ADDIS ABABA UNIVERSITY

COLLEGE OF HEALTH SCIENCE

SCHOOL OF PUBLIC HEALTH

Effect of Community based health insurance on catastrophic health expenditure among chronic patients in Asella referral hospital, South East Ethiopia

By: - Mosisa Bekele (BSc)

Advisor: - Dr. Anagaw Derseh(Phd)

Mrs. Berhan Tassew (BSc, MPH)

A Thesis Submitted to the Graduate Program of Addis Ababa University, College of Health Sciences, School of Public Health in Partial Fulfillment for the degree of Masters of Public Health in Health Economics

June, 2022
Addis Ababa, Ethiopia

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Approved by Examining Board

____________________________ **Signature** _______________

(Chairman Dean SPH)

Dr. Anagaw Derseh (Phd) **Signature** ___________________

(Advisor)

Dr. Dessalegn Sheabo (PhD) **Signature** ______________

(External Examiner)

Dr. Adane Melka (PhD) **Signature** __

(Internal Examiner)

June, 2022

Addis Ababa, Ethiopia

Acknowledgment

First and for most I would like to express my deepest gratitude to my beloved advisor Dr. Anagaw Derseh and Mrs. Berhan Tassew for their valuable, timely feedback, guidance and support. I would like to extend my gratitude to Addis Ababa university, college of health science, School of public health for giving me this golden opportunity.

I would also like to express my heartfelt gratitude to the administration and employees of Asella referral hospital, data collectors, and study participants for their kind cooperation, willingness, and unconditional support during the study.

Finally, I want to express my gratitude to my family for their continuous encouragement during these challenging times.

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List of Acronyms and Abbreviation

CBHI	Community based health insurance
CHE	Catastrophic health expenditure
CII	Critical Illness Insurance
CVDs	Cardiovascular disease
CNCD	Chronic non-communicable disease
DALYs	Disability Adjusted Life Years
E.C	Ethiopian Calendar
EHIA	Ethiopian Health Insurance Agency
ETB	Ethiopian Birr
FMOH	Federal minster of health
GDP	Growth domestic product
LMICs	Low- and middle-income country's
NCD	Non-Communicable Disease
NCDI	Non-Communicable Disease and Injury
NLFS	National Labor Force Survey
OOP	Out-of-pocket
PCA	Principal component analysis
PI	Principal Investigator
SNNP	Southern Nation Nationality and People
WHO	World Health Organization

Abstract

Background: Chronic disease-related catastrophic health spending is frequent in Ethiopia, affecting between 27% and 64.2 % of households, depending on the chosen catastrophe threshold. CBHI has been in place in Ethiopia since 2011, with the purpose of enhancing financial access to health care services, but there is little evidence of how well it protects chronic patients financially.

Objective: The objective of the study was to assess level of catastrophic expenditure and evaluate the effect of community-based health insurance on catastrophic health expenditure among patient attending chronic follow up departments in Asella referral hospital, Southeast Ethiopia.

Method: A health facility-based comparative cross-sectional study was conducted in Asella referral hospital from March 2022 to May 2022. Systematic random sampling was used to select 325 chronic patients. Data was collected by ODK collect app and then imported to STATA version 17 for analysis. Principal component analysis (PCA) has been used to construct a wealth index, and propensity score matching was used to identify the effect of community-based health insurance on catastrophic health expenditure.

Result: The study enrolled a total of 325 chronic patients (157 CBHI members and 168 non-members). Indirect costs were the major source of health care costs for insured patients, whereas direct costs were for uninsured patients. The incidence of catastrophic health expenditure was found in 39% of the total sample, while it was found in 31% and 47% of insured and uninsured patients, respectively, when the 15% non-food threshold is employed. Overshoot and mean positive overshoot were 10% and 33% for CBHI members, respectively, and 18% and 39% for non-members. Community-based health insurance contributes to a 19% (t = -2.97) reduction in catastrophic health expenditure among chronic patients.

Conclusion: Chronic patients, particularly uninsured households, had a high incidence and intensity of catastrophic health expenditure. Community-based health insurance has a substantial effect on lowering chronic patients' catastrophic expenditures. As a result, the government and all concerned bodies must expand community-based health insurance to provide financial protection for people suffered from chronic conditions.

Key Word

Chronic disease; Catastrophic health expenditure; Community-based health insurance, Ethiopia

Chapter 1: Introduction

1.1 Background

Out-of-pocket health care expenditure exposes individual and households to unforeseen and substantial financial risk that consumes a major portion of the family budget and forces people to choose between health and other requirements. Financing health care spending through out-of-pocket payments at the point of service is not an equitable or fair method since it may create a barrier to receiving the desired health care service, particularly for the poor(1–3).

The influence of out-of-pocket payments for health care extends beyond financial risk and may impend people from accessing health care services they need. This may lead to delay in utilization of health care, seeking suboptimal alternative or even go without any service at all (4,5)

The current focus of international debate is on the need to transition away from a system that relies heavily on out-of-pocket payments and toward one that involves risk pooling and prepayment in order to achieve universal health coverage. The dependence on out-of-pocket payments at the point of service stymies progress toward universal health care, since systems that rely more heavily on OOPS as a source of health spending have greater challenges with population financial security(6,7).

High-income countries have built mechanisms to fund health care through taxes or compulsory insurance during the previous fifty years or more, but most low- and middle-income countries have a small tax base and cannot afford to adequately fund health care services, relying instead on OOP. In low-income countries, out-of-pocket payments account for 30% of total funding. According to Ethiopia's seventh national health account report for 2016/17, OOP contributes for about 31% of overall funding, or 1.3 percent of GDP(8–10).

The reliance on OOP payments puts households at risk of catastrophic and impoverishing health costs, as the incidence of catastrophic and impoverishing health costs drops to a tolerable level or negligible only when out-of-pocket expenditures fall below 15-20% of total spending(4,5).

The financial difficulty in obtaining health care services for chronic patients would be a significant challenge with the rising burden of disease in developing countries, as health systems are primarily based on out-of-pocket payment, and chronic disease necessitates frequent interactions with the health system, with recurring and continuing medical expenses that can become catastrophic and lead to impoverishment(11). A sustainable way to reduce reliance on out-of-pocket payments in low and middle income countries is argued to be developing prepayment or health insurance scheme(4)

Community-based health insurance (CBHI) schemes have become a popular emerging concept since the second half of the 1980s for mobilizing revenue to supplement health care funding, providing financial protection against the cost of illness and improving utilization of health services, and have been found to be beneficial to households in the informal sector who are excluded from formal insurance. CBHI is also considered a better alternative to overcome catastrophic expenditure and fill the void in the healthcare financing systems of many low- and middle-income countries in the process of achieving universal health coverage(12–14).

Community based health insurance has been endorsed in Ethiopia since 2011 as part of new health financing reforms and it is designed to pool risk and protect household from out-of-pocket expenditure. The target populations of the scheme are individuals engaged in rural and informal sectors and their family members. Currently, the scheme has been expanded and implemented in all regions across the nation in 911 woreda, with 8.6 million households, or approximately 40 million people, as members, and has attained a coverage rate of 58% by the 2013 E.C (2020/21) Fiscal Year(15,16). Hence, this study aims to assess the effect of community-based health insurance in providing financial protection for households and individuals with chronic diseases.

1.2 Statement of Problem

Globally, about 930 million people (12.7%) incurred catastrophic health spending by devoting at least 10% of their household budgets to paying for health care out of their own pockets, and about 90 million people (1.2%) are still being pushed in to extreme poverty as a result of paying for health care out of their own pockets(3,17).

Catastrophic health expenditure due to chronic diseases is common in all countries at all income levels, and it occurs in 6–84% of households depending on the chosen catastrophe threshold (18). According to a study conducted in India and China, the prevalence of CHE among chronic disease

patients was 41.41% and 30.57%, respectively(19,20). In other research in China the incidence of CHE among rural and urban household with chronic disease was 17.96% and 26.14% respectively (21). Furthermore, having family members with chronic illness increase incidence and intensity of catastrophic health expenditure(19,22)

The financial burden of NCDs is exacerbated in low- and middle-income countries (LMIC), where 6–11% of the population would be impoverished (at 1.25 USD/day poverty line) if they had to buy the cheapest generic diabetic medicine(18). Furthermore, in Nigeria, 79% of chronic illness patients spend more than 10% of their monthly income on health care, whereas 21.3% of CNCD patients in Malawi experienced CHE with a 10% non-food expenditure(23,24).

OOP payments in Ethiopia were estimated to be 18.21 billion ETB in 2015/16, with noncommunicable illness treatment accounting for 23% of overall OOP spending. In addition, 68% of NCDI services were financed by OOP expenditures from households(25–27). According to study done in Dessie, Bahir Dar and Addis Ababa 64.2% of chronic patients, 59.6% of diabetic patients and 27% of cardiovascular disease patient had catastrophic health expenditure, respectively (28–30). Having household member with chronic illness were positively related with CHE according study done in western Ethiopia(31)

In order to decrease financial burden and limit catastrophic health spending, a prepayment plan (health insurance) was proposed as the alternative option. However, it had a mixed effect on catastrophic health expenditures in practice. According to certain studies, it aids in the lowering of CHE(32–34). Another study from China, on the other hand, found that health insurance is ineffective in preventing CHE in families with chronic disease patients, or that it provides just a limited level of financial security(35,36). Furthermore, additional research has discovered that it increases the likelihood of excessive and catastrophic expenditure(37).

The overall review of community-based health insurance in Ethiopia also revealed that impoverishment due to OOP health expenditures is 7% for CBHI members and 19% for non-members at the 15% threshold(15).

However, despite the high burden of catastrophic expenditure among chronic disease patients and controversy about the effect of health insurance on financial protection among these vulnerable groups, there has been no specific study done so far in Ethiopia(28,38) and little is known about the effect of CBHI on CHE among chronic disease patients.

Besides these, the few studies on chronic disease catastrophic expenditure in Ethiopia that have been published so far have only used a single method for measuring the outcome variable, the Wag Staff and van Doorslaer method, which uses total income or household non-food expenditure as the denominator(28–30). The purpose of the study was to assess the effect of CBHI on catastrophic health expenditure among chronic disease patients. Unlike the existing studies mentioned earlier, this study employed two widely used approaches to assess catastrophic health expenditure (Wagstaff and Van Doorslaer, (2002) and Xu et al., (2005)) by employing total household expenditure, non-food expenditure, and capacity to pay as the denominator. Additionally, this study includes indirect costs in terms of lost income for both patients and their caregivers as this is relevant in reflecting real changes in production due to disease.

1.3 Significance of the study

A community-based health insurance scheme in Ethiopia has been implemented in order to provide financial risk protection for the community in the informal sector. This study was the first to assess the effect of community-based health insurance on catastrophic health expenditure among chronic disease patients. As a result, the outcomes of this study add to the current body of knowledge on the economic cost of chronic disease and generate new evidence on the extent of financial protection provided by community-based health insurance to chronic disease patients in Ethiopia.

Furthermore, the findings of this study provide important knowledge about the effect of community-based health insurance on catastrophic health expenditure to concerned stakeholders (policymakers, MOH, and EHIA) for evidence-based decision-making in the implementation and scale-up of community-based health insurance in Ethiopia. In addition, it also benefits future researchers, who will use this research as a reference for different or further studies.

Chapter 2: Literature review

2.1 Theoretical review

2.1.1 Definition of basic terms and concepts

Chronic diseases, also known as noncommunicable diseases (NCDs), are defined as diseases that last for a long period, are not communicable (meaning they can't be transmitted from person to person), and progress slowly(11,39).

Out of pocket health expenditure has been defined by WHO as direct payment made by individuals to the health care provider at the time-of-service use excluding any type of prepayments like insurance. This definition can include transport costs for accessing healthcare and over-the-counter medicines and supplies(40).

The health care expenditure includes direct medical, non-medical and indirect costs. Direct medical costs are defined as the costs that patients incur while seeking medical care these may include costs from inpatient care, outpatient care, diagnostic tests, prescription drugs, as well as other medical supplies, all of which tend to have payment receipts maintained by hospitals, third-party payers, and other medical suppliers.

Direct non-medical expenditures are defined as expenses incurred by the patient and his or her family that are directly related to an illness but are not medical in nature, such as transportation, relocation fees, and informal care.

Indirect costs may include lost production as a result of a disease's morbidity and mortality. These productivity losses can be conventional depicted by absenteeism when a worker is unable to work due to a condition, either directly or indirectly. Work absences often represent a loss of productivity.

Catastrophic health spending is defined as health spending that surpasses a certain threshold and threatens a household's financial ability to meet its basic necessities by putting a certain percentage of families in financial distress. While on the other hand impoverishing health expenditure is defined as expenditure on health care that results in a household falling below the prevailing poverty line or deepening its impoverishment if it is already poor.

Coping strategies are defined as measures used by households to alleviate the out-of-pocket expenses that cannot be managed from their regular income or savings.

2.1.2 Overview of Chronic disease

Chronic disease has no unique etiologies rather it results from combination of genetic, physiological, environmental and behavioral factors. There are varies types of chronic disease but the four main types of NCD which are dominate in mortality and morbidity includes cardiovascular diseases (such as heart attacks and stroke), cancers, chronic respiratory diseases (such as chronic obstructive pulmonary disease and asthma) and diabetes. Also, many people with chronic conditions do not have a single, predominant condition, but rather they experience multimorbidity which refers to the presence of two or more chronic conditions in a person at the same time(11,41).

Globally, chronic disease kills 41 million people each year, equivalent to 71% of all deaths. From these more than 15 million people are between the age of 30 and 69 years and 85% of these premature deaths occur in low- and middle-income countries. 77% of all deaths are in low- and middle-income countries. NCDs contribute to a substantial amount 37.5% of the total DALYs lost in Ethiopia where cancer, cardiovascular disease and mental illness contribute highest lost(11,26).

2.1.3 Consequence of Chronic Disease

Chronic disease doesn't only pose persistent health effect rather the effect will extend to include social, psychological and economic consequences that had impact on peoples' quality of life. Chronic disease had long lasting economic impact on families, communities and societies in general as chronic disease are prolonged illness which necessitating frequent interactions with the health system with recurring and continuing medical expenses(42,43).

The exorbitant costs of NCDs include treatment costs known as direct medical costs, which are frequently incurred as a result of lengthy and expensive medical care, direct non-medical costs, which are due to repetitive visits while seeking health care services and are non-medical in nature, and other costs related to lost income or productivity as a result of illness. These NCD healthcare expenditures quickly deplete household resources, which can be catastrophic and contribute to impoverishment, especially in low-resource contexts(6).

2.1.4 Theoretical overviews of CBHI

CBHI has emerged in second half of 1980s as a way of funding health care in low-income countries in order to encourage equity within health care system and now a days it become one way to fund health care by some government particularly in low- and middle-income countries(9,13).

Community-based health insurance is a financial tool in the form of a micro health insurance scheme that is intended to pool risk and shield households from out-of-pocket expenses. This risk-pooling strategy attempts to distribute health expenses across families with varying health profiles in order to avoid catastrophic expenditures associated with unexpected health occurrences and it also allows for cross-subsidies from wealthier to poor populations(15,44).

CBHI is largely based on voluntary membership, nonprofit objectives, and the concepts of mutual solidarity and cooperation. Since it helps poor households manage their health-related financial risks, protects them from unexpected crises, and reduces barriers to accessing affordable care, it has recently become a popular option for addressing health-related expenditure problems for poor individuals in the rural and informal sectors(12,44).

In Ethiopia, it was endorsed in 2011 and is starting to be implemented as a pilot within 13 Woredas in the Amhara, Oromia SNNP, and Tigray regions, with the goal of improving financial access to health care services by reaching and covering the majority of rural agricultural and small informal sectors in urban areas. It was expanded to encompass 161 woredas across the nation three years later, and it is currently being expanded to reach 911 woreda with 8.6 million households, or approximately 40 million people, as members, among which 1.6 million households are covered by the indigent, and has attained a coverage rate of 58% by the 2013 E.C (2020/21) Fiscal Year(15,16,45).

The CBHI scheme was established at the Woreda/Town level, with direct participation of the kebele/tabia population, when at least 50% of eligible households decided to participate in the scheme. However, actual enrollment in the scheme occurs when the household decides to pay a contribution, and membership is at the household level, not the individual level(15,46).

The household that agrees to join the scheme should pay a registration fee as well as an annual contribution. The premium is decided at the household level, and the household makes a constant payment for core family members and an extra contribution if there are further family members.

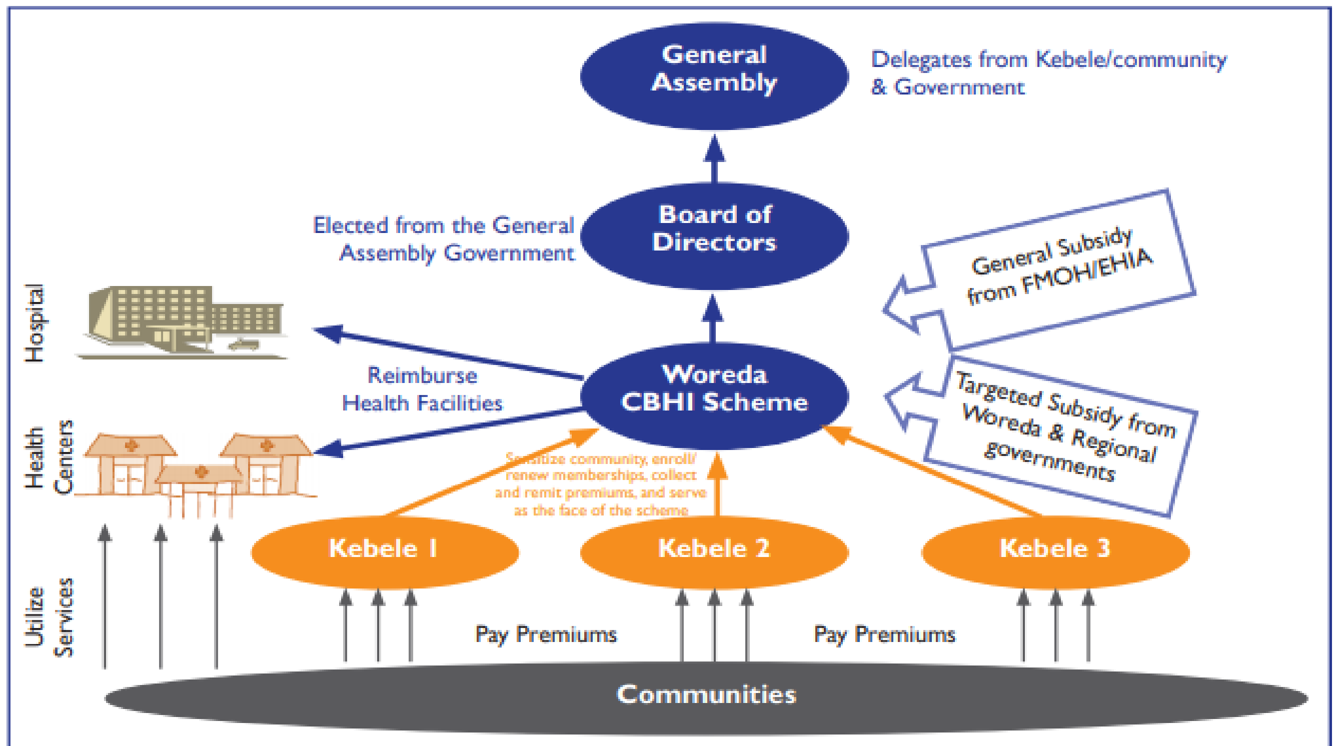
The contribution and premium varied by area, including differences in rural, urban, and trade licenses. The yearly contribution in the Oromia region was amended in 2014 E.C. and is now 400 birr for rural and urban households under woreda management, and 450 and 500 birr for urban areas under zonal and regional administration, respectively. Furthermore, every household member who is a member of the plan should be required to renew their membership every year by making an annual payment, and their membership card should show that it was renewed.(46,47).

As part of the scheme, there will be both general and targeted subsidies. The federal government provides a general subsidy to all CBHI members, while the regional and woreda governments give targeted subsidies to 10% of low-income households that are severely poor and cannot afford to pay the payment(15,45,46).

The benefit package covers all outpatient and inpatient services provided by public facilities, including drug/medication and laboratory services; however, it does not cover foreign treatment, renal dialysis, tooth implantation and extraction, eyeglasses, hearing aids, cosmetic procedures, transportation costs, services covered by another insuring agency in the event of an accident, or services provided for free(15,46).

CBHI schemes are governed at the woreda level by a General Assembly and a Board of Directors. The General Assembly is made up of 8–10 woreda members from the public sector and 3–5 delegates from each kebele with a CBHI program. The General Assembly elects 9–12 members to the boards. Three are from woreda sector offices, while 6–9 is kebele section representatives elected by the assembly(45,46).

The scheme's daily operations are managed at the woreda and kebele levels by an executive body reporting to the Board of Directors. At the woreda level, the executive body had a coordinator, an accountant, and an information expert who were in charge of establishing contracts with health care providers, reimbursing them, administering the fund, and maintaining the database. The executive body at the kebele level is in charge of enrolling members, collecting premiums, and directing funds to each woreda scheme(45,46).



Note: EHIA: Ethiopia Health Insurance Agency

Figure 1: *Flow of Finance, Governance, and Organizational Structure of CBHI Schemes (source(45))*

2.2 Empirical review

2.2.1 Cost of treating Chronic disease

A systematic review study in LMICs indicate that the average total cost of treatment of NCDs to patients/households per year for CVDs, cancer and diabetes were $6055.99, $3303.81, $1017.05, respectively(48).

Chronic disease has had a significant influence on Ethiopia's OOP spending. According to the national health account (NHA) VI report, 68 percent of noncommunicable disease and injuries (NCDIs) services were financed by household OOP spending. Furthermore, NCD accounts for 23% of total OOP spending in Ethiopia, with renal failure, mental illness, cancer, and diabetes accounting for 10%, 6%, 5%, and 2%, respectively(25–27).

According to study done on cardiovascular patient in Addis Ababa direct medical costs constitute 65%–83% of OOP payments from which drug cost is the major cost drivers comprising about 50%

of outpatient care costs while direct non-medical costs mainly transport cost contribute to 16%–34% of outpatient care cost(29).

Another study in Bahir Dar found that the mean monthly direct medical and non-medica cost for diabetic patients was 382.48 ETB (SD ±324.46) and 48.75 (SD ± 91.19) ETB, accounting for 75.74% and 9.65% of diabetic patients' health expenditure, respectively(30).

2.2.2 CHE among chronic patients

The incidence and intensity of CHE will be high among patient with chronic disease as the disease is non curable and patients follow life time health care follow up. Different studies indicate that CHE are high among chronic patients and having family members with chronic illness increases the incidence and intensity of Catastrophic health expenditure(22,49).

Study done in China and Vietnam shows that CHE incidence among chronic patients in urban and rural areas were 17.96% and 26.14% at 40% nonfood expenditure thresholds, 23.6% and 20.8% at 40% capacity to pay, respectively(21,50). .

Another study in China found that among persons with chronic conditions, 16.16 percent reported outpatient financial strains and 54.26 percent reported inpatient financial strains. Persons with chronic conditions (18%) and (56.9%) were more likely to experience both outpatient and inpatient financial hardship than people without chronic diseases (10.7%) and (43.30%), respectively (P 0.01)(51).

Study in India also reveals 41.41% or 41 out of 99 households with chronic illness experienced CHE at threshold of 10% of annual income and the odds of CHE was 1.5 times more among the households with chronic illness compared to the ones without chronic illness(19).

CHE is common in chronic patients in Ethiopia, according to several research. One research conducted in Dessie referral hospital found that 88.41%, 64.2%, 43.7%, and 37.1% of chronic patients had catastrophic health expenditures at 5%, 10%, 15%, and 20% of total household income, respectively(28).

Furthermore, according to a study on diabetic patients in Bahir Dar, the incidence (headcount) and intensity (overshoot) of catastrophic diabetic expenditures were 59.6 and 23.46 percent, respectively, while the proportion of mean positive overshoot (MPO) was 39.36 percent at 40% of

non-food expenditure. Similarly, 27% of cardiovascular disease patients in Addis Ababa experience catastrophic health expenditures at 10% of annual income (29,30).

2.2.3 Coping strategies

Patients or households with chronic diseases will adopt different coping strategies to meet their OOP for their treatment. Borrowing, selling assets, and taking loans are some of the main coping strategies used by NCDs patients in South Asia(52).

Chronic disease patients in Ethiopia also use family support, saving, borrowing, and selling assets as coping strategies to meet OOP expenditure. A study in Addis Ababa reveals that 27.1%, 5.6%, 0.4%, and 0.2% of cardiovascular patients use family support, saving, borrowing, and selling assets as coping strategies to meet their outpatient treatment expenses. Similarly, a study in Bahir Dar shows 21.2%, 13.5%, and 3% of diabetic patients meet their treatment expenses by using family/relative support, selling assets, and borrowing from someone, respectively. In addition, roughly 50.63 percent and 24.67 percent of diabetes patients who have had CHE deal with the cost of diabetic treatment by drawing saving and relying on relatives/family supports, respectively(29,30).

2.2.4 Effect of health insurance on CHE

Study in Chine shows none of health insurance types significantly reduced the incidence and intensity of CHE as OOP medical expenditure as a percentage of total medical expenditure was greater than 40% for both urban and rural patients with NCDs covered by basic medical insurance from 2014 to 2018 (21).

Other study done in China to assess effect of critical illness insurance(CII) on CHE reveals that CII had significant impact on reduction of CHE incidence but on other had it had mixed impact on CHE intensity and even increases CHE intensity(49)

Similarly, other Chinese research show that health insurance has a mixed effect on financial strain for those with chronic diseases; public health insurance reduces outpatient financial strain but has no statistically significant effect on easing inpatient financial strain. People who have private health insurance are more likely to experience inpatient financial difficulty, and they have 6.25 times the odds of experiencing financial barriers than their counterparts(51).

On other hand study done in Nigeria reveals that participating in national health insurance scheme provide financial protection and probability of experiencing CHE for an insured household is 82% lower than that of an uninsured household(53). Also study in Ghana's show that enrollment in national health insurance scheme reduce out of pocket expenditure by 86% and protect household against CHE and poverty by 3% and 7%, respectively(54).

Similarly in study done in north east Ethiopia insured household were 81% times less likely to incur catastrophic health expenditure compared with noninsured households and community based health insurance contribute 23.2% reduction of catastrophic expenditure among insured households(38).

The Ethiopian community-based health insurance evaluation report revealed that being enrolled in CBHI is negatively related to impoverishment due to OOP health expenditure. Insured households had a lower incidence of impoverishment at 15% and 25% of the non-food expenditure threshold, which is 7% and 3%, respectively, than noninsured households, where it is 19% and 9%, respectively(15). Additionally, studies on impact of Ethiopian CBHI on household economic welfare reveal that enrolment in CBHI lead to 5 percentage point or 13% decline in probability of borrowing and associated with increase in household income(55).

2.3 Conceptual Framework

The conceptual framework for these study was adopted from similar studies(28–30,38). This conceptual framework illustrated the relationship between outcome variable (CHE), intervention variable (CBHI enrolment) and explanatory variable which affect enrolment in CBHI and CHE (Socio-demographic and socio-economic variables).

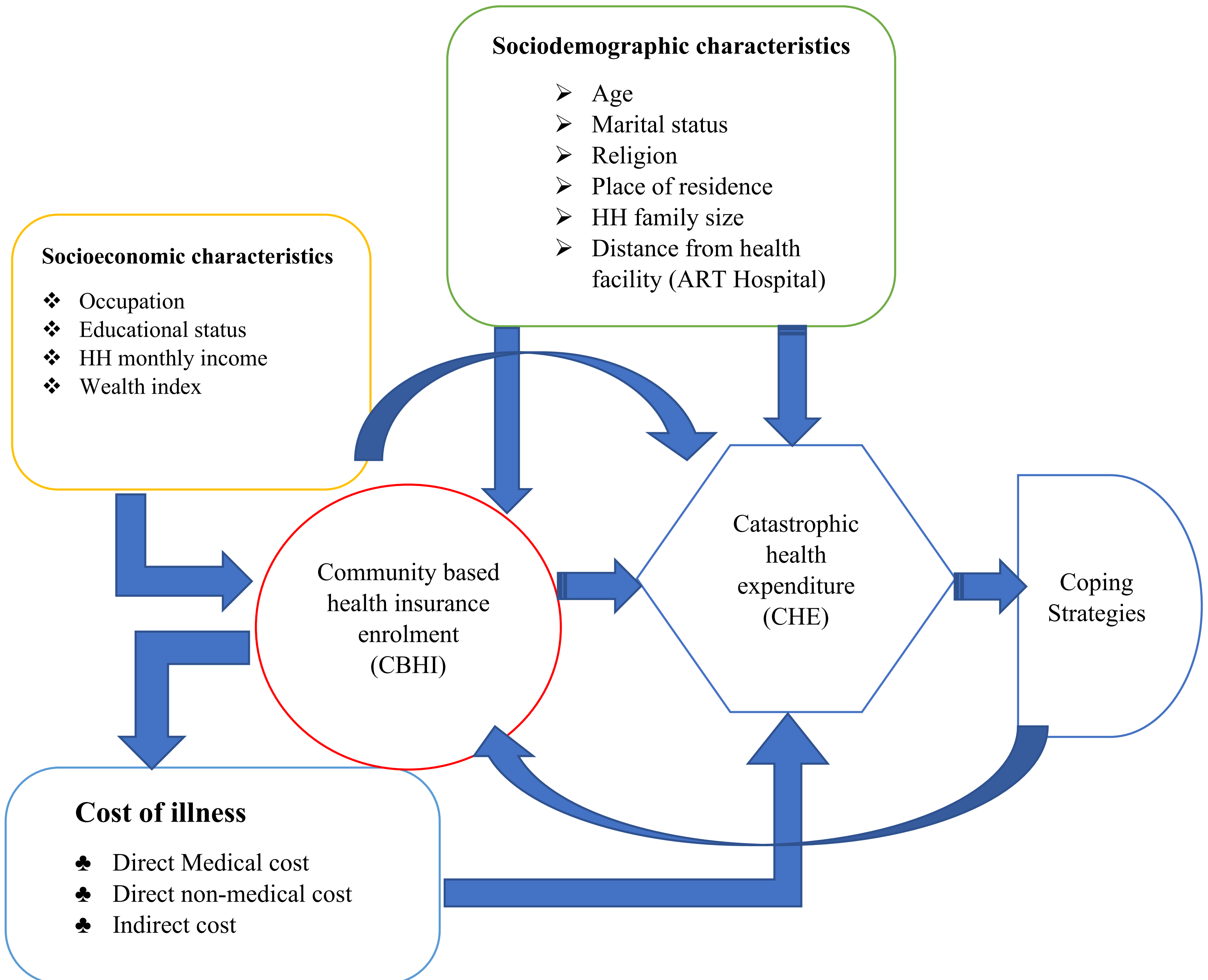


Figure 2: Conceptual framework for study on effect of community-based health insurance on catastrophic health expenditure among chronic patients in Asella referral Hospital, Southeast Ethiopia.

Chapter 3: Objective

3.1 General Objective

- To assess level of catastrophic expenditure and evaluate the effect of community-based health insurance on catastrophic health expenditure among patient attending chronic follow up department in Asella referral hospital, Southeast Ethiopia, 2022

3.2 Specific Objective

1. To examine the extent of catastrophic health expenditure among patients with chronic diseases attending services at Asella referral hospital
2. To identify major sources of health costs among chronic patients based on health insurance status
3. To assess the effect of community-based health insurance on catastrophic health expenditure

Chapter 4: Methodology

4.1 Study Area and period

The study was conducted in Asella teaching and referral hospital. Asella Teaching and Referral Hospital was founded in 1964 and is now part of Arsi University and its College of Health Sciences. As a tertiary hospital, it serves as a referral hospital for the Arsi Zone, providing healthcare for its more than 3.5 million inhabitants. It contains specialized departments include the Emergency Room, Internal Medicine, Pediatrics, Gynecology and Obstetrics & Fistula Unit, Surgery, Ophthalmology and intensive care unit. The Hospital has been serving as teaching hospital of college of health science and the college had specialty program in Internal medicine, surgery, Pediatrics and Gynecology and obstetrics in addition to undergraduate program in medicine, Public health, Nursing, Midwifery, Pharmacy, Medical laboratory and Anesthesia. Asella Hospital employed around 310 clinical and 80 non-clinical personnel. Clinical employees who are devoted to delivering health services include 40 specialists, 94 physicians, 92 nurses, 44 midwives, and 40 other health professionals. The study was conducted from March 15,2022 to May 13, 2022.

4.2 Study design

Health facility based comparative cross-sectional study was conducted at Asella teaching and referral hospital.

4.3 Population

4.3.1 Source population

All Chronic disease patients attending follow up in Asella teaching and referral hospital was the source population

4.3.2 Study Population

All Chronic disease patients attending follow up during data collection periods was the study population

4.3.3 Eligible criteria

Inclusion Criteria

All patients attending chronic disease follow up for at least more than a month during data collection periods and who are willing to participate in the study

Exclusion Criteria

- ❖ Critical ill patients who are unable to respond
- ❖ Patients less than 18 years old
- ❖ Client who are pregnant (may be gestational hypertension and diabetes which is transient and not considered as chronic since it will be resolved after pregnancy)

4.4 Sample size determination

Two population proportion formula was used to determine the sample size for primary objective using Epi-info version 7 stat-calc. The proportion of CHE was taken from CBHI evaluation final report which is 7% and 19% among insured and noninsured households respectively(15). 80% power, 95% CI and 5% degree of precision with one-to-one ration among insured and noninsured was taken.

$$n1 = \frac{\left[z_{a/2}\sqrt{\left(1+\frac{1}{r}\right)p(1-p)} \quad + \quad z_b\sqrt{p_1(1-p_1)+\frac{p_2(1-p_2)}{r}} \right]^2}{(p_1-p_2)^2}$$

Where;

r: - is the allocation ratio of insured to uninsured   i.e., n2: n1 (n2 = rn1)

p_1 is proportion of CHE in insured

P_2 is proportion of CHE in uninsured

$Z_{a/2}$ is the quintile of the standard normal distribution for type I error

Z_b is the quintile of the standard normal distribution for type II error/power

n_1 is the sample size for insured

n_2 is the sample size for uninsured

Based on this formula, the calculated sample size is 278. Considering 10% non-response rate to adjust sample size the final sample size for primary objective was 306 (153 insured and 153 uninsured).

The sample size to address the secondary objective was also calculated using a single population proportion formula based on the magnitude of catastrophic health expenditure by using 95% CI and 5% degree of precision as shown in the following table.

$$n = \frac{\left(z\alpha/_2\right)^2 p(1-p)}{d^2}$$

Where n desired sample size, $z\alpha/_2$ critical value at 95% CI (1.96), p proportion of CHE and d degree of precision

Table 1: *Sample size determination for secondary objective of study on effect of community-based health insurance on CHE among chronic patients in Asella referral hospital, Southeast Ethiopia, 2021*

CHE among	Magnitude of CHE	Sample size	Correction formula (N= 1735)(56)	Considering 10% non-response	Final sample size	Reference
Chronic patients	64.2%	353	293	29	322	(28)
DM patients	59.6%	370	305	31	336	(30)

The sample size for this study was determined by comparing the two computations and choosing the one with the largest sample size. As a result, 336 chronic patients were recruited in the study, including 168 CBHI members and 168 non-members.

4.5 Sampling Techniques and procedure

The sample size was proportionally allocated to three chronic disease follow-up OPD (Diabetes, Psychiatry, and other chronic disease OPD) in the hospital-based patient flow reports as shown in the following figure(56). Then to obtain a representative sample, systematic random sampling was applied to select eligible study participants from each OPD. Since the data collection period is one month "K" value was calculated based on this assumption.

$$K = \frac{N}{n}$$

Where N is estimated patient who had follow up in chronic disease OPD during data collection period and n is total Sample size.

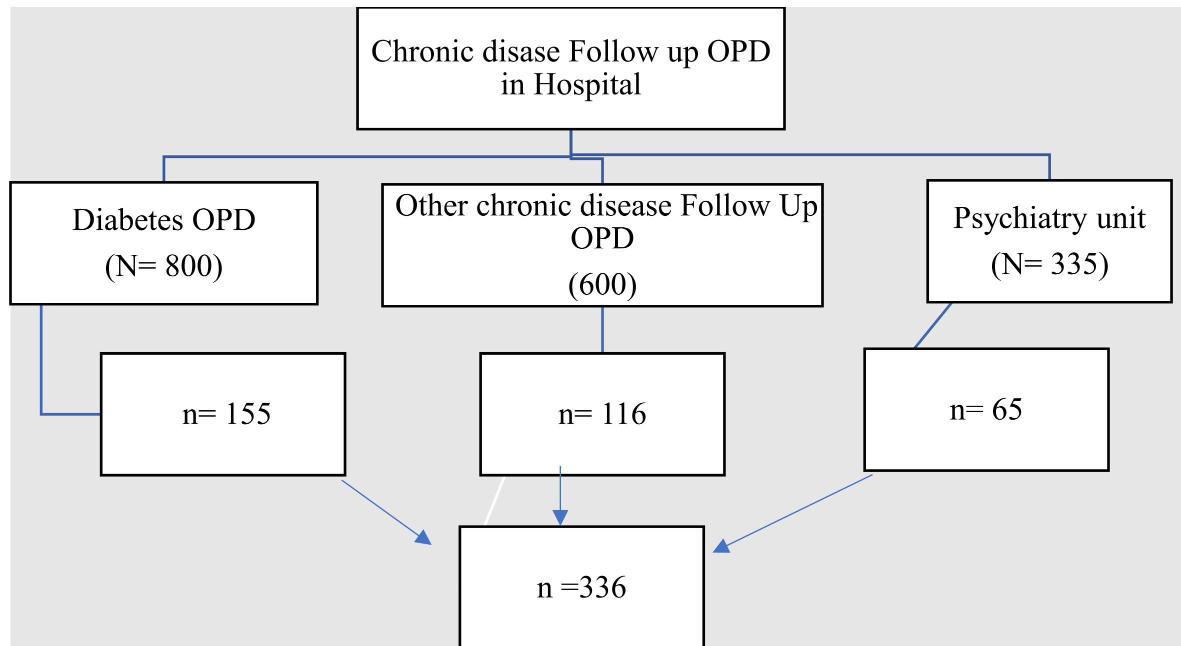


Figure 3: *Schematic presentation of sampling techniques for study on effect of community-based health insurance on catastrophic health expenditure among chronic patients in Asella referral Hospital, Southeast Ethiopia(56).*

4.6 Data collection instrument

A data collection tool adapted from a similar study was used to collect all the necessary variables(15,29–31). A structured questionnaire was first developed using the English language and later translated into the local languages of both Amharic and Afan-Oromo for better communication since these two languages are most widely spoken in the study area. The questioner was in line with the objective of the study and it include variables like socio-demographic and socio-economic characteristics, clinical characteristics, household food and non-food expenditure, monthly out of pocket health expenditure (direct medical and non-medical costs and additionally indirect costs) and participation in community-based health insurance status.

4.7 Data collection procedure

The data was collected from chronic patients who attend follow-up appointments between March and May 2022, for a period of around two months. Patients' data will be collected after they have completed their follow-up by setting up a separate room for interviews. The information was gathered through a face-to-face interview with a questioner using the ODK collect app on the data collector's smart phone or tablet. With the researcher's careful supervision, two data collectors, one

BSc nurses and one midwifery who are not employee in Asella referral and teaching hospital, gathered information from respondents.

4.8 Data Processing and analysis

Data collected using the ODK collect app was checked on the server every night of the data collection date and a backup has been taken. On the final date of data collection, the data was checked and transferred to STATA version 17 for analysis.

Descriptive statistics, including mean, median, standard deviation and proportion, has been performed to summarize the data and explain the study variables. Then the data has been presented using a table, bar graph, or pie chart accordingly. Principal component analysis was used to compute Wealth index of household. Propensity score matching was used to estimate the effect of community-based health insurance on catastrophic health expenditure. The detail is discussed below.

4.8.1 PSM Analysis for effect evaluation

Impact or effect evaluation is intended to determine whether the program had the desired effects on individuals, households, and institutions and whether those effects are attributable to the program intervention.

The main challenges in impact evaluation are basically a missing data problem, because it is impossible to examine the outcomes of program participants if they were not beneficiaries. In the absence of counterfactual data, the next best option is to compare the results of treated individuals or households to those of a control group that has not been treated. In order to do so, one must choose a suitable method to generate comparison group (57,58).

PSM is suitable for generating a counterfactual group for effect evaluation since this method is widely used in health insurance effect evaluation by constructing a control group that comprises households that do not participate in CBHI but who have the same probability of participating based on a set of observable factors and comparing them with those who participated in CBHI(34,38,59).

The Roy-Rubin-model (Roy (1951), Rubin (1974)) was standardized approach to solve problem in impact evaluation and in which the potential outcomes (catastrophic health expenditure) are defined as $Y_i(D_i)$ for each individual i, where D_i is treatment indicator and equals one if individual i receives treatment (CBHI member) and zero otherwise. The treatment effect for an individual i can be written as:

$$\tau_i = Y_i(1) - Y_i(0) \ldots\ldots\ldots..[1]$$

The issue is that for each individual i, only one of the possible outcomes is observed. This unobserved outcome is referred to as a "counterfactual outcome." As a result, measuring the individual treatment impact is difficult; instead, we must concentrate on (population) average treatment effects. The Average Treatment Effect on the Treated, or ATT, is a parameter of relevance that evaluates the impact of the program (CBHI enrollment) on people who participated in it. It is defined as:

$$\tau\text{ATT} = \text{E}(\tau|\text{D} = 1) = \text{E}[\text{Y}(1)|\text{D} = 1] - E[Y(0)|\text{D} = 1] \ldots\ldots.[2]$$

Where $E[Y(0)|\text{D} = 1]$ is the average outcome that the treated individuals (CBHI members) would have obtained in absence of treatment or, which is not observed. Hence, we choose a proper substitute for it in order to estimate ATT.

In non-experimental studies, using the mean outcome of untreated individuals $E[Y(0)|\text{D} = 0]$ is usually not a good idea due to problem of selection bias. For ATT it can be noted as:

$$\text{E}[\text{Y}(1)|\text{D} = 1] - E[Y(0)|\text{D} = 0] = \tau\text{ATT} + \text{E}[\text{Y}(0)|\text{D} = 1] - E[Y(0)|\text{D} = 0] \ldots.[3]$$

The difference between equation [3] and τATT is the so-called self-selection bias'. The true parameter τATT is only identified, if:

$$\text{E}[\text{Y}(0)|\text{D} = 1] - E[Y(0)|\text{D} = 0] = 0$$

In other words, if selection bias is zero, the difference between the mean observed outcomes for treated and untreated may be used to estimate ATT. To solve the selection problem in equation [3], several identifying assumptions must be used.

The first strong assumption is conditional independence, which states that potential outcomes are independent of treatment assignment given a set of observable variables X that are not altered by

treatment. The researcher observes all variables that impact treatment assignment and potential outcomes at the same time, ensuring that selection is exclusively based on observable characteristics.

$$(\text{unconfoundedness}) \quad (Y1, Y0) \perp D \mid X \quad \ldots\ldots\ldots [4]$$

The conditional independence assumption (CIA) based on the propensity score (PS) can be written as:

$$(\text{unconfoundedness given PS}) \quad (Y1, Y0) \perp D \mid P(X) \ldots\ldots [5]$$

Aside from independence, the common support or overlap condition is another required assumption. It rules out the phenomenon of perfect predictability of D given X:

$$(overlap) \quad 0 < P(D = 1|X) < 1 \ldots\ldots [6]$$

It assures that persons with the similar X values have a positive probability of being both participants and non-participants

The PSM estimator for ATT may thus be stated as follows, assuming the two assumptions (CIA and overlap) hold.

$$\tau_{ATT}^{PSM} = E_{P(X)}|D = 1\{E[Y(1)|D = 1, P(X)] - E[Y(0)|D = 0, P(X)]\}\ldots [7]$$

Propensity score

In PSM approaches, the first step is to calculate the likelihood (propensity score) that a person would have got the treatment based on specific variables. Given a set of observable variables, the propensity score is the conditional likelihood of being assigned to a specific treatment. The model of probability or the propensity score of vector X may be defined as:

$$P(X) = P_r(T = 1|X) \ldots\ldots [8]$$

Where X indicates all observable treatment-independent variables and T signifies the participation indicator, which implies T becomes one if the person is enrolled in CBHI and zero otherwise.

Either a logit or a probit model can be used to estimate the likelihood of enrolling in CBHI. The logit model was used in this study since it is easier to work with and the interpretation of parameter estimations is easy as well. Logit has an advantage over the others in the analysis of dichotomous

outcome variables in that it is extremely flexible and easy to use from a mathematical standpoint and subjects itself to meaningful interpretation.

Specification of logit model

The impact of CBHI membership on catastrophic health spending was investigated in this research. To do so, all observable factors that influence enrolling in the CBHI program has been identified, and a single propensity score was calculated using the logit model described below.

$$= \boldsymbol{\beta 0 + \beta 1X1 + \beta 2X2 + - - - + \beta iXi + \ Ui} \ldots . [\mathbf{9}]$$

The socio-demographic and socio-economic covariates that are identified by previous research to influence enrolment in the CBHI program were controlled in the model. These include age, marital status, educational status, household size, occupation, and wealth index. Therefore, the following logistic model was used to estimate the propensity score in this study.

$$= \boldsymbol{\beta 0 + \beta 1MaritalS + \beta 2eduS + \beta 3age + \beta 4HHsize + \beta 5occup + \ \beta 6wealth} \, . [\mathbf{10}]$$

Matching algorithm and selection criteria

There are a variety of matching methods available to create contrafactual comparison groups to estimate treatment effects. These methods include nearest neighbor matching (NNM), caliper and radius matching (RM), local linear matching (LLM) and kernel-based matching (KM). Every matching algorithm has its own set of benefits and downsides, since there is always a compromise between precision and bias.

There are different possibilities for matching algorithms, and the biggest question remains how one should select a specific matching algorithm. Clearly, asymptotically, all PSM estimators should yield the same results because, with increasing sample size, they all become closer to comparing only exact matches. However, in small samples, the choice of the matching algorithm can be important where a trade-off between bias and variance usually arises.

The choice of a given matching estimator depends on the nature of the available dataset. In other words, it should be clear that there is no "winner" for all situations and that the choice of a matching estimator crucially depends on the situation at hand. The choice of a specific method depends on

the data in question, and in particular on the degree of overlap between the treatment and comparison groups in terms of the propensity score(57,58). Therefore, this study used a suitable matching algorithm appropriate to the dataset.

Balancing test

The validity of PSM depends on critical assumptions of the Conditional Independence Assumption (CIA) as mentioned above. The selection into treated group members is solely based on observable characteristics. After controlling for these covariates, the potential outcomes are independent of the treatment status.

Since we do not condition on all covariates but only on the propensity score, it must be determined if the matching technique is capable of balancing the distribution of the relevant variables in both the control and treatment groups. The most well-known balance tests will be used, including standardized bias, the T test, and pseudo R^2.

The basic idea of all three approaches is to compare the situation before and after matching and check if there remain any differences after conditioning on the propensity score. If there are differences, the match on the score was not successful and remedial measures have to be taken, e.g., by including interaction-terms in the estimation of the propensity score.

Identification of common support strategy

The second critical assumption for PSM match to hold valid is presence of sizeable common support or overlap in propensity score across treatment and control. In our case there should have to be overlap in propensity score among CBHI member and non-member.

The most straightforward to check overlap or common support region is through visual analysis of the density distribution of the propensity score in both groups. Additionally, comparing the minima and maxima of the propensity score and estimating the density distribution in both groups can be used.

Therefore, in this study visual inspection of common support region by using histograms or density-distribution plots of propensity scores for the two groups, along with a comparison of the

minimum and maximum propensity score values in each distribution were done since existence of potential matches in the control group is sufficient for ATT.

4.9 Study variables

Catastrophic health expenditure is an outcome (dependent) variable of the study, and community-based health insurance was an intervention/program variable. Explanatory variables in the study includes socio-demographic variables (patient age, gender, religion, marital status, place of residence, family size, and distance from the hospital) and economic variables (patient monthly income, education, and occupation). The propensity score was estimated using socio-demographic, and economic variables as covariates.

Catastrophic health expenditure CHE_i is indicate by binary variable. Whether catastrophic health expenditure occurred in household as shown in formula [11].

$$CHE_i = \begin{cases} 1 & \text{If } \frac{T_i}{X_i} \geq z \\ 0 & \text{If } \frac{T_i}{X_i} < z \end{cases} \qquad \ldots\ldots\ldots\ldots\ldots [11]$$

Where T_i is total OOP health expenditure, X_i denotes total household expenditure or house hold non-food expenditure or capacity to pay based on the specific methodology used and z is given catastrophic threshold.

4.10 Measurement of the outcomes

Cost valuation Method

Direct cost was measured from patient perspective by using bottom-up approach (micro costing). This capture out of pocket expenditure for both direct medical and direct non-medical cost. Direct medical cost involves costs for drug, consultation (registration fee) and laboratory cost the client incur during one month follow up period. Direct non-medical cost includes costs for transportation, food and accommodation while seeking medical care in one month follow up period for both clients and caregiver(companion).

Indirect cost reflects Productivity loss due to a certain illness and estimated in terms of the productive time lost by patients and their caregivers (companions). It is value of time lost by client and caregiver while traveling and consultation of chronic disease follow up. This was estimated by using human capital approach. The forgone time while seeking care has been initially estimated and then converted to cost based on daily wage rates.

Daily wage rate is monthly income divide for 30 if patient or caregiver(companion) is employee and for patients or caregiver who are not formal employ with no permanent job and farmers was estimated using the minimum local daily wage rate in their settings (Ethiopian birr per day) for unskilled labor and multiplied by number of working days per month. All costs data was collected using Ethiopian birr and later converted to US dollar based on average National Bank exchange rate of 2022 (1USD= 51birr) to enable comparisons(60).

Measuring Catastrophic health Expenditure

There are two common methods for measuring CHE that is proposed by Wagstaff and Van Doorslaer, (2002) and Xu et al., (2005).

Wagstaff and van Doorslaer Methodology

This method used non-food household expenditure instead of total household expenditure as the denominator in order to calculate CHE since the substitution of non-food household expenditure for total household expenditure partly avoided the measurement deviations that were often overlooked in poor households.

The incidence and intensity of catastrophic expenditure was calculated using headcount, overshoot and mean positive overshoot by using formula [12] to [14] respectively. Catastrophic payment headcount is a percentage of household incurring catastrophic expenditure and it will measure the magnitude of catastrophic health expenditure with in overall sample by using the following formula [12].

$$H = \frac{1}{N}\sum_{i=1}^{N} CHE_i \quad \ldots\ldots..[12]$$

The difficulty with catastrophic payment head count is it doesn't reflect amount by which household exceed threshold. Therefore, I measure catastrophic expenditure overshoot which capture the average degree by which health expenditure exceed given threshold Z by using the following formula [13].

$$O = \frac{1}{N}\sum_{i=1}^{N} CHE_i \left[\frac{T_i}{TE_i - TFE_i} - Z\right] = \frac{1}{N}\sum_{i=1}^{N} o_i \qquad \dots\dots\dots\dots\dots\dots \quad [13]$$

The incidence and the intensity of catastrophic expenditures are related through the mean positive overshoot (MPO) which captures the intensity of occurrence of catastrophic expenditures defined as overshoot divided by headcount. MPO indicates the average percentage of OOP medical expenditure in excess of the threshold among households incurring CHE. It will be calculated using formula [14] below;

$$MPO = \frac{O}{H} \quad \dots\dots\dots\dots\dots.[14]$$

Xu. et.al Methodology

This methodology estimates catastrophic expenditure based on capacity to pay and health spending is considered catastrophic if the total health expenditure of a household equals or exceeds 40% of the total household's capacity to pay, and not catastrophic if the total health expenditure of a household is below 40% of the total household's capacity to pay. 40% of capacity to pay threshold were used as it is recommended by xu.e.al and used in others similar studies(35,61–63). Hence, to estimate these data out-of-pocket health expenditure, household total expenditure, food expenditure, poverty line and household subsistence spending and the household's capacity to pay will be required.

Household food expenditure was assessed by measuring the amount of money spent on food staff in one-week periods, while non-food household expenditure was estimated by measuring money spent on all essential household consumption either monthly or yearly. Then, using appropriate conversion, both food and non-food household expenditures was converted to a monthly basis.

Capacity to pay was calculated as follow by following this step. Initially equivalent household size will be determined by exponentiating actual household size with equivalent household

multiplier($\beta = 0.56$) as follow. β is obtained from regression equation in 59 countries and it implies that food consumption increases with additional household members, but that the increase in consumption is less than proportional to the increase in household size(61).

$$eqhh_{size} = HH_{size}{}^{\beta} \quad \dots\dots\dots\dots\dots..[15]$$

Then equivalent food expenditure was estimated by dividing food expenditure for equivalent household size as:

$$eqfoodh = food_h / \, eqhh_{size} \dots\dots\dots\dots\dots..[16]$$

The next step was generating the food expenditure share ($foodexph$) for each household by dividing households' food expenditure by total household expenditure.

$$foodexph = \frac{food_h}{Total_HHexp} \dots\dots\dots\dots\dots.[17]$$

Then identifying household food expenditure as share of total household expenditure in between 45th and 55th percentile across the whole sample. Then name these two variables as $food45$ and $food55$

Calculate the average equivalent food expenditure of households whose food expenditure share of total expenditures is in this percentile range will give us poverty line.

Household subsistence spending was calculated by multiplying the equivalent household size ($eqhh_{size}$) by the poverty line (P_{line})as shown in the following formula.

$$SE_i = eqhh_{size} * \; P_{line} \quad \dots\dots\dots\dots\dots\dots.[18]$$

Household capacity to pay is then defined as a household non- subsistence spending and calculated as;

$$CTP_i = \; EXP_i - \; SE_i \dots\dots\dots\dots\dots.[19] \quad \text{If, } SE_i \leq food_h \text{ or}$$

$$CTP_i = \; EXP_i - \; food_{h_i} \dots\dots\dots\dots[20] \quad \text{If, } SE_i > food_h$$

Where EXP_i is household total expenditure, SE is household subsistence spending and $food_h$ is food expenditure.

Catastrophic threshold level

There is no universal consensus on catastrophic threshold level and different study use different threshold that range from 10% to 40% of total household expenditure, nonfood expenditure and capacity to pay(15,31,38,62). In this study different threshold was used to check for sensitivity of incidence and intensity of catastrophic expenditure at 15%, 25% and 40% of nonfood expenditure, 10% and 15% of total expenditure and 25% and 40% of capacity to pay. To identify effect of CBHI on CHE 15% of non-food expenditure was used.

4.11 Data Quality Assurance

To enhance the quality of the data, the data collectors were trained for two days on the objective and methodology of the research and data collection approach. The questionnaire was translated into the local languages, Amharic and Afan-Oromo, in order to increase the response rate. Then a questioner developed in Amharic and Afan-Oromo were back translated into English to insure the validity of the question. Pilot testing of the questioner was performed on 5% of the sample (17 chronic patients) attending follow-up in Asella referral hospital, which are not included in the actual study, and the questioner was modified based on the findings of the pilot study. To minimize missing variables, the ODK collect app were used by making variable fields required and using appropriate skipping patterns.

4.12 Operational definition

Chronic disease Patients: - Patients with Non-communicable diseases (mainly DM, cardiovascular disease, mental illness, cancer, and respiratory diseases) which have been on follow-up for at least a month.

CBHI membership: Households who have been members of community-based health insurance for at least a month and have renewed their membership for the fiscal year of 2014.

Catastrophic health expenditure: Spending a high share of household income in form of out-of-pocket health costs (which is greater than specific threshold of non-food or total expenditure, and capacity to pay).

4.13 Ethical Consideration

Ethical clearance was obtained from Addis Ababa University, College of Health Science, School of Public Health, and a permission letter to carry out the study was obtained from Asella referral and teaching hospital. All study participants were given detailed information about the aims and methods of the study prior to the interview (which was attached as an information sheet) and informed verbal consent to participate in the current study was obtained.

The study is expected to have minimal risk as the patients share their personal information. Minimization and alleviation of such anticipated risks was seriously considered, and assessments and interviews were conducted in a private room to maintain the confidentiality and privacy of the participants. And most importantly, a close and harmonious relationship (rapport) were established ahead of the interview between the respondent and the interviewer, which highly avoids social desirability issues too.

4.14 Dissemination plan

The results of this study will be submitted and presented to Addis Ababa University College of Health Science, School of Public Health, department of health system management and policy. The finding will also, disseminated through publication in peer-reviewed, reputable journals and will be presented at local or international conferences. The results will also be submitted to respective health institutions (Asella referral and teaching hospital), regional and federal health bureaus, the Ethiopian health insurance agency, and other concerned bodies working on financial risk protection.

Chapter 5: Result

5.1. Demographic and Socio-economic characteristics

In this study, 325 study participants were involved, with a 96.7% response rate. Of these, 167 (51.38%) are male. The age range of the respondents was 18 to 79, with a mean of 47.32 (SD+16.47 (50)). The majority of study participants were married, Orthodox in religion, and urban residents; 235 (72.31%), 186 (57.23%), and 214 (65.85%), respectively. The household size of respondents ranged from 1 to 11, with a mean of 4.73 (SD+2.03(5)). Regarding access to health facilities, the mean distance from the hospital was 24.21 (SD+19.02 (25)) kilometer. The following table (Table 2) contains information on sociodemographic characteristics.

Table 2: *Socio demographic characteristics of respondents attending Chronic follow up in Asella referral hospital, 2022 (n=325)*

Characteristics	*Category*	*Frequency*	*Percent*
Sex	Male	167	51.38
	Female	158	48.62
Age in year	18-30	70	21.54
	31-45	81	24.92
	46-60	106	32.62
	61-79	68	20.92
Religion	Orthodox	186	57.23
	Muslim	102	31.38
	Catholic	5	1.54
	Protestant	32	9.85
Marital status	Single	65	20
	Married	235	72.31
	Widowed	19	5.85
	Separated	6	1.85
Residence	Urban	214	65.85
	Rural	111	34.15
Household size	<=5	220	67.69
	>5	105	32.31
Distance in km	1-25	227	69.85
	26-50	66	20.31
	51-75	25	7.69
	76-135	7	2.15

The socio-economic characteristics of study participants have been summarized in table 3. In terms of educational attainment, 75 (23%) can read and write, and 71 (22%) have completed tertiary education (above 12). Farmers account for 25% of the research participants, followed by employees at 19%. Participants' monthly earnings range from 500ETB to 76375ETB, with an average of 9393.076 (SD+11202.42 (6000)).

Table 3: *Socioeconomic characteristics of respondents attending Chronic follow up in Asella referral hospital, 2022 (n=325)*

Characteristics	*Category*	*Frequency*	*Percent*
	Not able to read and write	59	18.15
Educational Status	Read and write	75	23.08
	Primary education (1-8)	57	17.54
	Secondary education (9-12)	63	19.69
	Tertiary education (above 12)	71	21.85
	Farmer	80	24.62
	Employee (Gov't/private/NGO	64	19.38
	Self employed	2	0.62
	Unemployed	22	6.77
Occupation	Merchant	35	10.77
	Daily laborer	1	0.31
	House wife	50	15.38
	Student	25	7.69
	Retired	46	14.15
	< = 2500 ETB	46	14.15
Household monthly income	2501-5000 ETB	85	26.15
	5001-10,000 ETB	109	33.54
	>10,000 ETB	64	19.69
	Missing	21	6.46
	Poorest	70	21.54
Wealth quintiles	Q2	61	18.77
	Q3	64	19.69
	Q4	65	20
	Richest	65	20

5.2 CBHI enrolment status

157(48.31%) of respondents were member of community-based health insurance. Duration since being member of community-based health insurance will range from 2 to 80 months with mean of 20.14(SD±14.15). Among this majority 149(94.90) house hold paid for enrollment. Also, majority

150(95.54%) of them have benefited from CBHI and the most commonly mentioned benefit was reduced cost of health care 146(97.33) as indicated in table 4. Majority 139(88.54) of the CBHI member currently get service free of charge. 58(36.94%) of respondent's rate easy of getting medical access using CBHI as very easy while on other hand only 5(3.18%) rates as very difficult.

Table 4: *CBHI status of respondents attending Chronic follow up in Asella referral hospital, 2022*

Characteristics	*Category*	*Frequency*	*Percent*
CBHI member	Yes	157	48.31
	No	168	51.69
Payment type (N=157)	Household contribution	149	94.9
	Local government (coverage for Indigent HH)	8	5.1
Benefited from CBHI	Yes	150	95.54
	No	7	4.46
Types of benefit (N=150)	Increased access to healthcare	16	8.38
	Reduced costs of health care	146	76.44
	Reduced concerns about expected health care costs	29	15.18
Currently get service in Hospital	Free of charge	139	88.54
	Partial OOP payment	14	8.92
	Substantially OOP	4	2.55
Easy of getting medical access using CBHI	Very difficult	5	3.18
	Difficult	20	12.74
	Average	36	22.93
	Easy	38	24.2
	Very easy	58	36.94

5.3 Clinical characteristics

Table 5 presents clinical characteristics of study participant. About 143(44%) was diagnosed for diabetes and 98(30.15%) was diagnosed for hypertension. The mean duration of illness the patient

was living with chronic disease was 3.9 (SD±4.22) years. The majority 321(98.77%) of chronic patients had regular follow up and among this 169(52.65%) of them had follow up every month.

Table 5: *Clinical characteristics of respondents attending Chronic follow up in Asella referral hospital, 2022*

Characteristics	**Category**	**Frequency**	**Percent**
Type of chronic disease diagnosed	Diabetes	143	44
	Hypertension	98	30.15
	Heart disease	60	18.46
	Stroke	3	0.92
	Mental illness	66	20.31
	Respiratory illness (COPD)	2	0.62
	Kidney disease	16	4.92
	Other[1]	3	0.92
	Total	391	120.31
Regular follow up	Yes	321	98.77
	No	4	1.23
Follow up appointment	Every month	169	52.65
	Every two months	102	31.78
	Every three months	47	14.64
	Every six months	1	0.31
	Other[2]	2	0.62

Other[1]:- Neurologic, Goiter Other[2] ;- Every two week

5.4 Cost of chronic disease treatment and household expenditure

The average monthly total household spending was 4338.93 ETB, with (SD+4166.70ETB). Monthly food and non-food expenses were determined to be 1962.92 (SD+1808.99) ETB and 2376 (SD+3608.82) ETB, respectively.

The mean overall cost of chronic illness each month, as shown in (Table 6), was 555.22 (SD+544.17) ETB, with a mean direct medical cost of 244.1 (SD+318.5) ETB. The majority (244) of patients paid for medications, with an average monthly prescription cost of 158 ETB, whereas

only 84 patients paid for imaging, with an average monthly cost of 194.34 ETB. Drug and diagnostics (laboratory and imaging) contribute for 42% and 14% (6% and 8%) of total out of pocket health expenditure while consultation contribute for only 1%.

The majority of patients (303) had direct non-medical costs each month, averaging 106 (SD±170.1) ETB. During their follow-up, 154 of them paid for food and drink, with the average cost being 108.83 (SD±167.05) ETB. Only ten patients, on the other hand, paid for accommodation, with an average cost of 76.83 birr. Transportation cost contribute for 26% of total out of pocket cost while Food and drink and accommodation contribute for nearly16% and 1%

Indirect expenses for patients and caregivers due to lost productivity are calculated using their daily income. The average monthly productivity loss is 259.41(SD+391.39) ETB.

Table 6: *Cost of chronic illness and household expenditure of chronic disease patients attending follow up in Asella referral hospital, 2022*

Types Of Cost	**N**	**MEAN**	**STD.DEV.**	**MEDIAN**
Household Expenditure Per month				
Food Expenditure	325	1962.92	1808.99	2000
Non-Food Expenditure	325	2376.00	3608.82	1875
Total Expenditure	325	4338.93	4166.70	3686.67
Direct Medical Cost per month				
Registration/Card	100	7.84	3.64	7.5
Laboratory	162	49.63	103.2	15
Drug	244	158	142.84	125
Imaging	84	194.34	446	70
Total	**261**	**244.1**	**316.5**	163
Direct Non-Medical cost per month				
Food And Drink	154	108.83	167.05	70
Transportation	303	48.6	61.2	30
Accommodation	10	76.83	86.68	42.5
Total	**303**	**106.44**	**170.1**	57
Indirect cost per month	**325**	**259.41**	391.39	180
Total Direct Cost	**325**	**295.24**	358.84	212.5
Total Cost	**325**	**555.22**	544.17	

"N" number of observation ** All costs are in ETB (Ethiopian birr)

5.4.1 Major types of health cost incurred based on insurance status

The most common types of health cost incurred by chronic disease patients was found to be indirect cost which contribute 48% followed by direct medical cost which take 33% of total cost of chronic illness as indicated in figure 4.

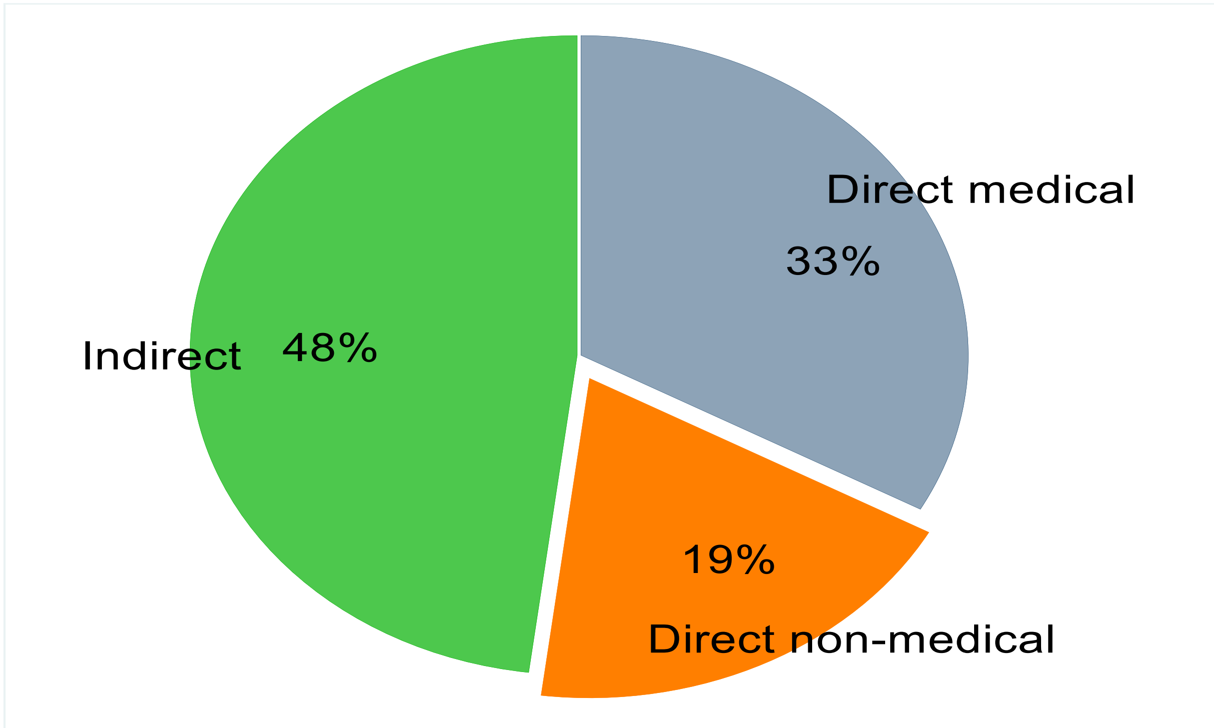


Figure 4:*Main types of cost as a proportion of total cost for chronic disease patients attending follow up in Asella referral hospital.*

The cost of chronic disease treatment varies depending on insurance status, according to this study. The aggregate average cost of chronic disease treatment among CBHI members was 605.21 (SD+684.82) ETB per month, as shown in Table 7. During their follow-up, 93 CBHI members reported direct medical expenses, with an average monthly expenditure of 303.14 (SD+493.2) ETB.

During the follow-up period, nearly all (150) CBHI members paid non-medical expenses, with the average monthly cost being 132 ETB. Food and drink take the highest part, with an average of 135 ETB each month. The average monthly lost productivity due to chronic illness was 298.34 (SD+459.9) ETB.

In this study, 76 (48.4%) insured households paid for drugs or medication, 42 (26.7%) paid for laboratory testing, 20 (12.7%) paid for imaging, and 33 (21%) paid for registration.

Non-insured households spent 509 birr per month for chronic disease treatment. During their follow-up, all of the patients had experienced direct medical expenses. The average cost of direct medical services was 211 ETB. Medication has been the expensive, costing an average of 155 birr, while registration was the lowest, costing only 9 birrs.

Uninsured households' direct non-medical expenditures roughly account for 82 Ethiopian birr on average. Among these, 77 of them paid for food and drink during their hospital visit and the spent-on average nearly 82 birr per month. The average loss of production due to this disease was 223 birrs.

All non-insured patients paid for medication (100%); 120 (71.4%) paid for laboratory; 101 (60.1%) paid for registration; and 64 (38.1%) paid for imaging.

Indirect costs are the most common types of costs among insured households, accounting for over half of total costs (55%). Direct medical costs, on the other hand, are the most common type of health care cost among non-insured households, accounting for 43% of total costs (see Figure 5).

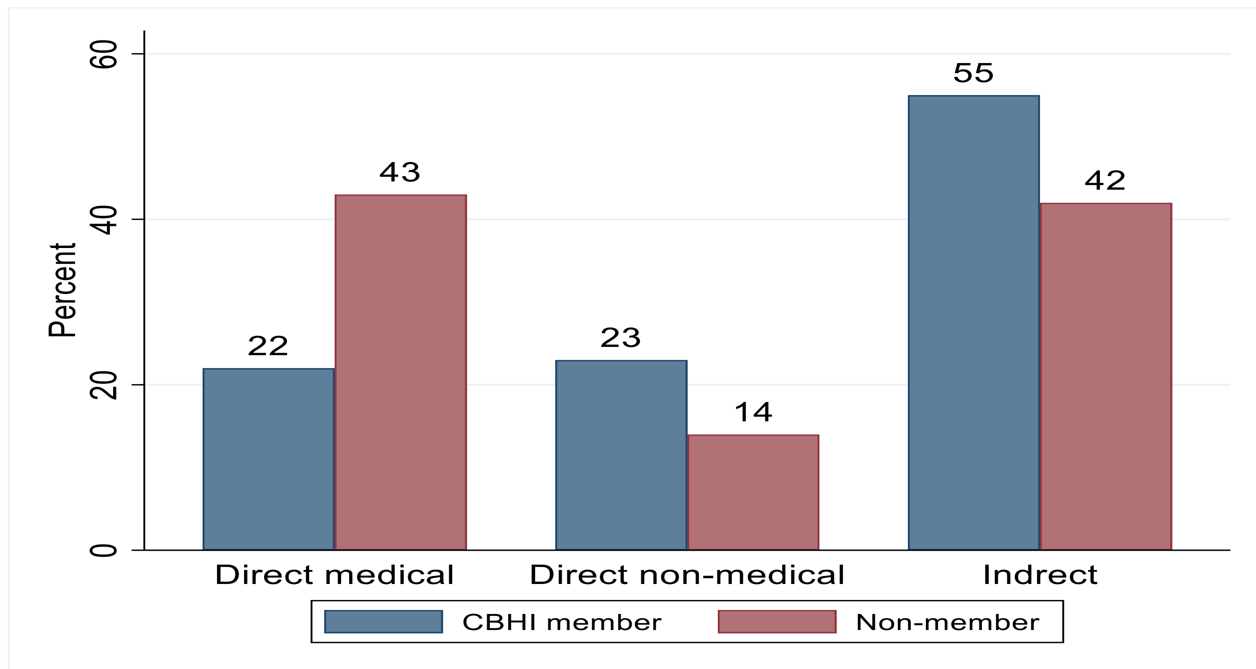


Figure 5: *Main types of cost as a proportion of total cost for chronic disease patients attending follow up in Asella referral hospital based on insurance status*

__Table 7:__ Cost of chronic illness among chronic disease patients attending follow up in Asella referral hospital based on CBHI status, 2022

	CBHI Enrolment = Yes			CBHI Enrolment = No		
Types of Cost	N	Mean	Std.dev.	N	Mean	Std.dev.
Direct Medical Cost per month						
Registration/Card	33	6.47	2.47	67	8.5	3.94
Laboratory	42	93.8	172.43	120	34.2	56.85
Drug	76	165.4	214.14	168	154.64	99.32
Imaging	20	573.3	813	64	75.9	53.24
Total	**93**	**303.14**	493.2	**168**	**211.36**	137.52
Direct Non-Medical cost per month						
Food And Drink	77	135.47	228.17	77	82.19	51.80
Transportation	150	57.75	73.82	153	39.61	44.01
Accommodation	7	97.86	97.68	3	27.78	5.09
Total	**150**	**131.85**	224.93	**153**	**81.52**	81.26
Indirect cost per month	**157**	**298.34**	459.90	**168**	**223.49**	312.44
Total out of pocket	**157**	**305.54**	485.27	**168**	**285.60**	172.22
Total Cost	**325**	**605.21**	684.82	**168**	**509.1**	366.1

5.4 Catastrophic Health Expenditure

The result of incidence and intensity of catastrophic health expenditure are stated in table 8. The incidence of catastrophic health expenditure varies depending on the methodology and threshold levels used to determine it. The threshold levels employed in this study range from 10% to 40% of nonfood expenditure, 10% to 15% of total household expenditure, and 25% to 40% of capacity to pay.

The incidence of catastrophic health expenditure due to chronic illness varies from 54% to 12% when household nonfood expenditure is used as the denominator. According to this study, 54%, 39%, 24%, and 12% of chronic patients incurred catastrophic health spending due to their chronic illness at 10%, 15%, 25%, and 40% of non-food expenditure, respectively.

At 10% and 15% total expenditure thresholds, respectively, the incidence of CHE was 28% and 19%. The incidence of CHE was approximately 11% and 20%, respectively, when a 40% and 25% capacity to pay thresholds was employed.

When the threshold is raised, the incidence of catastrophic health expenditures decreases. The estimated incidence of catastrophic health spending among chronic disease patients reduces from 54 percent to 12 percent as the threshold is raised from 10% to 40% of nonfood expenditure.

The incidence only shows the percentage of families who had catastrophic health expenses at a specific threshold, not the amount by which health payments surpassed that threshold. As a result, overshoot and mean positive overshoot (MPO) has been used to estimate the intensity or severity of health expenses.

The overshoot describes the severity of health payments paid for chronic disease among all patients, regardless of whether they have catastrophic health costs. The degree of overshoot depends on the methodology and threshold employed. When non-food expenditure was used, the overrun was 17% and 14% at the 10percent and 15percent thresholds, respectively. However, when total household expenditure is taken into account, it is just 5% and 4%.

Overshoot also declines as the threshold is raised. When the threshold is raised from 10% to 40% of non-food, it declines from 17 percent to 9 percent, and when we employ total household expenditure, it slightly drops from 5% to 4% as the threshold is raised from 10% to 15%.

The study also uses mean positive overshoot (MPO) to illustrate the severity of catastrophic health expenditure among patients who have suffered catastrophic health expenditure at a specific threshold level. At 10% and 15% of non-food expenditure, the MPO was 31% and 37%, respectively, while at 10% and 15% of total expenditure, it was 19% and 22%.

In contrast to incidence and overshoot, MPO increased as the threshold was raised, for example, from 31% to 73 percent when the threshold was raised from 10% to 40% of non-food expenditure and from 19% to 22% when the threshold was raised from 10% to 15% of total expenditure.

Table 8: *Incidence and intensity of CHE among chronic disease patients attending follow up in Asella referral hospital, 2022*

Method	***Catastrophic Threshold***			
	10%	***15%***	***25%***	***40%***
OOP as share of nonfood expenditure				
Head count (%)	53.56	39.01	24.46	12.07
Overshoot (%)	16.62	14.36	11.31	8.78
MPO (%)	31.22	37.04	46.53	73.20
OOP as share of total expenditure				
Head count (%)	28.31	18.77		
Overshoot (%)	5.24	4.10		
MPO (%)	18.50	21.87		
OOP as share of capacity to pay				
Head count (%)			20.12	10.53

Note: MPO refers to mean positive overshoot

The incidence of catastrophic health expenditure is high for noninsured patients at all thresholds and when different methods are employed, except for total household expenditure, in which it is lower than insured members. At a 15% non-food threshold, the incidence of catastrophic health spending among CBHI members was 30%, compared to 47% for non-members. In contrast, the incidence for insured and uninsured patients was 20% and 18%, respectively, at 15% of total household expenditure as indicated in Table 9.

When comparing non-insured households to their insured counterparts, the intensity of catastrophic out-of-pocket health costs owing to chronic illness is high across all methodologies. At a 15 percent threshold, for example, the overshoot was 10% for members and 18% for non-members. In addition, the mean positive overshoot for insured and uninsured households was 33% and 39%, respectively.

Table 9: *Incidence and intensity of CHE based on CBHI status among chronic disease patients attending follow up in Asella referral hospital based on CBHI status, 2022*

Method	OOP as share	CBHI enrolment Yes				CBHI enrolment No			
		10%	15%	25%	40%	10%	15%	25%	40%
Wagstaff an Van Doorslaer	Non-food								
	Head count (%)	44	30.6	21	10.2	63	47	27.7	13.9
	Overshoot (%)	12	10.20	7.57	5.20	21	18.30	14.80	12.15
	MPO (%)	27.23	33.22	36.02	50.83	33.87	39.39	54.06	88.74
	Total expenditure								
	Head count (%)	23	20			33.3	18		
	Overshoot (%)	4.34	3.32			6.10	4.84		
	MPO (%)	18.91	16.80			18.23	27.10		
Xu et.al Method	Capacity to pay								
	Head count (%)			17.2	8.3			23	12.7

5.5 Coping mechanism

About 152 (46.77%) of respondents used their own money to finance their chronic disease expenses, either via savings or salary, while 106 (32.62%) of respondents used community-based health insurance to finance their health expenses.

Own money was the most common source of financing for noninsured households, accounting for 112 (66.7%), followed by family support 37(22%). On the other hand, as illustrated in the bar chart (Figure 6) below, 40 (25.48%) of insured households finance their chronic disease health expenses with their own money. The only assets sold to fund medical costs were animals and crops 18(5.45%)

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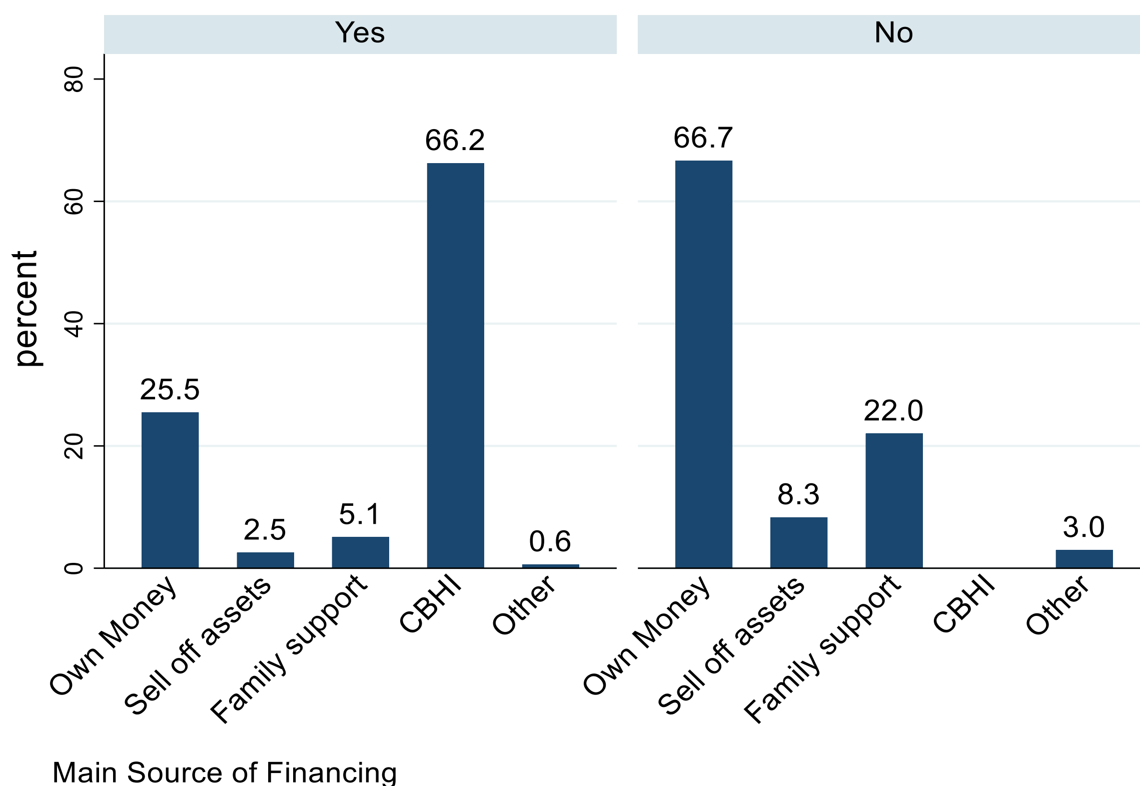

Figure 6: *The main source of financing health expenses among chronic patient attending follow up in Asella referral hospital based on insurance status, 2022*

Patients who had catastrophic health expenditure at 15% of non-food expenditure tried to cope with their financial hardship by using their personal savings and salary 67(53%), as well as family support 26(21%). While 28 (22%) of them relied on community-based health insurance to cope

5.6 Econometric Analysis

The effect of community-based health insurance on catastrophic health expenditure was assessed using a propensity score matching technique in this study. The estimation process followed the phases outlined below, each of which is discussed in detail. Computing the propensity score, choosing an appropriate matching technique for the data, identifying the common support region, assessing the matching quality and estimating standard errors are some of the procedures involved.

5.6.1 Estimation of propensity score

The logit model is used to determine the propensity scores, with CBHI membership as the dependent variable (CBHI member = 1, non-member = 0). The characteristics that are thought to influence CBHI enrollment have been carefully researched and accounted for in the STATA 17 software application's computation of propensity score matching. CBHI enrolment is found to be significantly related to age, educational status, occupation, and wealth quintiles. Despite the fact that previous research has suggested that CBHI participation is linked to marital status and family size, it is not significant in our model.

Table 10: *Logistic regression result for CBHI enrolment*

Variables	Coefficients	Z-value	
Age	.0149613	1.79**	
Marital status	.1398716	0.59	
Household size	.2765558	1.03	
Educational status	-.1965914	-1.91 **	
Occupation	.0845564	2.11*	
Wealth quintile	.1970857	1.85**	
_cons	-1.780399	-1.81 **	
Mean dependent var	0.483	SD dependent var	0.500
Pseudo r-squared	0.070	Number of obs	325
Chi-square	31.426	Prob > chi2	0.000

*Remark indicate, * p<.05(significant at 5%), ** p<.1(significant at 10%)*

5.6.2 Matching Algorithm selection

There are a variety of matching algorithms to choose from, and each one has been thoroughly tested using the data available. For this study, the most appropriate matching algorithm was chosen. The optimal matching algorithms was chosen based on the criteria of a reduced mean difference between the treated and control groups after matching, a low pseudo-R2 value, and the number of matched samples after matching.

As shown in Table 11 on the basis of this criterion, nearest neighbor matching with and without replacement, radius matching with caliper, kernel matching with different bandwidth, and local

linear matching were tested. However, relatively, the nearest neighbor matching is found to be more efficient option and the model interpretation are based on this algorithm.

Table 11: *Matching quality of different algorithm based on survey data, 2022*

Matching Algorithm	Selection criteria		
	Mean bias	Pseudo R2	Sample after matching
Nearest Neighbor Matching			
N=1 without replacement	23.4	0.049	321
N=2	4.9	0.004	321
N=3	4.5	0.003	321
N=5	**3.8**	**0.002**	321
Radius	28.1	0.067	321
Caliper			
0.2	6.5	0.010	321
0.01	6.4	0.010	320
Kernel			
Bandwidth 0.06	4.5	0.002	321
Bandwidth 0.1	4.4	0.002	321
Local linear	7.7	0.007	321

5.6.3 Common support region

The average treatment effect on treated (ATT) is only determined in the region of common support. Hence, an important step is to check the overlap and the region of common support between CBHI members and the comparison group. The most straightforward way to check for overlap or common support region is through visual analysis of the density distribution of the propensity score in both groups. In each distribution, the minimum and maximum propensity score values were compared to check if there were any potential matches in the control group, which is sufficient for ATT. Table 11 demonstrates that there is sufficient overlap.

Table 12: *Distribution of estimated propensity score*

Pscore	Obs	Mean	Std. Dev.	Min	Max
All sample	325	0.4830769	0.1528753	0.1755412	0.8562196
CBHI member	157	0.5314779	0.1374878	0.1821319	0.8562196
Non member	168	0.437845	0.1530487	0.1755412	0.7880461

Only two variables from the treatment group, those with the highest propensity score, are outside the support region after matching, whilst the rest are in the common support region, as shown in the graph below. All of this evidence suggests that CBHI members and non-members have similar propensity scores. As a result, the critical assumption of PSM matches having common support is fulfilled.

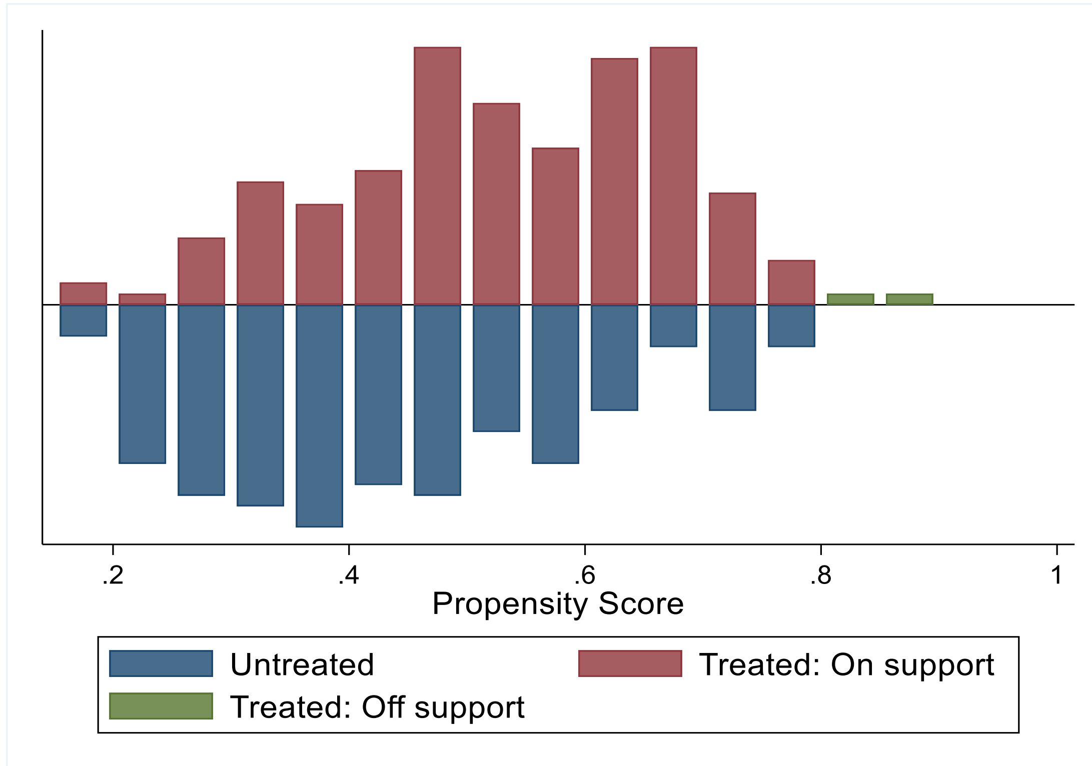

Figure 7: The common support region-based propensity score among CBHI member and non-members

5.6.4 Balance testing

After deciding on the optimum matching method, it's time to see if the technique can balance the distribution of the relevant variables in both the control and treatment groups. The T-test, standardized bias test, and chi-square were used to verify for equality of means between the treated and control groups after matching. The main objective of these tests is to verify that treatment is independent of unit characteristics after conditioning on observed characteristics.

As indicated in (Table 13), the t test findings show that there is a difference before matching, but that after matching, the covariates have been balanced in both groups, and so there is no significant difference.

Except for the marital status variable, the standardize difference before matching was greater than 20, but after matching, all were less than 20, indicating that there was a difference in covariates between participants and non-participants prior to matching, but that this difference was eliminated by the matching process.

Table 13: *Balancing Test for Propensity Scores and Covariates based on survey data,2022*

Variable	**Unmatched Matched**	**Mean**		**%reduction**		**t-test**		**V(T)/V/(C)**
		Treated	**Control**	**%bias**	**|bias|**	T	p>|t|	
Pscore	U	0.531	0.436	65.7		5.89	0.000*	0.81
	M	0.527	0.528	-0.2	99.8	-0.01	0.988	1.01
Marital status	U	1.943	1.849	16.4		1.47	0.18	1.48
	M	1.942	1.952	1.8	88.9	0.16	0.874	1.50
Household size	U	1.382	1.265	25.2		2.26	0.024**	1.21
	M	1.374	1.389	-3.3	86.8	-0.28	0.780	0.98
Educational status	U	2.675	3.373	-50.5		-4.54	0.00*	1.14
	M	2.697	2.719	-1.6	96.9	-0.15	0.885	1.34
Occupation	U	4.771	4.096	22.5		2.02	0.044**	1.33
	M	4.716	4.901	-6.2	72.6	-0.53	0.599	1.15
Wealth index	U	3.236	2.753	34.1		3.06	0.002*	0.88
	M	3.219	3.249	-2.1	93.9	-0.19	0.847	1.05
Age	U	49.803	44.765	30.9		2.78	0.006*	1.01
	M	49.426	48.132	7.9	74.3	0.69	0.491	0.91

*, ** significant at 1% and 5%, respectively

Another approach to test balance was checking for joint significance and Pseudo-R2. The pseudo R2 shows how well the variables describe the likelihood of participation. There are no systematic variations in the distribution of variables between the two groups after matching, since the pseudo

R2 is fairly low. A F-test on the combined significance of all variables is also performed, and the test has not been rejected before, but it is rejected after matching, as shown in Table 14.

Table 14: *Joint significance and Pseudo-R^2*

Sample	Ps R2	LR chi2	p>chi2	MeanBias	MedBias	B	R
Unmatched	0.073	32.77	0.000	35.0	30.9	66.0*	0.82
Matched	0.003	1.09	0.993	3.3	2.1	11.8	1.14

Rubin's B (the absolute standardized difference of the means of the linear index of the propensity score in the treated and (matched) non-treated groups) and Rubin's R (the ratio of treated to (matched) non-treated variances of the propensity score index) are less than 25 and between 0.5 and 2, respectively, as Rubin (2001) recommends.

In general, the balancing test results show that after matching CBHI members and non-members, the distribution of the independent variables has no significant difference, indicating that the treatment effect can be estimated using the observed data using the nearest neighbor (N=5) matching technique.

5.6.5 Effect of Community based health insurance on CHE

The effect of community-based health insurance on catastrophic health expenditure has been estimated by using average treatment effect on treated. 155 CBHI member and 166 nonmember chronic disease has been compared by using nearest neighbor matching. As the result in table 15 show enrolment in CBHI had significant effect on catastrophic health expenditure and patients who are member of CBHI had 19% lower incidence of catastrophic health expenditure compared to their counterpart.

Table 15: *Effect of community-based health insurance on catastrophic health expenditure among chronic disease patients on follow up in Asella referral hospital, 2022*

Outcome Variable	Treated	Controls	Difference	S.E.	T-stat
CHE at;					
10% non-food	.438709677	.651612903	-.212903226	.064271973	-3.31*
15% non-food	.303225806	.494193548	-.190967742	.064271037	-2.97 *
40% non-food	.096774194	.219354839	-.122580645	.044248702	-2.77*
10% Total expenditure	.225806452	.372903226	-.147096774	.060168301	-2.44*
40% capacity to Pay	.077419355	.197419355	-.12	.041805124	-2.87*

*, Significant at 1%

Then we should have to test whether the observed difference, 19% is significant or not and also, we have to understand what does the T-stat (-2.97) indicate. Then, in order to check the analytical standard error, we have to bootstrap replications to compute robust estimates for standard errors of the outcome indicator. 100 bootstrap replications have been used to compute robust estimates for standard errors of the outcome indicator. For clarity, only ATT bootstrapped estimates are reported in table 16.

Table 16: *Bootstrap statistics*

Variable	Reps	Observed	Bias	Std. err.	[95% conf.	interval]
_bs_1,	100	-.1909677	.0356749	.0674332	-.3247698	-.0571656 (N)
					-.2968554	-.0304348 (P)
					-.325	-.10125 (BC)

Note: *_bs_1 refers to ATT after bootstrapping*

The bootstrapped SE is assumed to be obtained after 100 replications. The bootstrapped standard errors result is .0674332. Then we can know the t-stat value by the formula of T-stat= B-hat/SE that is = -.1909677/.0674332 =-2.57 which is still lower t-stat value after matching that is already satisfied.

Chapter 6: Discussion

This study aimed to assess the level of catastrophic expenditure and evaluate the effect of community-based health insurance on catastrophic health expenditure among patients attending chronic disease follow-up in Asella referral hospital, Southeast Ethiopia.

The average monthly cost of chronic disease care was 555 ETB (10.9USD), according to the findings of this study. This is greater than a study of diabetic patients in Bahir Dar, where diabetes care costs 382 ETB each month, and a study of hypertension patients in Gondar (2510 ETB per year) (30,64). Differences in the study population could account for the discrepancy. In our study, we included patients with a variety of chronic diseases, whereas their study focused on only one type of chronic condition.

Additionally, this study is higher than study conducted in Uganda on Rheumatic heart disease (RHD) patients in which average cost of treatment of rheumatic heart disease was 78USD per person-year(65). This difference can be explained in context and socio-economic difference of study participant.

However, this finding is lower than that of other studies conducted in the Addis Ababa and Shewa zones, which found that the average monthly cost of hypertension treatment was 7194 and 613 ETB, respectively(66,67). This disparity could be explained by the fact that our study included members of community-based health insurance plans, whereas this study does not specify whether these individuals have insurance.

Indirect and direct medical expenditures account for the majority of the entire cost of chronic disease, accounting for 48% and 33%, respectively. Direct non-medical expenditures, on the other hand, account for approximately 18 percent of total costs. This suggests that chronic illness has resulted in a substantial loss of productivity for both patients and their caregivers.

This has a substantial influence on the economies of chronic patients since it is incurable and they must attend health facilities on a regular basis. It exposes patients and their caregivers to lost earnings owing to absences from work due to illness and follow-up. This loss of productivity as a result of this illness suggests that more attention should be paid to disease prevention in order to avert economic losses at the national level as a result of lost productivity.

Direct medical expenditures account for 57 percent of out-of-pocket health spending for chronic conditions. Medication and diagnostics account for the majority of direct medical expenditures (41 percent and 14 percent, respectively). This is consistent with the findings of a Ethiopian household survey, which found that medications and diagnostics account for approximately 45 percent and 16 percent of out-of-pocket health costs, respectively(25).

In general, this study finds that drug and transportation expenses account for 41% and 26% of out-of-pocket health expenditure for chronic diseases, respectively. Other studies have found a similar outcome, with the cost of medicine and transportation accounting for a significant portion of the direct cost of hypertensive disease(67).

This study examined the main types of chronic disease expenditures based on insurance status, and found that indirect and direct costs account for 55 percent and 45 percent for insured patients, respectively, whereas 42 percent and 68 percent for uninsured patients. This shows that, even though paying a lesser proportion of direct expenditures, insured patients and their caregivers experience significant productivity losses as a result of the illness, with a mean average monthly productivity loss of 300 ETB, which is larger than non-insured patients.

Direct medical costs account for 22% of the total cost of chronic disease and 38% of out-of-pocket spending among insured households, according to the findings. Medication expenditures accounted for the majority of this direct out-of-pocket spending (25 percent), indicating that individuals are incurring out-of-pocket medical expenses for pharmaceuticals regardless of their insurance coverage.

Furthermore, this survey found that 48% of insured families paid for pharmaceuticals and 40% paid for diagnostics (27% for laboratory and 13% for imaging), which is greater than the CBHI evaluation study(15), which found that just 2.7 percent and 1.6 percent paid for drugs and diagnostics, respectively. This huge difference might be attributable to the reality that chronic disease medications are expensive, and public health facilities may be out of stock, forcing this patient to purchase them from private institutions. Patients are also referred to private diagnostic services, which are not available in hospitals, for diagnosis. This could indicate that insured patients are still incurring out-of-pocket charges, necessitating more investigation into the reasons for these costs.

Depending on the approach and catastrophic threshold used, the level of catastrophic health spending in this study varied from 11 percent to 54 percent. The incidence of CHE among chronic diseases was 39 percent when 15% non-food was used, according to our data. Despite the fact that comparisons are difficult due to methodological differences and CHE criteria, the results are lower than those found in research conducted in Dessie referral hospital (64.2%) and Bahir Dar (59.6%)(28,30). However, the result is higher study conducted in Addis Ababa (27%)(29). This discrepancy could be attributable to the study population is different, and our study participants are insured.

This result is also lower than the 74.4 percent seen in an Addis Ababa study involving cancer patients(68).). This disparity is due to limited geographic access to cancer treatment centers and the costly service of medical care for cancer patients, and while this study covers inpatients, we only include outpatients in our study.

This finding, on the other hand, is comparable to a systematic review finding in Ethiopia, where the average catastrophic health expenditure was 40%, an Indian study, where 41% of chronic disease patients had catastrophic health expenditure, and a Ugandan study, where 35% of rheumatoid heart disease patients had catastrophic health expenditure.(19,65,69).

In this study, almost 54% of patients spend more than 10% of their monthly non-food expenditures, which is lower than a study performed in Nigeria, which found that 79 percent of chronic patients spend more than 10% of their family income. This disparity can be explained by differences in coping mechanisms, as only 8.6% of participants in the study had access to health insurance as a coping technique to finance their chronic disease expenses, whereas 32% of participants in our study used community-based health insurance as their primary source of financing(70).

This result, however, is higher than that of a Malawian survey (21.3 percent at 10% non-food expenditure). The difference might be due to study population differences, as the Malawi research was community-based while our study was facility-based(24).

This study also shows the severity of catastrophic health expenditure among chronic patients as overshoot and MPO. The average percentage of out-of-pocket medical expenditure that exceeded a given threshold (15 percent of non-food expenditure) in overall study participants was 14 percent, while the average percentage of out-of-pocket medical expenditure that exceeded a given threshold

among chronic patients who had incurred CHE was 37 percent. This finding is nearly similar to that of a study conducted on diabetes patients in Bahir Dar, where overshoot and MPO were found to be 23% and 39%, respectively.

This suggests that chronic disease patients are experiencing financial hardship as a result of their medical condition, as they spend approximately 29 percent of their non-food spending on medical treatment each month. It gets much worse for people who already have catastrophic expenses since they spend more than half (52%) of their monthly non-food expenditure on medical care. The majority of them still rely on their savings and family help to cover these medical costs.

Chronic disease patients have a much greater incidence and severity of catastrophic health expenditure. This is owing to chronic conditions requiring ongoing care and health services, which may impose a substantial cost burden on households. Furthermore, chronic disease medication and diagnostic procedures are also expensive.

CBHI members had a lower incidence of catastrophic health spending than non-CBHI members, with 31 percent for CBHI members against 47 percent for non-members at 15 percent of the non-food threshold. This is greater than CBHI evaluation study, which found that the incidence was only 7% and 19%, respectively (15). This disparity could be related to the nature of chronic illnesses, which necessitate frequent visits to health facilities, and patients suffer additional costs that aren't always covered by insurance plans, such as transportation. Furthermore, additional research have found that the prevalence of CHE is greater among chronic disease patients and families with chronic disease patients (22,49).

The severity of catastrophic health payments is also more intense for uninsured people than for insured people. For CBHI members, the overshoot and mean positive overshoot were 10% and 33%, respectively, whereas for non-members, they were 18% and 39%.

The overshoot shows that chronic disease patients in this study who were CBHI members and CBHI non-members spent 25% and 33% of their monthly non-food spending on chronic disease care, respectively. According to the MPO, CBHI members and non-members who had a catastrophic health expense at 15% of non-food spending invested 43% and 54% of their monthly non-food expenditure on chronic disease care, respectively.

This suggests that, despite the fact that the incidence and severity of catastrophic health spending is lower among insured households, such households nonetheless face financial hardship as a result of their chronic illness. This may necessitate the government's attention in considering this extremely vulnerable group and providing subsidies for such services.

In general, the incidence of catastrophic health expenditure lower for CBHI member than their counterpart. CBHI participation reduces the incidence of catastrophic health spending by 19 percent (ATT =-0.19, t = - 2.97), according to the propensity score matching model. This showed that being enrolled in CBHI lowers the risk of catastrophic medical expenses. This is due to the fact that medical expenditures, especially drug and diagnostic services, account for the majority of out-of-pocket health spending for chronic disease treatment, which is covered by the CBHI scheme benefit package.

This finding is similar to a study in Northeast Ethiopia, which found that being a member of CBHI lowered catastrophic out-of-pocket expenses by 23%. Furthermore, several research in Ghana, Nigeria, India, and China have found that health insurance has a considerable impact on the incidence of catastrophic health expenditure and out-of-pocket payments for health services (32–34,49,53,54).

In contrast, according to a study conducted in China, health insurance is ineffective in reducing financial burden among chronic disease patients (21,35). This disparity could be attributable to differences in health insurance benefit packages and actual reimbursement rates. In China, the insurance benefit package covers inpatient and limited outpatient care, whereas in Ethiopia, the CBHI benefit package involves both inpatient and outpatient services(15,71).

Chapter 7: Strength and Limitation of the Study

7.1 Strength of the study

The following are a summary of the study's primary strengths:

- This study uses a different method for evaluating catastrophic health expenditures, and determines lost productivity as a result of the illness.
- Information required in calculating costs was based on an investigation of patients and their households rather than document review
- Only two consecutive visit expenses were used to measure the average cost per visit to reduce recall bias.
- Electronic data collection using ODK (Open data kit) was employed to improve the quality of the data and reduce missing data.
- Data collectors were trained for two days before data collection and were professionals.
- This is the first study to examine the effect community-based health insurance catastrophic health expenditure among this highly vulnerable group and it generated good evidence and insight for further researches on this area

7.2 Limitation of the study

Despite all the strength mentioned above as research this study has its own limitations this includes.

- This is a facility-based study, and the participants were only those who sought treatment at a specific hospital.
- Furthermore, the sample used in this study can only represent a portion of outpatient health spending; it's possible that they used inpatient health services as well.
- The propensity score model used in this study has another limitation because it ignored the effects of unobserved factors that could affect the study's outcomes.

As a result, this should be taken into account when interpreting the results of this study.

Chapter 8: Conclusion

As per the findings, chronic disease-related financial difficulty has posed serious problems for patients and their families, since the incidence and severity of catastrophic health spending are both high among chronic patients. The incidence varies from 54 percent to 11 percent based on method and threshold employed. The intensity of the financial difficulties is also significant for this patient, as chronic disease care causes households to spend anywhere from 27% to 113% of their non-food or total expenditure on treatment.

Financial security for patients and their families has been a key issue and one of the aims of health systems across the world at this time. The financial security offered by community-based health insurance was also evaluated in this study. It shows that non-CBHI members had a substantially higher incidence and intensity of catastrophic health expenditure than CBHI members, and that CBHI participation reduces catastrophic health expenditure among chronic patients by 19%. This is because medical expenditures account for the majority of out-of-pocket health spending for chronic disease treatment, which is covered by the CBHI scheme benefit package. Despite the fact that the incidence of CHE has reduced among insured households, they are still faced with out-of-pocket health expenses for their medical services.

The overall evidence in this study implies the catastrophic nature of chronic health conditions on the welfare of households and the importance of focusing on addressing the problem. In this regard, expanding the coverage of community-based health insurance schemes helps to enhance financial protection against out-of-pocket health spending, particularly for the poorest households.

Chapter 9: Recommendation

The following recommendation has been forwarded to all concerned bodies based on the study.

Policy maker

- The considerable risk of financial hardship associated with chronic illness should be carefully considered, and policymakers (FMOH) and all involved stakeholders should prioritize and emphasize disease prevention.
- Subsidies for chronic illness treatment and medical supplies should be increased by the regional and federal governments.
- To make chronic care services more accessible and inexpensive, the government should strengthen the health system and different health-insurance schemes.

Ethiopian Health Insurance Agency

- Ethiopia's health insurance agency should take into account this extremely vulnerable population and reinforce and expand community-based health insurance coverage to address uninsured households.
- Ethiopian health insurance agency should have to ensure availability of essential drug and diagnostic service in contracted health facilities through continues supervision.

Researcher

- Additional study, including private institutions and inpatients, should be conducted on a wide scale.
- Qualitative study should be conducted to learn more about the problems and experiences of CBHI members and non-members who are experiencing financial difficulty as a result of a chronic disease.

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Annex

Annex 1: Study information sheet

[Greetings.] My name is__________________ I am here on behalf of Mosisa Bekele, a postgraduate student at Addis Ababa University, College of Health Science, Department of Health Economics. For partial fulfillment of his master's degree, he is here to conduct a study on the "Effect of Community-based Health Insurance on Catastrophic Health Spending among Chronic Patients in Asella Referral Hospital, South East Ethiopia".

You are kindly invited to participate in this important study that aims to generate crucial evidence on the effect of community-based health insurance on catastrophic health expenditure, which will be vital for decision-making in the implementation and scale-up of community-based health insurance in Ethiopia.

This study requires your full cooperation and active involvement. Participation in this study is entirely voluntary and you are free not to participate in the study and free to withdraw from the study at any time without explaining your reason. You are free to answer any question you feel comfortable with and you can avoid or skip questions that are too personal or of no interest to you. There is no penalty, reprisal, or loss of benefit for not participating or for withdrawing from study.

There will be minimal risk if you engage in this study as you will be providing us your personal information. However, any personal information you offer will be kept anonymous and confidential. In addition, all replies will be stored on a password-protected device. If you agree to participate, I will conduct a 20-30-minute interview with you.

There will be no direct benefit or compensation to you at the end of the interview, but your response will be critical for this study. At the end of the study, the aggregated findings will be communicated with the participants and key stakeholders. The reports will also be published in scientific journals. Nonetheless, confidentiality will be maintained in all published and written materials emerging from the study.

Do you have any questions? If you have any questions or concerns about the study, contact Mosisa Bekele, the Principal Investigator (mobile number: +251912323367, email: mosisabe31@gmail.com).

Annex 2: Oral Consent form

I have heard all the information stated above about the study as it was read to me by the data collector. I fully understand the purpose, benefit, and risk of the study, and I have freely decided to participate or not to participate in this study.

Tic “X” on Agree if patient decided to participate or on disagree if not.

Agree ______________ I disagree _________________ STOP

Thank You for willingness to participate

Annex 3: Questioners in English

Patient code ________________________ Date of Interview _________________

Data collector name _________________ Signature___ _____________________

Patient MRN _________________

Part I Socio-demographic factor			
No.	Questions	Options	Remark
101	Sex	1. Male 2. Female	
102	Age of patients in complete year?	________ Year	
103	Religion	1. Orthodox 2. Muslim 3. Catholic 4. Protestant 99. Other(specify) __________	
104	Marital status	1. Single 2. Married 3. Widowed 4. Separated 5. Divorced	
105	Place of residence	1. Urban 2. Rural	
106	Number of family member in the household?	_________	
107	Distance from Asella referral Hospital?	___________Km ___________Hour	

Part II Socio-economic factors			
S.No	Questions	Options	Remark
201	Educational status	1. Not able to read and write 2. Read and write 3. Primary education (1-8) 4. Secondary education (9-12) 5.Tertiary education (above 12)	
202	The main Occupation/employment	1. Farmer 2. Employee (Gov't/private/NGO 3. Self employed	

		4. Unemployed 5. Merchant 6. Daily laborer 7. House wife 8. Student 9. Retired 99. Other (Specify) ________	
203	What is the source of household income in the past 12 months?	1. Permanent job 2. Agricultural product and livestock breeding 99. Others(specify)__________	If other than 1 skip to 205
204	If permanent jobs on average how much is monthly income of your household?	_________________ Birr	
205	Do the household have any annual income earned as a result of sales of:	Teff __________ Birr Wheat _______ Birr Barley_______ Birr Beans or peas_________ Birr Vegetables (onion, potato) _________Birr livestock's_____________Birr 99.Others _____________ Birr	
206	If "other" on average how much is monthly income of your household?		

Part III Health Insurance enrolment			
S.No	Questions	Options	Remark
301	Are you member of community-based health insurance.	1. Yes 2. No	If "No" Skip to part IV
302	If "Yes" to Q301 for how long time are member?	__________ Year _________ Months	

303	Who paid for enrolment fee?	1. Household contribution 2. Local government (coverage for Indigent HH)	
304	Have you benefited from CBHI scheme?	1. Yes 2. No	If "No" skip to 306
305	If "Yes" to question 304, how does your household benefit? (Multiple responses possible)	1. Increased access to health care 2. Reduced costs of health care 3. Reduced concerns about expected health care costs 99. Others, please specify_______________	
306	How do you get service in Hospital currently?	1. Free of charge 2. Partial OOP payment 3. Substantially OOP	
307	How do you rate easy of getting medical access using CBHI?	1. Very difficult 2. Difficult 3. Average 4. Easy 5. Very easy	

Part IV: - Clinical characteristics			
S.No	Questions	Options	Remark
401	Which type of chronic disease was you diagnosed? (Multiple answer is possible)	1. Cancer 2. Diabetes 3. Hypertension 4. Heart disease 5. Stroke 6. Mental illness 7. Respiratory illness (COPD) 8. Kidney disease 99. Other (Specify)__________	

402	Duration since diagnosis?	___________Years	
403	Do you have a regular follow up for your NCD conditions?	1. Yes 2. No	If "No" skip to part V
404	How often is your follow up appointment	1. Every month 2. Every two months 3. Every three months 4. Every six months 99. Other (Specify)_______________	

Part V: - Direct medical and non-medical cost estimation			
S.No	Questions	Options	Remark
501	In the past 12 months, how many times did you get out patient service at the health facility due to your NCD conditions?	____________ times	
502	During the current follow-up visit, how much did you spend on the following items in ETB?		
	Card/Registration fee	_______________birr	
	Laboratory	______________birr	
	Drug/Medication	_____________ birr	
	Imaging		
	Total	____________ birr	
503	During the last follow-up visit (before current one), how much did you spend on the following items in ETB?		
	Card/Registration fee	_______________birr	
	Laboratory	______________birr	
	Drug/Medication	_____________ birr	
	Imaging	_____________ birr	
	Total	____________ birr	

504	During your regular follow up to Health facilities have you pay for services like food and drink?	1. Yes 2. No	If "No" Skip to Q506
505	If "Yes" to Q501 How much have you paid for food and drink?	3. _____________ Birr	
506	What transport modality have you used to travel from home to health facility?	1. Walk 2. Bicycle/motor cycle 3. Bajaj/Taxi 4. Public transport Car 5. Own/relative's car 99.Other(specify)__________	
507	How much do you pay for round trip?	_____________Birr	
508	Has anyone from your family/friends looked after you when you visited hospital?	1. Yes 2. No	If "No" Skip to Q 510
509	If yes in Q310, how much is your caregiver round trip transportation cost?	3. _______Birr	
510	Have you paid for lodging/accommodation for you and for your caregiver in last visit?	1. Yes 2. No	If "No" Skip to Part VI
511	If "Yes" to Q507 How much do you pay?	______________Birr	

Part VI: - Indirect cost estimation /Lost work days or productivity lost			
S.No	Questions	Options	Remark
601	Because of this illness have you ever stopped going to work in the last six months?	1. Yes 2. No	If "No" Skip to Q603
602	If "Yes" in Q 601, for how many days on average were you absent?	________ Days	

603	How many days did you come to health facilities for follow up on average in the last six months?	_________ Days	
604	Average monthly income of patients?	_______________Birr	
605	Has someone from family/friends come with you for follow up?	1. Yes 2. No	If "No" Skip to **Part VII**
606	If "Yes" in Q 605, How many caregivers were with you?	_________	
607	If "Yes" in Q605, how many days on average your caregiver with you in the last six months?	__________Days	
608	What is the main occupation your your caregiver/companion?	1. Farmer 2. Employee (Gov't/private/NGO 3. Self employed 4. Unemployed 5. Merchant 6. Daily laborer 7. House wife 8. Student 9. Retired 99. other _________	
609	Average monthly income of caregiver/companion?	__________Birr	
610	If doesn't know average monthly income how much is the minimum daily wage rate in your settings?	____________ Birr	

Part VII: - coping strategies			
S.No	Questions	Options	Remark
701	What are main source of financing above-mentioned costs (cost for chronic disease follow up)	1. Own money (salary, savings) 2. Borrowing 3. Sell off assets 4. My family supports 5. Reduce HH food consumption 6. Reduce HH non-food consumption 7. Community-based health insurance 8. Fee waivers from Kebele/Tabia/woreda 99. Other (please specify)	If "2" proceed to 702 If 3 skip 704
702	If you borrowed to cover your Medication cost, how much money did you borrow?	________birr	
703	From whom did you borrow?	1. Family 2. Cooperative 3. Neighbors/friends 4. Private bank 99. Others (Specify)__________	
704	If you sold your property for your treatment or to repay your loan, what type of property you sold or you have plan to sale?	1. Household item 2. Jewelry 3. Vehicle 4. House 5. Land 99. Others (specify)_____________	

Part VIII: - Estimation of household expenditure			
S.No	Questions	Options	Remark
	Household Food Expenditure		
801	How much on average do your household spends on food/food items?	________ birr per month	
	Household Non-food expenditure		
802	On average how much does your household spend on the following essential consumptions in ETB?............ETB in total per month?	Expense	
	1. Utilities (electricity, water, telephone)		
	2. Education (School for children or self)		
	3. House rent		
	4. Valuable item		
	5. Social obligation (Idir, funeral and ceremonies)		
	6. Other (Specify)_____________		
803	On average how much does your household spend on the following essential consumptions in ETB?............ETB in total per Year?	Expense	
	1. Goods (properties) and utensils for the household use		
	2. Clothes and related (Shoe)		
	3. Maintenance of properties		
	4. Expenditure on agricultural inputs (Fertilizer, pesticide, Seeds)		
	5. Death related expenditure (funeral & Teskar)		
	Total non-food expenditure	______________birr	
	Grand Total (Food +Non-food)	______________ birr	

Part IX: - Household Wealth			
S.No	Questions	Options	Remark
901	Does the household own a house?	1. Yes 2. No	
902	How many rooms does the house you live in have?	__________Rooms	
903	What are the main types of material the for **floor**s in your house?	1. Mud/Cow dung 2. Stone 3. Cement/brick 4. Hollow block 5. Wood 6. Grass 7. Iron sheet 8. Tiles 99. Other (specify)___________	
904	What are the main types of material the for **walls** in your house?	1. Mud/Cow dung 2. Stone 3. Cement/brick 4. Hollow block 5. Wood 6. Grass 7. Iron sheet 8. Tiles 99. Other (specify)___________	
905	What are the main types of material the for **roof** in your house?	1. Mud/Cow dung 2. Stone 3. Cement/brick 4. Hollow block 5. Wood 6. Grass 7. Iron sheet	

		8. Tiles 99. Other (specify)____________	
906	What is your main source of cooking	1. Firewood 2. Charcoal 3. Electricity 4. Gas_ Cylinder 5. Kerosene 6. Other (specify)	
907	What is your main source of lighting?	1. Electricity 2. Kerosine 3. Gas - biogas 4. Candle 5. Firewood 6. Solar 7. Other (specify) ____________	
908	**Does your household have any of the following items? If yes specify the quantity**	**Quantity**	
	Radio		
	Television		
	Computer		
	Bicycle		
	Motorcycle		
	Car or truck		
	Animal drawn cart		
	Refrigerator		
	Telephone/mobile		
909	**Does your household have any of the following animal? If "Yes" How many?**	**Quantity**	
	Ox		

	Cattel		
	Sheep		
	Goat		
	Donkey		
	Horse		
910	**Does your household own farming land? If "Yes" How much hectare?**	________Hectares	Please note: 4 timad=1 hectare. Therefore, 1timad=0.25 hectare

Thank you very much for your participation!!

Annex 4: Study information sheet (Amharic Version)

የጥናት መረጃ ወረቀት

(ሰላምታ) ስሜ___________________ እባላለው በአዲስ አበባ ዩኒቨርሲቲ በጤና ሳይንስ ኮሌጅ በጤና ኢኮኖሚክስ ትምህርት ክፍል የድህረ ምረቃ ተማሪ በሆነው ሞሲሳ በቀለን ወኪዬ ነዉ እዚ የተገኘዉት። ሁለተኛ ዲግሪያቸውን ለመጨረስ፣ "የማህበረሰብ አቀፍ የጤና መድህን ተላላፊ ያልሆነ ህመም ህሙማን ላይ የአደጋ የጤና ወጪዎች የሚያሳድረው ተፅዕኖ በአሰላ ሪፈራል ሆስፒታል፣ ደቡብ ምስራቅ ኢትዮጵያ" ላይ ጥናት ለማድረግ እዚህ ተገኝቷል።

የማህበረሰብ አቀፍ የጤና መድህን በአደጋ የጤና ወጪ ላይ የሚያደርሰውን ተፅእኖ ወሳኝ መረጃዎችን ለማመንጨት በሚደረገው በዚህ ጠቃሚ ጥናት ላይ እንድትሳተፉ በአክብሮት ተጋብዘዋል። ይህ ጥናት በኢትዮጵያ የማህበረሰብ አቀፍ የጤና መድህን ተግባራዊ ላማድራግ እና ለማሳደግ ዉሳኔ ለመስጠት እንደግባት የሚያገለግል ይሆናል።

ይህ ጥናት የእርስዎን ሙሉ ትብብር እና ንቁ ተሳትፎ ይጠይቃል። በዚህ ጥናት ውስጥ መሳተፍ ሙሉ በሙሉ በፈቃደኝነት ነው እናም በጥናቱ ላይ ላለመሳተፍ እና ምክንያቱን ሳይገልጹ በማንኛውም ጊዜ ከጥናቱ ለመውጣት ነፃ ነዎት። ምቾት የሚሰማዎትን ማንኛውንም ጥያቄ ለመመለስ ነፃ ነዎት እና በጣም ግላዊ የሆኑ ወይም እርስዎ ምንም ፍላጎት የሌላቸው ጥያቄዎችን ማስወገድ ወይም መዝለል ይችላሉ። ባለመሳተፍ ወይም ከጥናት በማቋረጡ ምንም አይነት ቅጣት፣ ወይም የሚያጡት ጥቅም የለም።

የግል መረጃዎን ስለሚሰጡን በዚህ ጥናት ውስጥ ከተሳተፉ አነስተኛ ስጋት ሊኖርዎት ይችላል። ሆኖም፣ የሚያቀርቡት ማንኛውም የግል መረጃ ስም-አልባ እና ሚስጥራዊ ይሆናል። በተጨማሪም፣ ሁሉም ምላሾች በይለፍ ቃል በተጠበቀ መሳሪያ ዉስጥ ይቀመጣሉ። ለመሳተፍ ከተስማሙ፣ ከ20-30 ደቂቃ የሚቆይ ቃለ መጠይቅ አደርግልዎታለሁ።

በቃለ መጠይቁ መጨረሻ ላይ ለእርስዎ ምንም አይነት ቀጥተኛ ጥቅም ወይም ማካካሻ አይኖርዎትም፣ ነገር ግን የእርስዎ ምላሽ ለዚህ ጥናት ወሳኝ ይሆናል። በጥናቱ ማብቂያ ላይ አጠቃላይ ግኝቶቹ ከተሳታፊዎች እና ከዋና ዋና ባለድርሻ አካላት ጋር ይጋራሉ። ሪፖርቶቹ በሳይንሳዊ መጽሔቶች ላይም ይታተማሉ። ቢሆንም፣ ከጥናቱ በሚወጡ ሁሉም የታተሙ እና የተፃፉ ፅሁፎች ውስጥ ምስጢራዊነት ይጠበቃል።

ጥያቄ አሎት? ስለ ጥናቱ ማንኛውም አይነት ጥያቄ ወይም ስጋት ካለዎት ዋና ተመራማሪውን ሞሲሳ በቀለን ማግኘት ይችላሉ (ሞባይል ቁጥር፡ +251912323367፣ ኢሜል፡ mosisabe31@gmail.com)።

Annex 5: Oral Consent form (Amharic version)

የቃል ስምምነት ቅጽ

ስለ ጥናቱ ከላይ የተገለጹትን መረጃዎች በሙሉ በመረጃ ሰብሳቢው ሲነበብ ሰምቻለሁ። የጥናቱ አላማ፣ ጥቅም እና አደጋ በሚገባ ተረድቻለሁ፣ እናም በዚህ ጥናት ለመሳተፍ ወይም ላለመሳተፍ በነጻነት ወስኛለሁ።

በተማሚዉ ለመሳተፍ ከወሰነ "እስማማለሁ" በሚለዉ ወይም ካልሆነ "አልስማማም" ላይ "X" አድርግ።

እስማማለሁ _______________ አልስማማም ___________________ አቁም

ለመሳተፍ ፈቃደኛ ስለሆናችሁ እናመሰግናለን

Annex 6: Questioners (Amharic version)

የታካሚ ኮድ ______________________ የቃለ መጠይቁ ቀን ________________

የውሂብ ሰብሳቢ ስም ________________ ፊርማ ______________________

የታካሚ የህክምና መዝገባ ቁጥር ________________

ክፍል 1፡ መሀበራዊ መረጃዎች			
ተ.ቁ	ጥያቄ	ምርጫ	ምርመራ
101	ጾታ	1. ወንድ 2. ሴት	
102	የታካሚ ዕድሜ በዓመት?	_______ ዓመት	
103	ሃይማኖት	1. ኦርቶዶክስ 2. ሙስሊም 3. ካቶሊክ 4. ፕሮቴስታንት 99. ሌላ (ይግለጹ) _________	
104	የጋብቻ ሁኔታ	1. ያላገባ 2. ያገባ 3. መበለት 4. ተለያይተዋል። 5. የተፋታ	
105	የመኖሪያ ቦታ	1. ከተማ 2. ገጠር	
106	በቤተሰብ ውስጥ ያሉ የቤተሰብ አባላት ብዛት?	________	
107	ከአሰላ ሪፈራል ሆስፒታል የመኖሪያ ቤት ርቀት?	__________ኪ.ሜ __________ሰዓት	

ክፍል 2፡ መህበራዊና ኢኮናማዊ ሁኔታዎች			
ተ.ቁ	ጥያቄ	ምርጫ	ምርመራ
201	የትምህርት ደረጃ	1. ማንበብ እና መጻፍ አለመቻል 2. ማንበብ እና መጻፍ የሚችል 3. የመጀመሪያ ደረጃ ትምህርት (1-8) 4. የሁለተኛ ደረጃ ትምህርት (9-12) 5. የሶስተኛ ደረጃ ትምህርት (ከ 12 በላይ)	

202	ዋናው ሥራ / የሥራ ሁኔታ	1. ገበሬ 2. ተቀጣሪ(መንግስት/የግል/መንግስታዊ ያልሆነ ድርጅት) 3. በራስ ተቀጣሪ 4. ሥራ አጥ 5. ነጋዴ 6. የቀን ሰራተኛ 7. የቤት እመቤት 8. ተማሪ 9. ጡረታ ወጥቷል 99. ሌላ (ይግለጹ) ______________	
203	ባለፉት 12 ወራት የቤተሰብ ገቢ ምንጩ ምንድ ነው?	1. ቋሚ ሥራ 2. የግብርና ምርትና የእንስሳት እርባታ 99. ሌሎች (ይግለጹ)___________	መልሱ ከ 2 ከሆነ ወደ 205 እለፍ
204	መልሱ ቋሚ ስራ ከሆነ በአማካይ የቤተሰብዎ ወርሃዊ ገቢ ስንት ነው?	___________ብር	
205	በሚከተለው የግብርና ምርትና የእንስሳት ሽያጭ ምክንያት ቤተሰቡ ምን ያህል ዓመታዊ ገቢ ያገኛል	ጤፍ _____ብር ስንዴ ___ብር ገብስ_________ ብር ባቄላ ወይም አተር__________ብር አትክልቶች (ሽንኩርት, ድንች)_________ብር የእንስሳት እርባታ_________ብር 99.ሌሎች ______________ ብር	
206	ሌላ ከልክ በአማካይ የቤተሰብዎ ወርሃዊ ገቢ ስንት ነው?	______________ ብር	

ክፍል 3፡ የጤና መድን ሁኔታ			
ተ.ቁ	ጥያቄ	ምርጫ	ምርመራ
301	የእርስዎ ቤተሰብ የማህበረሰብ አቀፍ የጤና መድን አባል ናቸዉ?	1. አዎ 2. አይ	“አይ” ከሆነ ወደ ክፍል 4 ይዝለሉ
302	ለ ተ.ቁ 301 “አዎ” ከሆነ ለምን ያህል ጊዜ አባል?	___________ ዓመት	
303	ለምዝገባ ክፍያ የከፈለው ማነው?	1. የቤተሰብ መዋጮ 2. የአካባቢ አስተዳደር (የድሆች ቤተሰብ ሽፋን)	
304	ከማህበረሰብ አቀፍ የጤና መድህን ተጠቃሚ ሆነዋል?	1. አዎ 2. አይ	“አይ” ከሆነ ወደ 306 ይዝለሉ

305	ለጥያቄ 304 "አዎ" ከሆነ፣ የእርስዎ ቤተሰብ እንዴት ይጠቅማል? (ከአንድ በላይ መልስ ይቻላል)	1. የጤና አገልግሎት ተደራሽነት መጨመር 2. የጤና እንክብካቤ ወጪዎችን መቀነሱ 3. ስለወደፊት የጤና እንክብካቤ ወጪዎች ስጋት ቀንሷል 99.ሌሎች፣ እባክዎን ይግለጹ__________	
306	በአሁኑ ጊዜ በሆስፒታል ውስጥ አገልግሎት እንዴት ያገኛሉ?	1. ከክፍያ ነጻ 2. በከፊል ከኪስ ክፍያ 3. ሙሉ በሙሉ ከኪስ ውጭ	
307	የማህበረሰብ አቀፍ የጤና መድህንን በመጠቀም የህክምና ተደራሽነትን እንዴት ይገመግማሉ?	1. በጣም አስቸጋሪ 2. አስቸጋሪ 3. አማካኝ 4. ቀላል 5. በጣም ቀላል	

ክፍል 4: - የጤና መረጃ/ሁኔታ			
ተ.ቁ	ጥያቄ	ምርጫ	ምርመራ
401	የየትኛዉ ተላለፍ ያለሆኑ ህመም ታማምኖት (በርካታ ምላሾች ይቻላል)	1. ካንሰር 2. የስኳር በሽታ 3. የደም ግፊት 4. የልብ ሕመም 5. ስትሮክ 6. የአእምሮ ሕመም 7. የመተንፈሻ አካላት በሽታ (COPD) 8. የኩላሊት በሽታ 99. ሌላ (ይግለጹ)_________	
402	በሽታው እንደያዝክ ካወቅህ ስንት ጊዜ ነው?	___________ዓመት	
403	ላለቦት ተላላፊ ላልሆኑ የበሽታ ሁኔታዎችዎ መደበኛ ክትትል አሎት?	1. አዎ 2. አይ	“አይ” ከሆነ ወደ ክፍል 5 ይዝለሉ
404	ቀጠሮዎ የሚከታተሉት በምን ያህል ጊዜ ነው?	1. በየወሩ 2. በየሁለት ወሩ 3. በየሶስት ወሩ 4. በየስድስት ወሩ 99. ሌላ (ይግለጹ)________________	

ክፍል 5: - ቀጥተኛ የሕክምና እና የሕክምና ያልሆነ ወጪ ግምት			
ተ.ቁ	ጥያቄ	ምርጫ	ምርመራ
501	ባለፉት 12 ወራት ውስጥ ተላለፍ በለሆነዉ ህመምዎ ምክንያት በጤና ተቋም ስንት ጊዜ የተመላለሽ አገልግሎት አግኝተዋል?	____________ ጊዜ	
502	ባሁኑ የክትትል ጉብኝት ለሚከተሉት እቃዎች በብር ምን ያህል አውጥተዋል?		
	የካርድ / የምዝገባ ክፍያ	_______________ ብር	
	ላቦራቶሪ	______________ብር	
	መድሃኒት	_____________ ብር	
	Imaging (X-ray, CT-scan, US, Eco)		
	ጠቅላላ	____________ ብር	
503	ባለፈዉ የክትትል ጉብኝት ለሚከተሉት እቃዎች በብር ምን ያህል አውጥተዋል?		
	የካርድ / የምዝገባ ክፍያ	_______________ ብር	
	ላቦራቶሪ	______________ብር	
	መድሃኒት	_____________ ብር	
	Imaging (X-ray, CT-scan, US, Eco)		
	ጠቅላላ	____________ ብር	
504	በመደበኛው የጤና ተቋማት ክትትል ወቅት እንደ ምግብ እና መጠጥ ያሉ አገልግሎቶችን ከፍለዋል?	1. አዎ 2. አይ	“አይ” ከሆነ ወደ Q507 ዝለል
505	ለ ተ.ቁ 505 "አዎ" ከሆነ ለምግብ እና ለመጠጥ ምን ያህል ከፍለዋል?	______________ ብር	
506	ከቤት ወደ ጤና ተቋም ለመጓዝ ምን ዓይነት የትራንስፖርት ዘዴ ተጠቅመዋል?	1. መራመድ 2. ብስክሌት / ሞተር 3. ባጃጅ/ታክሲ 4. የህዝብ ማመላለሻ መኪና 5. የራስ / የዘመድ መኪና 99.ሌላ (ይግለጹ)___________	
507	ለአንድ ዙር ደርሶ ምልስ ምን ያህል ይከፍላሉ?	______________ብር	
508	ሆስፒታሉን ስትጎበኝ ከቤተሰብህ/ጓደኞችህ የሚንከባከብ አለ?	1. አዎ 2. አይ	“አይ” ከሆነ ወደ ተ.ቁ 510 ይዝለሉ
509	ለ ተ.ቁ 511 "አዎ" ከሆነ ለአንድ ዙር ደርሶ ምልስ ምን ያህል ይከፍላሉ?	________ብር	

510	ለእርስዎ እና ለእንክብካቤ ሰጪዎ ለማደሪያ/መጠለያ ከፍለዋል።	1. አዎ 2. አይ	"አይ" ከሆነ ወደ ክፍል 6 ይዝለሉ
511	ለ ተ.ቁ 511 "አዎ" ከሆነ ምን ያህል ይከፍላሉ?	________________ብር	

ክፍል 6: - ቀጥተኛ ያልሆነ የዋጋ ግምት /የጠፋ የስራ ቀናት ወይም ምርታማነት			
ተ.ቁ	ጥያቄ	ምርጫ	ምርመራ
601	በዚህ በሽታ ምክንያት ወደ ሥራ መሄድ አቁመህ ታውቃለህ?	1. አዎ 2. አይ	"አይ" ከሆነ ወደ ተ.ቁ 603 ዝለል
602	በ ተ.ቁ 601 ላይ "አዎ" ከሆነ፣ በአማካኝ ስንት ቀናት ቀሩ?	__________ ቀን	
603	በአማካይ በየወሩ ለጤና ክትትል ስንት ቀናት ወደ ጤና ተቋማት መጥተዋል?	__________ቀን	
604	የታካሚ አማካይ ወርሃዊ ገቢ?	__________ብር	
605	ለጤንነትዎ ክትትል ከቤተሰብ/ጓደኞች የሆነ ሰው ከእርስዎ ጋር መጥቷል?	1. አዎ 2. አይ	"አይ" ከሆነ ወደ ክፍል 7 ይዝለሉ
606	ለ ተ.ቁ 604 "አዎ" ከሆነ ስንት ተንከባካቢዎች ከእርስዎ ጋር ነበሩ?	__________	
607	ለ ተ.ቁ 604 "አዎ" ከሆነ፣ ከእርስዎ ጋር ተንከባካቢዎ በአማካይ ስንት ቀናት መጥተዋል?	___________ቀን	
608	የእርስዎ ተንከባካቢ/ጓደኛዎ ዋና ሥራው ምንድነው?	1. ገበሬ 2. ተቀጣሪ(መንግስት/የግል/መንግስታዊ ያልሆነ ድርጅት) 3. በራስ ተቀጣሪ 4. ሥራ አጥ 5. ነጋዴ 6. የቀን ሰራተኛ 7. የቤት እመቤት 8. ተማሪ 9. ጡረታ ወጥቷል 99. ሌላ (ይግለጹ) _____	

609	የእርስዎ ተንከባካቢ/የጓደኛ አማካኝ ወርሃዊ ገቢ?	__________ብር	

ክፍል 7: - የመቋቋም ስልቶች			
ተ.ቁ	ጥያቄ	ምርጫ	ምርመራ
701	ከላይ የተጠቀሱትን ወጪዎች ለመሸፈን ገንዘቡን ከየት አገኙት	1. የራስ ገንዘብ (ደሞዝ ፣ ቁጠባ) 2. መበደር 3. ንብረቶችን መሸጥ 4. ቤተሰቤ ይደግፋሉ 5. የቤተሰብን የምግብ ፍጆታ መቀነስ 6. የቤተሰብን የምግብ ፍጆታን ያልሆኑ ይቀንሱ 7. የማህበረሰብ አቀፍ የጤና መድህን 8. ከቀበሌ/ታቢያ/ወረዳ ከክፍያ ነፃ መውጣት 99. ሌላ (እባክዎ ይግለጹ)	መልሱ "2" ከሆነ ወደ 702 ይቀጥሉ መልሱ 3 ከሆነ ወደ 704 ይዝለሉ
702	የመድሃኒት ወጪዎን ለመሸፈን ከተበደሩ ምን ያህል ገንዘብ ተበደሩ?	_________ብር	
703	1. ከማን ተበደሩ?	1. ቤተሰብ 2. የህብረት ሥራ ማህበር 3. ጎረቤቶች / ጓደኞች 4. የግል ባንክ 99. ሌሎች (ይግለጹ)_________	
704	ለህክምናዎ ወይም ብድርዎን ለመክፈል ንብረትዎን ከሸጡት ምን አይነት ንብረት ነው የሸጡት ወይም ለመሸጥ እቅድ አለዎት?	1. የቤት እቃዎች 2. ጌጣጌጥ 3. ተሽከርካሪ 4. ቤት 5. መሬት 99. ሌሎች (ይግለጹ)_____________	

ክፍል 8: - የቤተሰብ ወጪዎች ግምት			
ተ.ቁ	ጥያቄ	ምርጫ	ምርመራ
	የቤት ውስጥ ምግብ ወጪ		
801	የእርስዎ ቤተሰብ በአማካይ ለምግብ/ለምግብ ዕቃዎች ምን ያህል ያወጣል?	በወር __________ ብር	
	የቤተሰብ ምግብ ነክ ያልሆኑ ወጪዎች		

802	በአማካኝ ቤተሰብዎ ለሚከተሉት አስፈላጊ የፍጆታ ፍጆታዎች በወር ምን ያህል ያወጣል?......................... በአጠቃላይ በወር?	ወጪ በወር	
	1. መገልገያዎች (ኤሌክትሪክ, ውሃ, ስልክ)		
	2. ትምህርት (የህፃናት ትምህርት ቤት ወይም ራስን)		
	3. የቤት ኪራይ		
	4. ጠቃሚ እቃ		
	5. ማህበራዊ ግዴታ (ኢዲር, የቀብር ሥነ ሥርዓት እና ሥነ ሥርዓቶች)		
	99. ሌላ (ይግለጹ)_____________		
803	በአማካይ የእርስዎ ቤተሰብ ለሚከተሉት አስፈላጊ የፍጆታ ፍጆታዎች ምን ያህል ያወጣል?...............በአጠቃላይ በአመት?	ወጪ በአመት	
	1. እቃዎች (ንብረቶች) እና የቤት እቃዎች እቃዎች		
	2. አልባሳት እና ተዛማጅ (ጫማ)		
	3. የንብረት ጥገና		
	4. ለግብርና ግብዓቶች (ማዳበሪያ, ፀረ-ተባይ, ዘር) ወጪዎች.		
	5. ከሞት ጋር የተያያዘ ወጪ (ቀብር እና ቴስካር)		
	99. ሌላ (ይግለጹ)_____________		
	ጠቅላላ የምግብ ያልሆኑ ወጪዎች	__________ብር	
	አጠቃለይ ድምር (ምግብ + ምግብ ያልሆኑ)	__________ ብር	

ክፍል 9: - የቤተሰብ ሀብት			
ተ.ቁ	ጥያቄ	ምርጫ	ምርመራ
901	ቤተሰቡ ቤት አለው?	1. አዎ 2. አይ	
902	የሚኖሩበት ቤት ስንት ክፍሎች አሉት?	___________ ክፍሎች	
903	በቤትዎ ውስጥ **የወለል ንጣፎች** ዋና ቁሳቁሶች ዓይነቶች ምንድ ናቸው?	1. ጭቃ / ላም ኩበት 2. ድንጋይ 3. ሲሚንቶ / ጡብ 4. ባዶ እገዳ 5. እንጨት 6. ሣር	

		7. የብረት ሉህ 8. ንጣፍ 99. ሌላ (ይግለጹ) ___________	
904	በቤትዎ ውስጥ **የግድግዳው** ዋና ቁሳቁስ ዓይነቶች ምንድ ናቸው?	1. ጭቃ / ላም ኩበት 2. ድንጋይ 3. ሲሚንቶ / ጡብ 4. ባዶ እገዳ 5. እንጨት 6. ሣር 7. የብረት ሉህ 8. ንጣፍ 99. ሌላ (ይግለጹ) ___________	
905	በቤትዎ ውስጥ **ለጣሪያው** ዋናው ቁሳቁስ ዓይነቶች ምንድ ናቸው?	1. ጭቃ / ላም ኩበት 2. ድንጋይ 3. ሲሚንቶ / ጡብ 4. ባዶ እገዳ 5. እንጨት 6. ሣር 7. የብረት ሉህ 8. ንጣፍ 99. ሌላ (ይግለጹ) ___________	
906	ዋናው የማብሰያዎ ምንጭ ምንድነው?	1. የማገዶ እንጨት 2. ከሰል 3. ኤሌክትሪክ 4. ጋዝ ሲሊንደር 5. ኬሮሴን 6. ሌላ (ይግለጹ)___________	
907	የእርስዎ ዋና የመብራት ምንጭ ምንድን ነው?	1. ኤሌክትሪክ 2. ኬሮሲን 3. ጋዝ - ባዮጋዝ 4. ሻማ 5. የማገዶ እንጨት 6. የፀሐይ 99. ሌላ (ይግለጹ) ____________	
908	**የእርስዎ ቤተሰብ የሚከተሉትን እቃዎች አሉት? "አዎ" ከሆነ ስንት?**	ብዛት	
	ሬዲዮ		
	ቴሌቪዥን		
	ኮምፒውተር		
	ብስክሌት		

	ሞተርሳይክል		
	መኪና/የጭነት መኪና		
	ጋሪ		
	ማቀዝቀዣ		
	ስልክ/ሞባይል		
909	**የእርስዎ ቤተሰብ የሚከተለው እንስሳ አለው? "አዎ" ከሆነ ስንት?**	**ብዛት**	
	ከብት		
	በግ		
	ፍየል		
	አህያ		
	ሌላ (ይግለጹ) _____		
910	**የእርስዎ ቤተሰብ የእርሻ መሬት አለው? "አዎ" ከሆነ ምን ያህል ሄክታር ነው?**	__________ ሄክታር	ማስታወሻ ያዝ: 4 ጥማድ =1 ሄክታር፡፡ ስለዚህ, 1 ጥማድ=0.25 ሄክታር

ለተሳትፎዎ በጣም እናመሰግናለን!!

Annex 7: Study information sheet (Afan-Oromo version)

Waraqaa Ragaa Qorannoo

[Akkam] Maqaan Koo_________________ jedhama. Kanan dhufee obboo Moosisaa Baaqqallaa bakaa bu'udhaan yoo ta'u,isaan yuniversiitii Finfinneetti damee koolleejii fayyaa muummee ikoonomiksii fayyaattii barnoota digrii lammaffa isanii barachaa kan jiru. Yeroo ammaa kana waraqaa ebbaa isanii mata duree "inshuraansii fayyaa hawaasaa faayidaan innii baasii hamaa fayyaa irratti qabu qorachuudhaf gara hospiitaala Assallaa dhufanii jiruu.

Inshuraansiin fayyaa hawaasaa faayidaa inni baasii hamaa tajajilaa fayyaatiif bahu irratti qabu addaa baasuuf qorannoo yaadamee kana irrattii akka hirmaattaniif kabajaan isin gaafachaa, qorannoon kun hirmaanna kessanii fi tumsa keessan barbada. Qorannoo kana irrattii hirmachuun guutummaan guutuutti fedhaa keessan irratti kan murta'ee yoo ta'uu qorannoo kana irratti hirmachuu yoo hin barbaadiin yookaan addaan kutuu yoo barbaaddan sababaa isaa ibsuun isin irraa hin eegamu. Yeroo barbaadanittii addaan kutuu ni dandeessu. Gaaffilee isiniitti hin tollee kaminuu dhiisuu yookaan irra darbuu ni dandeessu. Qorannoo kana irrattii hirmachuu diduu keessaniin yookaan addaan kutuu keessaniif faayidaan dhabdan yookaan miidhaan isinirraa gahuu tokkoo illee hin jiru.

Ragaa dhunfaa keessanii waan nu keennitaniif qorannoo kana irratii yoo hirmaattan yaddoo qabaachuu dandessuu garuu ragaan dhuunfaa sassaabamuu kamiyyuu seeraanii fi iccitiidhaan kan qabamuu ta'a. Akkassumas debiin kamiyyuu meeshaalee barreertuu qaban keessaa kan seeraan ka'amu ta'a. Hirmaachuudhaaf yoo walii-galtan, daqiiqaa 20 hanga 30 gaaffi fi deebii isin waliin taasiifna.

Gaaffi fi deebii kun ergaa xumurameen booda faayidaan kallatiidhaan argatanii hin jiru. Ha ta'uu male qorannoo kanaaf hirmaannaan keessan bayyee barbaachiisaadha. Qorannoon kun yoo xumuramu bu'aan waligalaa qoorannichaa hirmaattootaa fi qaamolee dhimmi ilaallatu maraaf kan beeksifamu ta'a. Akkasumas gabaasa isaa maxansaawwan saayinsii irratii kan maxxanfamu ta'aa. Bareefamaa fi bu'aa qorannoo kamin irrattu eenyummaan keessan hin ibsaamu.

Gaaffii qabda/du? Yoo gaaffii fi yaada qabattan Qorataa qorannoo kana Obboo Moosisaa Baaqqallaa argachuu dandesuu. (Lakk bilbilaa 0912323367 email: mosisabe31@gmail.com]

Annex 8: Oral Consent form (Afan-oromo version)

Waraqqaa wali-galtee Afanii

Odeefannoo wa'ee qorannoo kan asii olitti ibsame kan namni ragaa sassaabu na dubbisee dhagahen jiraa. Kayyoo qoronnichaa, Faayidaa fi Miidhaa inni qabu hubadhee qoranno kana irratti hirmaachudhaf yookaan dhiisudhaaf fedhaa kootiin murteesen jira.

Yoo hirmaachuuf fedhii keessan ta'e " Eyyee" kan jedhu irrattii Yookaan "Lakkii" kan jedhu irrattii mallatoo "X" ka'i!

Eyyee ______________ Lakkii ______________ dhaabi

Hirmaachuuf heeyyemamaa wan taataniif Galatoomaa!

Annex 9: Questioners (Afan-Oromo version)

Lakk. Addaa Dhukubsataa ______________________ Guyyaa ________________

Maqaa raga sassaabaa/bduu ________________ Mallattoo ______________________

Lakk Galmee Dhukubsataa ________________

Kutaa 1;			
Lakk	Gaaffii	Filanoo	Hubachisaa
101	Saala	1. Dhiiraa 2. Dhalaa	
102	Umrii	_______ Waggaa	
103	Amantii	1. Ortodoksii 2. Islaama 3. Kaatoliikii 4. Prootestaantii 99. Kan biraa (Ibsi) _________	
104	Haala fuudhaaaf heerumaa	1. Kan hin fuunee/heerumne 2. Kan fudhee yookaan heerumte 3. Gursummaa 4. Kan wal hiikan 5. Kan gargar bahan	
105	Bakka Jireenyaa	1. Magaalaa 2. Baadiyyaa	
106	Baay'ina maatii	________	
107	Fageenya hospitaala Asaallaa irraa qabu?	__________K.M __________sa'aatii	

Kutaa 2;			
Lakk	Gaaffii	Filanoo	Hubachisaa
201	Sadarkaa Barumsaa	1. Dubbisuu fi Barreessuu hin danda'uu 2 Dubbisuu fi Barreessuu danda'a 3. Sadarka Jalqabaa (Kutaa 1-8) 4. Sadarka Lammaffaa (9-12) 5. Sadarkaa ol'aanaa (Kutaa 12 olii)	
202	Halaa hojii/Qacarrii	1. Qonnaan bula 2. Qacaramaa(Mootumma/Dhuunfa/NGO) 3. Kan dhuunfa 4. Hojii dhabaa 5. Daldalaa	

		6. Hojjataa humnaa 7. Haadha-warraa 8. Barataa 9. Soorama-bahaa 99. Kan-biraa ________	
203	Maddii galii mati keessani ji'oottan 12 darbanii kessaa maliraa ture?	1. Hojjii Dhabaa 2. Qonnaa fi Horsiisa Horii 99. Kan biraa(ibsi__________	Yoo "2' ta'ee gara 205 tti ce'i
204	Hojjii dhaabbataa yoo ta'ee matin kessaan ji'atti Giddu-galaan hangam argata ?	_Qarshii_________________	
205	Matii kessaan gurgurtaa miidhaan armaan gadii irraa waggaa kana kessaattii hangam argatee?	Xaafii irraa Qarshii __________ Qamadii irraa Qarshii _______ Garbuu irraa Qarshii _______ Baaqelaa fi Atara irraa Qarshii ________ Kudura fi muduraa irraa Qarshi _________ Horsiisa Horii irraa Qarshii_____________ 99.kan biraa irraa Qarshi _____________	
206	Kan biraa yoo jette maatiin keessan ji'atti Giddu-galaan hangam argata ?	Qarshii _______________	
207	Waliigalatti maatiin keessan waggaattii galii hangam argata?	Qarshii _______________	

Kutaa 3; Hirmanaa Inshuraansii Fayyaa			
Lakk	Gaaffii	Filanoo	Hubachisaa
301	Miseensaa Inshuraansii fayyaa hawaasaatii?	1. Eeyyee 2. Lakkii	"Lakkii" yoo ta;ee gara kutaa 4 darbi
302	Yoo 301 "Eeyyee" jette yeroo hangamitti	__________ Waggaa _________ Ji'aa	
303	Eenyuutu kaffaltii galmee kaffala?	1. Maatii 2. Mootummaa naannoo (kaffaltii matii harka qaleeyyetiin)	
304	Inshuraansii fayyaa hawaasaa irraa fayyadamaa taatanii?	1. Eeyyee 2. Lakkii	"Lakkii" yoo ta;ee gara 306 darbi

305	"Eeyyee" yoo jettan akkamitti fayadamtan? (deebiin lamaa fi isaa ol ni danda'ama)	1. Fayyadama tajaajila fayyaa dabala 2. Bassii kaffaltii fayyaaf kaffalamu hir'isa 3. Yaaddoo waa'ee baasii fayyaa hir'iaa 99. Kan biraa(ibsi)_____________	
306	Tajaajila fayyaa hospitaala kessatii akkamittii argachaa jirtu?	1. Bilisaan 2. Walakkaa kaffaluudhan 3. Guutummaan guutuutti kaffaludhaan	
307	Inshuransii fayyaa hawaasaatti fayyadamuudhaan tajaajila argachaa jirtan akkamitti madaltu?	1. Baayyee ulfataadha 2. Ulfataadha 3. Gidduu galeessa 4. Salphaadha 5. Bayyee salphaadha	

Kutaa 4: - Halaa Faayyaa			
Lakk	Gaaffii	Filanoo	Hubachisa
401	Dhukubaa dadarboo hin ta'in keessaa kamiif yaalamaa jirtu? (Deebii tokkoo ol ni danda'ama)	1. Kansarii 2. Dhukkuba sukkaaraa 3. Dhiibbaa Dhiigaa 4. Dhukkuba onnee 5. Istrookii 6. Dhukkuba sammuu 7. Dhukkuba sombaa (COPD) 8. Dhukkuba Kalee 99. Kan biraa(Ibsii)__________	
402	Dhukkuba kana akka qabduu ergaa bektee yeroo hangam ta'e?	Waggaa__________ffi	
403	Dhukkuba kanaaf hordoffii yaalaa yeroo maraa qabdaa?	1. Eeyyee 2. Lakkii	Yoo "lakki" ta'ee gara 405 darbi
404	Yeroo hangamii kessattii hordoffii qabda	1. Ji'a ji'aan 2. Ji'a lamaan 3. Ji'aa sadiin 4. Ji'a afuriin 5. Ji'aa jahaan 99. Kan biraa(ibsii)______________	

Kutaa 5: - Direct medical and non-medical cost estimation			
Lakk	Gaaffii	Filanoo	Hubachisaa
501	Ji'aa 12'n darbanii kessattii yeroo meeqaaf dhukkuba kanaan horodoofiidhaa gara dhaabbata fayyaa dhuftan?	yeroo___________ ffii	
52	Yeroo hordoffii amma kan wantoota arman gadii irrattii qarshii meeqaa bastanituu?		
	Galmeedha/kardiidhaa	Qarshii______________	
	Bakka-qorannaa/labiratoriidhaa	Qarshii______________	
	Qoricha	Qarshii______________	
	Dimshaashaan	Qarshii______________	
503	Yeroo hordoffii kan duraa kan wanatoota arman gadii irrattii qarshii meqaa baastaniitu?		
	Galmeedhaa/kardiidhaa	Qarshii______________	
	Bakka-qorannaa/labiratoridhaa	Qarshii______________	
	Qoricha	Qarshii______________	
	Dimshaashaan	Qarshii______________	
504	Yeroo hordofidhaa gara dhaabbilee fayyaa dhuftanittii nyaata fi dhugaatiidhaa kaffaltanii turtanii?	1. Eeyyee 2. Lakkii	"Lakki" yoo ta'ee gara gaffii 507 darbi
505	Yoo "Eeyye" ta'ee nyaataf dhugatidha hangam basitanii/kafatani	Qarshii______________	
506	Malaa geejjiba kamiin gara dhaabbata fayyaa kan dhuftan?	1. Deemsaan 2. Bisikileetii/motora 3. Baajaajii/takisii 4. Geejjiiba uummataatiin 5. Konkolaataa Dhuunfaa/firaatiin 99. Kan biraa(ibsii) __________	
507	Imala tokkof(demsa fi debif) hangam kaftaaa?	Qarshii______________	
508	Matii yokkan hirotaa kee kessaa nami siwajjin garaa dhabatta fayyaa dhufuu jira?	1. Eeyyee 2. Lakkii	"Lakki" yoo ta'ee gara gaffii 511 darbi
509	Yoo " Eeyyee ta'ee imala tokkof(demsa fi debif) hangam kaftaaa?	Qarshii______________	
510	Yeroo darbee yoo garaa dhabata fayyaa dhuftan ofii kettii/nama sifana turefee eddo bulmataf kafaltin kafltan jiraa ?	1. Eeyyee 2. Lakkii	"Lakki" yoo ta'ee gara kutaa 6ffa ttii darbi
511	Yoo " Eeyyee ta'ee hangam kaftaaa?	Qarshii______________	

Kutaa 6: -Indirect cost estimation /Lost work days or productivity lost			
Lakk	Gaaffii	Filanoo	Hubachisaa
601	Sababa dhukkuba kanatiif hojjii irraa haftee bektaa?	1. Eeyyee 2. Lakkii	"Lakki" yoo ta'ee gara gaaffii 603 ttii darbi
602	Yoo " Eeyyee " ta'ee guyaa meeqaaf ?	Guyyaa _______tiif	
603	Ji'attii gidduu galeessaan guyyaa meeqaaf hordoofidhaa gara dhaabbata fayyaa dhuftaa?	Guyyaa _______tiif	
604	Galii ji'aa dhukkubsataa Giddu-galeessaan?	Qarshii________________	
605	Maatii yookaan hiryoota kee keessaa namni si wajjin gara dhaabbata fayyaa dhufuu jiraa?	1. Eeyyee 2. Lakkii	"Lakki" yoo ta'ee gara Kutaa 8 darbi
606	Yoo " Eeyyee " ta'e namota meeqaa?	________	
607	Yoo " Eeyyee " ta'ee giddu galeessaan guyyaa meqaaf?	Guyyaa _______	
608	Halaa hojii/Qacarrii nama sii wajjin garaa dhaabbata fayyaa dhufee.	1. Qonnaan bula 2. Qacaramaa(Mootummaa/Dhuunfaa /NGO) 3. Kan dhuunfaa 4. Hojii dhabaa 5. Daldalaa 6. Hojjataa humnaa 7. Haadha-warraa 8. Barataa 9. Soorama-bahaa 99. Kan-biraa ________	
609	Ji'atti Giddu-galaan galii isanii hangami?	Qarshii_______________	

Kutaa 7: - coping strategies			
Lakk	Gaaffii	Filanoo	Hubachisaa
701	Kaffaltii asii olittii ibsite kan kaffaluuf qarshii essaa argate?	1. Qarshii kooti (mindaa, Qusannaa) 2. Liqeeffadheen 3. Qabeenyaa koo gurgureeen 4. Deeggarsaa maatiitin/hiriyaatiin 5. Baasii nyataa matii hiri'isuudhaan 6. Baasii maatii kan nyaataa alaa hiri'idhan 7. Inshuraansii fayyaa hawaasaa fayyadamuudhaan 8. Bilisaan(gandaan, anaan kan kaffalu) 99. Kan biraa(ibsi)_______	Yoo "2" ta'ee garaa gaffii 702 itti fufii Yoo "3" ta'ee garaa 704 darbii
702	Kaffaltii fayyaattii liqeeffatteta yoo ta'ee qarshii hangami liqeeffate?	Qarshii ________	
703	Eenyu irraa liqeeffate?	1. Matii 2. Waldaa irraa 3. Ollaa/ hiriyaa 4. Baankii Dhuunfaa irraa 99. Kan biraa(ibsi)_______	
704	Wal'aansaa faayyaatiif yookaan liqii kaffaluuf qabeenyaa kee gurgurtee jirta yoo ta'ee yookaan gurguruudhaa yaadaa jirta yoo ta'ee mal gurgurta?	1. Meeshaalee mana 2. Faaya 3. Konkoolaataa 4. Mana 5. Lafa 99. kan biraa (ibsi)____________	

Part VIII: - Estimation of household expenditure			
Lakk	Gaaffii	Filanoo	Hubachisaa
	Baasiiwwan nyaataa mana keessaa		
801	Giddu galeessaan maatiin keessan nyaataf/ gosa nyaataatiif hangam baasuu?	Ji'aan Qarshii__________	
	Baasiiwwan mana keessaa kan nyaataa alaa		
802	Giddu galeessan maatiin keessan wantoota barbaachisaa arman gaditti ji'an qarshii hangam baasuu?	Baasiiwwan qarshidhan	
	Dhiyeessaaf (ibsaa, Bishaan, Bilibila)		

	Barumsaaf (mana barumsaa ijooleedhaaf yookiin kan kee)		
	Kiraayii manaa		
	Meeshaalee gati qabeessa		
	Hirmaannaa hawaasummaa (Idir, sirnaawwaalaaf fi qophilee garaagarattif)		
	99. kan biraa (ibsi)___________________		
803	Giddu galeessaan maatiin keessan wantoota barbaachisaa armaan gaditiif waggaadhaan qarshii hangam baasuu?	Baasiiwwan qarshiidhaan	
	1. Qabeenya(Meeshaa) mana keessaa		
	2. Huccuu(uuffata) ykn kopheedhaaf		
	3. Qabeenyaa Suphuudhaaf		
	4. Baasii qonnaan wal-qabatan(Xaa'oo, farraa ilbisootaa fi Sanyii)		
	5. Baasii du'aan walqabate (sirna awwaalaa fi Taskaara)		
	Baasii waliigalaa Nyaataa ala	Qarshi____________	
	Baasii waliigalaa	Qarshi____________	

Kutaa 9: - Qabenyaa mati			
Lakk	Gaaffii	Filanoo	Hubachisaa
901	Maatiin mana dhuunfaa qabaa?	1. Eeyye 2. Lakki	
902	Manni keessa jirtani Gola(kutaa) meeqa qaba?	Gola__________	
903	**Lafti** mana keessanii meeshaa kam irraa hojjetame?	1. Dhooqqee 2. Dhagaa 3. Siminitoo/Birkii 4. Bilookeettii 5. Muka 6. Marga 7. Waardii sibilaa 8. Minxaafii 99. Kan bira (ibsi)___________	
904	**Dhaabni/Girgiiddaan** mana keessanii meeshaa kami iraa hojjetamee?	1. Dhooqqee 2. Dhagaa 3. Siminitoo/Birkii 4. Bilookeettii	

		5. Muka 6. Marga 7. Waardii sibilaa 8. Minxaafii 99. Kan bira (ibsi)___________	
905	**Goolgeen** mana keessanii meeshaa kam irraa hojjetame?	1. Dhooqqee 2. Dhagaa 3. Siminitoo/Birkii 4. Bilookeettii 5. Muka 6. Margaa 7. Waardii sibilaa 8. Minxaafii 9. Kan bira (ibsi)___________	
906	Nyaata mana keessaa maaliin bilcheesitu?	7. Qoraan 8. Cilee 9. Elektiriika 10. Gaazii-siliindariidhaan 11. Keroosinii 12. Kan bira(ibsi)_____	
907	Mana keessatti ibsaadhaaf maal fayyadamtu?	8. Elektriika 9. Kerosiinii 10. Bayoogasii 11. Dungoo/Shaamaa 12. Qoraan 13. Soolaarii 14. Kan bira(ibsi) ___________	
908	**Maatiin keessan meshalee armaan gadii qabaa? yoo qabate hangam?**	**Bay'ina**	
	Raadiyoo		
	Televizinii		
	Koompitara		
	Biskileeta		
	Mootoraa		
	Konkoolaataa/konkoolaataa fe'insaa		
	Gaarii		
	Qabbaneesiituu/Firiijii		
	Bilbila		
909	**Maatiin keessan horii armani gadii qabuu? yoo qabaatan hangam ?**		
	Loon		
	Hoolaa		
	Re'ee		

	Harree		
	Kan bira (ibsi) ________		
910	**Maatiin keessan lafa qonnaa qabaa "eyyye" yoo ta'ee heektaara meeqa?**	**Heektaara________**	**Hub:** ximaadiin 4= heektaraa 1 Kanaf ximmaadiin 1= heektaraa 0.25

Annex 10: Assurance of Principal Investigator

ASSURANCE OF PRINCIPAL INVESTIGATOR

I, the undersigned agree to accept all responsibilities for the scientific and ethical conduct of the research project. I provided timely progress report to my advisor and seek the necessary advice and approval from my primary advisors in the course of the research. I communicated timely to my advisors all stakeholders involved in the study including any source of funding for this research.

Name of the student: _MOSISA BEKELE DEGEFA

Date: ___June 10, 2022__________

Signature

Approval of the primary Advisor

Name of the primary advisor: ________Dr. Anagaw Darseh(Phd)__

Date: ___________June 10, 2022_____ ____________

Signature:

Annex 11: Curriculum vitae

PERSONAL INFORMATION

Name		**[MOSISA BEKELE DEGEFA]**
Address		**[Addis Ababa, Ethiopia]**
Telephone/ Contact		**+251912323367/+251924587356**
E-mail		Mosisa.bekele@aau.edu.et/Mosisabe31@gmail.com

Date of birth [Day, month, year]		01-10-1995
Place of birth		ARSI /OROMIA

Sex		Male ■	Female □

Marital status		Single ■	Married □	Widowed □	Divorced □	Separated □

WORK EXPERIENCE

Dates (from – to)		October, 2018 to October, 2019
Name of employing organization		Arsi University
Position		Graduate Assistant II (GA II)
Title of qualification		BSc in PUBLIC HEALTH

Dates (from – to)		October, 2019 to up to date
Name of employing organization		Arsi University
Position		Assistant lecturer
Title of qualification		BSc in PUBLIC HEALTH

EDUCATION AND TRAINING

Dates (from – to)	*Name and type of organization providing education and training*	Principal subjects/occupational *skills covered*	*Title of qualification awarded*
January 2021- up to date	Addis Ababa university	Health Economics	MPH in Health Economics candidate
March, 2022	Addis Ababa university school of commerce	Statistical application using SPSS software	Certificate of training in SPPS
December, 2021	Addis Ababa university school of commerce	Project management	Certificate of training in project management
2014-2018	Aris University	Public Health	BSc in Public Health
2012-2013	Sagure preparatory school	Natural science	The Ethiopian Higher Education Entrance Qualification Certificate

PERSONAL SKILLS AND COMPETENCES *Acquired in the course of life and career but not necessarily covered by formal certificates and diplomas.*		
MOTHER TONGUE		Afan Oromo

OTHER LANGUAGES

[Specify language]		Afan Oromo	English	Amaharic
• Reading skills		Excellent	Excellent	Excellent
• Writing skills		Excellent	Excellent	Excellent
• Verbal skills		Excellent	Excellent	Excellent

SOCIAL SKILLS AND COMPETENCES *Living and working with other people, in multicultural environments.*		Excellent interpersonal skills and sound capability of working with other people in multicultural environments; and I am capable of working in groups where team work is essential.

TECHNICAL SKILLS AND COMPETENCES *With computers, specific kinds of equipment, machinery, etc.*		I have excellent technical skill and competences on the following software. Microsoft: - MS-Word MS-Excel, MS-Power point Statical software: - SPSS, Epi-info, STATA

ADDITIONAL INFORMATION		**References** Dr. Anagaw Darseh(Phd) Assistant Professor of health economics School of Public health, Addis Ababa university Addis Ababa, Ethiopia Email: anagaw.darseh@aau.edu.et/anagawd@yahoo.com Phone: +251944121769 Mr Ashenafi Habtamu (MPH) Assistant Professor of Health service management Public health department Collage of Health science, Arsi University Asella, Ethiopia Email: inu.imu@gmail.com Phone: +251911911209