Assessment of Change in Nutritional Status and its Clinical Outcomes among Adult Patients in Mizan-Tepi University Teaching Hospital Southwest Ethiopia: A Prospective Cohort Study

BY:

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APPROVED BY THE BOARD OF EXAMINERS

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Acronyms and Abbreviations

AAU: Addis Ababa University

BMI: Body Mass Index

CCI: Charlson Comorbidity Index

DM: Diabetes Mellitus

DRM: Disease-Related Malnutrition

ERC: Ethical Research Committee

ETB: Ethiopian Birr

FAO: Food and Agriculture Organization

HIV/AIDS: Human Immunodeficiency Virus or Acquired Immune Deficiency Syndrome

IDDS: Individual Dietary Diversity Score

ICU: Intensive Care Unit

LOS: Length of Stay

MTUTH: Mizan Tepi University Teaching Hospital

NPO: Nil per oz.

SD: Standard Deviation

SEM: Standard Error of Mean

SGA: Subjective global assessment

SPH: School of Public health

SPSS: Statistical Package for Social Sciences

SPH: School of Public health

USA: United State of America

Abstract

Background: Large proportions of patients in the hospital are malnourished. Around 30% to 50% of patients show the risk of malnutrition at admission and many of these patients experience further nutritional decline during a hospital stay. Malnutrition among hospitalized patients has strong clinical effects that are reflected by an increased risk of medical complications, increased length of stay and poor quality of life among adult patients.

Objective: To examine the patterns of nutritional status over time in adult patients and its association with the occurrence of complication and length of stay in hospital in Mizan-Tepi University Teaching Hospital Southwest, Ethiopia 2020.

Methods: Hospital-based prospective observational study involving 258 medical, surgical, and gynecologic wards admitted adult patients, aged from 18-64 years was conducted in Mizan-Tepi University teaching hospital from March 1, 2020 – May 30, 2020. Patient's nutritional status was assessed within 24 h using the Subjective Global Assessment (SGA) at admission and before discharge. Chi-square and student t-test was used to identify the statistical difference between groups of nutrition change category and outcome variables. Logistic regression models were used to identify the predictors of decline nutritional status. Statistical significance of 0.05 was used in all hypothesis tests.

Results: On admission, a total of 258 patients were included, of these 166 patients had stayed greater than five days in the hospital and measured both subjective global assessment (SGA) at admission and discharge. The majority of participants were (66.9%) female. the median age was 45. The median length of stay in the study population was 10 days (8, 12). Around 75% were malnourished at admission (SGA B/C) and 61% were malnourished at discharge. Overall 31% (n=52) improved, and 19% (n=31) declined nutritionally from admission to discharge. Odds of occurrence of complications were significantly greater (OR=2.274, 95%CI, 1.052, 4.915) longer length of stay (12 days) for declined in nutritionally as compared and well-nourished patients.

Conclusions: In our study, 19% of patients declined their nutritional status during hospitalization. Indicating a need to monitor nutritional status before discharge and implementation of appropriate nutrition interventions to improve patients' clinical outcomes is mandatory in a clinical setting.

Keywords: Adult: Nutritional status: Hospital malnutrition

1. Introduction

1.1. Background

Hospital malnutrition in a hospitalized patient is common problem, worldwide, has impacts on clinical outcome (1-3). Malnutrition in hospitals were first identified before 1970s by Charles Butterworth; defining malnutrition is often being overlooked, undiagnosed, and undertreated there causing by adverse clinical effect(4) There is no a universally accepted definition for hospital malnutrition. Soeters et al define malnutrition has been described as any form of a nutrient imbalance, including under- and over-nutrition: over nutrition (intakes in excess of dietary requirements) and under nutrition (intakes less than dietary requirements) which resulting adverse effects on body composition and associated clinical outcomes among hospitalized patients(5). In this study the term hospital malnutrition is described as under nutrition.

Malnutrition in admitted patients is usually related to under nutrition due to reduced intake and increased metabolic rate disease. Malnutrition as clinical under nutrition alters nutritional state by an illness, the complications associated with illness or the treatment procedures during hospital stay. Combination of these factors lead to changes in tissue shape, and composition of the body which have been associated poor clinical outcomes during hospitalization(6)

A worldwide prevalence of hospital malnutrition was reported between 30% to 50% at admission (7, 8). In hospital under nutrition has been related to increased risk of complications and a prolonged hospital stay during hospitalization, and contributes 20-59% declines the nutritional status of patients by the time of discharge (1, 3, 9-12). A reason for declining of patients nutritional status in hospital are pointed either personal or organizational factors(13).

The primary objective our study is to investigate the change of nutritional state during hospitalization and its clinical outcome. Evaluating the changes either improve or decline of nutritional status during the hospital stay provides an opportunity for patients' nutritional state, which is likely to influence clinical outcome and functional progress in hospital. A clear understanding of the change in nutritional status in hospital admission will assist health care providers to prioritize, monitor, and intervene in successful nutrition care preventing further declining patients nutritional status over time.

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1.2. Statement of the Problem

Large proportions of patients in the hospital are malnourished. An estimated forty percent of the patients were malnourished on admission, and that 75% of patients who remained in the hospital for more than one week, lost further weight during in-hospital stay(14).

More than few studies are reported on changes of the nutritional status in hospital stay in developed countries. Two studies were report, that 20% of patients declined their nutritional status admitted during a hospital stay(15), and in another study a declining in nutritional status has been occurred 25% during hospitalization(16).

One-third of admitted patients are estimated to be malnourished in developing countries(4), of these two-thirds patients will have a significant decline in their nutritional status within the hospital stay of admission(17). On African, Hospital Malnutrition majority of findings report on malnutrition prevalence at admission. The highest prevalence rate 72.8% reported in South Africa(18). The lowest prevalence rate was reported among the Ghanaians population 13.4 % at the outpatient department (19).

In Ethiopia's 2014 report, Hospital malnutrition prevalence among adult patients was 55.6% (20). However, this study was mainly focused on their nutritional status at admission. There is a paucity of evidence that address change in nutritional status that occur in hospitalized patients and how these are associated with the occurrence of complication and length of hospital stay in general adults admitted patients of Ethiopia population.

1.3. The rationale for the Study

Nutritional decline during hospitalization is frequently observed in clinical practice and is independently associated with longer length of stay in admission, and other poor clinical outcomes among admitted patients(3, 12). Little evidence is shown whether nutritional status improved or declined after admission to long staying patients.

Recognition of the incidence of hospital malnutrition and the association between change in nutritional status and its clinical outcomes on the patient is important for a successful nutrition care program, and to prevent further nutritional status decline in hospital stay. This study, therefore, is aimed at filling the gaps, to attempt in quantifying the magnitude of in-hospital malnutrition, and evaluating the impacts of change in nutritional status on clinical outcomes among adult patients.

2. Literature Review

2.1. Hospital Malnutrition

2.1.1. Prevalence of hospital malnutrition

The widespread prevalence malnutrition in adults patient were identified in the early 1974 by Butterworth(4). Hospital malnutrition within sub-acute care settings has been reported up to 65% globally (21).

The hospital malnutrition prevalence in adult widely reported between different countries, and varies between 13% and 78% among acute-care patients(13). In the United Kingdom, 16–21% of patients are at nutritional risk(22). A study in Denmark 14% of patients were at risk of malnutrition during admission time(23). The nutritional risk in Beijing Teaching Hospitals was estimated of 27.3%.

In sub-Saharan Africa, there is limited evidence on a report of prevalence and risk of hospital malnutrition. A high prevalence of malnutrition risk was reported in South Africa(24). The lowest rate of malnutrition was reported in Ghana(18).

In Ethiopia, the prevalence of hospital malnutrition was 55.6%(20)

Several studies reported under nutrition and nutritional risk as common problems of medical and surgical patients(25, 26). Malnutrition is frequently under-diagnosed and untreated thereby causing various clinical outcomes in hospital stay(27). About 70% of hospitalized patients were undiagnosed during admission time (27), and 80% of malnourished patients are discharged without receiving any nutrition care in hospitals (27, 28). However, there is significant variability in the reported prevalence of hospital malnutrition due to differences in patient populations, geographic location, types of hospital and admission ward, the method used for measurement nutritional status, patient characteristics, incidence of other comorbidities in existing disease and main diagnosis.

2.1.2. Factors Contributing to Hospital Malnutrition

In hospital nutritional depletion is usually caused by the joint action of an underlying disease, and dietary deficiency. Theoretically malnutrition amongst adult patient occurs because of inadequate dietary intake, increased protein and energy requirements, impaired nutrient

absorption, altered transport, and/or altered utilization of available nutrients to the body(29). Traditionally, the main cause of malnutrition was famine, starvation, natural disasters and environmental issues such as drought and global warming, which impact agriculture and food supply in developing countries, facing the population to high levels of poverty and food insecurity(30).

Malnutrition in hospitals may include due to medical factors, socioeconomic status, and poor awareness by health care practitioners of the importance of nutrition or adverse outcomes during hospitalization. Some of the medical factors contribute to malnutrition in hospital are inflammatory processes, increased requirements, poor appetite, and poor absorption of nutrients were identified(31). The socioeconomic factors include poor income, lack of family support and isolation are risk factors for the development of malnutrition during in hospital stay(32). Pennington & McWhirter were identified that unrecognized on the part of patients as well as health care practitioners is common, including poor recognition of malnutrition and monitoring of nutritional status during admission are early sign of malnutrition(14, 33). Factors arising from hospitalization include hospital-acquired infection, side effects of drugs, depression, inadequate feeding assistance for the patients and keeping patients nil per os (NPO) status for further medical procedure and ignorance of importance of nutrition(13).

Generally, Kubrak and Jensen summarize factors contribute to malnutrition into two main major categories: Personal and Organizational. The personal factors include: age, response to treatment, physical, psychological, social, and low income have significant nutritional implication in hospital admission. The organizational factors include lack of nutrition screening and documentation, inadequate training of staff, confusion regarding nutritional responsibility, and lack of adequate nutritional intervention in the hospital are some factors for the development of malnutrition in hospital(13).

2.1.3. Consequences of Hospital Malnutrition

Malnutrition is associated with many adverse clinical outcomes among long staying patients(3) A poor in nutritional status impacts the patient on multiple levels: cellular, psychological, and physical through the hospitalization. Overall, the severity of the impact is dependent on personal and organizational factors(4)

The impact of malnutrition can lead to a further decline in the patient's condition if not recognized and treated early. Malnutrition is associated with slower recovery and more and severe complications during hospitalization. Insufficient food intake, illness, and inactivity lead to a reduction in muscle mass causes deterioration in the patient's general condition and septicemia, organ failure, and subsequent death(34). Malnourished people often have poorer immune status, delayed wound healing, a greater risk of developing infections, lower quality of life, and raised mortality, and these factors contribute to longer duration admission, poor response to the medical treatment, greater use of resources, and greater healthcare costs(7, 11, 24, 31, 35-37).

2.3. Clinical Studies on Changes in Nutritional Status during Hospitalization

A prospective observational cohort study was conducted in Canadian hospitals to examine factors associated with a nutritional decline in medical and surgical patients. Of 1022 patients participated in the cohort study, 478 had lengths of stay ≥7 d, 424 patients had taken admission and discharge SGA assessments; 51 % were malnourished at admission (SGA B or C); 37 % had in-hospital changes in SGA; 19.6 % deteriorated (14.6 % from SGA A to B/C and 5 % from SGA B to C); 17.4 % improved (10.6 % from SGA B to A, 6.8 % from SGA C to B/A); and 63.0 % patients were stable (34.4 % were SGA A, 21.3 % SGA B, 7.3 % SGA C). One SGA C patient had a weight loss of ≥5 %, likely due to fluid loss, and was designated as stable(12).

A prospective observational study was examined to determine the association between changes in nutritional status and clinical outcomes at St Vincent's Hospital in Melbourne. Patients were assessed on admission and before discharge using the Subjective Global Assessment (SGA) over three months. Admission data collected within 72 hours of admission and discharge data were collected on those participants who had a hospital stay of longer than 21 days and SGA measurement on admission. Fifty four percent were malnourished on admission (SGA B/C) and 44% were malnourished on discharge. 22% improved the SGA category, 75% remained stable and 3% deteriorated from admission to discharge(38).

A study was reported by carol Braunschweig. el in the United State to evaluate the impacts of change in nutritional status on different clinical outcomes. 2368 patients participated who had ≥ 7 days; of this 404 patients had complete SGA at admission and discharge. Changes in nutritional status during hospitalization assessed using SGA, 54% of patients malnourished at admission 31% declined in nutritional status between admission and discharge from hospital; specifically, 38% of patients who were admitted as normally nourished and 20% of those who were admitted as moderately malnourished experienced decline. Among those admitted as severely malnourished, 33% continued to deteriorate nutritionally as evidenced by a more than 5% weight loss between admission and discharge. Of patients admitted to nutritionally compromised 30% improved nutritionally while during the hospitalization course. Compared with the reference group normally nourished at admission and discharge, patients who declined nutritionally regardless of nutritional status at admission had significantly high hospital charge

and longer length of stay, and odds of a complication were significantly greater for patients who declined nutritional status (3).

Mc Whiter and Pennington observed to assess the change in nutritional status that occurred from hospital admission to discharge and to determine the incidence of in-hospital malnutrition during their stay. 500 patients screened at admission to hospital using anthropometric assessment. 40% (200 of the 500) patients were undernourished on admission. 112 patients reassessed on discharge who stayed ≥7 days in the hospital, all of the nutritional status groups showed a greater weight loss than weight gain and 78% of them deteriorated nutritionally during hospitalization(14).

In a study by Detsky et al. conducted on surgical patients to examine the association between change in nutritional status and its clinical outcome, 69% (n=139) of patients were classified as SGA A, 21% (n=44) as SGA B and 10% (n=19) as class C. 10% of the surgical patients experienced nutrition-related complications like death, wound healing, infection, sepsis(39).

Research conducted in the Netherlands by Naber et al among non-surgical hospitalized 330 patients assessed the nutritional status to determine the prevalence of malnutrition and its predictive value for the incidence of complications in patients hospitalized for internal or gastrointestinal diseases. 90 patients studied in the first 4-month period, nutritional status was assessed at admission, and at discharge who stayed ≥3 days in the hospital using different assessment scale including SGA, 45% were malnourished at admission and 51% nutritionally deteriorated at discharge(11). Crude odds ratios for the incidence of any complication in malnourished compared with well-nourished patients during hospitalization were 2.7 (95% CI: 1.4, 5.3) for the subjective global assessment.

A prospective observational cohort study done in South Africa revealed that using SGA Patients aimed to examine the association between changes in nutritional status and relevant functional outcomes that had a length of stay (LOS) longer than 21 days. 54% were malnourished on admission (SGA B/C) and 44% were malnourished on discharge. 22% improved the SGA category, 75% remained stable and 3% deteriorated from admission to discharge. Most patients (64%) encountered more complications (p=0.048) among the malnourished compared to the well-nourished(38).

2.4. Identified factors contributing to the nutritional decline

Sex

A prospective cohort study conducted in Canada shows male sex is the only predictor for a nutritional decline in surgical patients during hospital admission time 95% CI, P=0·005 (3). A systematic review meta-analysis in 27 studies confirms that, globally women were 45% more likely to be malnourished than men (OR 1.45 [95% CI: 1.27–1.66], P < 0.00001, I_2 = 24%)(40)

Age

A nationwide, multicenter study conducted in Spanish public hospitals revealed that age were significant contributor for malnutrition(41). *Ton HJ Naber* conducted on apparently healthy person to see the effect of age on malnutrition, high percentage of spurious malnutrition in elderly(42).

Cancer presence

A retrospective study conducted in Australia tertiary cancer center patients receiving concurrent chemotherapy were more likely to have 5% weight loss ($p < 0.001$) (14) and A prospective study of 1000 patients receiving radiotherapy treatment demonstrated weight loss of 5% was significantly associated with malnutrition determined by subjective global assessment (OR 2.29) (43)**.** Another prospective observational study conducted in Canada by J. Allard the presence of cancer during hospitalization was a predictor of nutritional decline among medical patients 95%, CI P=0.0009 (3).

New Infection Diagnosis during Hospitalization

A prospective cohort study revealed in the Canadian population that patients who develop new infection diagnosis during hospitalization were significantly associated with nutritional deterioration in medical patients (P-value = 0·0002) (3). In another prospective observational study conducted in the United State of America (USA) patients who develop infection in hospital were a significant risk for malnutrition(OR=3.06, 95% CI, 1.47-6.37) (4).

Food Intake

In a prospective study in a Canadian among medical and surgical patients reduced food intake were significant at (P-value = 0.009,0.02) for deterioration of nutritional status in hospital(12)**.** A study in South Africa hospitalized adult patients evaluated food intake at discharge, shows

patients consumes only 3/4 of usual intake were a risk for malnutrition ($p<0.01$;).

Conceptual framework

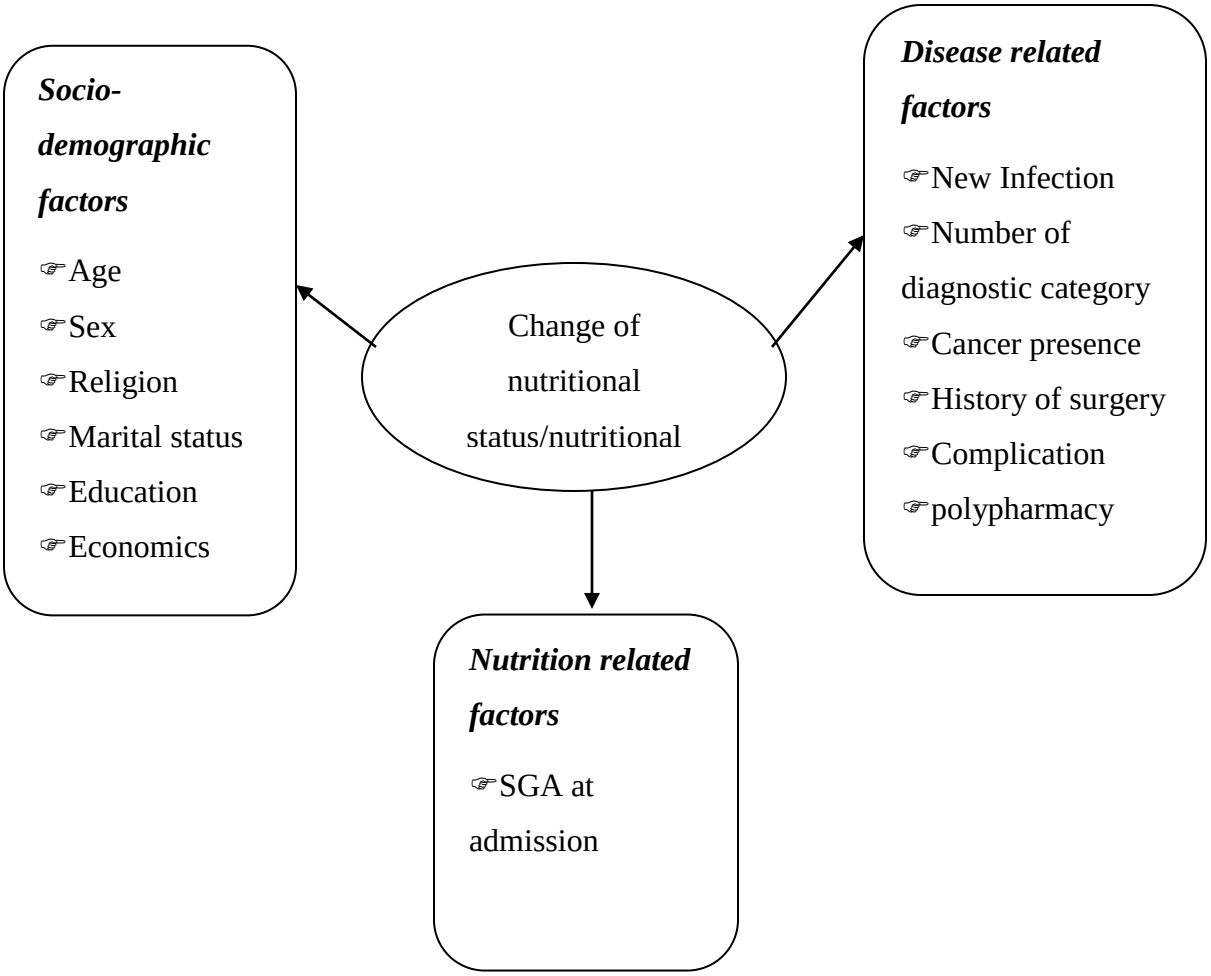

Figure 1: A conceptual framework for factors causing of nutritional change. (Adapted from different literature, 2019)

3. Objective

3.1. General objective

To examine the change of nutritional status over time in adult patients and its association with its clinical outcome during their stay in hospital in Mizan-Tepi University Teaching Hospital Southwest, Ethiopia 2020.

3.2. Specific objectives

- To examine the change of nutritional status over time in adult patients in hospital care between admission and discharge in MTUTH Southwest, Ethiopia from March 1, 2020 – May 30, 2020
- To assess the association between changes in nutritional status in adult patients and the occurrence of complication and length of stay in hospital in MTUTH Southwest, Ethiopia from March 1, 2020 – May 30, 2020

4. Method and Materials

4.1. Study Area and Study Period

The study was carried out in Bench-Sheko Zone, Mizan-Tepi University Teaching Hospital; which is located in Southwest Ethiopia. MTUTH is 580 km far from Addis Ababa, the capital city of Ethiopia. It has an estimated total population of 829,493 out of this 418, 213 are women (CSA, 2007). The Zone has five Woreda and 2 city administration.

In the zone, there is one teaching hospital (Mizan-Tepi University Teaching Hospital) which is linked 26 health center and 128 health posts and provide a health service for neighbors. Mizan-Tepi University Teaching Hospital serves as a teaching and provides health care services for the community under the administration of the Federal Ministry of Education. This was conducted in Mizan-Tepi University Teaching Hospital patients among medical, surgical, and gynecologic adult admitted patients. Data was collected from March 1, 2020 – May 30, 2020, adult patients admitted to the hospital for medical treatments and procedures.

4.2. Study Design

A hospital-based, prospective cohort study was conducted to examine the change in nutritional status among long-staying patients and its clinical outcome in Mizan-Tepi University Teaching Hospital.

4.3. Source Population

All adult inpatients (18-64 ages) were admitted in Mizan-Tepi University Teaching Hospital

4.4. Study Population

All adults who are admitted > 24 hrs.' In the selected wards from March 1 - May 30, 2020, and who are eligible for the study

4.5. Inclusion and Exclusion Criteria

4.5.1. Inclusion Criteria

All adult patients whose ages were greater than 18 years and patients admitted for greater than 24 hrs.' to the surgical, medical, and gynecologic wards from March 1 - May 30, 2020, were included in the study.

4.5.2. Exclusion Criteria

The study excludes critically ill and psychiatric, lactating or pregnant mothers, and patients receiving palliative care, and Subjects that did not give informed consent.

4.6. Sample Size Determination

For the first objective single population proportion formula is used considering the in-hospital changes in nutritional status 20 %, with a 95% confidence interval and a 5% margin of error(15)

$$N = \frac{(Z\ \alpha/2)2\ (P)\ (1-P)}{d2}$$

$$N = \frac{(1.96)^2 x 0.2\ (1-0.20)}{(0.05)^2} = 246$$

For the second objective double proportion formula using Epi-Info version 7 with the assumption of 95% CI, 80% power, and exposed to the unexposed ratio of 1. Considering the proportion of complications among malnourished nutritionally at discharge were 45% during hospitalization and taking AOR 2.7 the calculated sample size is 150(11). Therefore, the largest of these results (244) is taken as the sample size. Considering a non-response rate of 5 % largest of 258 taken

Table 1: Summary of sample size determination of study subjects in Mizan-Tepi University Teaching Hospital, Ethiopia 2019/2020

Variable	Power (%)	CI (%)	AOR	Ratio	Outcome among unexposed (%)	None response rate (%)	Total sample
To assess the changes in nutritional status and its clinical outcome Using Epi- info software							
Proportion complication among malnourished at discharge	80	95	2.7	1:1	45	5	150

4.7. Sampling Procedure

Mizan-Tepi University Teaching Hospital was purposively selected because it is the only teaching hospital serving acute health care services for the community in the bench shako zone. A list of the wards of MTUTH in line with the inclusion criteria will be selected. The eligible wards were stratified into the medical, surgical, and gynecology wards. The number of patients recruited from each ward was obtained according to the total number of beds (154) available in each ward-category. Every morning selection of newly admitted patients (≥24 hrs. admission) was recruited per ward when possible. The process continued until the sample size for the study was reached.

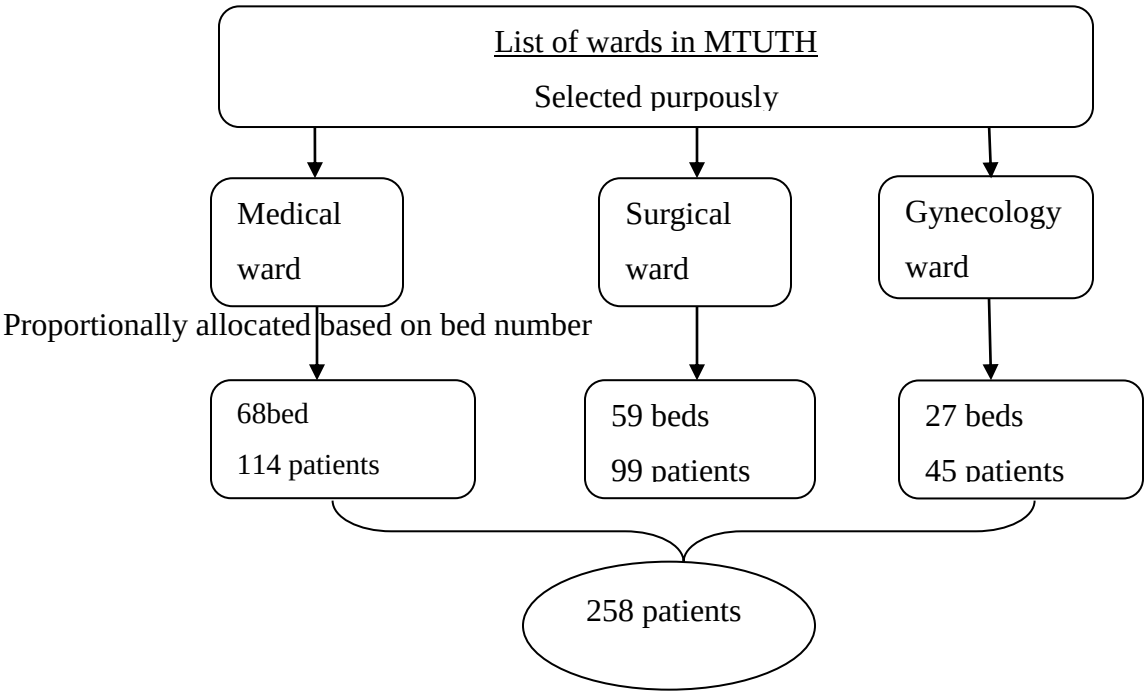

Figure 2: Showing sampling procedure to obtain study participants from Mizan-Tepi University Teaching Hospital, Ethiopia 2019/2020

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4.8. Study variables

Nutritional status at admission and discharge

The nutritional status of the patients was assessed using subjective global assessment SGA) within the initial 24 hrs.' of hospital admission. Subjective Global Assessment (SGA) is a validated nutrition assessment tool for adult patients comprising of two sections: a medical history and a physical examination. In medical history, five components are assessed, weight at admission, dietary intake, the presence of gastrointestinal symptoms, and functional impairment through questioning the patient. The second part of the SGA focuses on physical evidence of malnutrition assessed on subcutaneous fat loss, muscle tone and bulk, edema/fluid overload, and noted as either normal (0), mild (1 +), moderate (2+), or severe (3+). After collecting the SGA part patients were assigned a nutrition rating of SGA-A (well-nourished), SGA-B (moderately or suspected malnourished), or SCAC (severely malnourished).

4.8.1. Outcome variables

Length of Stay

The total number of days that the patient admitted to the hospital was calculated, by documenting the date of admission and discharge collection form, and then calculated by subtracting from the date of discharge and date of admission. Length of stay was calculated for all patients that were admitted to the hospital for a patient who stayed for five or greater days.

Complication

Physicians and Nurses were instructed to record if complications develop during admission time throughout the round session in the patients' record file. Presence of any complications (yes/no) that occurred after admission was derived from the patients' files after discharge physician summary report.

4.8.2. Covariate

Demographic and socio-economic characteristics

Socio-demographic characteristics such as age, sex, religion, level of education

Medical conditions

Admission ward, presence/absence of cancer, surgical history. The number of drugs and the Carlson comorbidity index (CCI) was collected.

Table 2: summary for study variables in Mizan-Tepi University Teaching Hospital, Ethiopia 2019/2020

Variables	Measurements	Descriptions
Exposure variables		
Nutritional risk status at admission	**Subjective Global Assessment (SGA)** **Medical history**: Change in weight, dietary intake, the presence of GI symptoms ,functional impairment and metabolic demand **Physical Examination** : Subcutaneous Fat, Muscle tone and bulk, Edema	A nutrition rating of SGA-A (well-nourished), SGA-B (moderately or suspected malnourished), or SCA-C (severely malnourished)
	Outcome variables	
Decline in nutritional status	SGA	change that shows SGA A at admission to SGA B or SGA C at discharge and SGA B at

		admission to SGA C at discharge
Length of hospital stay	Determined from the date of hospital admission to discharge in days	Number of days calculated by subtracting date of admission from date of discharge
Complication	Determined state in which a disease or accident is added to an existing illness without being related specifically to illness	Yes/No

4.9. Data Collection Tools and Process

Admitted adult (18-64 ages) in-patients service selected. Admitted for ≥ 24 hrs.' was directly identified from medical, surgical, and gynecologic wards participating for medical treatment or procedures in MTUTH. Then the nutritional status of the participant assessed using SGA. A review of medical records for all participants on patients demography, ward admission, Primary admission diagnosis, presence/absence of cancer, history of surgery while hospitalization, or within 3 months before admission were collected at admission and presence or absence of complication (3, 12, 43). Patients were selected consecutively each day for inclusion in the study. To determine the change in nutritional status during a hospital stay, patients who were hospitalized for more than five (≥5days) will be reassessed on discharge until thirty days on post-admission. The nutritional status of the patients was assessed at admission and discharge using subjective global assessment (SGA) in two different measurement forms. The admission data collection form was completed only on admission within 24 hrs. At the time of discharge, the discharge data collection form was completed only for patients who had a hospital stay of more than 5 days still before discharge. So, the study sample included only a patient's hospital stay of more than 5 days, and both SGA admission and discharge ranking.

4.9.1. Research Instrument

Subjective Global Assessment (SGA)

Subjective global assessment (SGA) is a tool that assesses nutritional status based on weight loss during the last 6 months, dietary change, and a physical examination of subcutaneous fat, muscle mass and fluid balance. The Subjective Global Assessment (SGA), first described by Baker et al in 1982, assesses the patient for malnutrition at the bedside, without the need for precise body composition analysis(24). Then Detsky et al described the SGA in more detail to facilitate its use and rating system(39). Nowadays SGA is a well-validated tool used in various populations worldwide including Ethiopia (24, 32, 36, 44-46), and is associated with clinical outcomes (3, 12, 36, 47, 48). It has also been used to assess nutritional decline (3, 12, 49). SGA classify subjects into: (SGA A =well-nourished; SGA B =moderately malnourished; SGA C = severely malnourished). The trained investigators were rate each item from 1 to 5, and decide the overall SGA score. Based on the overall SGA score, the patients will be categorized into 3 groups as SGA A (SGA score 8, well-nourished), SGA B (SGA score 9-39, mildly to moderately malnourished), and SGA C (SGA score 40, severely malnourished). Malnutrition was defined as SGA B or C (SGA B+C). Change in nutritional status was assessed as a difference between nutritional measures at admission and at discharge, and categorized as 'improved', 'stable' or deteriorated' based on the difference between SGA categories from admission to discharge. The parameters were measured within 24 hrs.'' from admission to and before discharge.

Anthropometry

Weight

The anthropometric measurements were required for this study is the weight. Anthropometry measurement is required for SGA and collected at admission/discharge data collection form. The anthropometric measurements were required on admission and on discharge to evaluate the loss of weight during discharge. Bodyweight was measured in light clothes with shoes off using electronic portable scale in the hospital measured to the nearest 0.5kg(12).

Functional Status

Takei Physical Strength Dynamometer was to be used to assess the patient's functional status. This data is needed to complete the SGA. Participants were asked to perform maximal contraction with the dominant hand and to hold it for a few seconds. Measurement was taken on

stand upright shoulders back, with feet even and hip-width apart, the elbow positioned in a complete extension, and the arm not supposed to touch any part of the body, in a neutral position, with the instrument in their dominant hand. If the patient was unable to stand, the measurement was taken in a seat position.

Clinical Examination

All clinical examination was performed for the presence of subcutaneous fat loss, signs of muscle wasting, and the presence of edema for SGA sore.

Clinical Signs of Subcutaneous Fat loss

The researcher assessed the patient for subcutaneous fat loss by assessing the patient's lumbar, upper arm, orbital and thoracic regions. Findings were interpreted according to the established SGA.

Clinical Signs of Muscle Wasting

Muscle wasting is assessed by evaluating the quadriceps and deltoids part of the patients. Findings were interpreted according to the established SGA.

Edema

The researcher assessed the patient for edema around the ankle, sacral, and abdomen for ascites. The finding was interpreted according to the established SGA.

Medical Information

Medical information was obtained from the patient's card. This included information on the date of hospital admission, specific ward type and the patients' primary diagnosis on admission, presence/absence of cancer, presence of complication, history of surgery while hospitalized within 6 months before admission, during hospitalization, patient charts were reviewed approximately every day.

Charlson Co morbid Index

The Carlson comorbidity index was assessed to classify the prognostic comorbidity. The CCI predicts the 10-year mortality for a patient who may have a range of comorbid conditions (up to twenty-two conditions), where each condition is assigned a score of 1, 2, 3, or 6, depending on the risk of dying associated with it. Scores were summed to provide a total score to predict mortality. Based on the CCI score, the severity of comorbidity was categorized into three grades: mild, with CCI scores of 1–2; moderate, with CCI scores of 3–4; and severe, with CCI, scores

≥5. The higher the score, the more likely the predicted outcome will result in mortality or higher resource use. Clinical conditions and associated scores are as follows: 1 for each: myocardial infarct, congestive heart failure, peripheral vascular disease, dementia, cerebrovascular disease, chronic lung disease, connective tissue disease, ulcer, chronic liver disease, diabetes. 2 for each: hemiplegia, moderate or severe kidney disease, diabetes with end-organ damage, tumor, leukemia, lymphoma. 3 for each: moderate or severe liver disease. 6 for each: malignant tumor, metastasis, AIDS.

Poly-pharmacy

Numbers of medications were collected from medical records. Poly-pharmacy was defined, as the use of five or more medications daily

4.10. Data collection procedure

Data were collected from March 1, 2020, to May 30, 2020. The three-day training was given to data collectors about SGA administration and anthropometric measurements. Information was collected using structured questionnaires detail on socio-demographic (age, sex, religion, marital status, and occupation), anthropometric (weight on admission and weight on discharge), and clinical data (SGA components).

4.11. Data quality management

An assessment was made before one week of actual data collection in MTUTH to check its consistency and any ambiguousness of the questionnaire. Then based on the result, some a modification like missing words, was made to the data extraction checklist. The training was given to the supervisor and data collectors on the overall objectives of the research and on how to extract the information for three days before data collection. A clear explanation of the purpose of the study was provided for the respondents at the beginning of the interview. Close supervision was carried out by the supervisor and the principal investigator during data collection procedures. The data from each respondent was checked for its completeness, clarity, consistency by the data collectors and principal investigator. Measuring weight equipment was checked regularly during data collection, and tests each scale with a standard weight of at least 5kg.

4.12. Operational Definitions

Change in nutritional status: is a difference between SGA measurement at admission who admitted ≥ 24 hrs.' and a patient stayed ≥ 5 days and before discharge until 4 weeks based on SGA.

The decline in nutritional status: is a change that shows SGA A at admission to SGA B or SGA C at discharge and SGA B at admission to SGA C at discharge.

Improved nutritional status: is defined as the nutritional status of SGA C at admission moving to SGA B or A by discharge and SGA B moving to SGA A by discharge

LOS: is defined as the difference (days) between the date of discharge and the date of admission to the hospital

Complication: A complication was defined as a state in which a disease or accident is added to an existing illness without being related specifically to illness (any complication).

4.13. Data analysis procedure

Data were cleaned manually, entered to Epi-data version 4.4.2.1, checked & cleaned for consistency, for any missing values, and finally, exported to IBM statistics version 25 for analysis. First, change in nutritional status assessed by SGA was categorized in to change group as follows: normal to normal (reference group), normal to moderate, normal to severe, moderate to normal, moderate to moderate, moderate to severe, severe to normal, severe to moderate and severe to severe. For further analysis, participants were divided into three groups as group N, improved, and declined. To assess how outcomes varied according to categorization, data was analyzed by comparing those who declined in nutritional status and those participants do not decline nutritional status. Summary statistics (frequency table, mean and median, SD) were used to describe the variables. Chi-square and student t-test was conducted categorizing the nutritional status into three groups. The relationship between continuous factors of interest and the nutritional decline was tested using a samples t-test. Logistic regression models were used to calculate the odds ratio (ORs) with 95% CI to identify predictors for a decline in nutritional status. Statistical significance of 0.05 was used in all hypothesis tests.

4.14. Ethical and Legal Aspect of Study

The study protocol was approved by the Ethical Research Committee (ERC) of the school of Public Health of Addis Ababa University. Following the approval, an official letter was written by the School of Public Health to the Zonal health department. The study objective of the research was explained to the concerned personnel to the zonal department and Mizan-Tepi University teaching hospitals. Data was collected after assuring the confidentiality nature of responses and obtaining oral consent from the study participant. All the study participants were encouraged to participate in the study and at the same time participants were informed that they have the right to refuse. When patients were identified as at-risk or malnourished during the course data collection period of the study, patients were not referred for nutrition consult on admission as it was an observational study, and intervention may affect the outcomes of the study population. When patients identified as malnourished during discharge assessment they were linked for nutrition counseling.

4.15. Dissemination of the of Research Findings

The finding of the research will be presented to the School of Public health (SPH), Addis Ababa University, and reported to MTUTH. Besides, the findings will be published and disseminated through reputable journals.

5. Result

5.1. Description of study participants

During the total of three months of the study period, 258 patients were admitted. We exclude 92 patients who were discharged within five days. The remained one hundred sixty-six (166) patients were included in our study, who are measured SGA both at admission and discharge, and stayed for >5 days in the ward. The majority of the study participants 89 (53.6%) admitted to general medicine, followed by surgery 57 (34.3%), and gynecology 20 (12%).

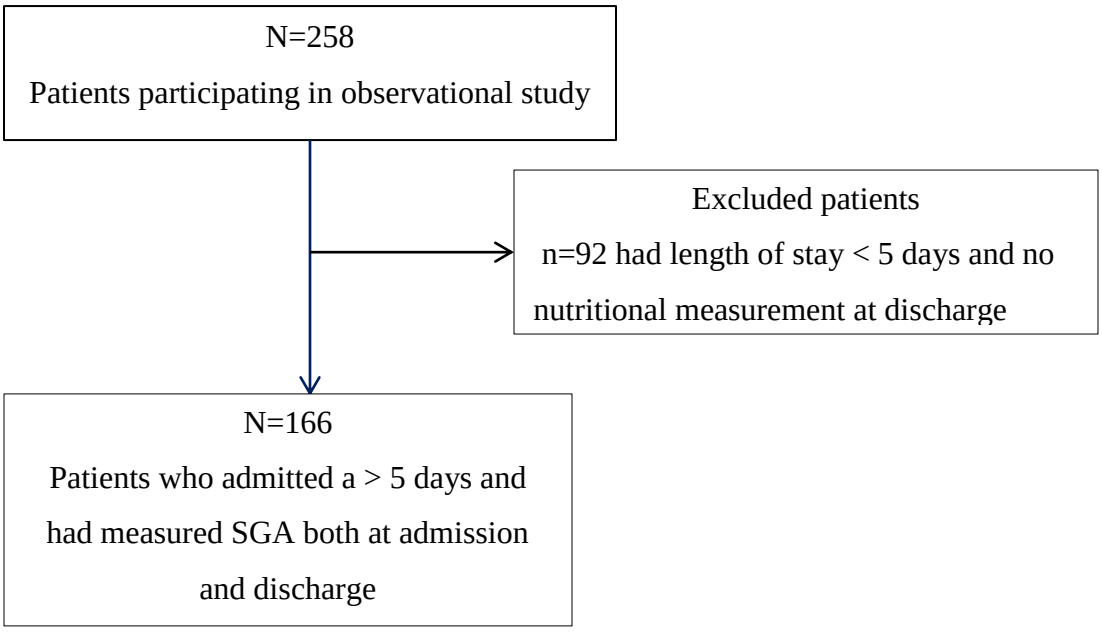

Figure 3:Fig. 1. Data used in the analysis in Mizan-Tepi University Teaching Hospital, Ethiopia 2019/2020

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5.1.1. Socio-demographic characteristics of participants

The study participants were aged from 18 to 65 years with median age was 45. Of 166 participants 55 (33.1%) were male and 111 (66.9%) were female. In our study 74 (44.6%) of the respondents are protestant followers, and (143) 86.1% were married. Almost one-fourth of 37 (22.3%) participants completed their primary school, and 53 (31.9%) of respondents were government employed. (See table 3)

Table 3: Socio-demographic and clinical characteristics of adult hospitalized patients in MTUTH, Ethiopia, 2020

Characteristics	Category	Number	Percent (%)
Sex	Male	55	33.1
	Female	111	66.9
	Total	166	100.0
Age in year	18_32	49	29.5
	33_47	60	31.1
	48_65	57	34.3
	Total	166	100
Educational status	Unable to read and write	23	13.9
	Able to read and write	22	13.3
	Primary level (1-8)	37	22.3
	Secondary level (9-12)	32	19.3
	Technical/Vocational	21	12.7
	Higher (University)	31	18.7
	Total	166	100.0
Marital status	Single	11	6.6
	Married	143	86.1
	Divorced	9	5.4
	Widowed	3	1.8
	Total	166	100.0
Occupational status	Government employed	53	31.9

	Unemployed	17	10.2
	Merchant	39	23.5
	Farmer	51	30.7
	Student	6	3.6
	Total	166	100.0
Religion	Orthodox	63	38.0
	Catholic	4	2.4
	Protestant	74	44.6
	Muslim	25	15.1
	Total	166	100.0

5.1.2. Clinical characteristics of participants

Out of 166 patients, 41(24.7%) were under SGA A, 102 (61.4%) were SGA B and 23 (13.9%) were SGA C at admission. The median hospital LOS of the study participant was 10 (8-12) days. 92 (55.4%) of the study participants have developed a medical complication during their hospital stay.

The overall prevalence of malnutrition (SGA B or C) on admission is 125 (75.3%). Out of 125 malnourished participants, 77 (61.6%) is evident among medical patients, 33 (26.4%) among surgical patients, and 15 (12%) among gynecology unit patients. The primary diagnosis of most patients included in our study was a gastrointestinal disease 35 (21%). (See figure 5).

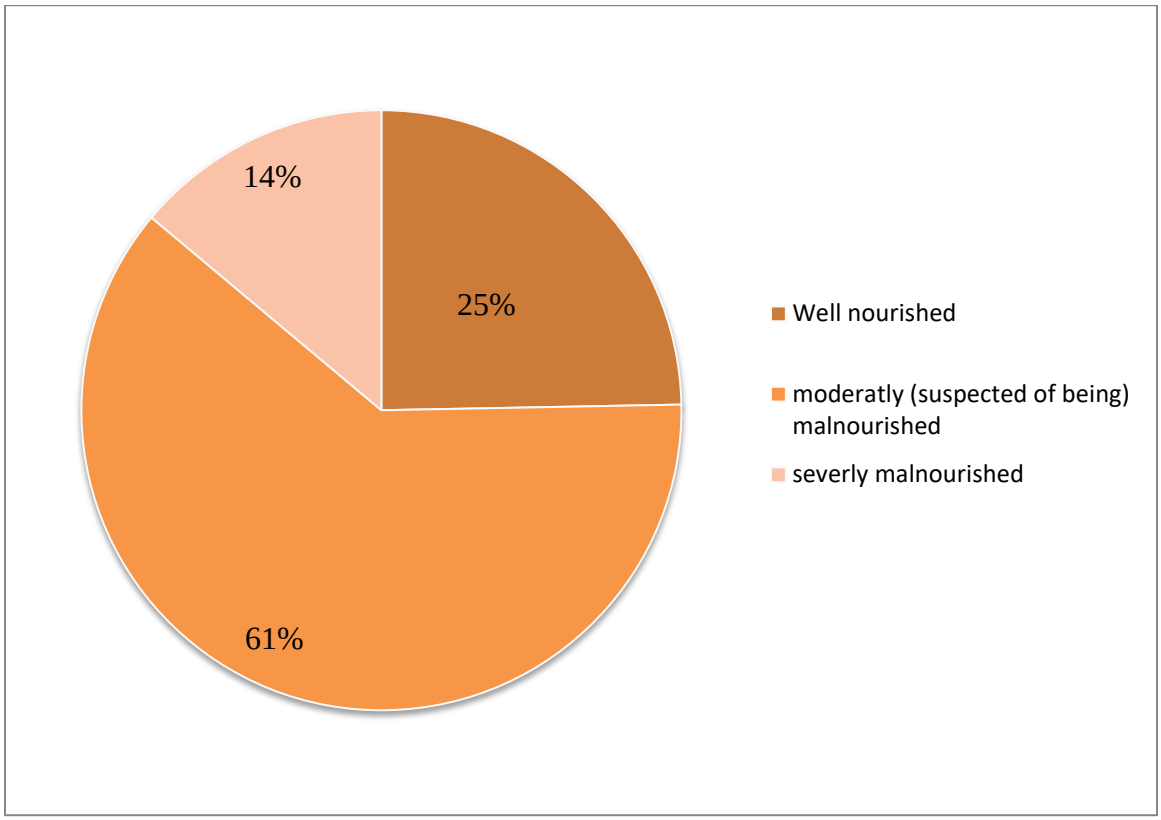

Figure 4: Magnitude of malnutrition at admission among adult hospitalized patients in MTUTH, Mizan_aman, Ethiopia, 2020.

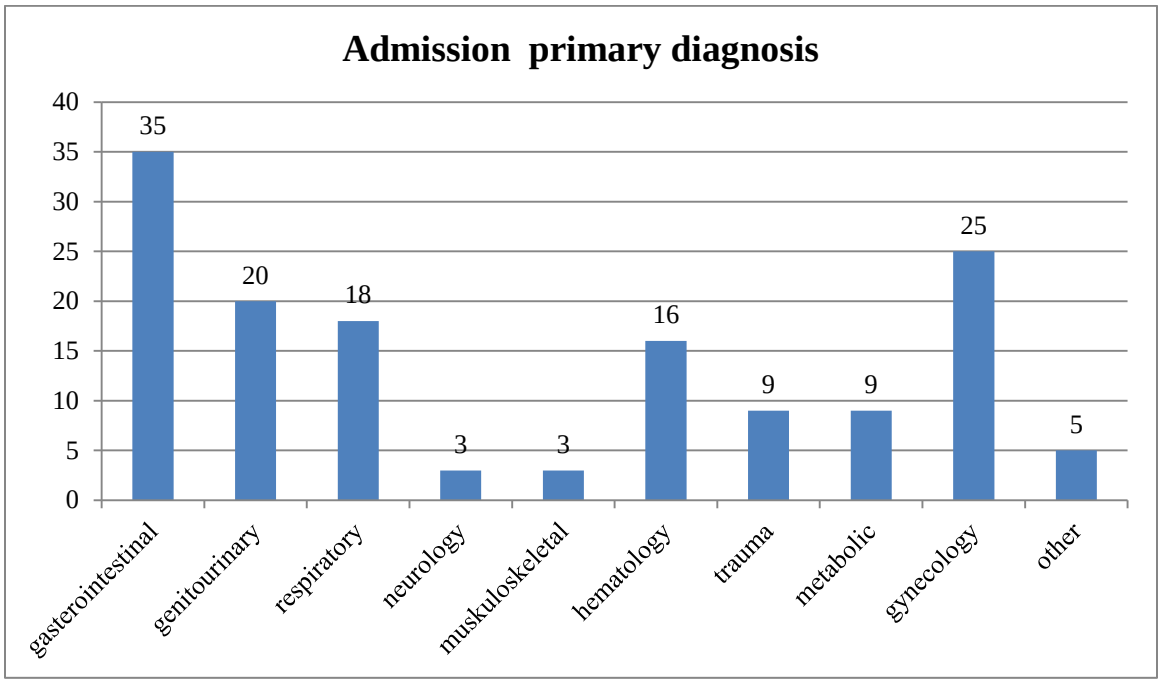

Figure 5: Diagnosis of study participants at the time of hospital admission in MTUTH, Mizan_aman, Ethiopia, 2020.

5.1.3. Change in nutritional status from admission to discharge

At the time of discharge, all 166 patients were reassessed using the SGA discharge assessment and 65 (39.2%) were SGA A, 80(48.2%) were SGA B and 21(12.7%) were diagnosed as SGA C. The prevalence of malnutrition at discharge (SGA= moderately and severely malnourished) was 101 (61%). Twenty-three subjects (14%) were stayed well-nourished, fifty-two subjects (31%) improved, and 31 subjects (18.7%) declined in nutritional status defined by the SGA category between admission and discharge, described in table 3.

38.6% of patients lose their weight during hospital admission. Weight loss was observed in 12 (7%) of 65 normally nourished patients, 35(21%) of 80 moderately malnourished, and 17(10%) of 21 severely malnourished patients.

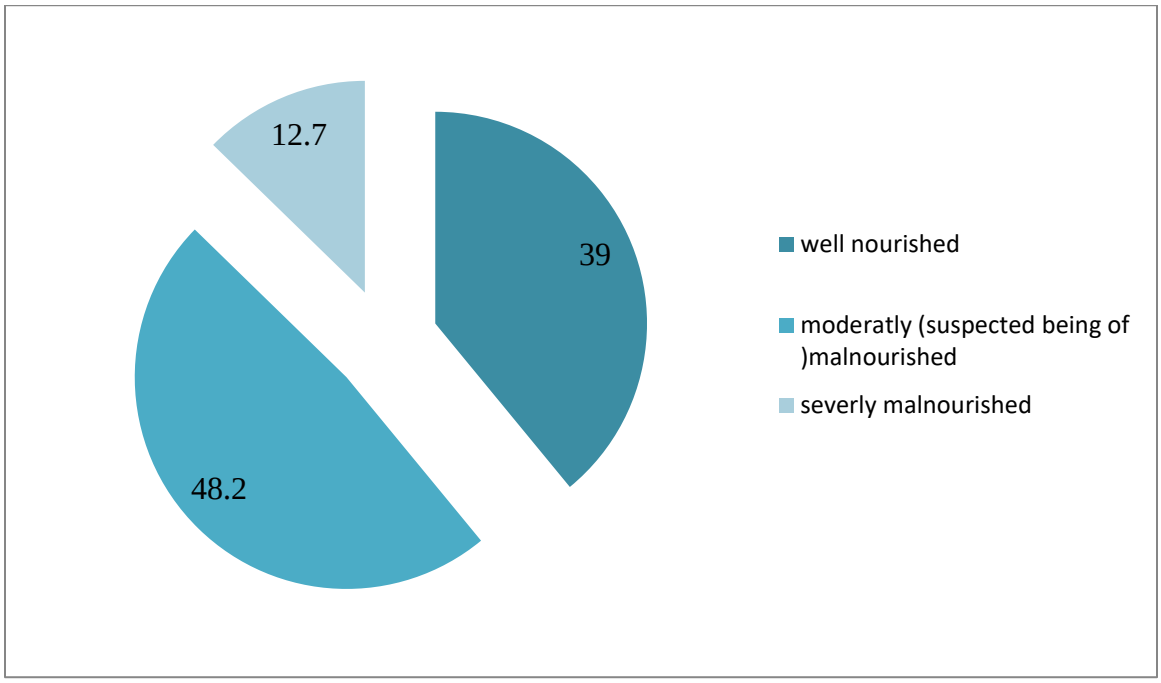

Figure 6: Magnitude of malnutrition at discharge among adult hospitalized patients in MTUTH, Mizan_aman, Ethiopia, 2020

Overall, 31 (18.7%) of patients during admission to the hospital experienced a decline in nutritional status between admission and discharge. Specifically, 14 of 41 (8.4%) experienced a decline in nutritional status who were admitted as SGA A and discharged SGA B; 4 of 41 (2.4%) experienced a decline in nutritional status who admitted as SGA A and discharged SGA C, and 13 (7.8%) experienced a decline in nutritional status patients admitted as SGA B to discharged SGA C were experienced a decline in nutritional status.

Table 4: The nutritional status of patients between admission and discharge in MTUTH, Ethiopia, 2020

	SGA at discharge			
	Normal	**Moderate**	**Severe**	**Total**
SGA at admission	**Number (%)**	**Number (%)**	**Number (%)**	**Number (%)**
Normal	23 (13.9)	14 (8.4)	4 (2.4)	41 (24.7)
Moderate	37 (22.3)	52 (31.3)	13 (7.8)	102 (61.4)
Severe	5 (3)	14 (8.4)	4 (2.4)	23 (13.9)
Total	65 (39)	80 (48.2)	21 (12.7)	166 (100)

5.1.4. Nutritional status and hospital length of stay

The median length of hospital stay in our study was 10(8-12) days. The longer mean length of hospital stay was recorded on a patient admitted normally nourished and discharge severely malnourished patients (13 days) see table 5.

Table 5: length of stay measured by the status of patient's nutritional status at admission and discharge, in MTUTH, 2020

	Normal to Normal	23(13.9%)	8±1.0
	Normal to Moderate	14(8.4%)	11.6±1.5
	Normal to Severe	4(2.4%)	13.2±0.5
	Moderate to Normal	36(21.7%)	9±1.8
	Moderate to Moderate	53(31.9%)	10.9±1.7
	Moderate to Severe	13(7.8%)	12.2±1.8
	Severe to Normal	5(3%)	10±3.16
	Severe to Moderate	14(8.4%)	9.5±2.24
	Severe to Severe	4(2.4%)	12.25±1.25

Significant differences in the length of hospital stay were observed between the three nutrition change groups. The declined nutritional status groups were significantly longer mean length of stay (12 days) ($p<0.001$) compared with a patients improved in nutritional status (9 days). (See table 6).

Table 6: Independent sample t-test for nutrition change groups in MTUTH, Ethiopia, 2020

Outcome Variables	**Change groups**	**N**	**Mean**	**Std. Deviation**	**Std. Error Mean**	**p-Value**
Length stay	group N	24	8.17	1.100	.206	
	Improved	52	9.27	2.078	.288	0.016
	Declined	31	12.10	1.557	.280	0.001

5.1.5. Nutritional status and complication

The crude odds ratios for the risk of complications in declined (OR=2.274, 95%CI, 1.052, 4.915) compared with improved (OR=1.158, 95%CI 0.463, 2.895) patients, and chi-square test explores significant differences in the occurrence of complications seen at p-value =0.006. Patient's grouped declined nutritional status groups were experiences a high percentage of complications as compared improved nutritional status.

Table 7: Percentage of complication for patients in 3 directional nutrition change groups in MTUTH, Ethiopia, 2020

Outcome variable	**Group N (reference) (n=30)**	**Improved n=51**	**Declined n=31**
Complication (%)	29	48	64

Table 8: Multivariate odds ratios (with 95% CIs) for occurrence of complications among declined compared with improved nutritional status patients, in MTUTH, Ethiopia, 2020

				95% C.I.for EXP(B)	
Change Groups	**S.E**	**Sig**	**EXP(B)**	**Lower**	**Upper**
Group N		.008			
Improved	.467	.754	1.158	.463	2.895
Decline	279	.037	2.274	1.052	4.915

The odds of occurrence of complications by the change nutrition group are shown in table 8. More complications were found among admitted normally nourished and discharged moderately malnourished patients and patients admitted moderately malnourished and discharged moderately malnourished compared with patients admitted and discharged normally (OR=4.8, 95% CI, 1.9 2,12 and OR= 4.8 95% CI, 1.67, 13.9).

Table 9: Multivariate odds ratio (OR) and 95%CI for the risk of complication during hospital stay by nine group nutritional status category between admission and discharge, in MTUTH, Ethiopia, 2020

Admission SGA	Discharge SGA	Patients number	P-Value	OR	95% C.I.
Normal	Normal	23(13.9%)	.012	1.0	
Normal	Moderate	14(8.4%)	.001	4.813	1.9 2,12.00
Normal	Severe	4(2.4%)	.246	.385	.077,1.93
Moderate	Normal	36(21.7%)	.034	3.812	1.01,13.12
Moderate	Moderate	53(31.9%)	.004	4.84	1.67, 13.97
Moderate	Severe	13(7.8%)	.999	.000	.000
Severe	Normal	5(3%)	.802	.847	.232,3.09
Severe	Moderate	14(8.4%)	.582	.555	0.57,5.14
Severe	Severe	4(2.4%)	.999	.000	.000

5.2. Predictors of nutritional decline

On bivariate analysis, female sex the patient diagnosed the nutrition category at admission SGA B+C (p=0.002), age group of 48-65 (p=0.05), and surgical procedures during admission time (p= 0.016) were found significant at 25%. Multivariate analysis found that patients admitted with some compromise of nutritional status at admission (SGA B+C) (p=0.005) and patients increase in age 48-65 (p=0.009) are highly significant for the nutritional decline.

Table 10: Bivariate analysis and multivariate analysis for predictors of nutritional decline in MTUTH, Ethiopia, 2020

	Bivariate		**Multivariate**	
Variable	**OR (95% CI)**	**p-value**	**OR (95% CI)**	**p-value**
Sex				
Male	1			
Female	7.33 (2.1,25.149)	**0.002**	10.8(2.87,40.8)	**0.001**
Ward type				
Gynecologic	1			
Medical	0.43(0.14, 1.3)	0.14	0.57(0.11, 2.8)	0.50
Surgical	0.91(0.2984, 2.78)	0.87	0.45(0.77,2.69)	0.38
SGA at admission				

SGA A	1			
SGA B+C	3.92(1.79,8.7)	**0.001**	4.75(1.8,12.3)	**0.001**
Age category				
18_32	1			
33_47	2.18(0.78,6.18)	0.143	2.8(0.88,9.2)	0.08
48_65	**2.79**(0.99, 7.8)	**0.051**	3.7(1.17 ,12.1)	**0.02**
CCI				
No CCI	1			
Mild	1.88(0.5,7)	0.34	1.8(0.4,7.5)	0.42
Moderate	1.76(0.76, 4.5)	0.18	1.46(0.47, 4.5)	0.51
Severe	1.72(0.49,7.4)	0.46	2.24(0.8,1.5)	0.32
Presence of cancer				
No	1			
Yes	0.0(0)	0.999		
Presence of infection at admission				
No	1			
Yes	1.22(0.57,2.6	0.59		
Number of medication				
0-3	1			
4-6	0.86(0.38,1.9)	0.72		
History of surgery				
No	1			
Yes	0.9(0.2,4.2)	0.92		
a surgical procedure in hospital				
No	1			
Yes	0.39(0.18, 0.83)	**0.016**	0.4(0.88,1.8)	0.25

6. Discussion

Poor nutritional at admission during hospitalization have a detrimental effect on the clinical outcome to patients, leading to an increased risk of complications and longer length of stay(11, 38)

This study shows that in patients hospitalized for greater than five days in Mizan_Tepi University Teaching Hospital to assess the association between changes in nutritional status during hospitalization using subjective global assessment (SGA) and its clinical outcome. A finding from this study, the prevalence of malnutrition in Mizan_Tepi University Teaching Hospital at admission was 75%, and 61% at discharge among adult hospitalized patients. About thirty-one (18.7%) of patients declined their nutritional status during hospitalization. Patients who declined nutritional status during hospitalization had a greater proportion of complications (64%) and experienced longer lengths of stay (12 days) than well-nourished patients. The results of the multivariate analyses for factors potentially associated with nutritional decline are being female sex, poor nutritional status at admission, and being older age.

We found a high prevalence of malnutrition at admission in Mizan_Tepi University Teaching Hospital. This finding is higher than Amhara National Regional State (55.6%) (50) and the reported in South Africa in 2006 (72.8%)(18). This difference in prevalence might be the clinical condition of patient characteristics or the main diagnosis of disease. In this study the majority of patients experienced a gastrointestinal side effect, this may indicate the presence of gastrointestinal side effects with acute disease conditions greatly affect dietary intake, literacy level (poor awareness of dietary diversity) findings explained that inadequate and imbalance essential nutrients diet intake is a predictor's for malnutrition(17).

In our study in addition to determining the prevalence of malnutrition on admission, changes in nutritional status by the time of discharge were investigated using SGA. There was a change in nutritional status between admission and discharge. The prevalence of malnutrition is decreased to 61% at discharge. Even the result of our study indicates the prevalence during discharge is decreased, but it is still higher in the figure. The decreased prevalence might be the gastrointestinal side effect decreased, minor improvement in functional capacity, minor improvement in their dietary intake during their hospitalization. In this study, the Subjective Global Assessment (SGA) identify the majority of patients at admission sample had mild to

moderate malnutrition than the discharge sample. The results indicate that there was a higher prevalence of malnutrition within the admission sample and it indicates more severe cases of malnutrition at admission. In similar to our study, results were obtained in the Brazilian National Survey, where despite fewer patients diagnosed as malnourished(45), as well as in a South African study conducted at Tygerberg Hospital, decreased the prevalence of malnutrition at discharge using SGA(51).

In our study, a decline in nutritional status was observed (19%). This study was supported by Johane P. Allard (19.8%) carol Braunschweig (31%) and Yildirim (25%) declined nutritionally while hospitalized (3, 12, 52). This decline in nutritional status in our study might be low food services given in hospital, lack of food choices by the patients or inadequate food intake. Study conducted in 2006 clearly shows that decreased food intake and altered nutritional status are still a major problem, patients who do not finish their meals should be considered to be at an increased risk of acquiring a significant protein-energy deficit within few days of admission and further decline in nutritional status through hospital stay(53). Lack of policy to detect hospital malnutrition at admission and discharge, and poor awareness of malnutrition by health professionals might lead decline the nutritional status of a patients. In our study area patients are discharged traditionally by looking the clinical improvements. Identifying patients at admission should lead to a nutrition care algorithm, which includes confirmation of the nutrition risk or malnutrition and monitoring for those who were detected and required treatment and specific nutrition intervention to prevent further decline of the nutritional status. Socio-demographic factors age, low literacy level, low income and lack of family support during hospital stay the nutritional status. From our studies, improvement in nutritional status was seen in 31%, compared with the studies 17.4%, 31%, (3, 12, 52). These differences may be characteristics of the patient (length of stay).

The present study examined the relationship between the decline in nutritional status and the occurrence of complications and length of hospital stay. Information on the association between nutritional status at admission and its clinical outcome is well described but scarce at discharge on decline nutritional status. In this study, patients who declined in nutritional status were more prone (62%) to experience complications than patients who are in normal nutritional status during hospitalization. This finding in line with a study by carol Braunschweig, odds of a

complication were greater for patients who declined nutritionally(3). Similarly, a study conducted in the United State showed patients who experienced a decline in nutritional status during their admission experience more complications (64%) than the patient's normal nutritional status. Naber et al reported that the incidence of any complication was higher among nutritionally compromised patients compared with well-nourished patients(11). A study confirmed that malnourished patients are at greater risk of co-morbid complications(54). Almost small these differences might be the number of complications, the organ system affected by a complication or severe condition of the disease. Further, this study was confirmed as there was a significant difference in nutritional status and the presence of complications, with patients at malnourished patients experiencing more complications than those patients not malnourished(51). We found that complications during hospitalization were more likely to occur in patients admitted who were normally nourished and discharged moderately malnourished. In addition to our find's more complications is occurred in patients admitted and discharged nutritionally compromised patients(3, 11). That might be the severity of the disease and the mean number of complications.

In this study, we found a longer length of stay (12 days) occurred in patients who declined nutritionally than patients admitted and discharged normally by an average of 4 days. This data corresponding to a previous study, conducted in the United States looked at adult patients hospitalized for more than 7 days and examined the impact nutritional decline had on clinical outcomes, findings showed that patients who were admitted with some degree of malnutrition, and those patients who experienced a decline in nutritional status during their admission, had significantly longer hospital stays (by an average of 4 days) than patients both admitted and discharged as well-nourished patients(3). Findings in Australia hospital found a significantly greater difference of 5 days between the length of stay of malnourished and well-nourished patients(55). Similarly, a study showed patients that who were identified to be malnourished had a significantly longer length of stay than those patients that were not(51). The differences in duration might be due to the clinical condition of patients (disease category) such as patients who were diagnosed with TB, patients undergoing surgery. However, that patients who were admitted normally nourished and discharged severely malnourished have a longer mean (13.2±0.5) length

of stay, this finding is lower than a study by carol Braunschweig, (23±4.6) length of stay(3). The differences could be prolonged duration of treatment.

The predictive factors that contribute to nutritional decline were also evaluated in this study, we found being of the female sex, older age, and poor nutritional status at admission was significant contributing factors for the decline in nutritional status during hospitalization, this in line with a study by Johane P. Allard(12). No more articles were found to compare the findings factors for the nutritional decline that occurred in the hospital.

6.1. Strength and limitation of the study

6.1.1. Strength of the study

These study insights nutritional status of patient at admission and discharge, and a validated SGA tool used.

6.1.2. Limitation of the study

- Since this study is a hospital-based; and single-center study it may not represent the general population.
- This study is carried out during the COVID-19 pandemic; patients were not usually admitted as its diagnosis, they were discharged early.

7. Conclusion and recommendation

7.1. Conclusion

Around 19% of patients declined their nutritional status during hospitalization. A declined in nutritional status was found significantly associated with a longer length of stay and a higher likelihood of complication. Therefore, strategies like nutrition intervention should be considered early in the management of these patients to prevent or reduce the decline in nutritional status during hospital stay.

7.2. Recommendations

Looking at the findings the following stakeholders were recommended:

For hospital

Set a policy to implement how to screen patients of nutritional status at admission and reassess at discharge to reduce the decline of patient's nutritional status and its impacts.

For health care providers

Health care providers should be aware of how to make a reducing decline in patients in nutritional status and consider re-assessing nutritional status before discharge

For researchers

Since this study may not provide representative evidence of the Ethiopian heterogeneity population, so a large prospective study on a nationwide multicenter should be conducted to confirm the findings of malnutrition at admission and discharge.

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Annexes

Annex I: participant screening and selection form

Hospital code		Hospital name	
Ward category		Ward number	

	Patient initial and surname	Ward and bed no	Hospital admission in past 48 hours		Patient Age (18-64)	Patient conscious		informed consent obtained		If NO consent obtained, provide reason	If consent obtained, allocate participant study
			Yes	No		Yes	No	Yes	No		
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											

Annex: II data extraction form

Part I: Admission data collection form

Participant code		
Date of interview (dd/mm/yyyy) E.c	_____/_____/_____	
Date of admission to ward (dd/mm/yyyy) E.c	_____/_____/_____	
Admission ward	1. Medical	
	2. Surgical	
	3. Gynecologic	

Part I: Socio-demographic characteristics

Instruction: Now I am going to ask you questions about your socio-demographic information Ask the following questions carefully and circle the response unless there is no specific instruction.

Ques	Questions	Response	Skip
101	How old are you?	……..years (age in complete years)	
102	Sex of the respondent	Male……....1 Female…….…...2	
103	Level of education	Unable to read and write…….....1 Able to read and write.……....2 Primary level (1-8) …….……..3 Secondary level (9-12) ……....4 Technical/Vocational……5 Higher (University) …..…….6	
104	What is your marital status?	Single……...…...1 Married……..…….2 Divorced……..…..….3 Widowed……..……..4 Others Specify……..……..5	
105	What is your occupation	The government employed.……...…..1 Unemployed……...…...2 Merchant…….....3 Farmer……...….4 Student……...…5 Others(specify)……...…6	
106	What is your religion	Orthodox…….……...…1 Catholic……..2 Protestant……...……3 Muslim……...……4	

		Others (specify)…….……....5	

Part II: Baseline clinical data

No	Question	Response	Skip
201	Admission primary diagnosis	Cardiovascular……...1 Gastrointestinal…...……..….2 Genitourinary…..……..….3 Respiratory…..……4 Neurology…….…….5 Musculoskeletal…..……...….6 Metabolic……...……....7 Hematology ……..…8 Trauma ……9 Others _____10	
202	Please specify primary admission Diagnosis (please review the chart)	----------	
203	Admission secondary diagnosis (comorbidities)	Yes ……1 No ……..2 →	205
204	If yes to Q304, specify admission Secondary diagnosis	----------	
205	Is there any clinical evidence /dx of infection at the time of admission? (please review the chart)	Yes ……1 No...…….2	
206	Are you currently taking any Drugs?	Yes ……1 No……..……2 →	209
207	How many different drugs are you taking per day?	☐	
208	Is there any history of previous surgery in the past three years?	Yes……1 No……...2	
209	Indicate if the patient developed any medical complications during hospitalization	Yes……1 No……...2	

Part III: Disease severity score (CCI) (circle one)

No	Condition	Response	Point
301	Has a patient had Myocardial Infarction	Yes ……1 No……..2	1
302	Has a patient been hospitalized or treated Congestive Heart Failure	Yes ……1 No……..2	1
303	Does the patient have Peripheral Vascular disease	Yes ……1 No……..2	1
304	Has a patent had a CVA or transient ischemic disease (CVA	Yes ……1 No……..2	1

305	Does the patient have Alzheimer's, dementia, cognitive impairment (DEMENTIA)	Yes ……1 No……..2	1
306	Does the patient have asthma, chronic lung disease, chronic bronchitis, or (COPD)	Yes ……1 No……..2	1
307	Does the patient have any rheumatic or connective tissue disease? (RHEUMATIC)	Yes ……1 No……..2	1
308	Has the patient had a gastric or peptic ulcer(ULCER)	Yes ……1 No……..2	1
309	Does the patient have diabetes that requires treatment (DM)	Yes ……1 No……..2	1
310	Does the patient have end-organ damage from diabetes (DM ENDORGAN)	Yes ……1 No……..2	2
311	Does the patient have a moderate or severe renal disease(RENAL)	Yes ……1 No……..2	2
312	Does the patient have Hemiplegia	Yes ……1 No……..2	1
313	Does the patient have any hypertensive (HYPERTENSION)	Yes ……1 No……..2	1
314	Does the patient have depression (DEPRESSION)	Yes ……1 No……..2	1
315	Has the patient had cancer(Leukemia, solid Tumor, Lymphoma)	Yes ……1 No……..2	2
316	Had a patient had a metastatic solid tumor	Yes ……1 No……..2	6
317	Has the patient had skin ulcer (SKIN ULCER)	Yes ……1 No……..2	2
318	Does the patient have chronic liver disease (MILDLIVER	Yes ……1 No……..2	2
319	Does the patient have moderate or severe chronic liver disease(SIVERLIVER)	Yes ……1 No……..2	3
320	Does the patient have HIV OR AIDS	Yes ……1 No……..2	6
321	CCI scoring	1. ≤2 2. >2	

Part V. Subjective global assessment data (SGA) (circle one rating for each)

Instruction: Now I am going to ask you questions about your nutritional status

Ques	Questions	Response	Skip
401	Weight change Overall loss in the past 6 months	No weight change or gain ……..…1 Minor weight loss (<5%)…….…..2 Weight loss 5 to 10%.....3 Weight loss 10 to 15…….…….4 Weight loss > 15%.....5	
402	Dietary intake change (relative to normal)	No-change…….…....1 Suboptimal solid diet……../..…2 Full liquid diet……...…3 Hypo caloric liquid..….....4 Starvation……..….....5	If no change go to question 304
403	Gastrointestinal symptoms (that persisted for >2 weeks)	None……...1 Nausea…….....2 Vomiting…….3 Diarrhea…….……4 Anorexia…….……...…5	
404	Functional capacity	No dysfunction (e.g., full capacity)…….1 difficulty with ambulation …….2 difficulty with normal activity …….……..3 Light activity …….……....4 Bedridden with no or light activity……5	If no dysfunction go to question306
405	Disease and its relation to nutritional requirements Primary diagnosis (specify)	----------	
406	Metabolic demand (stress)	No stress……..…….....1 Low stress……..……2 Moderate stress…..……....3 High stress……...….5	
407	Decreased fat store or loss of subcutaneous fat (below triceps, biceps,	None (no change)……..……1 ……..……2 Moderate ……..……....3	

	or chest)	……..……4 Severe ……..……5	
408	Sign of muscle wasting (below Quadriceps or deltoid	None (no change)……..……1 ……..……2 Moderate ……..……....3 ……..……4 Severe ……..……5	
409	Sign of edema (ankle, sacral, ascites)	None (no change)……..……1 ……..……2 Moderate ……..……....3 ……..……4 Severe ……..……5	
410	Malnutrition score (Sum of score)		
412	SGA rating	Well-nourished……...A Moderately (or suspected of being) malnourished……..…B Severely malnourished……...C	

SGA rating (select one)

A=Well-nourished

B = moderately (or suspected of being) malnourished

C = severely malnourished

Please double-check that all sections are fully completed!

Completed by:	
Checked by:	
Date:	

Discharge Data Collection Form

<u>This form can only be completed if the patient was in the hospital for longer than ≥5 days.</u>

Part 1: Discharge data collection form

Participant code	
Date of interview	_____/_____/_____
Date of admission to award	_____/_____/_____
Date of discharge from hospital	_____/_____/_____

<u>Part IIb: Clinical data</u>

601	Weight at discharge	……kg
602	Indicate if the patient developed any medical complications during hospitalization	Yes ……1 No……..2

Part VII: Disease severity score (CCI)

	Condition	Response	Point
701	Has a patient had Myocardial Infarction	Yes ……1 No……..2	1
702	Has a patient been hospitalized or treated Congestive Heart Failure	Yes ……1 No……..2	1
703	Does the patient have Peripheral Vascular disease	Yes ……1 No……..2	1
704	Has a patient had a CVA or transient ischemic disease (CVA	Yes ……1 No……..2	1
705	Does the patient have Alzheimer's, dementia, cognitive impairment (DEMENTIA)	Yes ……1 No……..2	1
706	Does the patient have asthma, chronic lung disease, chronic bronchitis, or (COPD)	Yes ……1 No……..2	1
707	Does the patient have any rheumatic or connective tissue disease? (RHEUMATIC)	Yes ……1 No……..2	1
708	Has the patient had a gastric or peptic ulcer(ULCER)	Yes ……1 No……..2	1
709	Does the patient have diabetes that requires treatment (DM)	Yes ……1 No……..2	1
710	Does the patient have end-organ damage from diabetes (DM ENDORGAN)	Yes ……1 No……..2	2
711	Does the patient have a moderate or severe renal disease(RENAL)	Yes ……1 No……..2	2
712	Does the patient have Hemiplegia	Yes ……1 No……..2	1
713	Does the patient have any hypertensive (HYPERTENSION)	Yes ……1 No……..2	1
714	Does the patient have depression (DEPRESSION)	Yes ……1 No……..2	1
715	Has the patient had cancer(Leukemia, solid Tumor, Lymphoma)	Yes ……1 No……..2	2
716	Had a patient had a metastatic solid tumor	Yes ……1 No……..2	6

	Has the patient had skin ulcer (SKIN ULCER)	Yes ……1 No……..2	2
717	Does the patient have chronic liver disease (MILDLIVER	Yes ……1 No……..2	2
718	Does the patient have moderate or severe chronic liver disease(SIVERLIVER)	Yes ……1 No……..2	3
719	Does the patient have HIV OR AIDS	Yes ……1 No……..2	6
720	CCI scoring	3. ≤2 4. >2	

Part VIII: SGA ASSESSMENT FORM

Instruction: Now I am going to ask you questions about your nutritional status

Ques	Questions	Response	Skip
801	Is there a weight loss at discharge	Yes ……1 No ……...2	
802	Weight change Overall loss in the past 6 months	No weight change or gain ……..…1 Minor weight loss (<5%)…….…..2 Weight loss 5 to 10%.....3 Weight loss 10 to 15…….…….4 Weight loss > 15%.....5	
803	Dietary intake change (relative to normal)	No-change…….…....1 Suboptimal solid diet……../..…2 Full liquid diet……...…3 Hypo caloric liquid..…….....4 Starvation……..…....5	If no change go to question 304
804	Gastrointestinal symptoms (that persisted for >2 weeks)	None……...1 Nausea…….....2 Vomiting…….3 Diarrhea…….…….4 Anorexia…….……...…5	
805	Functional capacity	No dysfunction (e.g., full capacity)…….1 difficulty with ambulation …….2 difficulty with normal activity …….……..3 Light activity …….……....4 Bedridden with no or light activity……5	If no dysfunction go to question306
806	Disease and its relation to nutritional requirements Primary diagnosis (specify)	----------	
807	Metabolic demand	No stress……..…….....1	

	(stress)	Low stress……..……2 Moderate stress…..……...3 High stress……...….5	
808	Decreased fat store or loss of subcutaneous fat (below triceps, biceps, or chest)	None (no change)……..……1 ……..……2 Moderate ……..……....3 ……..……4 Severe ……..……5	
809	Sign of muscle wasting (below Quadriceps or deltoid	None (no change)……..……1 ……..……2 Moderate ……..……....3 ……..……4 Severe ……..……5	
810	Sign of edema (ankle, sacral, ascites)	None (no change)……..……1 ……..……2 Moderate ……..……....3 ……..……4 Severe ……..……5	
811	Malnutrition score (Sum of score)		
812	SGA rating	Well-nourished……...A Moderately (or suspected of being) malnourished……..…B Severely malnourished……...C	

Part IX: Length of stay

No	Question	Codding category	Skip
901	Date of admission (dd/mm/yyyy) E.c	_____/_____/_____	
902	Surgical procedure during Hospitalization	Yes ……1 No ……2	→ 904
903	Date of surgical procedure (dd/mm/yyyy) E.c	_____/_____/_____	
904	Date of discharge (dd/mm/yyyy) E.c	_____/_____/_____	

Please double-check that all sections are fully completed!

Completed by:	
Checked by:	
Date:	

Annex III: Information sheet (English version)

Research Title: assessment of the association between the change in nutritional status and its clinical outcome among adult hospitalized patients in Mizan-Tepi university teaching hospital, southwest, Ethiopia, observational prospective cohort study

Name of the principal investigator: Addisu Yigezu

Name of the sponsor:

Introduction: This information sheet was prepared for Mizan-Tepi University Teaching hospital, Adult admitted clients. The form aims to make the institution clear about the purpose of the research, data collection procedures and finally to get permission to conduct the research.

Purpose of the research project: Primarily, the result of the study will be submitted to Addis Ababa University School of Public Health for the requirements to get a Masters of Public Health in Nutrition.

Since there is a paucity of studies on the area of hospital malnutrition in Ethiopia. Thus, the finding of this study will contribute its part in filing the information gap regarding hospital malnutrition and its care by isolating factors that bring the poor nutritional status of patients to guide specific interventions on those factors. Therefore, it will contribute its part to policies that focus on hospital malnutrition specifically the change in nutritional status.

Procedure: All selected inpatient who is admitted for a greater than 5 days in Mizan-Tepi University Teaching hospital will be selected and a review of the required information from the records will be made using a checklist. For some variables that are unavailable on records, patients will be interviewed and necessary information will be collected after getting their consent during admission and before discharge. six nurses from the inpatient center will be trained and collect the data.

Risk/ discomfort: There will be no risk at all on patients whom their records are reviewed and interviewed.

Benefits: There will be no incentive or direct benefit to patients involved in the study. In dead, they will benefit indirectly from the research when the result of the study is used for program planning to improve hospital malnutrition. Therefore, this research will have a paramount direct

benefit for patients, health care planners, and managers to prove health-related costs and resources.

Confidentiality: All patient rights will be highly respected. Patients' names will not be used, instead, number codes will be used for every patient. The patient's information will be kept confidentially so as no other parties can obtain except the principal investigator.

Person to contact: This research project will be reviewed and approved by the institutional review board of the College of Medicine and Health Sciences, Addis Ababa University. In case, if you want to know more information about the research and its undertakings, you can contact the committee through the following address.

Addis Ababa University College of Medicine and Health Science Research Review Committee

Tel: +251-115157701 or +251-115-513-099

Adisu Yigezu (MPH Candidate): Tel: 0913872598/0935171010

Permission: Therefore, you are kindly requested to permit and forward your permission to the concerned body in your organization so that the researcher can get cooperation responsible bodies.

With regards!

To be filled by Medical Directors:

I have properly examined the objective of the study, understood patient rights are respected patient confidentiality is assured and there will be no risks on patients related to the study. Therefore, I gave formal permission for the study to begin on behalf of the Mizan-Tepi University teaching hospital.

Medical Director Name:

Signature:----------

Date:----------/----------/----------

Annex IV: Information sheet (Amharic version)

<u>የጥናቱን አጠቃላይ ሁኔታ የሚገልጽ የመረጃቅጽ፡</u>

የጥናቱ ርእስ፡ የምግብ ይዘት መጠን መቀያየርና ከህክምና ውጤቶች ጋር ያላቸውን ተያያዥነት ማየት።

"Association between the change in nutritional status and its clinical outcome"

የተመራማሪው ስም፡ አቶ አዲሱ ይገዙ

የጥናቱ ስፖንሰር፡አዲስ አበባ ዩኒቨርሲቲ

መግቢያ፡ይህ የመረጃ ቅጽ ለሚዛን ቴፒ ዩኒቨርስቲ ቲችንግ ሆስፒታል ለኣዋቂ ተኝቶ ታካሚ የተዘጋጀ ነው። ዓላማውም ሆስፒታሉ የጥናቱን ዓላማ በሚገባ እንዲረዳ እና የመረጃ አሰባሰብ ሂደቱ ምን እንደሚመስል እንዲረዳ በመጨረሻም ጥናቱ እዲካሄድ ተቋማዊ ፈቃድ እንዲሰጥ ነው።

የጥናቱ ዓላማ፡

በቅድሚያ የጥናቱ ውጤት ስንምግብ ትምህርት ዘርፍ የማስተርስ ዲግሪ ለማግኘት ለአዲስ አበባ ዩኒቨርሲቲ የማህበረሰብ ጤና ትምህርት ቤት የሚገባ ነው።በሀገራችን ኢትዮጵያ በተኝቶ ታካሚ ሲገቡና ሲውጡ ያላቸው የምግብ ይዘታቸ ምን እንደሚመስል ያላቸው ለውጥ ከህክምና ውጤቶች ጋር ያላቸውን ተያያዥነት ላይ የተሰሩ ጥናቶች ባለመኖራቸው እንደአንድ ግብ ዓት ለኢትዮጵ የጤና ፖሊሲ ፕሮገራም ዘርፍ የሚያገለግል ጥናት ሲሆን ጥናቱን በማየት ለተሻለ ኣገልግሎት ኣሰጣጥ እንደአንድ ስትራቴጂ ያገለግላል። ስለዚህም የዚህ ጥናት ውጤት ሆስፒታል ውስጥ ተኝተው የሚታከሙት የምግብ ይዘታቸው መቀያየርና ክህክምና ውጤች ጋር ያላቸውን ተያያዥነት በማየት የትግበራ ማስተካከያ ለማድረግ ያግዛል።

የመረጃ አሰባሰብ ሂደት፡በሚዛን ቴፒ ዩኒቨርስቲ ቲችንግ ሆስፒታል ለኣዋቂ ተኝቶ ታካሚ ለህክምና ክትትል በግቡ ሁለትቀን ውስጥ መጠይቅ ይደረግላችዋል በድጋሚ ተኝትው ለታከሙት 5 ቀንና ከዚያ በላይ ለሆናቸው በድጋሚመጠይቅ ይደረግላችዋል ።ከሆስፒታል ስድስት ነርሶች ጥናቱን በሚመለከት ስልጠና ይሰጣቸዋል።

ጥናቱ በህመምተኞች ላይ ያለው ተፅኖ፡

ፈቃደኛ ሆነው መረጃቸው የሚሰበሰብ ወይም ቃለምልልስ የሚያደርጉህ መምተኞች ከጥናቱ ጋር በተያያዘ ምንም አይነት ጉዳት አይደርስባቸውም።

የጥናቱ ጥቅም፡የጥናቱ ተሳታፊዎች ከጥናቱ ጋር በተያያዘ ምንም አይነት ድጎማ ወይም ጥቅም አያገኙም። ነገር ግን የጥናቱ ውጤት የህክምና እንክብካቤ እና ኣሰጣጥ ለማሻሻል ለሚደረገው የፕሮግራም እቅድም ህመምተኞችም ቀጥተኛ ባልሆነ መንገድ ተጠቃሚ ይሆናሉ።

የመረጃው ሚስጥራዊነት፡የታካሚዎች መብትና ሃሳብ ሙሉበሙሉ ይከበራል።የታካሚዎች ስም በፍጹም አይካተትም።ከታካሚዎች ስም ይልቅ ለያንዳንዱ ታካሚ መለያዎችን እንጠቀማለን። የታካሚዎች መረጃ ከጥናቱ ባለቤት ውጪ ማንም እነዳያይ በምስጢር ይጠበቃል።

ለበለጠመረጃ፡

ይህ የጥናት ፕሮጀክት በአዲስ አበባ ዩኒቨርሲቲ የህክምናና ጤና ሳይንስ ኮሌጅ ጥናታዊ ፕሮጅክቶችን መርምሮ በሚያጸድቅ ቦርደ / institutional review board/ ተገምግሞ ፀድቋል። ስለ ጥናቱ ተጨማሪ ማብራሪያ ካስፈለገ የሚከተለውን አድራሻ በመጠቀም መጠየቅ ይችላሉ።

የአዲስ አበባ ዩኒቨርሲቲ የህክምናና ጤና ሳይንስ ኮሌጅ ጥናታዊ የጥናታዊ ጽሁፎች ገምጋሚ ኮሚቴ

ስልክ፡ +251-115157701 or +251-115513099

ጥናቱን የሚያካሄዱት ባለሙያ፡ አቶ አዲሱ ይገዙ ስልክ፡ +251-913872598/935171010

ፍቃድ፡

ስለዚህ ይህ ጥናት በተቋማችሁ በተሳካ ሁኔታ እንዲካሄድ እንድትፈቅዱልንና ለሆስፒታሉ የተኝቶ ህክምና ክፍል ዩኒቶች ለሌሎችም ለሚመለከታቸው አካላት የተላመደ መልካም ትብብራቸውን ያደርጉልን ዘንድ እነድታሳውቋቸው በአክብሮት እንጠይቃለን፡፡

1. ለተኝቶ ህክምና ክፍል
2. ለቀዶ ጥገና ክፍል
3. ለማጸንና ጽንስ ክፍል

ከምስጋናጋር!

በሜዲካል ዳይሬክተሩ የሚሞላ፡

የጥናቱን ዓላማ የታክሚዎችን መብት መጠበቁን መረጃቸው በሚስጥር እንደሚጠበቅና ከጥናቱ ጋር በተያያዘ በጥናቱ ተሳታፊዎች ላይ ምንም አይነት ጉዳት እነደማይደርስ ተረድቻለው፡፡ስለዚህም ሂደት በሚዛን- ቴፒ ዩኒቨርስቲ ቲችንግ ሆስፒታል ስም ጥናቱ እንዲጀመር መፈቀዱን እየገለጽኩ የሚመለከታቸው ክፍሎች አስፈላጊውን ትብብር እንዲያደርጉላቸው እጠይቃለው፡፡

የሜዲካል ዳይሬክተሩ ስም፡----------

ፊርማ----------

ቀን---------/--------/----------

Annex V: Consent form for face to face interview with patients (English version)

Good morning/Good afternoon

My name is _____.I am working with Mr. Addisu Yigezu who is researching partial fulfillment for the requirement of Mater in Public Health in Nutrition at Addis Ababa University. This study is intended for the assessment of the association between the change in nutritional status and its clinical outcome in Mizan-Tepi University Teaching Hospital who are under follow up for treatment in in-patient wards.

The study is aimed to fill the information gap and provide evidence for program planners, implementers, and decision-makers at different levels and thereby to improve the nutrition intervention program.

Formal consent was obtained from MTUTH to begin the study and now we are collecting the data from patient records and by face to face interviews with patients.

I assure you that your information will be kept confidential and your name will not be used in the study. Your answers to any of the questions will not be given to anyone else and no reports of the study will ever identify you.

The interview is voluntary and it may take 15-20 minutes. Your right not to participate or to terminate will not affect services that you or your family may receive from the health service provider. However, if you participate in the interview, you will contribute a lot to improvements in-hospital care for the patients related to the study.

Are you willing to participate in the study?

1. Yes 2. No

The responder is willing to take part in the study

Name of data collector: _____ Signature: _____

Annex VI: Consent form for face to face interviewwith patients(Amharic version)

<u>የህመምተኞችን ፈቃደኛነት መጠየቅያ ቅጽ</u>

ጤና ይስጥልኝ!

ስሜ .....ይባላል።በአሁኑ ሰዓት የአዲስ አበባ ዩኒቨርስቲ የማህበረሰብ ጤና ዘርፍ የሁለተኛ ዲግሪ የመመረቂያ ጥናታዊ ፅሁፋቸውን ከሚሰሩት ከአቶ አዲሱ ይገዙ ጋር በመሆን መረጃ በማሰብሰብ ላይ እገኛለው።ጥናቱ የሚደረገው በሚዛን-ቴፒ ዩኒቨርስቲ ቲችንግ ሆስፒታል የተኝቶ ህክምና ክፍል ህክምናን ለመከታተል በገቡ ታካሚዎች እና ህክምናውን በመከታተል ጨርሰው ለሚወጡ ታካሚዎች ሲገቡና ሲውጡ ያላቸው የ ምግብ ይዘታቸው መጠን ምን እንደሚመስልና ያላቸውስ ለውጥ በህክምና ላይ ያላቸውን ተፅኖ ለማየት ነው።ጥናቱ ለፕሮግራም አውጭዎች፣አስፈጻሚዎች እንዲሁም ውሳኔ ሰጪዎች ጥናታዊ መረጃ በመስጠትና ያለውን የመረጃ እጥረት በመቀነስ የህሙማኑን የጤና ሁኔታ ለማሻሻል ጉልህ አስተዋፆ ያደርጋል።ስለዚህም በሚዛን-ቴፒ ዩኒቨርስቲ ቲችንግ ሆስፒታል ፈቃድ በማግኘት ለዚህው ጥናት የሚውል መረጃ ከታካሚዎች ማህደር እና ህመምተኞችን በአካል በማግኘትና ቃለመጠይቅ በማድርግ በመሰብሰብ ላይ እንገኛለን።የሚሰጡት መረጃ ሚስጥራዊነት የተጠበቀ ሲሆን፤ ስምዎትም በዚህ ጥናት ውስጥ አይገለጽም መረጃንም ለሌላ ወገን አሳልፈን እንደማንሰጥ አረጋግጥልዎታለው።ቃለምልልሱም እስከ 15 ደቂቃ ሊፈጅ ይችላል ቃለምልልሱ በፈቃደኝነት ላይ የተመሰረተ ሲሆን ያለመሳተፍ ወይም በማንኛውም ሰዓት የማስቆም መብትዎ የተጠበቀ ነው።ይህ በመሆኑም በእርሶም ሆነ በቤተሰብዎ ላይ ከሆስፒታሉ በሚያገኙት አገልግሎት ላይ ምንም አይነት ተፅእ ኖአይኖረውም። ሆኖም ግን መረጃ በመስጠት ቢተባበሩን በሆስፒትል ውስጥ የምግብ ይዘት መጠን መቀያየ ጋር ተያይዞ ለሚሰጡ ህክምናና እንክብካቤ ማሻሻያዎች የበኩልዎን አስተዋፆ የበረክታሉ።

ለጥናቱ መረጃ ለመስጠት ፍቃደኛነዎት?

1. አዎን 2. አይደለሁም

በጥናቱ ለመሳተፍ ፈቅደዋል።

የመረጃው ሰብሳቢ ስም: _____ ፊርማ:_____

የአማርኛ መጠይቅ

የመጠይቁ ቁጥር		
የተኙበት ቀን	_____/_____/_____	
መጠይቁ የተካሄደበት ቀን	_____/_____/_____	
የተኙበት ክፍል	1. የውስጥ ደዌ	
	2. ቀዶ ጥገና	
	3. ማህጸን	

ክፍል አንድ: አጠቃላይ የማህበራዊ አኗኗር ሁኔ ታ መረጃ ዳሰሳ

ክፍል 1.መሰረታዊ እና የስነ-ህዝብ መረጃን የተመለከቱ ጥያቄዎች አሁን የርስዎን መሰረታዊ እና የስነ-ህዝብ መረጃዎች የተመለከቱ ጥያቄዎችን እጠይቅዎታለሁ። የሚከተሉትን ጥያቄዎች በጥንቃቄ በመጠየቅ ምርጫ ከሆነ መልሱን ያክብቡ፤ነፃ ጥያቄ ከሆነ የመላሹን መልስ ይፃፉ።

ቁጥር	ጥያቄ	ኮድ	ዝለል
101	ዕድሜዎ ስንትነው (በሙሉአ መት)	……አመት 777. አላውቅም	
102	ጸታ	ወንድ……..…...1 ሴት……..….2	
103	ምንያህል ተምረዋል?	ማንበብና መፃፍ የማይችል.....1 ማንበብና መፃፍ የሚችል.....2 አንደኛ ደረጃ (1-8) .....3 ሁለተኛ ደረጃ (9-12) .....4 ኮሌጅ/ቴክኒክ.....5 ዩኒቨርስቲ.....6	
104	የጋብቻ ሁኔታ	ያላገባ……..……..…..1 ያገባ..……..……..…2 የተፋታ/የተፋታች…….…...……..3 የሞተባት/የሞተበት……..……...….4 ሌላ ካለ ይግለጹ……..….5	
105	የስራአይነት	የመንግስት ሰራተኛ…….....….1 ስራየለኝም……..2 ነጋዴ…….....3 ገበሬ……..……..…...…4	

		ተማሪ……..……..…....5 ስራየ ለኝም…..……..…....6 ሌላ፡.....7	
106	የየትኛው ሀይማኖት ተከታይነዎት?	ኦርቶዶክስ……..…..…...1 ካቶሊክ……...…….……2 ፕሮትስታነት…..……..…...3 ሙሰሊም……...…….....…4 ሌላካለይገለጹ……..…...…..…5	

ክፍል ሁለት. መሰረታዊ የጤና ነክ መረጃ

ተቁ	ጥያቄ	መልስ	ዝለል
201	የገቡበት የበሽታ አይነት	ልብና የደም ቧንቧ በሽታ .....1 የጨጓራ እና የአንጀት.....2 የኩላሊት እና የሽንት ቧንቧ.....3 የመተንፈሻ አካላት.....4 የነርቭ በሽታ.....5 የጡንቻ ና የአጥንት በሽታ.....6 የሜታቦሊክ በሽታ.....7 የደምና ተያያዥ በሽታዎች.....8 ድንገተኛ አደጋ.....9 ሌላ ካለ ይገለጽ _____10	
202	የበሽታውን አይነት በዝርዝር ይጻፉ (ከታካሚው ካርድ ላይ ይመልከቱ)	----------	
203	የገቡበት ሌላ ተጨማሪ በሽታ (ከታካሚው ካርድ ላይ ይመልከቱ)	አለ.....1 የለም.....2	
204	ታካሚው ተጨማሪ በሽታ አለበት ካሉ በዝርዝር ይጻፉ	_____	
205	የታወቀ የካንሰር በሽታ አለቦት? (ከታካሚው ካርድ ላይ ይመልከቱ)	አለ.....1 የለም.....2	
206	የተኝቶ መታከሚያ ክፍል የገቡበት ቀን ላይ የለ ማንኛውም አይናት የኢንፌክሽን ምልክት ? (ከታካሚው ካርድ ላይ ይመልከቱ)	አለ.....1 የለም.....2	
207	አሁን የሚወስዱት መድሃኒት አለ (ከታካሚው ካርድ ላይ ይመልከቱ)	አለ.....1 የለም.....2	
208	ስንት የተለያየ መድሃኒት በቀን ወስጥ ይወስዳሉ ? (ከታካሚው ካርድ ላይ ይመልከቱ)		
209	ለፉት ሶስት አመታት ውስጥ የቀዶ ጥገና አድርገው የውቃሉ?	አድርጌለው.....1 አላደረግኩም.....2	
210	የተኝቶ መታከሚያ ክፍል ከገቡ በሃላ	አለ.....1	

	ማንኛውም ህመም ከገቡበት የበሽታ አይነት ውጪ ካለ ?(ከታካሚው ካርድ ላይ ይመልከቱ)	የለም.....2	

ክፍል ሶስት፡ ሰብጀክቲቭ ግሎባል አሰስመንት

ከታካሚው ጋር የተገናኘ የጤና ምርመራ (ለሚተኙ ታካሚዎች የተዘጋጀ መጠይቅ)

301	በስድስት ወርው ስጥ ያጋጠመ የክብደት መቀነስ	
	መጨምር /መቀነስም የለም.....1 በመጠኑ ቀንሷል(<5%).....2 ቀነሰ 5-10%.....3 ቀነሰ 10-15%.....4 ቀነሰ >15%.....5	
303	በሁለት ሳምንት ውስጥ የአመጋገብ ሁኔታ	
	ለውጥ የለም.....1 ለስለስ ያለ ፈሳሽ ምግብ.....2 ሀይል ሰጪ ንጥረነገር ያነሰው ፈሳሽ.....4 አለመመገብ.....5	
304	ከሁለት ሳምንት በላይ የቆየ የሆድህ ህመም ምልክቶች	
	ምንም ምልክት የለም.....1 ማቅለሽለሽ.....2 ማስታወክ.....3 ተቅማጥ.....4 የምግብ ፍላጎት መቀነስ.....5	
305	የለትለት እንቅስቃሴን የማከናወን አቅም	
	ትንሽ ትንሽ መስራት .....1 ለመንቀሳቀስ የሚከብድ.....2 ለመስራት የሚከብድ.....3 መንቀሳቀስብቻ.....5 አልጋ ቁራኛ.....6	
306	የመጀመሪ የምርመራ አይነት(ይጠቀስ) _____	
307	የሰውነት የምግብ ፍላጎት(ጫና)(የአመጋገብ ፍላጎትን የሚጎዳ በሽታ)	
	ጫና የለውም .....1 ትንሽ ጫና አለው .....2 መካከለኛ ጫና አለው.....3 ከፍተኛ ጫና አለው.....5	
308	የእጅ እና የደረት አጥንት መጋለጥ (በቆዳ ብቻመሸፈን)	
	ትንሽ/ለውጥ የለም.....1-2 ከትንሽ-መካከለኛ.....3-4 ከፍተኛ.....5	

309	ጡንቻ መሳሳት (መቀመጫ አካባቢ)	
	ትንሽ/ለውጥ የለም.....1-2 ከትንሽ-መካከለኛ.....3-4 ከፍተኛ.....5	
310	ውሃ መቆጠር ምልክት (ቁርጭምጭሚት፣አከርካሪ አጥንት፡በፈሳሽ የተወጠረ ሆድ)	
	ትንሽ/ለውጥ የለም.....1-2 ከትንሽ-መካከለኛ.....3-4 ከፍተኛ.....5	
311	ሰብጀክቲቭ ግሎባል አሰስመንት ኣጠቃላይ የምግብ ሁኔታ(አንዱን ምረጥ)	
312	ሰብጀክቲቭ ግሎባል አሰስመንት ኣጠቃላይ የምግብ ሁኔታ(አንዱን ምረጥ)	

የተመጣጠነ አመጋገብ ያለው .....A

መካከለኛ የምግብ እጥረት ያለበት(ጥርጣሬ).....B

በከፍተኛ ደረጃ የምግብ እጥረት ያለበ.....C

አመሰግናለሁ።

<u>እባክዎን ብትክክል ሁሉም ክፍል መሞላቱን በድጋሚ ያረጋግጡ!</u>

ሰብሳቢ ስም:	
ተቆጣጣሪ ስም:	
ቀን:	

ከታካሚው ጋር የተገናኘ የጤና ምርመራ (ተኝቶ ህክምና ጨርሰው ለሚወጡ (≥5 ቀን ና በላይ ለሆኑ ታካሚዎች የተዘጋጀ መጠይቅ)

Participant code	
መጠይቁ የተካሄደበት ቀን (ቀን/ወር/አ.ም)	_____/_____/_____
ከሆስፒታል የወጡበት ቀን (ቀን/ወር/አ.ም)	_____/_____/_____

ክፍል አራት ፡ መሰረታዊ የጤና ነክ መረጃ

ተ/ቁ	ጥያቄ	መልስ
401	አሁን ያለ የሰውነት ክብደት (እባኮን አሁን ያለውን የሰውነት እብደት ይለኩ)	.....ኪ።ግ
402	የተኝቶ መታከሚያ ክፍል ከገቡ በሃላ ማንኛውም ህመም ከገቡበት የበሽታ አይነት ውጪ ካለ ? (ከታካሚው ካርድ ላይ ይመልከቱ)	አለ የለም

ክፍል አምስት: ሰብጀክቲቭ ግሎባል አሰስመንት

501	በስድስት ወርው ስጥ ያጋጠመ የክብደት መቀነስ

	መጨምር /መቀነስም የለም.....1 በመጠኑ ቀንሷል(<5%).....2 ቀነሰ 5-10%.....3 ቀነሰ 10-15%.....4 ቀነሰ >15%.....5	
503	በሁለት ሳምንት ውስጥ የአመጋገብ ሁኔታ	
	ለውጥ የለም.....1 ለስለስ ያለ ፈሳሽ ምግብ.....2 ሀይል ሰጪ ንጥረነገር ያነሰው ፈሳሽ.....4 አለመመገብ.....5	
504	ከሁለት ሳምንት በላይ የቆየ የሆድህ ህመም ምልክቶች	
	ምንም ምልክት የለም.....1 ማቅለሽለሽ.....2 ማስታወክ.....3 ተቅማጥ.....4 የምግብ ፍላጎት መቀነስ.....5	
505	የለትለት እንቅስቃሴን የማከናወን አቅም	
	ትንሽ ትንሽ መስራት .....1 ለመንቀሳቀስ የሚከብድ.....2 ለመስራት የሚከብድ.....3 መንቀሳቀስብቻ.....5 አልጋ ቁራኛ.....6	
506	የመጀመሪ የምርመራ አይነት(ይጠቀስ) _____	
507	የሰውነት የምግብ ፍላጎት(ጫና)(የአመጋገብ ፍላጎትን የሚጎዳ በሽታ)	
	ጫና የለውም .....1 ትንሽ ጫና አለው .....2 መካከለኛ ጫና አለው.....3 ከፍተኛ ጫና አለው.....5	
508	የእጅ እና የደረት አጥንት መጋለጥ (በቆዳ ብቻመሸፈን)	
	ትንሽ/ለውጥ የለም.....1-2 ከትንሽ-መካከለኛ.....3-4 ከፍተኛ.....5	
509	ጡንቻ መሳሳት (መቀመጫ አካባቢ)	
	ትንሽ/ለውጥ የለም.....1-2 ከትንሽ-መካከለኛ.....3-4 ከፍተኛ.....5	
510	ውሃ መቆጠር ምልክት (ቁርጭምጭሚት፣አከርካሪ አጥንት፡በፈሳሽ የተወጠረ ሆድ)	

	ትንሽ/ለውጥ የለም.....1-2 ከትንሽ-መካከለኛ.....3-4 ከፍተኛ.....5	
511	ሰብጀክቲቭ ግሎባል አሰስመንት ኣጠቃላይ የምግብ ሁኔታ(አንዱን ምረጥ)	
512	ሰብጀክቲቭ ግሎባል አሰስመንት ኣጠቃላይ የምግብ ሁኔታ(አንዱን ምረጥ)	

የተመጣጠነ አመጋገብ ያለው .....A, መካከለኛ የምግብ እጥረት ያለበት(ጥርጣሬ).....B, በከፍተኛ ደረጃ የምግብ እጥረት ያለበ C

ክፍል ስድስት፡ የሆስፒታል ቆይታ

ቁጥር	ጥያቄ	ኮድ	ዝለል
601	የገቡበት ቀን (ቀን/ወር/አ.ም)	_____/_____/_____	
602	በቆይታቸው ወቅት የተደረገላቸው ቀዳጥደና አለ	አለ.....1 የለም.....2	604
603	ቀዶ ጥገና የተደረገላቸው ቀን (ቀን/ወር/አ.ም)	_____/_____/_____	
604	ከሆስፒታል የወጡበት ቀን (ቀን/ወር/አ.ም)	_____/_____/_____	

<u>እባክዎን ብትክክል ሁሉም ክፍል መሞላቱን በድጋሚ ያረጋግጡ!</u>

ሰብሳቢ ስም:	
ተቆጣጣሪ ስም:	
ቀን:	

አመሰግናለሁ።

Curriculum vita of Primary Advisor

- **Curriculum Vitae**: Bilal Shikur

  Last updated: August 2015

  Personal Information

  First name: Bilal Middle name: Shikur Last name: Endris

  Age: 29years Sex: Male Marital status: Married and father of a son

  Place of Birth: Addis Ababa, Ethiopia

  Date of Birth: 1 October 1986

  Nationality: Ethiopian

  Language: Amharic, English, and Arabic: Speak, Read and Write

  Email: lebiluka@yahoo.com

  Phone number (mobile): +251911-47-53-75

  Home Address

  Kolfe Keranio sub-city, Kebele 08/09

  House number 1056, Addis Ababa, Ethiopia

  Tel: +251-112-792232

  Work/office address

  Lideta sub-city, Addis Ababa University, College of Health Sciences, School of Public Health

  Tikur Anbessa Specialized Referral Hospital, Main building, Second Floor, Room number c216

  P.O. box: - 5657

  Tel: +251-115-157701

  I. Academic Qualification

  1. Masters of Public Health in Epidemiology (MPH):

  Period of study: September 2012- July 2014

  Program: Masters of Public Health, Epidemiology Specialty Track

  Institution: Addis Ababa University, School of Public Health, Addis Ababa, Ethiopia

  2. Degree of Doctor of Medicine (MD):

Period of study: January 2006-September 2011

Program: Medicine

Institution: Addis Ababa University, School of Medicine, Addis Ababa, Ethiopia

3. Ethiopian Higher Education Entrance Certificate:

Period of study: September 2003-July 2005

Program: Preparatory Program

Institution: Medhaniyalem, Addis Ababa, Ethiopia

4. Ethiopian General Secondary Education Certificate:

Period of study: September 2001-July 2003 G.C

Program: High School

Institution: Dilachin, Addis Ababa, Ethiopia

II. Work Experience

1. Assistant Professor of Public Health

Duration of employment: Since July 2014

Institution: Addis Ababa University, School of Public Health, Addis Ababa, Ethiopia

2. Lecturer

Duration of employment: September 2011 – June 2014

Institution: Addis Ababa University, School of Public Health, Addis Ababa, Ethiopia

3. **Co-PI** of Addis Ababa Mortality Surveillance Program: June 2014 -July 2015

4. **PI** of Addis Ababa Mortality Surveillance Program-Since July 2015

5. Clinical Intern

Duration of Employment: July 2010 – July 2011

Institution: Tikur Anbessa Specialized Teaching Hospital

Research experience

- Assessment of the relationship between malnutrition and malaria among under-five children in Adami Tulu district: A case-control study *(Under Review, BMC-Public HealthJournal)*

- Assessment of the magnitude and factors associated with exclusive breastfeeding among employed and unemployed mothers: a comparative cross-sectional study
- Immunization in completion rate and associated factors among children aged 12-23 months in Yirgalem town, SNNPR.
- Prevalence and factors associated with work-related injuries in Iron and Steel industries Addis Ababa, Ethiopia.
- Prevalence and Risk Factors of Diabetes mellitus and impaired glucose level among federal police officers in Addis Ababa, Ethiopia.
- Substance use and other predictors of academic outcomes among undergraduate medical students of Addis Ababa University (ongoing)

Teaching

- Lecture masters of public health students of Addis Ababa University, on public health nutrition
- Lecture undergraduate medical students of Addis Ababa University and Myung Sung Medical College (MMC), on public health nutrition

Committee Membership and related activities

- Member of the managing committee of the Butajira Demographic and Health Survey (One of the oldest demographic surveillance sits in Africa)
- Member of Research Ethics Committee (REC) for the department of Reproductive Health and Health Service management
- I was a member and secretary of the School of Public Health's Golden Jubilee Core Committee.

Merits received

- AMREF young African research scholarship award winner
- PI in a research award by Addis Ababa University-Medical Education Partnership Initiative (MEPI)
- Ethiopian General Secondary Education Certificate with **4.00 GPA** (9As)
- Ethiopian Higher Education Entrance Certificate with **Distinction**

- Masters in Public Health with very great distinction with **CGPA-3.97 (the top Grade of the year)**
- MPH Research-**Excellent grade**

Professional Associations Memberships

- Ethiopian Medical Association (EMA)
- Ethiopian Public Health Association (EPHA)
- Ethiopian Society of General Medical Practitioners (ESGMP)

Consultancy services

- Maternal and Neonatal Health in Ethiopia Initiative (MaNHEP) a project on Amhara and Oromia regions of Ethiopia; end line survey

Training has taken and Conferences attended

- Oral presenter on AMREF health Africa international conference at Nairobi, Kenya
- Oral presenter at EPHA 51st conference
- PMTCT training from AAU & John Hopkins University/TSEHAI project, March 2011.
- ART & HIV care training from AAU School of Medicine & WHO, August 2011.
- Training on "Understanding and Using the Demographic and Health Surveys", Measure DHS, August 2012
- Ethiopian Public Health Association 25th Annual Conference, Feb 20 -22, 2014, African Union, Addis Ababa, Ethiopia
- MDR/XDR TB management training from the Ethiopian Society of General Medical Practitioners and USAID, September 2010.
- Emergency Medicine training for interns from AAU, September 2010.
- BPR & Government policy training from the Ministry of Health, September 2011.
- TOT on Application of Behavior Change Communication Strategies for HIV/AIDS, by AAU-MARCH Project, Johns Hopkins University Bloomberg School of Public Health & the US CDC.
- Research Ethics, Addis Ababa University, College of Health Sciences IRB in collaboration with MEPI

- Reproductive Health Commodity Security, Addis Ababa University School of Public Health in collaboration with UNFPA

Skills, interests, and hobbies

- Know how on statistical software packages (SPSS, EPI INFO, WHO-Anthro, ENASMART, OPEN EPI, open code, STATA)
- Trainer on life skills
- Team leadership
- Good communication skills
- IT know-how
- Public speech

Future Plans and Interests

- To upgrade my level of education to the next higher level
- To be a distinguished health researcher and academician
- Giving voluntary health services
- To be an expert in my area of study

References:

1. Dr. Wakgari Deressa, Dean of the School of Public Health at Addis Ababa University. (*deressaw@gmail.com*)

2. Dr. Ahmed Reja, Chief Executive Director, College of Health Sciences, Addis Ababa University(ahmedreja@yahoo.com)

Annex VIII: Assurance of investigator

I, the undersigned senor MPH candidate agree to accept responsibility for the scientific and technical conduct of the research project and provision of required progress reports as per the terms and conditions of the research and publications office of the Addis Ababa University.

Name of the investigator: Addisu Yigezu

Date _____

Signature _____

Approval of the primary Advisor

Name of the primary advisor:_____

Date._____ Signature _____