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**ADDIS ABABA UNIVERSITY COLLEGE OF HEALTH SCIENCES
SCHOOL OF PUBLIC HEALTH DEPARTMENT OF HEALTH
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**INEQUALITY IN BENEFIT DISTRIBUTION OF PUBLIC HEALTH
SPENDING IN ETHIOPIA**

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DECLARATION

I declare that the thesis entitled “Inequality in the Distribution of Public Health Spending in Ethiopia” is my original work; which has not been presented for degree in AAU and/or another university. I also declare that all the sources of material used for this thesis have been fully acknowledge.

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Contents

List of Tables	vi
List of Figures	vi
Abbreviation	vii
Abstract	1
Chapter 1: Introduction	2
1.1 Background	2
1.2 Statement of the Problem	4
Chapter 2: Literature Review	5
2.1 Theoretical review	5
2.2 Empirical review	8
Chapter 3: Objectives	12
3.1 General Objective	12
3.2 Specific Objectives	12
3.3 Methodology	13
3.3.1 Data source	13
3.3.2 Data analysis procedure	13
3.3.3 Calculating benefit incidence	14
3.3.4 Method of estimating unit government subsidy	15
Chapter 4: Results	16
4.1 Government unit subsidy	16
4.2. Health service utilization	17
4.3 Inequalities in Health Service Utilization	21
4.4 Inequity in Health Service Utilization	22
4.5 Inequalities in Utilization of Public Facilities	25
4.6. Benefit Incidence of Public Spending on Health	26
Chapter 5: Discussion	32
Chapter 6: Conclusion and Recommendation	36
6.1 Conclusion	36
6.2 Recommendation	36
Reference	38

List of Tables

Table 1 Estimated government unit subsidy per outpatient and inpatient service in Ethiopian birr EFY, 2008	16
Table 2 Health Service Utilization by Household Characteristics	19
Table 3 Health Service Utilization by Individual Characteristics	20
Table 4 Inequalities in Utilization, Indirect Standardization.....	21
Table 5 Decomposition of Concentration Index for Health Service Utilization Linear Model	23
Table 6 Inequality in Utilization of Public Facilities	26
Table 7 Inequalities in public health spending.	28

List of Figures

Figure 1: Decomposition of CI for OPD, IPD, Hospital and HC Visits.....	24
Figure 2: Decomposition of CI for total health service utilization.....	25
Figure 3: Share of public health spending by service type.....	28
Figure 4: Share of public health spending by facility type.....	28
Figure 6: Concentration Curves of Subsidies of OPD IPD, Health Center and Hospital services ...	29
Figure 5: Share of public spending for total health service utilization.....	30
Figure 7: Concentration Curve of Spending of Total Health Care Utilization.....	31

Abbreviation

ADePT	Automated DEC Poverty Tables
ALOS	Average length of Stay
BIA	Benefit Incidence Analysis
DEC	Development Economics
EDHS	Ethiopian Demographic and Health survey
EFY	Ethiopian Fiscal Year
ETB	Ethiopian Birr
GDP	Gross Domestic Product
GTZ	German Agency of Technical Corporation
HC	Health Center
HSDP	Health sector Development Plan
HSTP	Health sector Transformation Plan
IMR	Infant Mortality Rate
MDG	Millennium Development Goals
MOFED	Ministry of Finance and Economic Development
PHCU	Primary Health Care Unit
USAID	United States Agency for International Development
U5MR	under Five Mortality Rate

Abstract

Background: Health inequality is differences in health status or in the distribution of health determinants between different population groups. Health inequities are unfair differences in accessing and utilizing health services between different socioeconomic groups. Inequalities and inequities in health utilization are examined with health determinant variables and benefit incidence analysis is used to measure the distribution of government health spending.

Objective: To estimate the benefit distribution of public spending on health care across socio-economic groups, in Ethiopia.

Methods: A national representative Ethiopian living standard measurement survey having 23,393 set of households data in the year 2015/16 was used to measure the benefit incidence analysis of the government health expenditure. Concentration index was used to assess the degree of income-related inequality in the distribution of a health variable and decomposition of the concentration index provides socio economic and demographic contribution to the inequalities.

Result: Government unit subsidy at hospital level is 75.4 and 2018.6 Ethiopian birr and at health center 67.4 and 187.5 Ethiopian birr per outpatient and inpatient services respectively. Out of the total government subsidy 60.6 % of government spending goes to health centers and 39.4% to hospitals and more than two third of government spending concentrated to outpatient visit (72.5%) relative to inpatient visits (27.5%). The total share of public spending is low in the lowest quintile (3.6%) while high in the second quintile (27.9%).

Conclusion: In this study we found pro-poor public spending on health with concentration index of -0.039 which varies at different health delivery level and service type. The hospital level and inpatient visit preferentially benefit the wealthiest quintile while health center and outpatient visit is pro-poor.

Chapter 1: Introduction

1.1 Background

The 1978 Alma-Ata declaration, affirmed health service as a human right and strongly stated that inequality among nations and within a country as politically, socially and economically unacceptable. The declaration emphasized that governments should formulate national policies, strategies and plans of action to launch and sustain primary health care as part of a comprehensive national health system because Primary health care is the key to attaining this target as part of development in the spirit of social justice (1).

According to the World Health Organization (WHO) health inequality is defined as difference in health status or in the distribution of health determinants between different population groups. It is also noted that social determinates ¹of health are accountable for this unfair inequalities where some inequalities are the result of natural and biological differences or free choices where others are beyond the control of individuals or group which can be avoidable. Health inequities are unfair differences in accessing and utilizing health services between different socioeconomic groups (2).

A focus on health equity means valuing health as an essential and valuable resource for human development. Health also represents an important public good, an investment in human, societal and economic development. Addressing social exclusion, promoting social inclusion and respecting diversity need to be key public policy priorities. Health equity requires an integrated approach across government departments and cross-sectoral partnerships between and within sectors. Therefore governments should devising responsive strategies to address inequality (2).

The crucial challenge that countries are currently facing is health inequality due to widening income inequality. Therefore, the extent of inequality, its drivers, and what to do about it becomes some of the most debated issues by policy makers (3).

¹ Conditions, in which people are born, grow up, live and work.

Most African countries considered inequality as one of the factor for low progress towards achieving MDG. Therefore the African government highlighted the importance of bridging the health inequality gap by setting out a number of strategies to the need of their population in order to provide health access to all.

Over the last several years, the Ethiopian government has committed substantial resources to expand health services and infrastructure in rural areas to address primary health access to all citizens and increased public budget allocation over time. The Ethiopian health accounts showed that the total health spending has been growing steadily that reached ETB 49.5 billion (US\$ 2.5 billion) in 2013/14, from ETB 11.1billion (US\$1.2 billion) in 2007/08 which is 4.73 percent of the GDP (4). However, despite the substantial allocation of resources and notable achievements attained in coverage of health services, the health sector still faces major challenges related to access, equity and quality of health services among different groups. The Health Sector Transformation plan (HSTP) also analyzed health equity among high impact intervention disaggregated by relevant equity dimension and showing high gap among high and low a wealth quintile group and among regions (5).

Fee waiver system is one of the government strategy being implemented as a mechanism to ensure equity to those segments of the society who are not able to pay for their health care needs and community based health insurance (CBHI) to provide financial protection for citizens in the informal sector in order to achieve universal health coverage (6). Therefore equal access and utilization to essential health services for all is listed out as an important element to ensure that every Ethiopian is reached with essential quality services (5).

This paper analyzes the state of public health spending inequality in Ethiopia and the results of the study are very useful evidence that shows which sections of the population benefits from public health expenditure and informs policy makers for action to improve efficiency in allocation of public health expenditure in order to improve health outcomes.

1.2 Statement of the Problem

Public health spending in Ethiopia accounts 4.73 % of gross domestic product (GDP) which accounts over 30 % of the total health spending and per-capita health expenditure on essential health services is very low (US\$ 28.6) compared with other related countries and WHO's year 2015 recommendation of US\$ 60 (7).

Public expenditure on health as a percentage of total expenditure has been low in Ethiopia. According to 2013/14 Ethiopian health account survey, government spending on health represents only 6.65 percent of the general government expenditure which failed to meet the target of allocating at least 15 percent of their annual budgets to the health sector as pledged by Abuja declaration in 2001 (4).

Ethiopia has made remarkable achievement in improving access to health services however disparities in health service utilization and outcomes remains key challenge. The 2015/16 household survey of Ethiopia also revealed the existence of disparity in health service utilization among different groups and the clear positive association between economic status and healthcare seeking behavior. Because of the identified disparity the health sector transformation plan, has set ambitious goals to improve equity, coverage and utilization of essential health services for every Ethiopia by 2020 (5).

The benefit incidence analysis shows whether or not public health spending benefit are distributed across income groups and assists to monitor government effectiveness in targeting government spending. However there is very few benefit incidence analysis study conducted for Ethiopia, so that it is important to do this research to generate more evidence for policy makers.

Chapter 2: Literature Review

2.1 Theoretical review

The gross inequalities in health within and between countries present a challenge to the health system in all corners of the world. There are multi- dimensional factors for health inequality across the population within any country and between countries, but mostly the state of health inequality is expressed in social determinants. Social inequities in health are directly or indirectly generated by social, economic and environmental factors and structurally influenced lifestyles. These determinants of social inequities are all amenable to change (8).

The magnitude and cause of observed social inequalities in health are sometimes different. The question of how the benefits from the provision of health services are distributed between women and men, or between different wealth groups, remains important and can provide information on the equity dimension of health resource allocation. In addition it is also important to understand the extent of health interventions that have been a key element of government's strategy where it is mostly analyzed using benefit incidence of health service. (8)

Health benefit incidence analysis examines how efficiently public health spending is targeted to the poor and who benefits from expenditure on public health services and it gives idea on how much health care a person get. Benefits are expressed in monetary terms and are essentially calculated by multiplying utilization rates of different types of health service by their unit costs (9)

The key policy concern is to consider how well the overall health system is performing in terms of the distribution of service benefits. It is agreed that benefits of health services should be distributed across a population according to their need for health care rather than on the basis of their ability to pay for. Thus, benefit incidence analysis (BIA) can usefully

be applied to assessing the appropriateness of the distribution of benefits from using any health service relative to the need for care (10).

Benefit incidence analysis focuses mainly in addressing the question of the extent of the government spending on services which improve the lives of the poor combined with the tracking of spending to the facilities, it can also help assess the translation of the budget into effective health services. The starting point is the reported use of government services by households combining this information (usually obtained from household surveys) with information on the cost of providing the service, the incidence of the benefit of government spending can be estimated across household groups.(11)(9)

The benefit incidence is calculated basing the following steps:

- 1. Estimating unit subsidies:** - The unit cost of a publicly provided service is estimated by dividing the total expenditure on that particular publicly provided good (net of any cost-recovery fees and out-of-pocket expenses by the users) to the total number of users of that good. Actual government expenditure account is a base for estimating unit subsidy.
- 2. Identifying users of the service:** - Assigning the unit subsidy to individuals. The information about the users of publicly-provided goods are obtained from household surveys dichotomized into different groups of the society for instance, poor and non-poor, rural and urban, etc.
- 3. Aggregating users into groups:** - Ranking individuals or households into groups to estimate whether the benefits from government spending is well targeted to those who needs most and across the population. Empirical evidence has shown that the most frequent method of grouping is based on income quintiles but in this paper we used consumption for grouping.
- 4. Accounting for household spending:** Derive the distribution of benefits by multiplying the average benefit from the previous three steps by the number of users of the service in each income or consumption group. This step assumes that the average benefits from or

cost of a service delivery does not vary with income or consumption level, or any other factor. It conceptually assumes that firstly the quantity of service may vary across users either because of variation in spending or the cost of producing the service, secondly the value that users may place on a given service may also vary across households.

5. Compare the resulting distribution of benefits with a number of benchmark distributions: It is the most important component of a BIA since it informs policymakers on how well government spending on a service is targeted, how it compares with the incidence of other types of government spending at each level of service delivery unit or how the resulting benefit incidence stacks up against the past incidence of government spending in the same country or against incidence of spending in other countries. Benefit incidence analysis have typically focused on either five or ten discrete points (that is, quintiles or deciles) on the distribution of benefits.

In general, the distribution of benefits can be better captured through concentration curves for each type of government spending, since these curves describe the entire distribution and not just five or ten points.

Concentration curve is one of the tools for assessing the degree of income-related inequality in the distribution of a health variable whether subsidies to the health sector are better targeted towards the poor or not. The concentration curve plots shares of the health variable against quintiles of the living standards variable that measures the cumulative percentage of health subsidies accruing to the different quintile percent of the population.

But a concentration curve does not give a measure of the magnitude of inequality that can be compared conveniently across many time periods, countries, regions, or variables to be chosen for comparison. The concentration index which is directly related to the concentration curve, quantify the degree of socioeconomic related inequality in a health variable (12).

Concentration index is twice the area between the concentration curve and the line of equality (the 45-degree line). It is used to identify whether socioeconomic inequality in

some health sector variable exists and whether it is more pronounced at one point in time than another. In the case where there is no socioeconomic-related inequality, the concentration index is zero by contrast, if there is socioeconomic-related inequality the concentration index takes value from -1 to 1, the index takes a negative value when the curve lies above the line of equality, indicating disproportionate concentration of the health variable among the poor, and a positive value when it lies below the line of equality (12).

Concentration index is computed by the formula

$$C = \frac{2}{u} cov(h, r)$$

Where, h is the health sector variable, u is its mean, and r is the fractional rank of individual i in the living standards distribution.

The concentration index summarizes information from the concentration curve and through the imposition of value judgments about the weight given to inequality at different points in the distribution. The sign of the concentration index indicates the direction of any relationship between the health variable and position in the living standards distribution, and its magnitude reflects both the strength of the relationship and the degree of variability in the health variable.

2.2 Empirical review

In most developing countries, direct government subsidy for health services is one of the most common mechanisms that governments have adopted to improve health care service at affordable price but other factors affects equitable health service utilization. For instance the study from Liberia shows that direct government subsidies for public health facilities could reduce the price of health services. (13). Another comprehensive evaluation in distribution of public health care spending for Sub-Saharan Africa, Asia, and Latin America similarly reports that the extent of government subsidy is substantial in improving health status of the poor. Pro-poor public spending result seen in most Asian countries, is

due to their financial arrangement and very high level government per capita spending (14).

However, as these subsidies are not normally targeted to the poor it can be mainly used by the richest society since they likely have higher demand for these services and ability to access it than the poor. Even if poor people use health service, they more likely use outpatient visit at primary level. Therefore, government subsidies should target towards outpatient services at lower-level health facilities to improve the equity of benefits. Improving other barriers like access i.e. making health care providers more available in the nearby area will potentially improve equity in the distribution of government subsidies.(13).

The benefit incidence analysis of health services has nearly exclusively focused on the benefit incidence in the health sectors to examine which socioeconomic groups tend to benefit from public spending and public subsidies of services. There is a vast and growing related literature analyzing the level of health inequalities in developing countries showing the health inequality gap between wealthier and poor and also between urban and rural communities (15) (16).

The benefit incidence analysis on social spending, poverty and gender equality in Kenya revealed poor people gain little directly from the significant subsidies at the highest level of health care delivery and proportionate share of primary health care services. The result regarding use of health care services among gender shows overall females get more out of health spending than males but poorer women are disadvantaged in benefiting from health care subsidies particularly with respect to referral hospital than poor males and better off females use all health facilities including hospitals more than better off males (17).

Research on benefit incidence of different health services conducted in South Africa (18). and similar research in Uganda (19) clearly demonstrated that private sector outpatient health care services, private hospital inpatient care, national central hospital outpatient facilities and public sector inpatient care accrue to the richest population, whereas public

clinics and district hospital outpatient facilities are pro-poor. In general share of health care benefits heavily favors the richest groups.

A study conducted in Malawi on priority public health services shows that poorest population receives only 15.8% of the health service, while the richest benefited 21.2%, looking at the gender beneficiaries, woman receives 55.2 % of the benefit whereas males receive the rest proportion and urban & rural receives proportionate benefit (16). Lekha S, analyzed benefit incidence analysis to define the effectiveness of spending at the sub national government level in India's health sector. The analysis revealed that the poorest quintile (poorest 20 percent of the population) captured around 9 percent of the total net public expenditure in the health sector while the richest income quintile benefited around 40 percent of the total net public expenditure in the health sector. The combined analysis of inpatient and outpatient services revealed that public expenditure in the health sector is pro rich in distribution(20).

Few researches have been conducted on health inequality in Ethiopia. For instance Tranvåg, compared within-group and between-group inequalities in length of life among population groups using EDHS 2000 and 2011 in modified logit life table system (21). Length of life inequality has decreased and life expectancy has increased for all population groups between 2000 and 2011. Length of life inequality within wealth quintiles is found three times larger than the between-group inequality. Another study estimated concentration and gini index using EDHS data, the result shows health achievement indices improved overtime for most indicators but Wealth-related inequality has remained persistently high in all surveys unequal socioeconomic and geographic distribution of health and access to key services and socioeconomic determinants need to be addressed in order to achieve better and more fairly distributed health. (22) (23)

A study conducted by World Health Organization (WHO) on 28 sub-Saharan African countries shows Ethiopia is among one of the highest coverage gaps for every indicator and, yet the contribution of within-country inequality tended to be proportionally low (8).

The BIA conducted by Seifu for education and health of Ethiopia, found that overall health spending is poorly targeted. The benefits from primary health-care go disproportionately to the poor. People in the rural areas most frequently use clinics and health centers while those in urban localities prefer health centers and hospitals. The researcher concluded that the country's fiscal policy looks to have been successful in targeting health services to the poor (24).

In Ethiopia there are few inequality researches conducted using benefit incidence analyses in different socioeconomic topics, but there is no recent notable health benefit incidence analysis research. It is important to conduct this benefit incidence analysis on public health spending that can be used to develop an overall fiscal and social policy framework, to assess impact of health sector policies and strategies and to justify the resource allocation and utilization of health sector.

Chapter 3: Objectives

The study is important to realize the performance and efficiency of how public health expenditure is distributed across the population that can be used to develop an overall fiscal policy framework and to justify the need to improve resource utilization in public health sector.

3.1 General Objective

The general objective of this study was to estimate inequalities of public spending on health care across socio-economic groups in Ethiopia in 2015/2016.

3.2 Specific Objectives

1. To determine the disparity in the distribution of public expenditure on health care services across socioeconomic groups;
2. To determine level of health service utilization inequities and inequalities across socioeconomic groups;
3. To assess distribution of healthcare utilization across household and individual characteristics.

3.3 Methodology

3.3.1 Data source

Several data sources were used for conducting this analysis on inequalities of healthcare utilization and the BIA. Total number of outpatient and inpatient health care services delivered in EFY 2008 (2015/16) was extrapolated from the routine health information system database of the Ministry of Health from all public health facilities (3562 HC and 241 hospitals) that were identified to be functioning during the year. The detail health facility level data by visit type were carefully reviewed, edited and aggregated to regional and national level,

Health service utilization data by households and characteristics of individuals were obtained from 2015/2016 Living standard measurement survey conducted by Central Statistics Agency of Ethiopia and the World Bank. The sample covers 23,393 households throughout the country that provides information on basic demographics; education and health. The data is freely available on the World Bank website.

The recurrent health expenditure data is taken from Ministry of Finance and Economic Development of Ethiopia. The expenditure data is disaggregated by region, facility type and administration level expenses. For this study all recurrent budgets spent at facility level in EFY 2008 is used for the analysis.

3.3.2 Data analysis procedure

Benefit incidence analysis (BIA) is used to measure inequality of public health spending. The analysis is done using ADePT software which is developed by the World Bank for the purpose of equity analysis, health financing, and poverty and inequality analysis. ADePT is statistical software for automated economic analysis developed to automate and standardize the production of analytical reports. It allows complex analysis on data sets for BIA users. The tool emphasizes interpretation and policy implications of the results by quickly generating standardized tables and charts with result summaries ready for use.

SPSS software was used to clean Living standard measurement survey data before analyzing since ADePT has no data manipulation capability (25).

Wealth index was also used based on household consumption. The wealth index is a composite measure of a household's cumulative living standard in order to compare individual households by their relative wealth. The index is separated in quintiles across the population (or cumulative groups of 20% from the least wealthy to wealthiest)

The most popular and direct measure of living standard are income, expenditure and consumption, of these consumption based living standard measure is used in this analysis. According to (12) measuring consumption is fair than income for developing countries since formal employment is less common, many households have multiple and continually changing sources of income, and home production is more widespread.

Result of the percentage share of total government subsidy benefits accrue to each wealth quintile is expressed by concentration index.

3.3.3 Calculating benefit incidence

The benefit incidence of public spending on health service can be seen in different perspective. The incidence to one group (the poorest income group or the population across different regions) depends on the use of publicly-funded services by that group, and the distribution of government spending for services.

To do benefit incidence analysis, estimating unit cost, identifying the users and aggregating users into groups are the major steps (10).

Mathematically, BIA is estimated by the following formula:

To see if there is inequality in public health spending among different wealth quintile

$$\times j \equiv \sum_i U_{ij} \frac{S_i}{U_i} \equiv \sum_i \frac{U_{ij}}{U_i} S_i \equiv \sum_i e_{ij} S_i \quad (1)$$

Where X_j :- The benefit incidence from the total health subsidy enjoyed to group j. or
total health subsidy imputed to group j

U_{ij} :- Health service utilization of service i by group j;

U_i :- Utilization of health service i by all (across all groups)

S_i :- Government spending on health service i and

e_{ij} = group j's share of utilization of service i.

3.3.4 Method of estimating unit government subsidy

The unit subsidy of specific health service is the ratio of total recurrent costs estimated for that service relative to all patients utilized that specific health service. It is calculated as the ratio of the total recurrent government health expenditure on a particular type of service relative to total number of health service users to that service.

A frequently used assumption of outpatient visit equivalent per inpatient days was used to estimate inpatient unit subsidy (i.e. we convert inpatient days into an equivalent number of outpatient services). To calculate health centers inpatient unit subsidy we used one inpatients equivalent equates to 2.78 discharge (26) and for hospital outpatient equivalent we took one inpatient days equate to 4 outpatient visit (27) multiplied by 7 days average length of stay (ALOS) study conducted for developing countries by Berman Haward (28).

$$\text{Outpatient Unit Subsidy} = \frac{\text{Total government health expenditure}}{\text{Total number of outpatient health service user}}$$

$$\text{Inpatient service unit sub} = \text{Outpatient unit subsidy} \times \text{Outpatient equivalent ratio} \times \text{ALOS}$$

$$\text{Health center Inpatient Unit Subsidy} = \text{HC outpatient unit subsidy} \times 2.78 \times 1$$

$$\text{Hospital Inpatient Unit Subsidy} = \text{Hospital outpatient unitsubsiy} \times 4 \times 7$$

Chapter 4: Results

4.1 Government unit subsidy

The estimates of unit government subsidies for health services provided within public health facilities are presented in Table 1 below. It was reported that in EFY 2008 (2015/16) 4,892,039,391.3 Ethiopian birr (ETB) recurrent budget was allocated to public health facilities, of this allotment, 39.4 % is to public hospitals, and 60.6 % is to health centers and health posts.

A total of 52,614,415 health service visits were registered in EFY 2008 (2015/2016) of which 82% is outpatient services and from the whole outpatient services, 83 % were provided within health centers and health post, and 17% were provided within hospitals. Out of 1,009,267 inpatient services, 62% (630,556) were provided within public hospitals, and 38 % (378, 711) were provided within health centers. The total outpatient equivalent days for all inpatient services were 17,951,717, of these 16,898,901 and 1,052,817 total outpatient equivalent days for hospital inpatient services and for health center inpatient services respectively.

Table 1 Estimated government unit subsidy per outpatient and inpatient service in Ethiopian birr EFY, 2008

Description	Hospital	HC	Total
Government Subsidy	1,926,949,335.9	2,965,090,056.5	4,892,039,391.3
Outpatient service	8,684,391	42,920,757	51,605,148
Inpatient service	630,556	378,711	1,009,267
Number of outpatient equivalence	16,898,901	1,052,817	17,951,717
Unit subsidy per outpatient service	75.3	67.4	
Unit subsidy per inpatient service	2018.6	187.5	

The result indicated that on average government provided 75.3 and 67.4 ETB per outpatient service in hospital and health center respectively. When it comes to inpatient

services, the unit subsidy per inpatient service in public hospitals is 2018.6 ETB, while it is 187.5 ETB in public health centers. Based on this analysis it is estimated that from the total government subsidy 1,343,825,915.1 ETB is allocated for inpatient service and 3,548,213,476.2 ETB for outpatient services.

4.2. Health service utilization

In this analysis the variables analyzed with public spending costs are inpatient admissions, outpatient visits, hospital utilization, and health center utilization and total health service visit. Moreover individual (age, gender and education) and household level (residence and region) health determinant variables were used to assess levels of health inequalities. The inpatient admission considers data reported in the last 12 months and for outpatient visits those reported in the last month is taken and annualized. The analysis also assumed for those people who reported health facility visits more than 12 times per year is taken as a maximum of 12 times and people who visited health post is categorized under health center visit.

The mean relation across health service utilization indicators and household characteristic of residence is shown in table 3. Mean outpatient visit is higher in rural residents (1.917) than in urban residents (1.859) whereas inpatient visit is more frequently used by urban ones. Health center is more frequently visited by rural residents while hospital utilization is very highly preferred by urban residences (0.271) than rural residents (0.097) and the overall health service utilization per person per year is more frequent among urban residents. This result is similar with the NHA 6 finding shows that use of inpatient service is high in the richest households and urban residents than those living in the poorest households and rural residents (29).

Outpatient visit per person per year among the lowest wealth quintile is low (1.786) followed by middle level (1.897) compared to the rest of the group which has almost similar level of utilization. Health center visit is higher in lowest and fourth quintile while hospital visit is higher in the highest quintile (0.204) followed by the second (0.164) with a close result of use among the rest group.

The mean total health service utilization is higher (2.534, 2.448) in the second and lowest wealth quintile groups respectively while lower among fourth quintile irrespective of type of health service providers. This might be because OPD visits at health center were mostly used by the poorest quintile.

This result is different from Federal Ministry of Health per capita outpatient visit reported through HMIS in the survey period. We are assuming the differences could be because all services provided at all levels health facilities were not included in the previous per capita outpatient visit definition stated in HMIS indicator definition manual used until 2017. It So recognizing this problem FMOH revised the outpatient visit per capita definition so as to incorporate every patient or client who visited the health facility is included (30). The other thing may possibly be methodological difference specially in annualizing of outpatient visit.

Regionally the mean number of outpatient visit is slightly higher in SNNPR (1.925) following Oromia (1.914) and Amhara (1.907) and relatively lower in afar region (1.774). Health Center visit is lower in Addis Ababa (0.505) followed by Tigray (0.549) and higher in Gambella (0.894) and Afar (0.805). Hospital utilization is benefiting Addis Ababa (0.423) in contrast Benishangul region has a very low hospital visit (0.05), followed by Gambella (0.089) and Somali (0.094). Total Health service utilization is higher in Addis Ababa with mean utilization frequency of (3.02) followed by Tigray (2.79) and lower in Ethiopia Somali region (1.76).

Table 2 Health Service Utilization by Household Characteristics

	Outpatient	Inpatient	Health center utilization	Hospital utilization	Total health service visit
Residence					
Urban	1.859	0.099	0.569	0.271	2.715
Rural	1.917	0.053	0.703	0.097	2.079
Region					
Tigray	1.849	0.086	0.549	0.279	2.749
Afar	1.774	0.094	0.805	0.146	2.278
Amhara	1.907	0.071	0.682	0.107	2.234
Oromia	1.914	0.052	0.664	0.122	2.178
Somalie	1.872	0.046	0.724	0.094	1.761
Benshagul Gumuz	1.871	0.049	0.790	0.050	1.908
SNNPR	1.925	0.071	0.665	0.147	2.109
Gambela	1.868	0.012	0.894	0.089	2.232
Harari	1.898	0.103	0.657	0.257	2.366
Addis Ababa	1.858	0.096	0.505	0.423	3.209
Diredawa	1.801	0.092	0.687	0.276	2.170
Wealth Quintiles					
Lowest	1.786	0.105	0.692	0.128	2.448
Second	1.908	0.071	0.670	0.164	2.534
Middle	1.897	0.058	0.639	0.126	2.185
Fourth	1.904	0.054	0.691	0.113	2.015
Highest	1.918	0.073	0.642	0.204	2.338

Utilization by individual characteristics (sex, age and education level) is presented in Table 3. There was no significant difference in OPD visit between male and female but slightly higher IPD visits by females. The health center was more visited by females while hospitals were preferred by male.

The total health service utilization is less frequent among age of 6-14 years (1.77) and more frequent by people age 65 and above (3.00) compared to other group on the other hand use of inpatient and outpatient service was not associated with increasing age.

Illiterate people use no inpatient visit but on the contrary mean of total health service utilization shows higher use among illiterate people (4.44) following people with basic education which indicates that education does not have any effect in health service utilization.

Table 3 Health Service Utilization by Individual Characteristics

	Outpatient	Inpatient	Health center service	Hospital service	Total health service visit
Gender					
Male	1.916	0.061	0.652	0.162	2.144
Female	1.901	0.071	0.676	0.149	2.354
Age					
0-5	1.914	0.035	0.762	0.109	2.077
6-14	1.945	0.042	0.698	0.086	1.770
15-19	1.931	0.039	0.682	0.089	1.978
20-24	1.913	0.108	0.677	0.115	2.206
25-29	1.890	0.085	0.745	0.153	2.348
30-34	1.888	0.090	0.743	0.158	2.167
35-39	1.863	0.093	0.640	0.226	2.392
40-44	1.890	0.073	0.715	0.105	2.498
45-49	1.851	0.054	0.490	0.204	2.365
50-54	1.843	0.091	0.620	0.206	2.529
55-59	1.837	0.088	0.600	0.222	2.959
60-64	1.798	0.052	0.524	0.356	2.713
65+	1.846	0.070	0.582	0.240	3.004
Education level					
Elementary	1.919	0.060	0.653	0.135	2.089
Secondary	1.896	0.114	0.552	0.251	2.374
Certificate	1.777	0.119	0.541	0.242	3.194
Diploma	1.870	0.094	0.499	0.387	2.642
First degree& above	1.872	0.090	0.704	0.143	2.510
Basic education	1.877	0.176	0.514	0.207	3.530
Illiterate	1.911	0.001	0.631	0.369	4.439

4.3 Inequalities in Health Service Utilization

Inequalities in health service utilization focus on the distribution and the size of inequalities in use of specific types of health care utilization between the poor and better off. ADePT analyzes health service utilization by standardizing the confounding factors like age and gender. Table 5 below shows the distribution of health care utilization by wealth quintile. The average number of OPD visits among the lowest quintile is 1.74 and for the highest quintile are 1.86 visits per person. The average number of IPD admissions is 0.069 for the lowest quintile and 0.085 admissions per person for the highest quintile. Highest mean utilization of IPD is observed in the fourth quintile (0.12) followed by middle (0.10) indicating a tendency of greater utilization by the richest quintile having a CI of 0.009. From the table we can understand that except the less utilization by the lowest quintile, OPD is more frequent among the second poor and the medium than the highest quintile where the cumulative effect makes it pro poor with a concentration index of -0.005.

The average number of hospital visit is higher among the rich (0.267) and lower among the poor (0.250) having a CI of 0.189 while health center service visit is more frequent among the poor than the rich with -0.063 CI indicating that health center use is benefiting the poor while hospital service is benefiting the richest population. The overall health service utilization is showing a few higher frequencies among the richest quintile relative to the poorest with a positive CI (0.067).

Table 4 Inequalities in Utilization, Indirect Standardization

Indicator	Lowest	Second	Middle	Fourth	Highest	Total	CI
Outpatient visits	1.740	1.858	1.872	1.847	1.863	1.852	-0.005
Inpatient visits	0.069	0.104	0.089	0.116	0.085	0.091	0.180
Health center utilization	0.597	0.710	0.631	0.695	0.647	0.654	-0.063
Hospital visit	0.250	0.220	0.164	0.138	0.267	0.209	0.184
Over all health service visit	2.648	2.756	2.494	1.949	2.849	2.501	0.067

4.4 Inequity in Health Service Utilization

Total inequality is divided by inequality (justifiable) and inequity (unjustifiable). Inequality measures (income or socioeconomic status), differentiated from inequity is part of inequality that is considered unjustified. Health determinants are separated into two categories: standardizing and control. Standardizing variables, such as age and gender are determinants of health considered justified. On the other hand, control variables wealth, residence, region, and education are factors whose relationship with health is considered unfair or inequitable (31).

The decomposition of CI quantifies the degree of socioeconomic inequality in health service utilization. The CI is directly related to the concentration curve which illustrates whether or not inequality exists for a health variable. The decomposition of the health concentration index by health determinant (age, wealth, residence, region, gender and education) is presented in table 4.

In OPD visit and total health service utilization, age has contributed about 0.010 and 0.013 respectively and also -0.026 for hospital and 0.006 for HC visits as well but we can say that the age contribution for IPD visit (0.001) is almost none. Gender has a negative contribution for OPD and hospital visits, it also has a positive contribution for IPD (0.022), HC visits (0.015) and for total health service utilization (0.011). Negative value indicates the contribution of age or gender is more concentrated among the poor and vice versa for positive value

The total inequity for OPD and health center visit is negative that has a pro-poor distribution, having the same contribution of the unjustified inequality of residence (-0.002) and wealth (-0.004) for OPD and also residence (-0,058) and education (-0.001) for Health center visit. Education has a very minimal negative contribution (-0.001) for IPD visits whereas has no contribution for OPD visit. Regional differences tend to concentrate utilization of services among the rich except IPD visit and the socioeconomic status-related inequity of all health services gives advantage to the rich except OPD visit,

The total inequity for hospital visit (0.184), IPD (0.180) and total health service utilization is (0.067) benefiting the rich with the positive contribution of control variable wealth (0.028, 0.041, 0.013), and residence (0.115, 0.089, 0.043) indicating that the contribution of the unjustified inequality is concentrated among the rich. The total inequality for hospital visit is concentrated among the rich with the same contribution of all control variables. Health center visit with the unjustified inequality of residence (-0.058) and education (-0.001) tending to benefit the poor.

Table 5 Decomposition of Concentration Index for Health Service Utilization
Linear Model

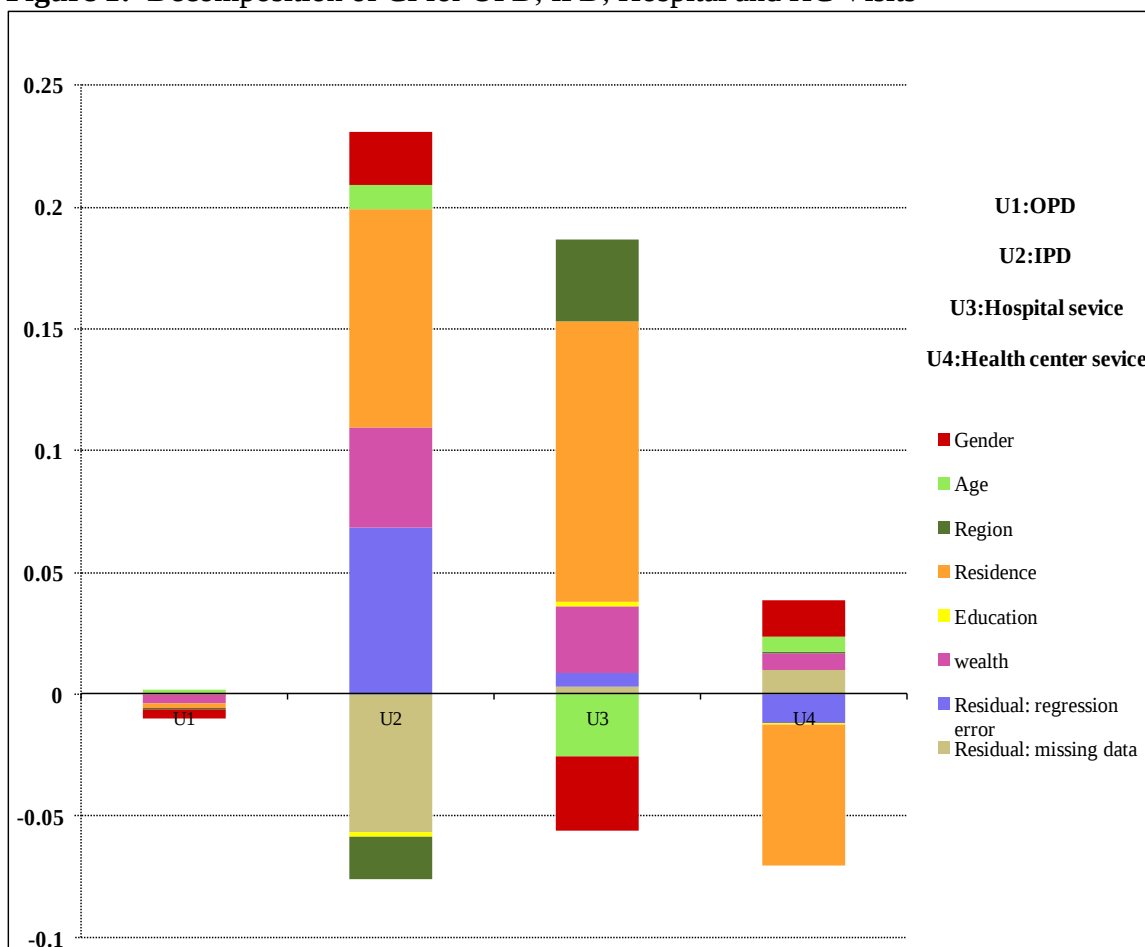
Indicator	Standardizing (Justifiable)		Control variables				Total Inequality	Inequity
	Gender	Age	Region	Wealth	Residence	Education		
Type of health service								
OPD	-0.004	0.001	0.000	-0.004	-0.002	0.000	-0.008	-0.005
IPD	0.022	0.010	-0.017	0.041	0.089	-0.001	0.155	0.180
Total health service utilization	0.011	-0.013	0.003	0.013	0.043	0.002	0.058	0.067
Types of health facility								
Hospital	-0.030	-0.026	0.034	0.028	0.115	0.002	0.131	0.184
HC	0.015	0.006	0.001	0.007	-0.058	-0.001	-0.032	-0.063

The decomposition of the concentration index across health center utilization, hospital utilization, OPD visit and IPD visits by various determinants (figure 1). The determinant variable is drawn above or below a horizontal line at zero, above the line indicates a positive contribution of the variable making the concentration index more pro rich; below the line indicates a negative contribution of the variable making the concentration index more pro-poor. The variable with a larger area in the graph shows that it has a greater contribution to

make the concentration index more pro-rich or pro-poor. The residuals show the part of the concentration index that is not due to the determinants.

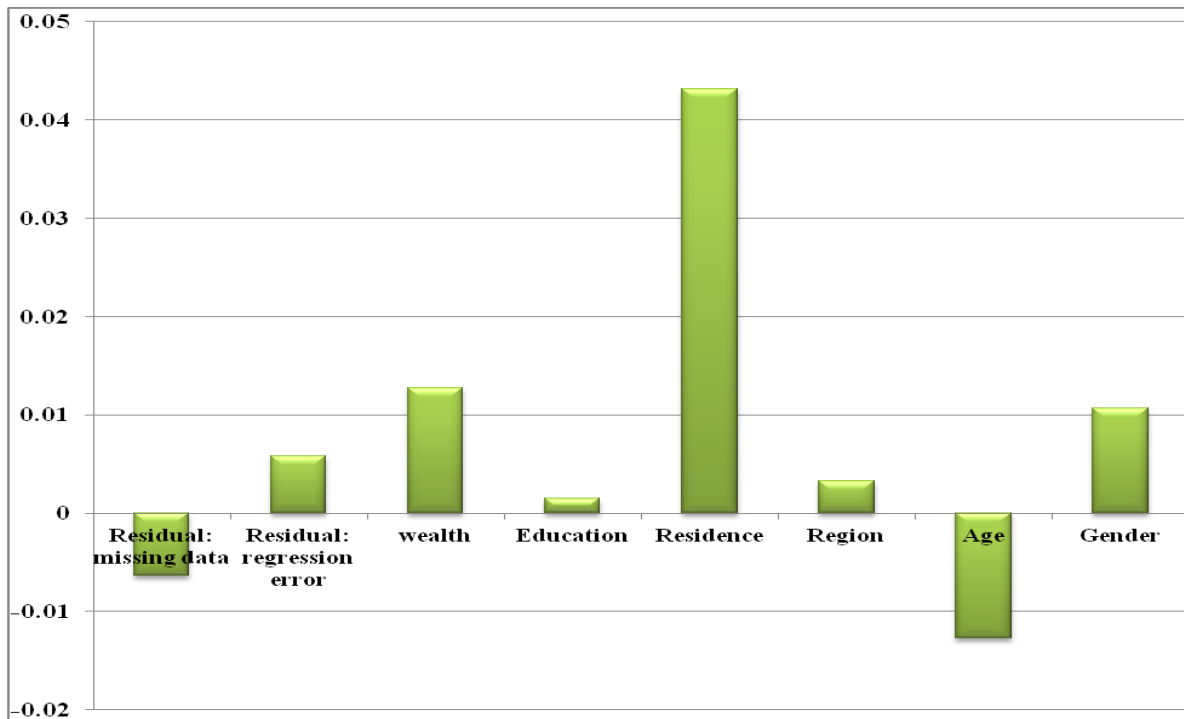
The residence and wealth status largely contribute to make IPD admissions and hospital visit more frequent among the rich and the opposite is true for OPD visit that contributed negatively. Similarly, residence contributed negatively for OPD visit and HC utilization. Regional differences have a negative contribution for IPD visit and positive for hospital utilization but don't have any contribution on OPD. On the other hand gender makes OPD and health center utilization pro-rich. The effect of the education has very little contribution in making the concentration index positive or negative.

Figure 1: Decomposition of CI for OPD, IPD, Hospital and HC Visits



The decomposition of CI for total number of health service utilization by the determinants variable indicates that residence contributes largely to make concentration index pro rich and also all other determinants have similar effect except age that contributed negatively (Figure 2).

Figure 2: Decomposition of CI for total health service utilization



4.5 Inequalities in Utilization of Public Facilities

The Distribution of health care utilization (OPD and IPD) by facility type (health center, Hospital) in terms of wealth quintile is described in table 6. The distribution is presented as percentage shares of total health care utilization by the given income quintile. The wealthiest quintiles have the largest share of hospital services (32.6%). The concentration indices are positive (0.1546 IPD, 0.1307 hospital service), indicating that the benefits pro-rich.

The share of outpatient visits is higher among the second quintile which accounts 25.2 % and the opposite occurs for the lowest quintile with 1.7 % visits that distributed mostly

among the poor. Inpatient admission remains in favor of highest quintile taking health care utilization share of 32.6% and the opposite is true for the lowest quintile 5.5%.

The concentration indices reflect similar patterns. The health services distributed at the health center level and OPD visits tends to favor the poor with a negative concentration index (-0.008,-0.0322). The positive concentration indices of Hospital level service and IPD admission (0.1307, 0.155) benefit the rich. The pro poor health center utilization has the same finding with the BIA study on health and education by Seifu that shows pro-poor primary health care service.(24).

Table 6 Inequality in Utilization of Public Facilities

Indicator	Lowest quintile	Second	Middle	Fourth	Highest quintile	CI
OPD	1.7	25.2	24.3	24.2	24.6	-0.008
IPD	5.5	27.4	22.5	19.4	25.2	0.155
Hospital service	3.3	26.0	20.1	18.1	32.6	0.131
Health center service	4.1	25.1	23.2	24.2	23.4	-0.032

4.6. Benefit Incidence of Public Spending on Health

Benefit-incidence analysis (BIA) tries to see whether there is a disproportionate benefit in public health spending among the poor or the better off household. To examine this BIA using ADePT constant unit cost assumption is used from the four different assumptions (constant unit subsidy, constant unit cost, proportional subsidy and proportional cost assumptions). Constant unit cost assumes that each unit of health service has the same cost but subsidy per unit of utilization is different.

In estimating BIA using constant unit cost assumption out of pocket payment needs to be deducted, however if user fee payment made is to fill gaps between cost of care and budget it could be ignored (12). In Ethiopia public facilities are not profit making, where

users are paying to cover only costs of services it may not necessary to deduct OOP. However in doing this BIA we deducted OOP because in survey used for this analysis, respondents were asked about cost incurred for medical consultations including medicine or tests prescribed even if purchased elsewhere. An estimated unit cost of services is deducted from the reported out of pocket payment from each individual and for a result where OOP payment is less than unit cost or become negative after deduction is taken as zero.

Benefit incidence result can be presented; either as a simple percentage share of total benefits accruing to each quintile or by means of concentration curves and indices. So this paper presents both to give clear highlight. The share of benefits across quintiles is a useful way of presenting the findings to policymakers to express the inequalities in benefits between socio-economic groups in a simple and visually appealing way (10).

The share of government spending in table 7 shows the majority of hospital spending share goes to the richest quintile (33%) while only 2.9 % goes to the very poorest quintile. Health center spending is concentrated to the second quintile and fourth quintile following the middle, and goes down to 4.1 % in the lowest quintile. The share of OPD and IPD service spending is more concentrated in the second quintile and least concentrated in the lowest quintile. In terms of health facility type the major share of hospital subsidy goes to the richest quintile (33%) and the poorest get the very lowest share (2.9%). The second and the fourth quintile get equal share of the health center subsidy still lowest subsidy at the lowest quintile of the population (4.1%). Government spends 60.6% to health centers and 39.4% hospital subsidy.

The government spending in service type inequality shows nearly two third of public spending share goes to OPD services, while 27.2% is for IPD. In general the share of government subsidy is very weak in the lowest quintile of the population and relatively highly concentrated in the second quintile except hospital service subsidy benefiting the richest quintile.

Table 7 Inequalities in public health spending.

Wealth Quintile	Health facility			Health Service		
	Health Center Service	Hospital Service	Total	OPD	IPD	Total
Lowest quintile	4.1	2.9	3.6	7.5	7.2	7.4
2	25.2	27.1	25.9	37.8	30.0	35.6
3	24.8	18.8	22.4	17.9	19.9	18.4
4	25.2	18.2	22.4	17.4	19.1	17.9
Highest quintile	20.7	33.0	25.6	19.5	23.9	20.7
Share in the total subsidy	60.6	39.4	100.0	72.5	27.5	100.0
Concentration Index	-0.058	0.103		-0.060	0.134	

Figure 3: Share of public health spending by service type

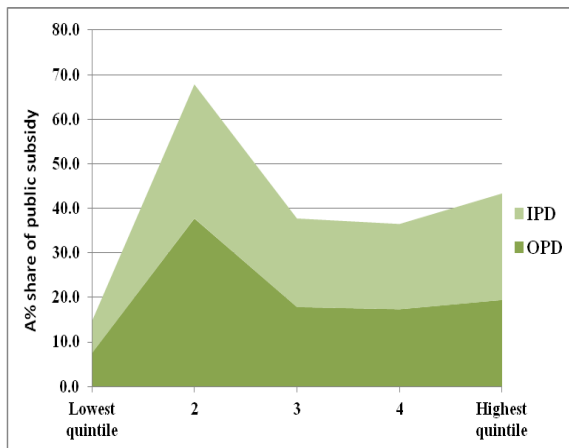
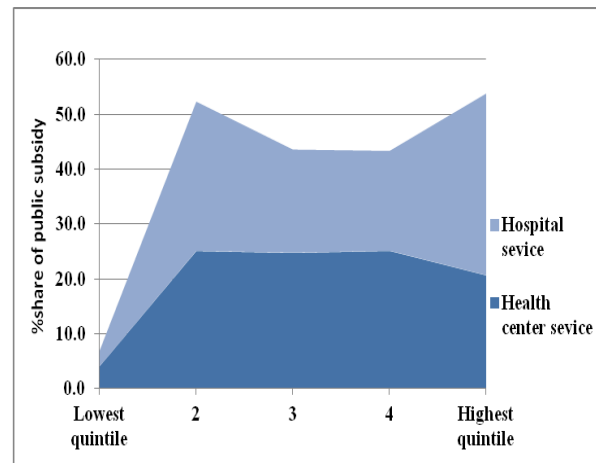


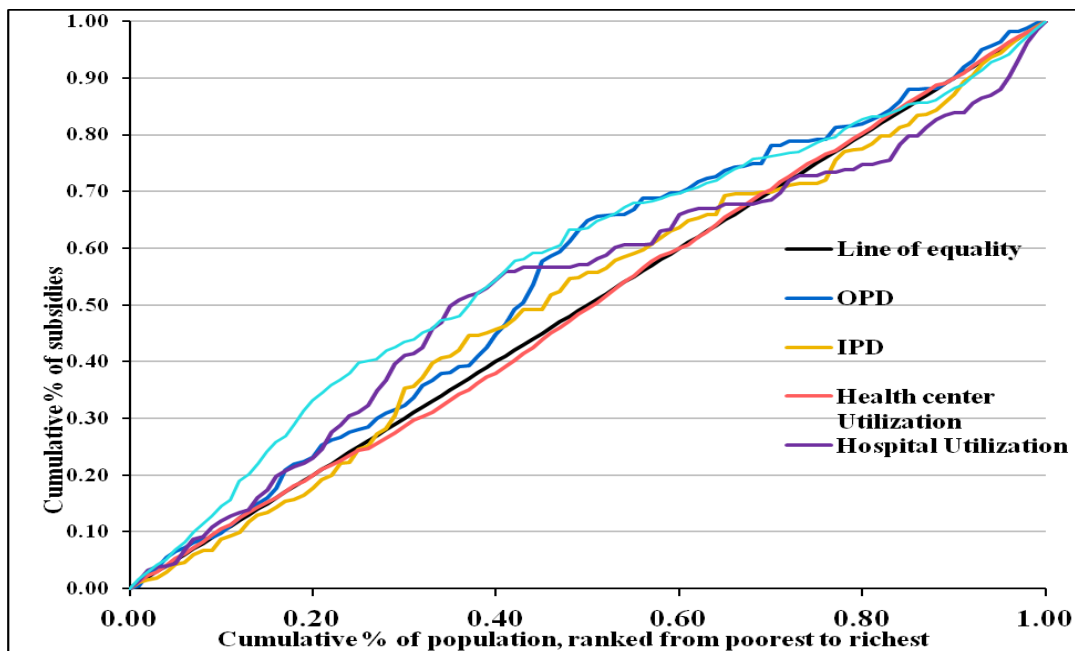
Figure 4: Share of public health spending by facility type



The concentration curve of public spending for outpatient visits. Inpatient visit, health center and hospital utilization is presented in table 6 below. The result shows that concentration curve of health center utilization is almost equitable having low utilization by the first quintile (Q1) having a concentration index of -0.058 and OPD visit are a bit

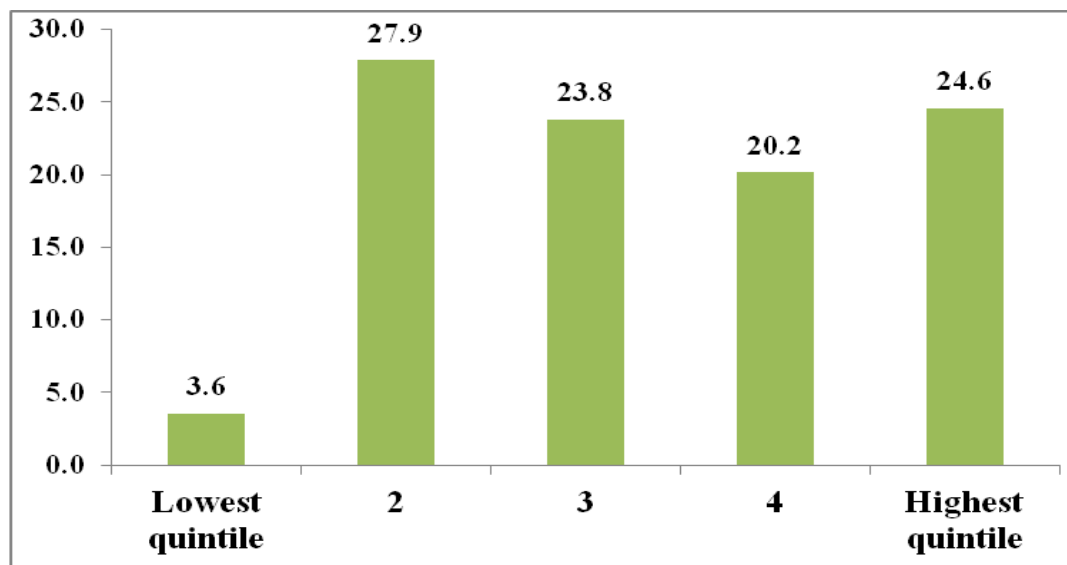
further above the 45 degree line of equality, benefiting poorer households receive with corresponding subsidy having a concentration index of -0.060. The concentration curve of hospital visits shows that it is disproportionately benefiting the highest quintile (Q5) and IPD curve concentration index indicates pro-rich bias with CI of 0.103 and 0.134 respectively unlike with that of health center and OPD. The result of OPD and IPD result is similar finding with the research conducted for developing countries that shows inpatient care is less pro-poor than outpatient care with varying inclination among countries (32). There is similar finding on subsidy to the health delivery level with the comparative analysis study done for sub-Saharan Africa Asia and Latin America indicated that in (Ghana, Kenya, Tanzania, Malawi, and South Africa), hospital level benefits are generally pro-rich, although the magnitude of inequalities differed across countries and primary health care services were largely pro-poor (14).

Figure 5: Concentration Curves of Subsidies of OPD IPD, Health Center and Hospital services



The result in figure 5 presents the share of public spending in total health service utilization. It is somewhat in favor of the poor where the second 20% of the poor receives more than one third (27.9%) of the government spending while less than 4% goes to very poorest of the population. The difference in benefit distribution is very huge between the first 20% of the population and the rest group unlike many other country studies. For instance in Malawi though the distribution of benefit across quintile is different the variation between quintiles is not much (16) another study conducted in south Africa where OPD and IPD is evenly distributed though inpatient care is less pro-poor than outpatient care.(18). Same variation is observed in Kenya where the poorest quintile received 2.5% share of outpatient benefits, compared to 63.5% received by the richest quintile.(33) In South Africa, the richest quintile received 42.1% share of inpatient benefits in tertiary hospitals compared to 2.5% share by the poorest quintile.

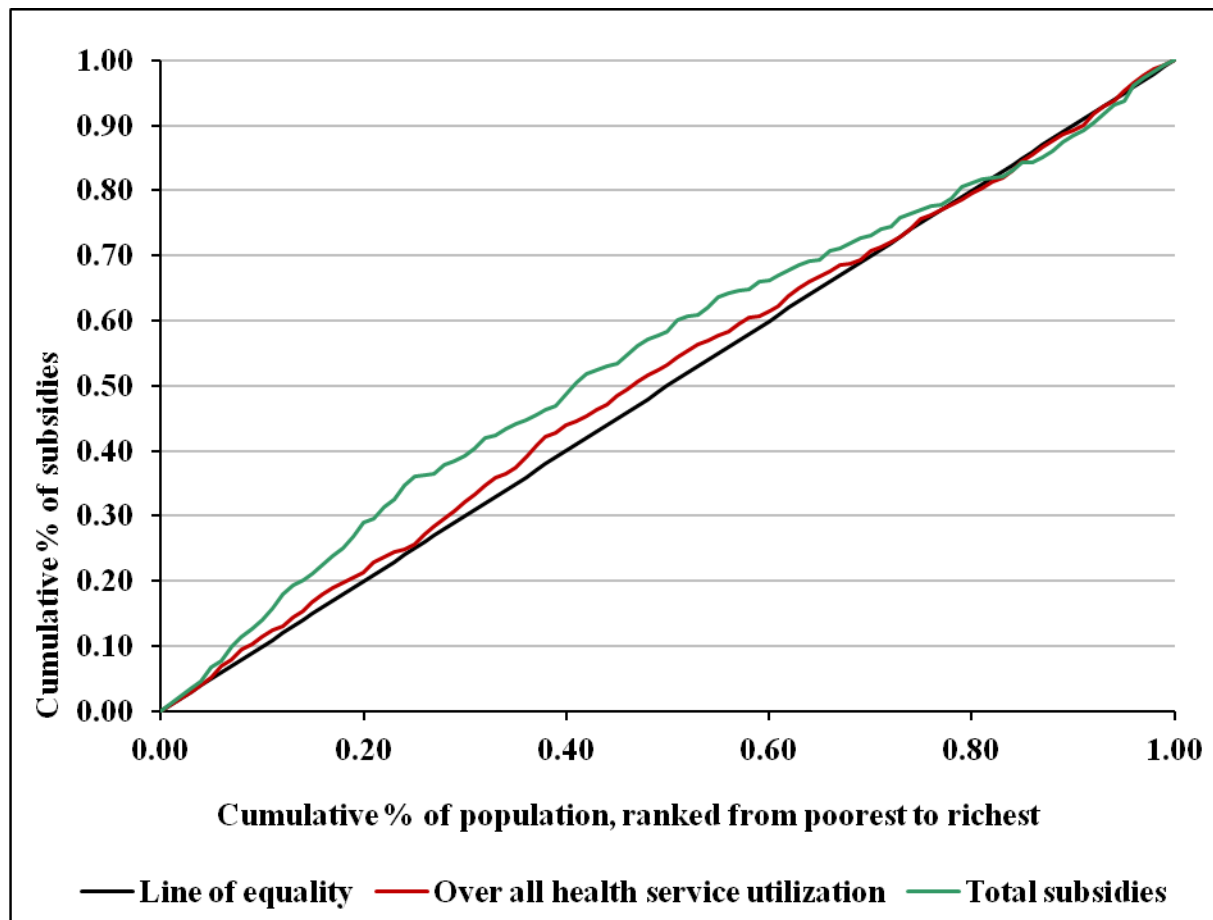
Figure 6: Share of public spending for total health service utilization



The public health spending for the over all health service utilization in figure 7 indicates that it is a bit above the 45 degree line with a little inclination in benefiting the poorest quintile with a CI of -0.039 regardless of the level and type of health care system. Studies shows similar finding in most developing countries the health spending is pro-poor. Thomas and James analyzed BIA for developing countries found that benefit incidence of spending on human

services, such as education and health, is pro-poor (32). There is opposite finding by Doris and Vincent where that total health system benefits in the African countries is generally found pro-rich (14).

Figure 7: Concentration Curve of Spending of Total Health Care Utilization



Chapter 5: Discussion

Different health inequality studies shows there exist large but varying inequalities in health across countries in the world where the rising average income certainly seems to be associated with rising health inequalities. Health inequality gap is wide in developed countries whereas Sub-Saharan Africa is somewhat less (15).

The benefit incidence analysis of this finding shows that in Ethiopia total public health spending is pro-poor with a little varying inequality in the health care systems and health service delivery unit. The health policy and strategy, the delivery system platform and demand empowerment system can be cited as a good achievement to shift the curve to make it pro poor.

Government legislation and policy affirms the right of every citizen, irrespective of geographical location, cultural background or economic status, to equal access to a national health system that provides health services for all in need of care. Accordingly, the Federal Ministry of Health (FMOH) has committed to improve the state of geographical inequality in the country and stipulated improving equity of health services by expanding primary services along with higher allocation of budgets for PHCUs as one of the transformation agenda and implementation and scaling up of high impact maternal and child interventions focusing on primitive, preventive and curative health care services through its national twenty-year health sector strategies (HSDP and HSTP) (5).

The health delivery system defined different packages of activities at different tier/level/ of health care delivery system facilitated to provide equitable and quality care across the country, and also implementation and increased coverage of high impact interventions that led to reduced Infant mortality, child mortality, maternal mortality, and increased utilization of all primary essential health services makes the health center subsidy to be pro poor.

To creating awareness and demand for health care services for the community, the Health Extension Programme (HEP) played a pivotal role in improving accesses to essential services by delivering cost-effective basic services to all Ethiopians, mainly women and children in rural poor community. In addition Community Based Health insurance (CBHI) increased health service utilization of poor community that covers the medical and drug supply at affordable cost.

Outpatient services and health center utilization has pro poor while hospital utilization and inpatient services tend to favor the wealthy. The pro rich result of hospital service and inpatient visit are interrelated since most of the inpatient service is given at hospital level. The cause of the pro rich inequality of hospital-based care could be most of tertiary and secondary hospitals are located in urban areas where rural and poor are less likely to have access to the service due to poor infrastructure, transport problem and ability to pay for direct and other indirect health costs, Whereas the poor use the nearby health centers. This finding is similar with study conducted in India where in inpatient and hospital service is pro-poor in one the study region (34)

Looking the types of services and health service delivery type, outpatient visit and health center utilizations are pro-poor while IPD and hospital service is in favor of wealthy with a very high decomposition effect of wealth and residence to make the CI of hospital service and inpatient visits positive.

According to the health management information (HMIS) data most of the OPD service is conducted at health center level and at the same time majority of government health centers located in rural area to address the poor community this might be the cause for the BIA result to be found pro poor OPD and health center visits.

Education doesn't show any effect in health service utilization that could be because of the government undertaking in strengthening the health center health post linkage to provide essential health services through community centered household package which

address the rural community where most of them have low education level and another possibility could be because educated people may prefer to use private facilities.

In Ethiopia government subsidy is one of the most common ways of health service expenditure used to improve equity in access to health service. The government allocated 60.6 % of the health expenditure to health center and 39.4% to hospital. The share of government unit subsidy is higher at hospital level (76.3, 2018.4) while health center (67.4, 187.5) for OPD and IPD services respectively. In addition more than two third of government spending is concentrated on OPD (78.5%) relative to IPD (21.5%).

There is disparity in health service utilization by residents where urban residents use higher IPD services and hospital while lower use of health center and OPD. The higher utilization of inpatient and hospital service by urban population has a similar result with study for Afghanistan (35) and different from Malawi study (16). where rural residents use more than urbanities The lower health service utilization is registered in Ethio-Somali region and the next lower in Benishangule while higher health service utilization in Addis Ababa followed by Tigray region.

In general though the benefit incidence analysis shows pro poor, public health spending interns of socioeconomic inequality shows that the very poor who belongs to lowest quintile are still the very disadvantaged people in benefiting public subsidy.

This Benefit incidence analysis is the first of its kind and we provide evidence using accepted economic analysis software using large sample size and data quality. Moreover multiple data sources were used and cross checked. However there are some caveats in this study which needs careful consideration in the interpretation of the results from this study.

First in this study we used secondary data which is difficult to disaggregate up to the interest of this study, Therefore the analysis did not provide whether or not a particular service is 'pro-poor' or not at different level of health service delivery unit and also urban

rural residents since we don't have disaggregated subsidy for each service type and residence.

Secondly the seasonal effects did not taken into account in annualizing outpatient visits. So this might cause over or underestimate health service utilization for some areas.

Third the common BIA assumption used in this analysis is that the unit cost per service is the same across all income groups, which might not likely to be true.

The methodological limitation in benefit incidence analysis is that it does not provide specific reasons for incidence outcomes, particularly as they involve individual behavior. However understanding the specific cause would have been important to provide evidence which helps for decision making and policy design.

Chapter 6: Conclusion and Recommendation

6.1 Conclusion

The main objective of this study is to estimate inequalities of public health spending across socio-economic group. This benefit incidence analysis result finds pro poor public health spending in Ethiopia during the study period. The inequality by service type and by type of facility shows that health center and outpatient service has become pro-poor in lesser extent while for hospital and inpatient visit continues to be pro-rich.

On the other hand 20% of the lowest quintile is getting the lowest share (3.7%) of government health subsidy (HC 4.1% & hospital 2.9%) on the contrary the highest public spending (27.9%) benefiting second poorest quintile (HC 25% & hospital 27%). Government unit subsidy at hospital level is high 75.4 ETB for outpatient visit and 2018.6 ETB for inpatient compared to health center subsidy 67.4 ETB for outpatient visit and 187.5 ETB for inpatient. Nearly sixty one percent share of government spending allocated for health centers and 39% goes to hospital.

6.2 Recommendation

The Significant efforts that has been made by the government to make pro poor distribution particularly for primary health care services towards restructuring health financing arrangements has shown a positive result in meeting the objective and it should be maintained and shall also be expanded to the hospital level

In Ethiopia increasing share of health spending at PHCU level may not be the only solution for the poor to get access to all level of health facilities there are other barriers needs to be look at beyond the health system. So problem like social, cultural and infrastructural problem should be minimized through multi-sectoral engagement by

aligning plan with concerned stakeholders to create accountability and establish a strong monitoring and evaluation system.

Fee weaver system is one of the health care financing strategy being implemented as a mechanism to ensure the equity of health services to those segments of the society who are not able to pay for their health care needs but the result indicates that people belongs to the very lowest quintile are not benefiting from the government subsidy Therefore, the illegible indigent targeting and selection process should be reviewed in such a way that accountability and transparency is in place. And also there should be a continuous awareness creation activity by establishing community forums with health facilities and other strategies so that the poor can benefit from the free services.

Although in Ethiopia, the overall public health expenditure appears to be pro---poor, much more effort is required in making in patient care and hospital service utilization in rural areas accessible to those in lowest quintiles. by reducing geographical barriers (2) greater efforts to improve the quality and performance of public facilities.

Promote for the health insurance system to have a bigger pool for cross subsidization among members and also encourage all partners and donors to pull their money in the insurance pool in order to benefit all in every health program without disparity instead of investing in specific program.

This research is very informative and complimentary to the existing studies but it is also believed that further research should be done to see the potential barriers preventing the poorest of the poor from benefiting the government health subsidy and also regional service level and health service type inequality should be investigated to identify problem in response to alternative program that could lead to more effective policy making.

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DECLARATION

I declare that the thesis entitled “Inequality in Benefit Distribution of Public Health Expenditure in Ethiopia” is my original work; which has not been presented in AAU and/or another university. I also declare that the sources of material used for this thesis have been fully acknowledged.

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This thesis work has been submitted for the examination with my approval as a university advisor.

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