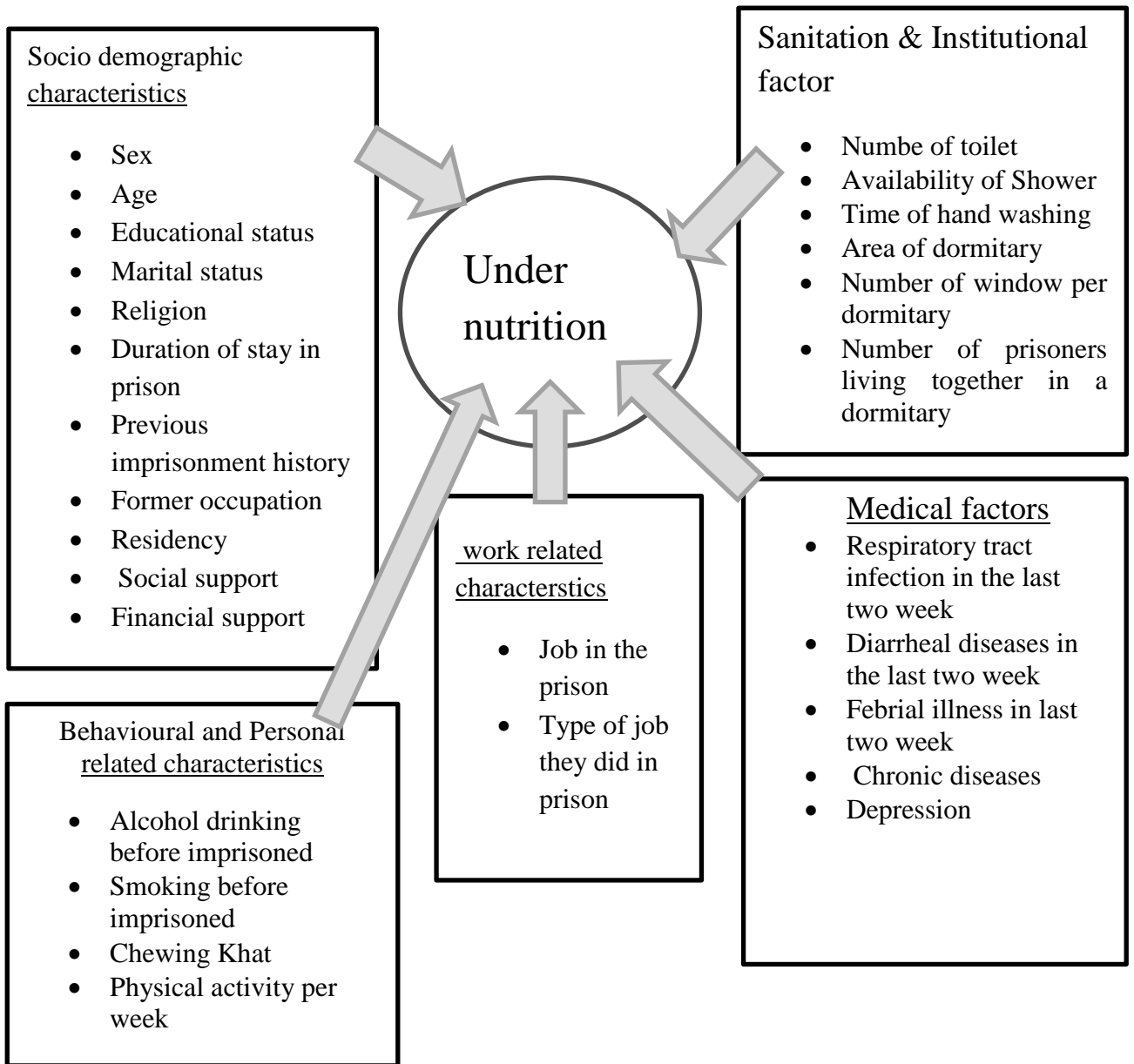


Figure 1. Conceptual framework that shows factors of undernutrition among prisoners in Bahir Dar prison centers, Northwest, Ethiopia, 2021(23-25, 29, 34).

3. OBJECTIVE

3.1 General Objective

To assess undernutrition and associated factors among prisoners in Bahir Dar Zone prison center, Northwest, Ethiopia, 2021 GC.

3.2 Specific Objectives

- To determine the prevalence of undernutrition among prisoners in Bahir Dar Zone prison center, Northwest, Ethiopia, 2021 GC.
- To identify factors associated with undernutrition among prisoners in Bahir Dar Zone prison center, Northwest, Ethiopia, 2021 GC.

4. METHODS AND MATERIALS

4.1. Study area

Bahir Dar prison center is one of the major prisons in Amhara region. It is located in Sebatamit kebele which is 11 km far from Bahir Dar city, behind Tibebe Gihion specialized Hospital. It has 1 clinics which contains (2 Deploma & 2Bsc Nurse), 1 Diploma & 1Bsc pharmacy, 1 Diploma Laboratory Technician), 1 primary School(grade1-8), 1 secondary school (grade 9-12), 24 teachers, 12 toilet houses & 12 shower rooms, 12 water pipe, 1 foot ball sport field, 1 vally ball field & 1 cafeteria. Some volunter prisoners participate in working of edetibeb, tiller & home vegeterian. It accommodates thousands of inmates every year and; about 2186 adult prisoners were incarcerated. From these male account 2136 & female =50. The food menu of the prison has weekly scheduled with break fast containing 1 cup of tea & 200 gm of bread, lunch contains shiro watt with injera & dinner containing Kik watt with injera, exception of Miser watt with injera on Wednesday & Sunday without snack foods; this meal schedule continoue through out the year except holiday.

4.2. Study design and period

Institutional based cross-sectional study was conducted from October 1-October 30, 2021 G.C.

4.3. Source population

All prisoners in Bahir Dar prison center and whose age ≥ 18 years.

4.4. Study population

All prisoners in Bahir Dar prison center whose age ≥ 18 years & stayed more than six month..

4.5. Inclusion and exclusion criteria

Inclusion criteria:-

All prisoners whose age greater ≥ 18 years and stay for at least 6 months.

Exclusion criteria:-

Prisoners who have hearing impairment and have lower extrimity edema(elephantiasis).

4.6. Sample size and sampling procedures

4.6.1. Sample size

By considering the following assumptions the total sample size for this study is calculated as: by using 95% confidence interval, marginal error of 4%, Proportion 38.8 % (24). Non response rate 5%. By taking an average of 2186 prisoners incarcerated per month; From those about 1864 were stayed in the prison greater than or equal to six month (from monthly registration of prisoners).

Using single proportion formula

$$\begin{aligned}n &= z^2 \frac{p(1-p)}{d^2} \\ &= (1.96)^2 \frac{(0.388)(0.612)}{(0.04)^2} \\ &= 571\end{aligned}$$

The final sample size = initial sample size + Non response rate 5% = 571 + 29 = 600

For the second specific objective factor associated with undernutrition. In this case the sample size is calculating by using EPI Info version 7 software program that are studied previously(10, 23, 25)

Table 1. sample size determination for undernutrition by using factor associated with undernutrition(10, 23-25).

Determinates	%unexposed	AOR	Power	CL(%)	Sample size+5% non response rate
Age 40-49	54.7	3.014	80	95%	129
Khat chewing	23.2	2.68	80	95%	158
Depression	21	5.04	80	95%	59
Social support	20	2.83	80	95%	120
Imprisoned history	61.7	2.31	80	95%	234

From the above sample size determination by using associated factors of undernutrition among prisoners. From those factors; imprisonment history gives relatively larger sample size 234. But total sample is 600 that get from single population formula is larger than the factors sample size. Therefore the total sample size was 600.

4.6.2.Sampling technique & Procudere

Simple random sampling technique was used to select the study participants. First, Obtaining the lists of all prisoners from the prison record, then selecting list of prisoners whose age \geq 18 years & stayed six month and above in the prison,then giving ID for selected study populations. Finally computer-generated random number selection technique was used to selecte 600 study participants.

4.7 Study variables

4.7.1 Dependent variable

- Under nutrition(Yes,No)

4.7.2 Independent variable

Socio demographic characteristics

- Sex
- Age
- Educational status
- Marital status
- Religion
- Residence before imprisoned
- Occupation before imprisoned
- History of imprisonment
- Duration of stay in prison/ total (Length of sentence / punishment)
- Social support
- Financial support

Sanitation & Institutional related factors

- Time of washing hands
- Shower frequency/week
- Area of dormitory
- Number of toilet
- Number of prisoners living together in a single dormitory
- Number of windows in a dormitory

Behavioural and Personal related characteristics

- Physical Activity per week
- Alcohol use before imprisoned

- Smoking before imprisoned
- Chewing khat

Work related factors

- Job in the prison
- Type of job they did in the prison like waving, tiller in the prison center

Medical factors/types of self reported illness

- Respiratory tract infection in the last two week
- Diarrheal disease in the last two week
- Febrile illness in last two week
- Chronic diseases, like TB, HTN, DM, HIV/AIDS
- Depression

4.8. Definition of Terms & Operational definitions

Undernutrition:- Participants who had BMI less than 18.5kg/m² considered as undernutrition while those who had BMI \geq 18.5 kg/m² considered as not undernutrition (38).

Prison:- an institution for the confinement of persons who have been remanded (held) in custody by a judicial authority or who have been deprived of their liberty following conviction for a crime(39).

Physical activity:- The participants' physical activity was measured using the global physical activity questionnaire (GPAQ) that include both work and recreational activities and divided activities in to moderate and intense intensity. Total time(minute) spent in intense physical activity during a typical week were multiplied by eight & total time(minute) spent in moderate physical activity in a week were multiplied by four. The total amount of activity was added up and divided into two categories: physically active (600+ MET minutes per week) and physically inactive (<600MET minutes per week)(40).

Duration of stay in prison:- prisoners who are sentenced in the prisons that stay \geq 12 month considered as longer to stay in the prison, prisoners that stay <12 month considered as short imprisonment period(10).

Khat chewing:- Participants were classified as chat chewers if they utilized chat for more than five years in his/her life time and chewed for more than four hours & and over 100g of khat per session & If they utilized chat for less than five years and chewed for less than four hours & and over 100g of khat in a single chewing session consider as not chewer(41).

Cigarette smoking:- Participants who had smoked at least 100 cigarettes in his or her life time before they were incarcerated were classified as smoker & participants who had smoked < 100 cigarette ever in his/her life consider as non smoker(42).

Alcohol consumption.:- If an adult consume any type of alcohol up to four drink(measured in cup(1cup = 25ml) for areki & wine(1 cup=125ml), glass for Tella,bottle for beer(1 small bottle/glass = 330ml)) of alcohol per day/14 drink per week considered as moderate/ normal drinker.

If an adult consumes more than four drinks of alcohol per day/ more than 14 drinks of alcohol per week — consider as drinker(43).

Social support:- Based on Oslo-3 Social Support Scale (OSS-3) respondents who have a score of 3-8 of the OSS-3 considered as having poor social support, a score of 9-11 of the OSS-3 considered as having moderate social support & a score of 12-14 of the OSS-3 are considered as having strong social support(44).

Depression :- Depression was measured by using PHQ-9, which has 9 items with a 5 point severity scale over the last 2 weeks preceding the survey. Those who score ≥ 10 were considered as having depression disorder(45).

Diarrheal Diseases:- It is a symptom of the passage of three or more loose or liquid or bloody stools per day (or more frequent passage than normal).

Participants who reported that having giardia, amebiasis, hookworm, typhus, cholera considered as having diarrheal diseases in the past two weeks while participants who had not been diagnosed with giardia, amebiasis, hookworm, typhus, cholera considered as not having diarrheal diseases(46).

Febrile illness:- Participants who reported that having malaria, pneumonia, typhoid, typhus considered as having febrile illness in the past two weeks but who had not been diagnosed with malaria, typhoid, typhus considered as not having febrile illness(47).

Respiratory illness:- Participants who had reported symptoms of common cold or a clinician observed symptoms and participants who reported that having COPD, pneumonia, Covid 19 & asthma in the past two weeks considered as having respiratory illness(48).

Shower frequency:- It depends in part on your life style but taking a shower two to three times a week (≥ 2 times/week) is enough to maintain good health(49).

Financial support:- The provision of monetary resources including money or capital and credit; obtaining or furnishing money or capital for a purchase or enterprise and the funds so obtained (i.e. If an individual gains any resource from others considered as having financial support(50).

4.9. Data Collection tools and procedures

Data were collected by using interviewer administered semi-structured questionnaire that include socio demographic factors, institutional related factors, behavioral related factors, diseases related factors and work related factors. The questionnaire was pretested in 5% of study participants, who are incarcerated in Motta prison. Anthropometrics measurements of participants were determined by recording the weight and height of individuals. GPAQ was used to measure physical activity, OSSS-3 was used to assess the social support scale & PHQ-9 was used to measure depression level, OSSS-3 and PHQ-9 were used & validated in the previous study in North shewa.

Physical activity

The participants' physical activity was measured using an adaptation of the global physical activity questionnaire (GPAQ) that took into account both work and recreational activities. The activities were divided into two categories: moderate and intense intensity. Total time spent in physical activity during a typical week (i.e. duration of physical activity in minutes and frequency of physical activity per week) and intensity of physical activity were multiplied by four for moderate intensity and eight for intense intensity.

The total amount of activity was added up and divided into two categories: physically active (600+ MET minutes per week) and physically inactive (600MET minutes per week). The ratio of a person's working metabolic rate to their resting metabolic rate is measured in METs. . One MET is defined as the energy cost of sitting quietly, and is equivalent to a caloric consumption of 1kcal/kg/hour(40)

Anthropometric measurements

The weight of the participants was measured using mobile weight scale and the height was measured by using tape meter. The weight scale was calibrated to zero before measuring each participant and the accuracy of the instrument was checked by measuring the weight of a known object.

By measuring the height of an object with a known height, the accuracy of the stadiometer was also tested. Both measurements were taken wearing only light clothing, bare feet, and without a hat. The weight was calculated to the closest 0.1 kilogram.

When measuring height, the patient should stand with his or her heels together and weight evenly distributed. Patient positioning should be with the shoulder blades, buttocks, and heels should touch vertical backboard/ tape meter. Shoes off, feet together and arms by the sides; eyes looking straight ahead (Frankfurt plane) so that the line of sight was perpendicular to the body. . When measuring body weight, the subject stands still with their hands by their sides. Remove your shoes and any unnecessary clothing. The values of height was recorded to the nearest 0.1 cm. Weight and height was measured twice and taking average of weight & height, and BMI (weight/height (kg/m²)) was computed. According to the guidelines, the best technique of determining a prisoner's nutritional status is to utilize the body mass index (BMI)(51).

➤ **Anthropometric measurement of disabled person with Spinal curvature**

Arm span is the distance between the tips of the middle finger of one hand to the other with the trunk upright, arms stretched wide apart sideways and parallel to the ground surface.

Arm span measurement was used to estimate the height of disabled persons with curvature of the spine, weakness of back muscles or weakness in the leg muscles. In order to do so the participant must be able to stretch out their arms, hands and fingers in straight line and the measure requires two people.

1. The participant should remove any bulky clothing.
2. The participant should stand against a vertical surface such as a wall or door frame for support.
3. Ask the participant to stretch out arms, hands and fingers with palms facing forwards. Support can be given to maintain arm position perpendicular to the body.
4. The tape measure should be placed at the end of the middle finger on the right hand and held in place.
5. The second measurer should then stretch out the tape across the body to the middle finger of the left hand.
6. Check that the tape is horizontal to the floor.
7. Record the measurement on the data entry form to the nearest 0.1 cm.

8. Take the measurement at the tip of the middle finger of the left hand.

Height in centimeters for males = $56.9 + (0.64 * \text{arm span})$ and for women $53.4 + (0.64 * \text{arm span})$

Then by considering variations BMI-in arm span cut-offs equivalent to BMI-ht cut-offs: for both male & female BMI-ht cut offs measurement is 18.5kg/m^2 but BMI-in arm span cut offs is different (i.e for male BMI cut offs is 17.1Kg/m^2 & for female 17.7Kg/m^2).

BMI in arm span for male $+1.4 \text{Kg/m}^2 = \text{BMI in height measurement}$.

BMI in arm span for female $+0.8 \text{kg/m}^2 = \text{BMI in height measurement}(52)$.

4.10. Data quality assurance

Data quality was insured by translating the questionnaire from English to Amharic and then back-translated to English by language experts to keep the consistency of the questions. A pre-test was administered to 5% of the study participant, in Motta prison inmates. Based on the result of the pre-test some modifications of items (such as wording and order of questions) was made. Three data collectors(2 Bsc & 1 diploma nurses) were trained for two days to ensure that everyone understand the purpose of the study, how to measurement of weight and height, and how to approach each participant. Weight and height was measured twice and taking average to decrease measurement error. The completeness, accuracy and consistency of the collected data was checked daily by principal investigator. The measuring scales was regularly tested and calibrated before each measurement by using objects with known weight and height measurements.

4.11. Data processing and analysis

Data were cleaned, coded and entered into Epi-info statistical soft ware Version 7 and exported to SPSS version 23 for further analysis. To assess undernutrition of the study subject, anthropometric data was converted to BMI and compared to the standard reference. Descriptive statistics was presented with graphs and tables.

The relationship between the dependent and independent variables was investigated using an odds ratio with a 95% confidence. A binary logistic regression was used to analyze the association between the outcome variable (undernutrition) and the independent variables. Bi-variable logistic regression analysis was performed to estimate the relative contribution of each variable to the outcome variable, while multi-variable logistic regression analysis was used to determine the effect of several factors on the outcome variable. Data of bi-variable analysis with p-value of less than 0.25 was candidate variables to enter multi-variable analysis; those variables with p-value of less than 0.05 in multi-variable analysis was considered as significant factors with undernutrition. Multicollinearity was checked by checking the variance inflation factor (VIF)($p=1.02$). Hosmer-Lemeshaw Goodnes of Fit Test ($p=0.78$) was used to check the fitness of model to determine whether the model adequately describes the data.

4.12. Ethical considerations

Ethical clearance was obtained from the Ethical Review Board of Bahir Dar University College of Medicine and health sciences. Written letter for the next steps was adopted from Bahir Dar prison administration office. Consent was obtained from each study participants after informing them all the purpose, benefit, risk, their right to refuse or discontinue participation, at any point of time during data collection and also the confidentiality of the information and the voluntary nature of the participation in the study and the name of the participants is not collected. Each participant was clearly informed in advance that their participation would not be considered in decisions regarding his /her release or future detention. Participation is completely voluntary, with no economic or other motivational incentive and a written informed consent was taken from each participant.

The possible prevention methods of Corona Virus Disease 19 (COVID-19) was implemented during data collection.

4.13. Dissemination of Finding

The result of this study will be presented to Bahir Dar University as partial fulfillment of the degree of Master of Science in public human nutrition. It will be submitted to Bahir Dar prison administrative office and other who are concerned at regional or federal level.

It will be also presented at seminar and workshops, and submitted to different journal for publications.

5. RESULTS

5.1 Socio-demographic characteristics of the respondents

From the total sample of 600 prison inmates;582 were interviewed in the study, which is response rate of 97%. The mean \pm SD of the participants age were 34.6 (\pm 10.169) years & whose age ranges from 18 to 65 years. About 238 (40.9%) of the participants were in the age group of 26 to 35 years. About 543(93.3%) of prisons were male and 498(85.6 %) were Christians Orthodox in religion. Regarding occupation 213(36.6%) of them were farmers and 122(21%) had imprisonment history & more than half of participants 313(53.8%) were living in prison for duration of \geq 12months. More than half 323(55.5%) had poor social support (Table2).

Table 2: Socio demographic characteristics of prisoner in Bahir Dar prison center, north west Ethiopia, 2021. (N= 582)

Variable	Category	Frequency	Percent(%)
Age	<=19	8	1.4
	20-24	78	13.4
	25-29	137	23.5
	30-34	110	18.9
	35-39	81	13.9
	40-44	60	10.3
	45-49	35	6
	>50	73	12.5
Sex	Male	543	93.3
	Female	39	6.7
Educational status	Unable to read & write	107	18.4
	Able to read & write	108	18.6
	Primary(grade1-8)	121	20.8
	Secondary(grade 9-12)	110	18.9
	College & above	136	23.4
Marital status	Single	247	42.4
	Married	268	46
	Divorced	53	9.1
	Widowed	14	2.4
Religion	Orthodox	498	85.6
	Muslim	51	8.8
	Protestant	30	5.2
	Others ^a	3	0.5
Residence	Urban	262	45
	Rural	320	55
Occupation before imprisonment	Farmer	213	36.6
	Merchant	99	17

	Civil servant	72	12.4
	Student	107	18.4
	Others ^b	91	15.6
Duration of imprisonment	<12month	269	46.2
	>=12 month	313	53.8
History of imprisonment	Have history of imprisonment	122	21
	Have no Hx of imprisonment	460	79
Social support	Poor social support	323	55.5
	Moderate social support	137	23.5
	Strong social support	122	21
Financial support	Yes	189	32.5
	No	393	67.5

a-Catholic

b-Driver,Daily laborer

5.2 Sanitation and institutional characteristics of prisoners

Out of the total respondents, about sixteen(2.7%) of respondents were not washing hands before eating and seventeen(2.9%) of participants were not practice washing hands after defication. About 158(27.1%) of prisoners were taking shower <2 times/week.

Table 3: Sanitation and Institutional characteristics of prison inmates in Bahir Dar prison, north west Ethiopia, 2021(N=582)

Variable		Characterstics		Frequency	Percent(%)
Time of washing hands		Wash hand before eating		566	97.3
		not Wash hand before eating		16	2.7
		Wash hand after eating		564	96.9
		Not Wash hand after eating		16	3.1
		Wash hand after defication		565	97.1
		Not Wash hand after defication		17	2.9
Shower frequancy/week		>=2 times/week		424	72.9
		<2 times/week		158	27.1
Type of dormitary	No-of class	Area of a single dormitary	No-of window for each	Average no-of prisoners in each dormitary	Average no-of prisoners share a toilet
Larger class/dormitary	44	30m*6m=180m2	30	58	28
Small Dormitary	18	3m*3m=9m2	1	2	

5.3 Behavioural characteristics of prisoners

From the total respondents 76 (13.1%) were cigarette smoker before incarcerated & 72(12.4%) had history of chewing Khat and 375(64.4%) were alcohol users. More than half 305(52.4%) had physical inactivite (Table 4).

Table4: Behavioural characteristics of prison incarcerated in Bahir Dar Zone prison center, north west Ethiopia, 2021 (N=582)

Variables	Charactersics	Frequency	Percent
Smoking status	Non smoker	506	86.9
	Smoker	76	13.1
No cigarret smoked/life time	<100 cigarret/life time	40	6.9
	>=100 cigarret/life time	36	6.2
Alcohol drinking status	Non Drinker	207	35.6
	Drinker	375	64.4
Amount of alcohol drunk	<=14 drink/week	267	45.9
	>14 drink/week	108	18.6
Chewing status	No	510	87.6
	Yes	72	12.4
Hours spent on Khat chewing in a single occasion	<=4 hour	68	11.7
	>4 hour	4	0.7
Years elapsed on Khat chewing	<=5 years	21	3.6
	>5 years	51	8.8
Amount of chewed Khat per session	<100 gram	18	3.1
	>100 gram	54	9.3
Physical activity	Physical inactive	305	52.4
	Physical active	277	47.6

5.4 Morbidity related characteristics

More than one sixth 105(18%) of participants had chronic diseases like DM,HTN,HIV/AIDS & TB. Of the total participants 249(42.8%),178(30.6%), 153(26.3%) had respiratory illness, dearrheal diseases & febrile illness in the past two weeks respectively.

Based on the responses of prisoners nearly half of the respondents 280(48.1%) had depression.

Table 5: Morbidity related characteristics among the respondents Bahir Dar prison, north west Ethiopia, 2021 (N=582).

Variables	Response	Frequency	Percent(%)
Chronic disases	No	477	82
	Yes	105	18
Type of chronic diseases	Diabetis Millitis	31	5.3
	Hypertension	20	3.4
	HIV/AIDS	25	4.2
	Tuberculosis	11	1.9
	Other chronic disease ^a	19	3.3
Respiratory illnes in the past 2 week	No	333	57.2
	Yes	249	42.8
Type of respiratory illnes in the past 2 week	Common cold	153	26.3
	Asthma	45	7.7
	Pneumonia	35	6
	Other respiratory illness ^b	19	3.3
Diarrheal diseases	No	404	69.4
	Yes	178	30.6
Type of diarheal disease in the past 2 week.	Gardia	82	14.1
	Amebia	61	10.5
	Other ^c	12	2.1
Febrile illness	No	429	73.7
	Yes	153	26.3
Type of febrile illness in the past 2 week	Malaria	31	5.3
	Typhoid	29	5
	Other ^d	14	2.4
Depression	Not depressed	302	51.9
	Depressed	280	48.1

a-kidney stone, liver disease,bile stone

b- sinusitis

c- hook worm

d-typhus

5. Work related characteristics of prisoners in Bahir Dar Zone prison center

Out of the total respondents only 160 (27.5%) had job in the prison. Among the the total participants 40(6.9%) were tillers ,49(8.4%) were wavers and 71(12.2%) were doing other job.

Table 6: Work related characteristics of prisoners in Bahir Dar prison center, north west Ethiopia, 2021 (N=582)

Variables	Response	Frequency	Percent
Job in the prison	Yes	160	27.5
	No	422	72.5
Type of job you did	Tiller	40	6.9
	Waving	49	8.4
	Others ^a	71	12.2

a-waiter in the cafeteria, yejisira

5.6 Prevalence of undernutrition among prisoners

In this study the prevalence of undernutrition was 17.5% (95% CI:14.3, 21) & the mean body mass index of the participants were 21.505kg/m² with (SD=±2.569). (Fig2).

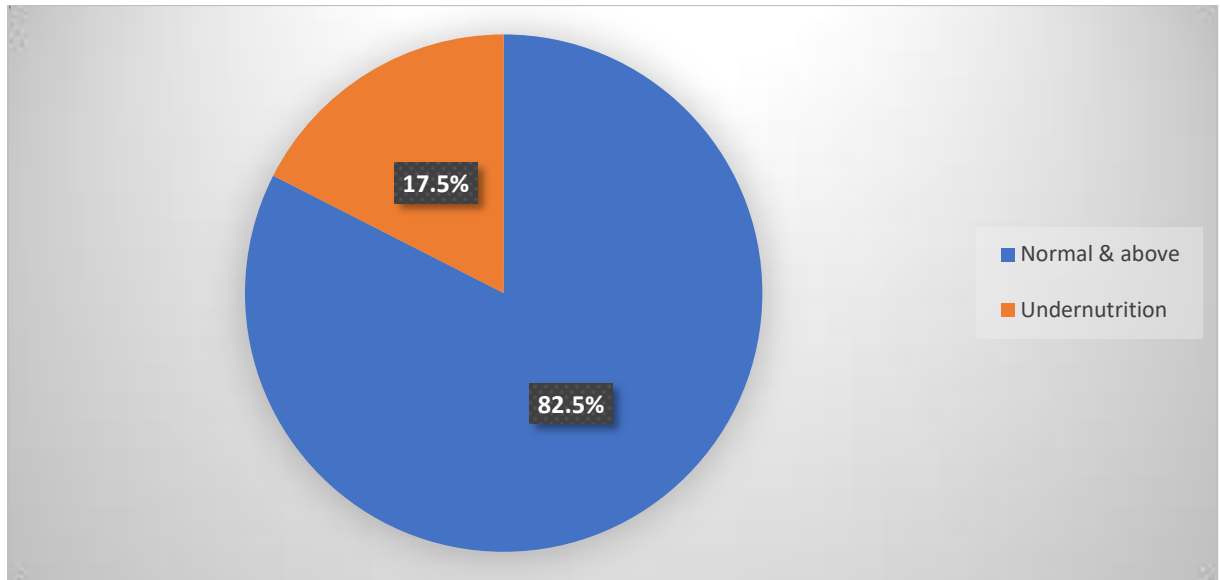


Fig2. The prevalence of undernutrition among prisoners incarcerated in Bahir Dar prison center, north west Ethiopia, 2021 (N=582)

5.7 Factors associated with undernutrition among prisoners incarcerated in Bahir Dar Zone prison center.

The bi-variable analysis result showed that imprisonment history, duration of imprisonment, history of smoking, chronic diseases, experience of respiratory diseases in the past two weeks, experience of diarrheal diseases in the past two weeks, depression, social support, physical activities were significant factors with under nutrition at $p < 0.25$.

The multivariable logistic regression analysis revealed that previous history of imprisonment, duration of imprisonment, history of smoking, experience of diarrheal diseases, social support and depression were significantly associated with undernutrition at $p < 0.05$.

This study revealed that respondents who had previous imprisonment history were 5 times more likely to develop undernutrition (AOR: 4.98, 95%CI:2.80, 8.86) than prisoners that had no

previous imprisonment history and participants that stays in the prison ≥ 12 months were 1.82 times more likely to develop undernutrition (AOR:1.82,95% CI:1.04,3.19) compared to those participants imprisoned less than 12 month. Participants who had smoking history were more than 5 times more likely to develop undernutrition (AOR:5.38, 95% CI :2.86,10.13) than non smokers. Prisoners who had diarrheal diseases were 2 times more likely to develop undernutrition (AOR:1.98,95 %CI:1.15,3.41) compared to those prisoners that did not experience diarrheal diseases in the past two weeks. Prisoners that had depression in the past two weeks were more than 3 times increase the odd of undernutrition (AOR:3.23,95% CI: 1.888,5.57) compared to prisoners that had not developing depression. Prisoners who had poor social support were 7 times more likely to develop undernutrition with (AOR: 7.09,95% CI: 3.57,14.05) than who were getting strong social support(Table 7).

Table 7. Bivariate and Multivariate analysis of factors associated with undernutrition among prisoners incarcerated in Bahir Dar Zone prison center, north west Ethiopia,2021.(N=582)

Variables	Categories	Undernutritio n		COR(95%CI)	AOR(95%CI)
		Yes	No		
Imprisonment Hx	Yes	43	79	3.70(2.33-5.87)	4.98(2.80,8.86)*
	No	59	401	1	1
Durationof imprisonment	>=12 month	67	246	1.82(1.17-2.85)	1.82(1.04,3.19)*
	<12 month	35	234	1	1
Smoking	Yes	38	38	6.90(4.10-11.62)	5.38(2.86,10.13)*
	No	64	442	1	1
Chronic diseases status	Yes	23	82	1.41(0.84-2.38)	0.83(0.42,1.63)
	No	79	398	1	1
Respiratory illness	Yes	57	192	1.90(1.23-2.92)	1.32(0.77,2.27)
	No	45	288	1	1
Diarrheal Diseases	Yes	47	131	2.277(1.47-3.53)	1.98(1.15,3.41)*
	No	55	349	1	
Social support	Poor social support	22	301	5.50(3.07-9.87)	7.09(3.57,14.05)*
	Moderate social support	45	92	0.82(0.48-1.40)	0.82(0.44,1.54)
	Strong social support	35	87	1	1
Physical activity	Good physical activity	58	219	1.57(1.02-2.42)	1.06(0.62,1.83)
	Poor physical activity	44	261	1	1
Depression	Depressed	69	211	2.67(1.70-4.19)	3.23(1.88,5.57)*
	Not depressed	33	269	1	

NB * = P-value <0.05, AOR: Adjusted odds ratio , COR: Crude odds ratio.

Used – Enter method

6. DISCUSSION

This study was aimed to assess undernutrition & associated factors among prisoners. According to this study the prevalence of undernutrition was 17.5%, which is lower than the general population in Ethiopia(53).

The prevalence of this study was in line with the finding of the studies in Mizan Tepi and North Showa(10, 23). This might be due to the relative similarity of socio economic & health status of the population.

The prevalence of this study was lower than the finding of the study in Gondar prison center(24). This might be due to difference in source population (i.e male prisoners) & male prisoners are involved in strenuous activity like steel work & wood work but may not get enough food to meet the body requirement.

This study finding also lower than the finding of the study in Madagascar(34). The discrepancy may be due to the difference in study participants in Madagascar were females. Additionally explained that the variation may be due to that females have smaller and less muscular bodies than men & they are at greater risk of undernutrition due to the increased nutritional needs associated with menstruation, pregnancy and lactation(54).

However, the prevalence of undernutrition in this study was higher than the studies conducted in Tanzania and in Nigeria (31, 35). This discrepancy may be due to the difference in socioeconomic statuses in the study areas (i.e. Both Tanzania and Nigeria have relatively better statuses; for instance, in terms of health services; the most vulnerable populations in Nigeria benefit from free health care services and exemption mechanisms: those are children, pregnant women, people living with disabilities, elderly, displaced, unemployed, retirees and the sick & in Tanzania provisions for exemptions and waivers within the cost recovery programme were introduced with a view to protect vulnerable social groups and the very poor and also to those with specific diseases, and for people with long term mental disorders (55, 56). Further explanation was the discrepancy may be due to difference in sample size.

The finding of this study reflected that the odd of undernutrition among prisoners who had imprisonment history was nearly five times higher than prisoners that had no imprisonment

history. The finding also supported by another study conducted in Mizan Tepi(10). This may be due to similarity of source population & study group. Another reason might be that; employment rate and earning of individuals released from prison is low and had an increased probability of undernutrition(57).

The result of this study showed that prisoners that stayed ≥ 12 month were two times more likely to develop undernutrition than prisoners who stayed less than 12 month. This finding was supported by other study conducted in Mizan Tepi(23). This might be due to that, incarcerated prisoners for longer period exposes the prisoners to poor nutrition both in quantity & quality; which lead prisoners to undernutrition(10).

The finding the study revealed that cigaret smokers before incarceration were five times more likely to increase the odd of undernutrition than non smokers before imprisoned. This finding is supported by the study done in pakistan(32). This might be due to that, cigaret smoking decreases the immunity system and increase the risk of acquiring chronic disease like heart disease, lung disease COPD, stroke, certain eye diseases & others. This may lead poor appetite, weak immunity that may increase undernutrition(58).

This study showed that prisoners that had poor social support had nearly eight times increase the odd of undernutrition than good social support. This study was comparable to the result obtained from North Shewa(23). This might be due to that peoples that are not supported by close relationships with friends, family, or fellow members of church, work, or other support groups in terms of emotional support, physical support such as money and materials & informational support are more vulnerable to ill health and undernutrition(59).

Participants that had depression were three times more likely to develop undernutrition than had no depression. This result was in accordance with the finding in Mizan Tepi and North Shewa(10, 23). This might be due to corticotropin-releasing hormone (CRH) is released from the hypothalamus in response to the perception of psychological stress by cortical brain regions. This hormone induces the secretion of pituitary corticotropin, which stimulates the adrenal gland to release cortisol into the plasma & the high cortisol hormone production can lead to inflammation, insulin resistance, poor cardiovascular function & impaired immunity that decrease the nutritional status(60). Another explanation this could be due to that, depression associated with major

symptoms such as increased sadness and anxiety, loss of appetite, skipping meals and a loss of interest in pleasurable activities(61).

Prisoners that had diarrheal diseases were two times more likely to be undernourished than those who hadn't diarrheal diseases. This variable was not assessed by another similar research before among prisoners; while this variable was essential to assess the nutritional status. This finding may be due to the fact that diarrhea can lose a lot of body fluid and also be accompanied by symptoms, such as nausea or loss of appetite, vomiting & abdominal pain; that also make it hard to keep food and liquids down. This reduces your calorie intake, which can also contribute to weight loss(62).

7. STRENGTH AND LIMITATION OF THE STUDY

7.1 Strengths

This study includes study participants who have spinal curvature/kyphosis & leg deformity: those participants were not include in the previous studies..

7.2 Limitation

During data collection time the administrative body did not allow to collect the data by data collectors who works out side the prison & difficult to get language transcribers for hearing impaired participants due to this: thus participants were excluded in the study.

8. CONCLUSSION

The magnitude of undernutrition among prisoners in Bahir Dar prison center found to be lower than the general population in Ethiopia.

Factors associated with undernutrition were imprisonment history, smoking status, diarrheal diseases, depression, social support and duration of imprisonment.

Prisoners who had imprisonment history, smokers and depression were more likely to have undernutrition while those who had strong social support and shorter duration of imprisonment were less likely to have undernutrition while experience of diarrheal diseases in the past two weeks were more likely to develop undernutrition.

9. RECOMMENDATIONS

The following recommendations are forwarded based on the finding.

1. To Bahir Dar prison administrative office
 - To intervene on prevention and control of infectious diseases/ diarrheal diseases which leads to under nutrition.
 - Early screening of depression and involve in depression reduction by creating social support have paramount importance to create active & productive citizen both in the prison and after they released.
 - Give attention to prisoners that had poor social support, made they feel well by providing emotional support refers to the actions people take to make someone else feel cared for and instrumental support refers to the physical, such as money and housekeeping and informational support means providing information to help someone.

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REFERENCES

1. National Library of Medicine ncfbi. *Undernutrition*. *Malawi Medical journal*. 2006 Dec; v.18(4); PMC3345626 189–205.
2. USLEGAL. *Prisoners Law and Legal Definition* | USLegal, Inc. <https://definitions.uslegal.com/prisoners>. 2022(.
3. Swathy J. *Rights of Prisoners*. *Legal service India E-Journal*. 2000-2022 (<https://www.legalserviceindia.com/legal/article-75-rights-of-prisoners.html>).
4. Leach BI GS. *Preventing malnutrition in prison*. *Nursing Standard*. 2014;28(20):50-6; quiz 60.
5. Sultana T, Karim MN, Ahmed T, Hossain MI. *Assessment of under nutrition of Bangladeshi adults using anthropometry: can body mass index be replaced by mid-upper-arm-circumference?* *PloS one*. 2015;10(4):e0121456.
6. Section JPL. *Prisoner Diet Legal Issues*. *ALELE Monthly Law Journal*. –July, 200;7.
7. ABSaLK M. *Food systems in correctional settings, A literature review and case study*. 2015.
8. Weldeyohannes BT. *Reforming prison policy to improve women-specific health and sanitary care conditions of prisons in Ethiopia*. 2017;24:101.
9. Human Rights Law in Africa E. *Prison and conditions of detention in Africa*. *Human Rights Law in Africa Online*.1(1):600-1.
10. Wondimagegn WondimuID1, Bethlehem GirmaID2, Melese Sinaga, Abonesh Taye. *Undernutrition and associated factors among incarcerated people in Mizan prison institute, southwest Ethiopia*. <https://doi.org/10.1371/journal.pone.0251364> may 11, 2021.
11. Enggist S, Møller L, Galea G, Udesen C. *Prisons and health: WHO Regional Office for Europe*; 2014.
12. Başoğlu M, Yetimalar Y, Gürgör N, Büyükçatalbaş S, Kurt T, Seçil Y, et al. *Neurological complications of prolonged hunger strike*. *European journal of neurology*. 2006;13(10):1089-97.
13. WHO. *Good governance for prison health in the 21st century: A policy brief on the organization of prison health: World Health Organization. Regional Office for Europe*; 2013.
14. *World Prison Brief IfCJPR. World Prison Population List*. 2021.
15. Rights UDoH. *Paris on 10 December 1948*.
16. Ethiopia FDRo. *Food & Nutrition Policy November 2018*.
17. WHO WFD. *Malnutrition is a world health crisis*. 26 September 2019
18. Rachel KK, Kigaru DMD, Nyamota MW. *Dietary intake and factors affecting food service of male prisoners living with human immunodeficiency virus at selected prisons in Kenya*. *International Journal of Nutrition and Metabolism*. 2018;10(2):6-15.
19. Times N. *Malnutrition 20 MAY, 2009*.
20. Shekar M, Heaver R, Lee Y-K. *Repositioning nutrition as central to development: A strategy for large scale action: World Bank Publications*; 2006.
21. Fraser A, Møller L, van den Bergh B. *The health of prisoners*. *The Lancet*. 2011;377(9782):2002.
22. Daniel M, Mazengia F, Birhanu D. *Nutritional status and associated factors among adult HIV/AIDS clients in Felege Hiwot Referral Hospital, Bahir Dar, Ethiopia*. *Science Journal of Public Health*. 2013;1(1):24-31.
23. Yohannes Y. *Assessment of undernutrition & its influencing factors among prisoners in North shoa, Amhara Region, Ethiopia 2020*.
24. Ali E. *Undernutrition and associated factors among male prisoners, North Gondar, Ethiopia 2015*.

25. Abera SF, Adane K. One-fourth of the prisoners are underweight in Northern Ethiopia: a cross-sectional study. *BMC Public Health*. 2017;17(1):1-11.
26. FMOH. National Nutrition Strategy I, Addis Ababa, Ethiopia January 2008
27. FMOH. National Nutrition Program II. 2016-2020.
28. Institute TEPH, (NIPN) NIPfN. The National Nutrition Program II Progress analysis: Evidence for the upcoming Food and Nutrition Strategy Development, ADDIS ABABA. May 2020.
29. Tsebaot Kassa AAaMT. Assessment of Nutritional Status and Associated Factors among Prisoners Living with HIV/AIDS in Kaliti Prison, Addis Ababa, Ethiopia. *Journal of AIDS & Clinical Research*. (2017; 8:6.
30. Akinlotan J.V NSSaOOO. ASSESSMENT OF NUTRITIONAL STATUS OF INMATES IN OYO STATE, NIGERIA. *J Sciences and Multidisciplinary Research*. Dec 2010;2.
31. Camilla Gould BT, Garry Brian, Robert McKay, Rosalind Gibson, Karl Bailey & Bernard J. Cross-sectional dietary deficiencies among a prison population in Papua New Guinea. *BMC International Health and Human Rights Published*: 22 April 2013;21 (2013)
32. Qadir M, Murad R, Qadir A, Mubeen SM. Prisoners in Karachi-A Health and Nutritional Perspective. *Prisoners in Karachi-A Health and Nutritional Perspective*. 2017.
33. A.Rahman, I, RA, MSI, UKP. Effect of Dietary Pattern on Nutritional Status of Prisoner. *IOSR Journal of Nursing and Health Science (IOSR-JNHS)*.vol 6(issue 5 Ver. III. (Sep. -Oct .2017)):50-6.
34. Ravaoarisoa L, Pharlin AH, Andriamifidison NZR, Andrianasolo R, Rakotomanga JdDM, Rakotonirina J. Nutritional status of female prisoners in Antanimora prison, Madagascar. *The Pan African Medical Journal*. 2019;33.
35. Akinlotan J, Nupo S, Olorode O. Assessment of nutritional status of inmates in oyo state, Nigeria. *Journal of Sciences and Multidisciplinary Research*. 2010;2.
36. Muasa P, Guillaume Kalonji, Gérard De Coninck, Léon Okenge Ngongo. Nutritional Status of Inmates in the Central Prison of Mbuji-Mayi, Democratic Republic of Congo. *International Journal of Nutrition and Metabolism*. 06 Sep 2021; Vol- 4(6 Issue).
37. Goswami I M. Prevalence of Under-nutrition among the Juangs, A study on a particularly vulnerable tribal group of Odisha, India. *Antrocom Online Journal of Anthropology* 2013;vol. 9(n. 1 – ISSN 1973 – 2880).
38. CDC, Prevention. Healthy weight, nutrition, and physical activity. About Adult BMI Page last reviewed: September. 2020;17.
39. Coyle AG. "Prison". *Encyclopedia Britannica*, <https://www.britannica.com/topic/prison> Accessed 27 June 2021. 9 Mar. 2021,.
40. WHO. Physical activity. 26 November 2020.
41. Tesfaye Girma Legesse I aDGB. Prevalence of under Nutrition and Associated Factors among KhatChewers in Khat Chewing Shops at Gulalle Sub City, Addis Ababa, Ethiopia. *Journal of Pharmacy and Nutrition Sciences*,. 2016;, 6: 144-52.
42. CDC. adults tobacco use information. . since 1965.
43. USDA. DIETARY GUIDELINES FOR AMERICANS, Alcoholic Drink-Equivalents of Select Beverages EIGHTH EDITION. 2015-2020
44. Bøen H, Dalgard OS, Bjertness E. The importance of social support in the associations between psychological distress and somatic health problems and socio-economic factors among older adults living at home: a cross sectional study. *BMC geriatrics*. 2012;12(1):1-12.

45. Kroenke K, Spitzer RL, Williams JB. *The PHQ-9: validity of a brief depression severity measure. Journal of general internal medicine.* 2001;16(9):606-13.
46. WHO. *Diarrhoeal disease, Key facts.* 2 May 2017.
47. Divyalakshmi Bhaskaran I, Sarabjit Singh Chadha 3, SS, RS, SA. *Diagnostic tools used in the evaluation of acute febrile illness in South India: a scoping review. BMC infectious diseases.* (2019)
48. University CM. *Assessment of Infection and Colds - The Common Cold Project, measured by.* 2022.
49. fre pysh. *How often should you shower.* August 17, 2021.
50. Medicine USNLo. *What does financial support mean? - Definitions.net.* Jan 21, 2021
51. Casadei K, Kiel J. *Anthropometric measurement. StatPearls [Internet].* 2020.
52. De Lucia E LF, Tesfaye F, Demisse T, Ismail S. *The use of armspan measurement to assess the nutritional status of adults in four Ethiopian ethnic groups. European Journal of Clinical Nutrition.* 2002; ;56(2):91-5.
53. Federal Republic of Ethiopia. *ETHIOPIA Demographic and Health Survey 2016.*
54. Wales Ea. *Gender inequality, Why diet and gender matter. Action against hunger UK, 6 Mitre Passage, London, SE10 0ER.* 2020.
55. Masuma Mamdani MB. *BOOKSHELF Poor People's Experiences of Health Services in Tanzania: A Literature Review. Reproductive Health Matters* 2004;12(24):::138–53.
56. Aregbeshola B. *Health care in Nigeria: Challenges and recommendations,* <https://socialprotection.org/discover/blog/authors/author/17676>. *Social protectionorg.* 2019.
57. Holzer HJ SM, Raphael S. . *Employment Dimensions of Reentry: Understanding the Nexus between Prisoner Reentry and Work. New York Univ Law Sch. [Internet].* 2003;;Available from: <https://peerta.acf.hhs.gov/content/employment-dimensions-reentry-understanding-nexus-between-prisonerreentry-and-work-can>.
58. Services USDoHH. *Smoking & Tobacco Use, Health effect. Office on Smoking and Health, National Center for Chronic Disease Prevention and Health Promotion.* 2014.
59. minnesota Uo. *Earl E. Bakken Center for Spirituality & Healing, Social Support.* 2016.
60. HASLERI G. *PATHOPHYSIOLOGY OF DEPRESSION: DO WE HAVE ANY SOLID EVIDENCE OF INTEREST TO CLINICIANS? World Psychiatry .* 2010 Oct;v ; 9(3): :155–61.
61. T. S. Sathyanarayana Rao MRA, B. N. Ramesh, and K. S. Jagannatha Rao. *Understanding nutrition, depression and mental illnesses. Indian J Psychiatry* 2008 Apr-Jun;I; 50(2): : 77–82.
62. Pratt E. *Does Diarrhea Cause Weight Loss? The spruse,.* February 17, 2022.

Annex A: Consent form

Bahir Dar University College of medicine and health science, Institute of public health

Consent statement Questionnaire for assessment of nutritional status to be filled by prison inmates

How are you, my name (data collector name) is _____. I would like to ask you a few questions about your socio-demographic status, institutional related, physical activity, Medical related, Behavioral and Personal related questions; with a measurement of height and weight in order to assess the nutritional status of prison inmates among Bahir Dar prisoners from Sept 1 to 30, 2021.

This will help us to prevent and control under nutrition among prison inmates in Bahir Dar prison based on the information obtained from you. Your name will not be written in this form and will never be used in connection with any information you tell us. All information obtained from you will be kept strictly confidential. Your participation is voluntary and you will not be forced to answer any question which you do not want to answer. If you feel discomfort please feel free to stop any time you want. The questions will take about 20 minutes.

Would you like to continue?

1. yes

2. No,

if “No“ skip to the next participant

Data collectors name _____ signature _____ date _____

Thank you!!

Annex B: Information sheets

Information sheet

Title of the research: Undernutrition and associated factors among prison inmate in Bahir Dar Zone Prison center, North West Ethiopia.

Name of principal investigator:- Gebyaw Lulie

Name of the organization: Bahir Dar University, College of medicine and health science, institute of public health

Purpose of the research project:

The aim of this study is to assess undernutrition and associated factors among prison inmates in Bahir Dar Zone prison center.

Procedure

You are selected randomly and we are inviting you to take part in the study. Your participation will help us to assess nutritional and associated factors among prison inmates. We are going ask you some simple questions. Your honest answers are very useful to our study we are going to measure your weight and height. We will like to appreciate your help in responding to these questions.

Benefit:

When you are participating in this research, there may not be direct benefit to you rather you will know your BMI status. However your participation is very indispensable to us in identifying the nutritional status and associated factors among prison inmates in Bahir Dar prison in order to design and carry out appropriate intervention for the target group

Risk and/discomfort

There is no risk when you are participating in the research project except devoting your time about 20minutes

Confidentiality

The information collected for this research project will be kept secured. Your name will not be written in this format and never be used in connection with any of the information you are going to provide

Right to refusal or withdrawal

You have an absolute right to refuse participating in this research and withdraw at any time

Contact person

If you have any questions you can contact the principal investigator by using the following address

Investigator: Gebyaw Lulie Mobile no, 0910912278

Advisors

1. Mr. Oumr Seid (PHD Fellow, Associate Professor)
2. Mr. Hunegnaw Almaw (MPHN)

Annex C: Questionnaire (English version)

Date_____

Participant identification number_____

Part I Socio demographic and economic characteristics			
S/No	Questions	Responses	Remark
101	How old are you?	1. _____ Years	
102	What is your sex	1. Male 2. Female	
103	What is your educational level?	1. Unable read and write 2. Able to read & write 3. Primary(1-8grade) 4. Secondary(9-12 grade) 5. College & above	
104	What is your marital status?	1. Single 2. Married 3. Divorced 4. Windowed	
105	What is your religion?	1. Orthodox 2. Muslim 3. Protestant 4. Others, specify_____	
106	What is your residence befor imprisonment	1. Urban 2. Rural	

107	What is your occpation befor imprisonment	1. Farmer 2. Merchant 3. Civil servant 4. Student 5. Other spesify_____	
108	For how long do you stay here	_____ in months	
109	Do you have imprisonment history	Yes.....1 No.....0	
Part II	Sanitation &hygien and Institutional related factors		
201	When do you wash hands(multiple response is possible)	1.Before eating 2.After eating 3.Before defication 4.After defication/ toilet use	
202	How many times do you take shower/week	_____times	
203	What is the area of a single Dormitary of prison(in square meter)/feet	_____	
204	How many Windows have your Dormitary	_____	
205	How many prisoners are living together in a dormitary	_____	
206	How many prisoners use/share a single latrine house (No_ of prisoners/No_latrine in the Zone)	_____	
Part III	Behavioural related Questionnaire		
301	Did you smoke cigarettes before Imprisoned	Yes.....1 No.....0	If No,skip Qn 302
302	If yes, How many cigarette did you smoke/year/day	Numberof Cigarret/year_____ No ofCigarret/day_____	

303	Did you drink alcohol(Tella/Teji/Areki/Beer/Wine etc...) before imprisonment	Yes.....1 No.....0	IfNo,skip Qn 304
304	If yes to Qn 303, How many alcohol did you drink/week	_____glass(for Tella/teji) _____cup/melekia(for Areki _____bottle(for Beer)	
305	Have you ever chewed khat?	Yes.....1 No.....0	IfNo,jump to Qn 309
306	If yes, In a single session, How many times chewed khat	_____hrs	
307	If yes to Qn 305, How many years do you chewed khat in your life	_____yrs	
308	If yes to Qn 305, How many gram of khat used per session	_____gram	
309	Do you get financial support from relatives/others	1. Yes 0. No	
Part IV	Morbidity related factors Questionnaire		
401	Did you have history of known or current chronic communicable /non communicable illness	Yes.....1 No.....0	If no skip Qn 402
402	If yes for Qn 401, what type of chronic illness?(Multiple response is possible)	1.Diabetes Melitus (DM) 2.Hypertension(HTN) 3.HIV/AIDS 4.Tuberculosis (TB) 5.Other Specify_____	
403	Did you have respiratory tract infection in the last two week	Yes.....1 No.....0	If, No skip Qn=404
404	If yes,what was the diseases that you got (Multiple response is possible)	1. Common cold 2. Asthma 3. Pneumonia	

		4. Other,specify_____	
405	Did you have Diaharrial desease in the last two week	Yes.....1 No.....0	If No, skip Qn-406
406	If yes, what was the diarrhal disease you have developed. (Multiple response is possible)	1. Gardia 2. Amoeba 3. Typhoid 4. Other, specify_____	
407	Did you have febril illness in last two week	Yes.....1 No.....0	If No, skip Qn-408
408	If yes, what was the diseases you had. (multiple response is possible)	1. Malaria 2. Pneumonia 3. Typhoid 4. Other, specify_____	
V	Work and Physical activity related factors Questionnaire		
5A	Work related factors Questionnaire		
501	Do you have Job in the prison	Yes.....1 No.....0	If No, skip Qn-502
502	If Yes,What is your Job in the prison	1. Tiller 2. Waving 3. Other Specify_____	
5B.	Physical activity related factors Questionnaire		
503	Does your work involves vigorous intensity activity that causes large increases in breathing or heart rate like (carring or lifting heavy loads, chopping wood, digging in the garden/yard etc.) for at least 10 minutes continuously	Yes..... 1 No.....0	If No,go to 506

504	In a typical week, on how many days do you do vigorous intensity activities as part of your work	Number of days _____	
505	How much time do you spend on doing vigorous physical activities as part of your work/week?	_____ hours _____ minutes	
506	Does your work involve moderate intensity activity that causes small increases in breathing & heart rate such as brisk walking or carrying light loads,sweeping,washing windows & raking in the garden/yard for at least 10 minutes continuously	Yes.....1 No.....0	If No,go to 509
507	In a typical week,on how many days do you do moderate intensity activities as part of your work?	Number _____ of days	
508	How much time do you spend doing moderate intensity activities as part of your work/week?	_____ hours _____ minutes	
5 C Sports, Fitness & recreation activities(Leisure)			
509	Do you do any vigorous intensity sports,fitness or recreational/leisure activities that causes large increases in breathing or heart rate like (running or foot ball) for at least 10 minutes continuously	Yes.....1 No.....0	If No,go to 512
510	In a typical week, on how many days do you do vigorous intensity sports,fitness or recreational(leisure) activities as part of your work	_____ Number of days	
511	In a typical week, How much time do you spend on doing vigorous sports,fitness or recreational(leisure activities)?	_____ hours _____ minutes	
512	Do you do moderate intensity sports,fitness or recreational(leisure) activities that causes small increases in breathing & heart rate such as brisk walkin(cycling,swimming,volley ball)for at least 10 minutes continuously	Yes.....1 No.....0	If No,go to 515
513	In a typical week,on how many days do you do moderate intensity sports,fitness or recreational(leisure) activities?	_____ Number of days	
514	In a typical week, How much time do you spend doing moderate intensity sports,fitness or recreational(leisure) activities?	_____ hours _____ minutes	

Part VI Depression assesement					
How often you have bothered by any of the following problems? (Use "×" to indicate your answer)					
Sr No	Activities	Not at all(0)	More than aday(1)	Several days(2)	Nearly every day(3)
1	Little interest or pleasure in doing things	0	1	2	3
2	Feeling down, depressed, or hopeless	0	1	2	3
3	Trouble falling or staying asleep, or sleeping too much.	0	1	2	3
4	Feeling tired or having little energy	0	1	2	3
5	Poor appetite or overeating	0	1	2	3
6	Feeling bad about yourself or that you are a failure or have let yourself or your family down.	0	1	2	3
7	Trouble concentrating on things, such as reading the newspaper or watching television.	0	1	2	3
8	Moving or speaking so slowly that other people could have noticed. or the opposite being so figety or restless that you have been moving around a lot more than usual.	0	1	2	3
9	Thoughts that you would be better off dead, or of hurting yourself	0	1	2	3
	Total of each	0			
	Sum of total /27	_____			

VII Social support scale

SR No	Question	Answer	Skip
1	How many people are so close to you that you can count on them if you have serious problems	1. none 2. one or two 3. three to five 4. six or more	

2	How much concern do people show in what you are doing?	<ol style="list-style-type: none"> 1. Alote of concern and interest 2. Some concern and interest 3. Uncertain 4. Little concern and interest 5. No concern and interest 	
3	How easy can you get practical help from friends if you should need it?	<ol style="list-style-type: none"> 1. Very easy 2. Easy 3. Possible 4. Difficult 5. Very difficult 	
Total			

Anthropometric measurements	
	Weight (kg) _____ Height(meter)_____
Anthropometric measurement of disabled person with Spinal curviture/spinal problem	
	Weight (kg) _____ Height(meter)_____

Consider the following for disables.

BMI in arm span for male $+1.4\text{Kg}/\text{m}^2 = \text{BMI in height measurement.}$

BMI in arm span for female $+0.8\text{kg}/\text{m}^2 = \text{BMI in height measurement.}$

የተሳታፊው መረጃ እና የስምምነት ማረጋገጫ ቅጽ

ስሜ(data collector).....ይባላል። አቶ ገበያዉ ሉሌ በባህር ዳር ዩኒቨርሲቲ የህብረተሰብ ጤና ት/ት ቤት በ ስርዓተ- ምግብ(Department of nutrition & Dietetics) የሁለተኛ ዲግሪ ተማሪ ስሆኑ ይህ መጠይቅ የመመረቂያ ምርምር ለማድረግ አስፈላጊውን መረጃ ለመሰብሰብ የተነደፈ ነው።ይህ ደብዳቤ በዚህ ምርምር ላይ ተሳታፊ እንዲሆኑ ለመጋበዝ ሲሆን የምርምሩ ዓላማም በባህር ዳር ማረሚያ ቤት ውስጥ የሚገኙ የህግ ታራሚዎችን የስነ ምግብ ችግር እና ተጓዳኝ /አጋላጭ ሁኔታዎችን ለማጥናት/ለመለየት ሲሆን ፡ በዚህ ጥናት ላይ ለመሳተፍ የተመረጡት በእጣ ሲሆን የመሳተፍ ውሳኔው የእርስዎ ነው ፡ ለመሳተፍ ባይፈልጉ የሚያመጣብዎት ምንም አይነት ችግር አይኖርም፡ ፡ ለመሳተፍም ከወሰኑ ምንም አይነት ተጨማሪ ጥቅማጥቅም አይኖርዎትም፡ በዚህ ጥናት ላይ መሳተፍዎ ከፍተኛ ጠቀሜታ አለው ይህም በማረሚያ ቤቱ የምግብ እጥረትን ፣ አጋላጭ ሁኔታዎችን እና ከ ምግብ እጥረት ጋር ተያይዞ የሚመጣን በሽታ ለመከላከል ያስችላል ፡ ፡ በጥናቱ ላይ በመሳተፍዎ በእርስዎ ላይ የሚደርስ ምንም አይነት ጉዳት የለም፡ ፡

በዚህ ጥናት ላይ የሚሰጡት ማንኛውም አስተያየት እና መልስ በኮድ ስርዓት በሚስጠራዊነት የሚቀመጥ ሲሆን ለማንም ሰው አይሰጥም፡ ፡ ስምዎንም ሆነ ስልክ ቁጥርዎን መስጠት አይጠበቅብዎትም፡ ከእርስዎ ፈቃድ እና ህጋዊ መብት ውጭ ለሶስተኛ ወገን መረጃው አይተላለፍም፡ ፡ እርስዎ ካልመሰለዎት ከዚህ ጥናት ተሳታፊነት ራስዎን የማግለል ሙሉ መብት አለዎት፡ ፡ ቃለ መጠይቁ 20 ደቂቃ የሚፈጅ ሲሆን በዚህ ጥናት ላይ ለመሳተፍ ከፈለጉ ለመረጃ ሰብሳቢዎቹ ምላሽዎን እንዲሰጡ ይጠየቃሉ፡ ፡

በቃለ መጠይቁ ላይ ለመሳተፍ ፍፈቃደኛ ነዎት ? 1. አ ም 2. አይደለውም

ስለትብብርዎ እናመሰግናለን!!!

የተሳትፎ ማረጋገጫ

የሰነዱን ይዘት እና የምርምሩን አላማ ተረድቻለሁ፡ ፡ በዚህ ምርምር ፕሮጀክት ላይም ለመሳተፌ ፍቃደኛ ሆኛለሁ፡ ፡ በማንኛውም ሰዓትም ከጥናቱ ራሴን ለማግለል መብት እንዳለኝ አውቃለሁ፡ ፡

የተሳታፊው ፊርማ_____ ቀን _____

የመረጃ ሰብሳቢው ስም_____ፊርማ_____ ቀን _____

ለተጨማሪ መረጃ

ስም ገበያዉ ሉሌ ስ.ቁ 0910912278

ክፍል አንድ. ግለ ታሪክን በተመለከቱ መጠይቆች			
ተ.ቁ	ጥያቄ	መልስ	ምርመራ
101	እድሜ	_____	
102	ፆታ	<ol style="list-style-type: none"> 1. ወንድ 2. ሴት 	
103	የትምህርት ደረጃ	<ol style="list-style-type: none"> 1. ማንበብ እና መጻፍ የማይችል 2. ማንበብ እና መጻፍ የማይችል 3. የመጀመሪያ ደረጃ ት/ት 4. ሁለተኛ ደረጃ ት/ት 5. ኮሌጅ እና በላይ 	
104	የትዳር ሁኔታ	<ol style="list-style-type: none"> 1. ያላገባ 2. ያገባ 3. የፈታ 4. በሞት የተለየ 	
105	ሐይማኖት	<ol style="list-style-type: none"> 1. ኦርቶዶክስ 2. ሙስሊም 3. ፕሮቴስታንት 4. ሌላ----- 	
106	የመኖሪያ ቦታ/ሽ የት ነበር	<ol style="list-style-type: none"> 1. ከተማ 2. ገጠር 	
107	ስራ/ሽ ምን ነበር	<ol style="list-style-type: none"> 1. አርሶ አደር 2. ነጋዴ 3. የመንግስት ሰራተኛ 4. ተማሪ 5. ሌላ----- 	
108	ማረጋገጫ ቤት ውስጥ/ታስረህ/ሽ ምን ያህል ጊዜ ቆየህ/ሽ	_____ ወር	

109	ከዚህ በፊት ታስረው/ ማረሚያ ቤት ገብተው ያውቃሉ	1-----አዎ 0-----አላገኝም	
ክፍል ሁለት. ከንፅህና እና ከተቋሙ ጋር የተያየዙ መጠይቆች			
201	እጅ ህን/ሽን የምትታጠበው/ቢዉ መች ነዉ (ከአንድ በላይ መልስ መስጠት ይችላሉ)	1.ምግብ ከበላህ በፊት 2. ምግብ ከበላህ በሃላ 3.መፀዳጃከመሄዴ በፊት 4.ከመፀዳጃ ቤት መልስ	
202	በሳምንት ስንት ጊዜ ገላህን ትታጠባለህ/ሽ	_____ ጊዜ	
203	የአንዳ ዶርም ስፋት ስንት ሜትር/እርጃ ይሆናል	_____	
204	የአንዱ ዶርም ስንት መስኮት አለዉ	_____	
205	በአንዳ ዶርም ዉስጥ ስንት የህግ ታራሚ ይኖራል	_____	
206	በአንድ ሽንት ቤት ዉስጥ ስንት ታራሚ ሰዎች ይጠቀማሉ(በአንድ ዞን ዉስጥ ያሉ ታራሚዎች/ በአንድ ዞን ዉስጥ ያሉ ሽንት ቤቶች ብዛት)	_____	
ክፍል ሶስት. ማሐበራዊ ጉዳዮችን የሚመለከቱ መጠይቆች			
301	የሲጋራ/የትምቦሆ ተጠቃሚ ነበሩ	0. -----አዎ 0. -----አይደለሁም	አይደለሁም ከሆነ ወደ 303 ይለፉ
302	አዎ ከሆነምን ያህል ሲጋራ ያጨሱ ነበር	_____ በዓመት _____ በቀን	
303	አልኮል(ጠላ፣ጠጅ፣አረቄ፣ቢራ/ወይን) ይጠጡ ነበር	1. -----አዎ 0. -----አልጠጣም	አልጠጣም ከሆነ ወደ 305 ይለፉ
304	አዎ ከሆነ፣ ሥንት ይጠጡ ነበር/ በሳምንት	_____ ብርጭቆ ጠላ/ጠጅ _____ ስኒ/መለኪያ አረቄ _____ የቢራ	

		ጠርመ-ስ/ቢራ	
305	ጫት ትቅም ነበር	1. -----አዎ 0. ----አልቅምም	አልቅምም ከሆነ ወደ 309 ይለፉ
306	አዎ ከሆነ፣ በአንድ ጊዜ ጫት በምትቅምበት ወቅት ለስንት ሰዓት ትቅማለህ/ሽ	_____ ሰዓት	
307	በህይወት ዘመንህ/ሽ ለስንት ዓመት ጫት ቅመሃል/ሻል	_____ ዓመት	
308	በአንድ ጊዜ ጫት በምትቅምበት ወቅት ስንት ግራም ጫት ትቅማለህ/ሽ	_____ ግራም	
309	ከዘመድ/ ከሌላ የገንዘብ እርዳታ/ድጋፍ ያገኛሉ	1.-----አዎ 0.-----አላገኝም	
ክፍል አራት. ከህመም/ ከበሽታ ጋር የተያያዙ ጥያቄዎች			
401	ለረጅም ጊዜ የቆየ በሽታ አለብዎት	1.-----አዎ 0.-----የለብኝም	የለብኝምከ ሆነወደ 403 ይለፉ
402	አዎ ከሆነ፣ በሽታዎ ምንድን ነው? (ከአንድ በላይ መልስ መስጠት ይችላሉ)	1.ስካር 2.ግፊት 3.HIV/AIDS 4. የቲቢ በሽታ 5.ሌላ_____	
403	የመተንፈሻ አካል (Respiratory illness) በሽታ ነበረብዎት/ በ ሁለት ሳምንት ውስጥ	1.አዎ 0..የለብኝም	የለብኝምከ ሆነወደ 405 ይለፉ
404	አዎ ከሆነ፣ በሽታዎ ምንድን ነበር? (ከአንድ በላይ መልስ መስጠት ይችላሉ)	1.ጉንፋን 2.አስም 3.የሳንባ ምች 4.ሌላ-----	

405	የተቅማጥ በሽታ(Diarrheal diseases) ነበረበዎት/ በ ሁለት ሳምንት ውስጥ	1.አዎ 0.የለብኝም	የለብኝምከ ሆነውደ 407 ይለፉ
406	አዎ ከሆነ፣ በሽታው ምንድን ነበር?(ከአንድ በላይ መልስ መስጠት ይችላሉ)	1. ቋርዲያ 2. አሜባ 3. ታይፎይድ 4. ሌላ-----	
407	የሚያተኩስ/ሙቀት የሚጨምር በሽታ/febrile illness ነበረበዎት/ በ ሁለት ሳምንት ውስጥ	1.አዎ 0..የለብኝም	የለብኝምከ ሆነ 408 ይዘለሉት
408	አዎ ከሆነ፣ በሽታው ምንድን ነበር?(ከአንድ በላይ መልስ መስጠት ይችላሉ)	1. ወባ 2.የሳንባ ምች 3.ታይፎይድ 4.ሌላ-----	
ክፍል አምስት. የአካል እንቅስቃሴ እና ከስራ ሁኔታ ጋር የተያያዙ መጠይቆች			
5 ሀ	ከስራ ሁኔታ ጋር የተያያዙ መጠይቆች		
501	በማረሚያ ቤት ውስጥ ስራ አለዎት	1.-----አዎ 0.-----የለኝም	የለኝም ከሆነውደ 503 ይለፉ
502	አዎ ከሆነ፣ የሚሰሩት የስራ መደብ ምንድን ነው	1. ልብስ ሰፊ 2. ሽመና 3. ሌላ ይጥቀሱ _____	
5ለ	ከስራ ሁኔታ ጋር የተያያዙ የአካል ብቃት እንቅስቃሴ መጠይቆች		
503	ከበድ ያለ ስራ ትሰራለህ(ሽክም፣ ከባድ ነግር ማንሳት፣ ቁፋሮ) ቢያንስ ለአስር ደቂቃ	1.-----አዎ 0.----- አልሰራም	አልሰራም ከሆነውደ 506 ይለፉ
504	በአንድ ሳምንት ውስጥ ምን ያህል ቀን ከበድ ያለ ስራ ትሰራለህ/ሽ	_____ ቀን	

505	በአንድ ሳምንት ውስጥ ምን ያህል ጊዜ ከበድ ያለ ስራ ትሰራለህ/ሽ	_____ ሰዓት _____ ደቂቃ	
506	መካከለኛ ስራ ትሰራለህ(ቀላል ሸክም፣ ወለል/መስኮት መወልወል፣) ቢያንስ ለአስር ደቂቃ	1.-----አዎ 0.-----አልሰራም	አልሰራም ከሆነውደ 509 ይለፉ
507	በአንድ ሳምንት ውስጥ ምን ያህል ቀን መካከለኛ ስራ ትሰራለህ/ሽ	_____ ቀን	
508	በአንድ ሳምንት ውስጥ ምን ያህል ጊዜ መካከለኛ ስራ ትሰራለህ/ሽ	_____ ሰዓት _____ ደቂቃ	
5መ ስፖርት፣ የአካል ብቃት ፣ ከ መዝናኛ ጋር የተያያዙ መጠይቆች			
509	ከበድ ያለ ስፖርት፣ የአካል ብቃት እንቅስቃሴ ትሰራለህ/ሽ(ፍጫ፣ እግር ካስ ጨዋታ) ቢያንስ ለአስር ደቂቃና በላይ	1.-----አዎ 0.-----አልሰራም	አልሰራም ከሆነውደ 512 ይለፉ
510	በአንድ ሳምንት ውስጥ ምን ያህል ቀን ከበድ ያለ ስፖርት፣ የአካል ብቃት እንቅስቃሴ ትሰራለህ/ሽ.	_____ ቀን	
511	በአንድ ሳምንት ውስጥ ምን ያህል ጊዜ ከበድ ያለ ስፖርት፣ የአካል ብቃት እንቅስቃሴ ትሰራለህ/ሽ.	_____ ሰዓት _____ ደቂቃ	
512	መካከለኛ ስፖርት፣ የአካል ብቃት እንቅስቃሴ ትሰራለህ/ሽ(ሳይክል መንዳት፣ ዋና፣ መረብ ካስ ጨዋታ) ቢያንስ ለአስር ደቂቃና በላይ	1.-----አዎ 0.-----አልሰራም	አልሰራም ከሆነውደ 515 ይለፉ
513	በአንድ ሳምንት ውስጥ ምን ያህል ቀን መካከለኛ ስፖርት፣ የአካል ብቃት እንቅስቃሴ ትሰራለህ/ሽ.	_____ ቀን	

514	በአንድ ሳምንት ውስጥ ምን ያህል ጊዜ መካከለኛ ስፖርት፣ የአካል ብቃት እንቅስቃሴ ትሰራለህ/ሽ.	_____ ሰዓት	
		_____ ደቂቃ	

ክፍል ስድስት :- ጭንቀትን(Depression) የተመለከቱ መጠይቆች

ከሚከተሉት ውስጥ ከሁለት ሳምንታት በላይ በተደጋጋሚ የተጨነቁበት ጊዜ ካለ ምን ያህል አስጨንቅዎታል?("x" ይህን ምልክት ይጠቁሙ.

ተ.ቁ	ጥያቄ	በጭራሽ (0)	ጥቂት ቀናት (1)	ለብዙ ቀናት (2)	በየቀኑ (3)
1	ከሚሠሩት ስራ የሚያገኙት ደስታ አንሶ ወይም ቀንሶ ነበር	0	1	2	3
2	የመደበኛ ወይም ተስፋ ማጣት እና፣ መጨነቅ ስሜት አለ	0	1	2	3
3	የእንቅፍ ማጣት ወይም ከበቂ በላይ ማንቀላፋት ይታይባቸዋል	0	1	2	3
4	የድካም ወይም የአቅም ማነስ ስሜት አለ	0	1	2	3
5	የምግብ ፍላጎት መቀነስ ወይም መጨመር አለ	0	1	2	3
6	ስለ እራሶቻቸው መጥፎ ስሜት ይሰሙታል ወይም ለራሶቻቸው እና ለሌሎች የሚሰጡት ግምት ዜቅተኛ ነው	0	1	2	3
7	ለነገሮች ትኩረት ይሰጣሉ ለምሳሌ ጋዜጣ ለማንበብ ፣ ቴሌቪዥን ለማየት	0	1	2	3
8	በእንቅስቃሴ ወይም በንግግር ለዘብተኝነት ሰዎች ይተችዎታል ወይም በተቃራኒው ሳያቋርጡ በማወራቸው እና በመንቀሳቀሳቸው	0	1	2	3
9	እራስን መጉዳት ወይም ሞት ይሻላል ብለው ያሳሰቡት ጊዜ ነበር	0	1	2	3
	ድምር	0			
	ጠቅላላ ድምር				

ክፍል ሰባት . ማህበራዊ እርዳታን (social support) የተመለከቱ መጠይቆች

ተ.ቁ	ጥያቄ	መልስ
1	ለእርሶ ቅርብ ከሆኑ ሰዎች መካከል ምን ያህል ችግር ቢያጋጥምዎ ይደርሱልኛል	1. ምንም 2.1-2

	ብለው ያስባሉ	3. 3-5 4. 6 እና ከዙያበላይ	
2	እርስዎ በሚያረጉት ድርጊት ሰዎች ምን ያህል ያስብልዎታል	1. ብዙ ያስብልኛል 2. በመጠኑ ያስብልኛል 3. እርግጠኛ መሆን አልችልም 4. በትንሹ ያስብልኛል 5. ማንም ሰው አያስብልኝም	
3	ችግር አጋጥሞዎት እርዳታ ቢያስፈልግዎት ከጓደኛዎ በምን ያህል ፍጥነት ሊያገኙ ይችላሉ	1. በጣም በቀላሉ 2. በቀላሉ አገኛለሁ 3. ላገኝ የምችል ይመስለኛል 4. ከባድነው ለማግኘት 5. በጣም ከባድ ነው	
	ደምር		

የእድገት መለኪያ (Anthropometric measurement)	
	ክብደት (በኪ.ግ) _____ ቁመት (በሜትር) _____
የአካል ጉዳተኞች ልኬት	
	ክብደት (በኪ.ግ) _____ የክንድ ልኬታ (በሜትር) _____

ለ አካል ጉዳተኞች

BMI in arm span for male +1.4Kg/m² = BMI in height measurement.

BMI in arm span for female +0.8kg/m² = BMI in height measurement.

Annex E: Declaration

I, the under signed, declared that this is my original work, has never been presented in this or any other University, and that all the resources and materials used for the research, have been fully acknowledged.

Name of the student: Gebyaw Lulie Signature: [Signature] Date 12/10/14 EC

Approval of the advisor (s)

Advisors Name	Signature	Date
1. Oumer Seid (PHD Fellow, Assoc prof)	<u>[Signature]</u>	<u>17 June 2012</u>
2. Hunegnaw Almaw (MPHN)	<u>[Signature]</u>	<u>13/10/2014</u>
Internal Examiner name		
Netsanet Fentahun (Double PHD, Assoc prof)	<u>(Por) [Signature]</u>	<u>13/10/2014</u>

