



Jimma University, Institute of Health, Department of Health Economics,  
Management, and Policy.

Hidden Costs of Institutional Delivery and Associated Factors in Bale Zone Public  
Hospitals, Oromia Region, Southeast of Ethiopia.

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Ethiopia.

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.

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## Abstract:

**Background:** Reduction of maternal mortality is one of the priority goals on the international agenda like Sustainable Development Goal and others. For attainment of maternal mortality reduction goal several interventions were applied in Ethiopia. Of which, decreasing barriers of maternal health service including institutional delivery for free is implemented. However, the hidden cost of institutional delivery which retracts the poor households from using the service is not official accounted in hospital cost to devise policy implication for enhancing national coverage of institutional delivery.

**Objective:** To estimate the hidden costs of institutional delivery and associated factors in Public Hospitals of Bale Zone, 2018.

**Methods:** Institutional based cross sectional study design was employed from August 13 to September 9, 2018. The data were collected through structure questionnaire & face to face exist interview was employed. Bottom-up and Human capital approaches method were used to estimate the cost. The consecutive sampling technique was used to select the study participants. Multiple linear regression analysis was done to identify significant predictors. Significant independent predictors were declared at 95% confidence level & P-value less than 0.05.

**Result:** Out of the total 390 mothers who were planned for the study 390 were successfully interviewed, yielding the response rate of 100%. The total median of non-medical cost was 14US\$ [95% CI: \$13-15], the median of direct medical cost of drug expenses from private pharmacy 4.7UD\$ [95% CI: 3.7\$-5.7\$] and the median of indirect cost was 9.7US\$ [95% CI: 8.7\$-10.6\$] respectively. The median of total hidden costs expenditure was 25.5US\$ [95% CI: 23.8\$-27\$], indicating that in median patient expenditure was equivalent to 2% of annual family income. Distance from the hospital [P=0.0001], length of stay in hospital [P=0.0001], mode of delivery [Instrumental, P=0.003, Caesarean section P=0.037], family monthly income [P=0.0001] were significantly associated with hidden cost. The adjusted R<sup>2</sup> value for this model was 53.6%.

**Conclusion:** The finding of the study suggested that, the half percent of the mothers were incurred high total hidden cost. Direct cost of drug expenses from private pharmacy was low percent accounted from the total hidden cost. Length of stay, mode of delivery, family monthly income, and distance were significantly associated with the hidden cost institutional delivery.

**Key word:** Hidden cost, Institutional delivery, Hospital, Oromia.

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## Acronyms/Abbreviation

BSc .....	Bachelor Science
EMONC.....	Emergency Obstetric and New Borne Care
ETB.....	Ethiopian Birr
FMoH.....	Federal Ministry of Health
GDP.....	Gross Domestic product
ID.....	Institutional delivery
Km.....	Kilometric
LOS.....	Length of Stay
MHC.....	Maternal Health Care
MLR.....	Multiple Linear Regression
MMR.....	Maternal Mortality Ratio
OOP.....	Out of Pocket Payment
SPSS.....	Statistical Package for Social Science.
SSA.....	Sab- Saharan African
USD.....	United States Dollar
WHO .....	World Health Organization

## CHAPTER 1. INTRODUCTION

### 1.1 Background

Globally, maternal mortality ratio is estimated to be 216 maternal death per 100,000 live birth with, majority (99%) of the death occurring in developing countries especially Sub Saharan Africa, where 66% of the maternal death occur(1).

This shows that women in the developing countries continue to lose their lives due to preventable cause of pregnancy & delivery complication. The World health organization (WHO) has made a call to reduce global mortality rate to less than 70 per 100,000 live birth by 2030(2). Furthermore a supplementary National target was made that no country should have twice the global average by 2030(3).

The safe motherhood initiative strongly emphasizes ensuring the availability and accessibility of skilled care during pregnancy and childbirth, of which institutional delivery is one element. Hence, an important component in the effort to reduce the health risks of mother and children is to increase the proportion of baby's delivery in a safe and clean environment and under the supervision of health professionals. Delivery by skilled birth attendants is the solution to maternal mortality reduction. Many countries in the past have introduced free maternity services to increase deliveries by skilled birth attendants(4).

Despite the progress made in many countries on increasing the availability of maternal health care, the majority of women across Africa remain without full access to this care. Countries face a variety of obstacles to improved maternal health: insufficient data prevents ministries from implementing programs most effectively, while cost and other access issues prevent women from using the available resources(5).

According Study conducted in African, 147,741 maternal death occurred in 45 African countries, that resulted in a total non-health GDP loss \$45billions, from this 30.6% was accounted by lower income country(6).The hidden costs of institutional delivery service are costs which, are not officially accounted on institutional delivery cost and which, includes the purchasing of drugs from private pharmacies, food costs and drinking costs, lodging cost, transportation costs, loss of wage by both the patient and the patient's accompaniers during the health institutions stay(7).

The mean out of pocket health expenditure incurred during delivery was quite high. Majority (81.2%) of the households suffered from catastrophic healthcare expenditure during delivery(8). The hidden costs of free maternity services at government facilities call for improvement in the quality of care and infrastructure at the existing public-health facilities, increased vigilance to avoid corruption, and to make 'free' services more accessible for the needy(9).In other ways, hidden costs could be a significant barrier to institutional delivery for women from poor household and women come from remote area(10).As study, estimate total of \$95 million and \$85 million are lost each year in Ethiopia and Uganda respectively due to poor maternal health service(11).

In our country, utilization of maternal health services is extremely low and, although government decree against charging for maternity service but, free maternity care is implemented in health facilities even though more than one third of the beneficiaries did not utilize their exemption for health service use in public health facility. they fail to use this opportunity as a result of drug stock –out, forcing the patient to buy medication conventional store that are expensive and procedures in public health facility and challenges of high non-medical cost(12,13).

The other, more than 2 in 3 women (70%) report having at least one of the specified problems in accessing health care. Among these problems, getting money for advice or treatment was the leading issue (55%), followed by the distance to a health facility (50%), not wanting to go alone (42%), and getting permission to go for treatment (32%)(14).

## 1.2 Statement of the problem

Globally, in order to reduce maternal mortality rate & improve maternal health, women need access to effective intervention & high quality reproductive health care. Many countries have implemented program to expand access to intervention in order to ensure delivery by skilled birth attendants. Despite increasing coverage of delivery by skilled birth attendant both globally & in several region coverage is still only 51% in the world health organization African region & in low income country(15).

In our country according to Ethiopian demographic survey revealed that, institutional delivery no more improvement through the year ;5%,10% and 26% in the year of ,2005,2011 & 2016 respectively. No substantial reduction in home or unskilled deliveries was observed, especially in the rural community of Ethiopia in which urban births are more likely than rural births to be delivered in a health care facility and maternal mortality rate in Ethiopia is 412 per 100,000 live birth. One critical strategy for reducing maternal morbidity and mortality is to ensure that every baby is delivered in a health care facility with the assistance of a skilled health care attendant(14).

The fee exemption for Caesarean sections does not protect households from catastrophic expenditures. One of the reasons, women were often handed prescriptions for drugs that are not included in the Caesarean kits provided by the government and paid for the drugs out of pocket(16).Some findings show that removing user fees at health facilities does not remove all financial barriers to accessing skilled birth care. Non-medical expenses such as transportation cost for patients and persons accompanying them, loss of wages also discourage the poor from seeking care (17).

According to study conducted in tertiary hospital of western Nepal the average cost of institutional delivery was (38.1 US \$) while average hidden costs were (267.6 US\$) which was 87.5% of institutional delivery expenditure and the earnings lost by respondent women, husbands, and heads of household were (58.4US\$),(72.9 US\$), and (60.6 US\$), respectively (7). In this study method of analysis that utilized to identify the predictors not considered rather than only seeing association. And also it only covered urban area it is not involved mothers that came

for service from rural area. But our study considered both urban and rural mothers came for giving birth during the study period.

Even though, poor household woman faces a significant economic impediment in accessing health services during delivery due to hidden costs. Therefore, it is not enough to view institutional delivery from provider's perspective alone. An account of hidden expenditure for pregnant women to attend urban institutions during delivery can reflect the real scenario of economic burden for pregnant women(18).

Study conducted in Madagascar show that non-medical costs, payments for food and transportation during hospitalization accounted for 21.0% out-of-pocket payments for women however in this study indirect costs are not addressed (19).The study conducted in Northern Ghana on operations of the free maternal care policy suggested that, out of pocket payment during child birth the overall mean of out of pocket payment 17\$ ,which was constituting 5.6% of the average monthly household income(20).

In this study indirect cost was not addressed rather than direct medical cost and direct non-medical cost. Study in eleven administrative region of Ethiopia reported that distance and cost were the major constraint of in using health facility for delivery (21).Even though free maternity launched in our country, till mothers incurred the cost which is categories under the hidden cost. Coming to study area, till their no study conducted on hidden cost of institutional delivery. Hence this study was employed to estimate the real cost that incurred by institutional delivery.

### 1.3 Significance of the study

Improving maternal health, reducing maternal mortality & morbidity are a top agenda for the Government of Ethiopia. So, hidden costs which are usually unaccounted in health facility costs were barrier to pregnant women those seeking to delivered at health facility. To that end, this study is conducted to generate information on factors that contributing as women incurred cost during institutional delivery. Knowing this information from this study will be used to identify areas where hidden costs could be reduced and where output or productivity could be increased.

This study can help health policy makers to direct the necessary programs to improve institutional attendance that might ultimately improve mothers and child health. In addition to this the importance of the study will elucidate contextual factors that associated with hidden costs. Moreover, it can help for strengthening and implementation of appropriate obstetric care and it may encourage other researchers to carry out a more extensive research in similar setting issues and Finally the finding of this study will help researchers to use it as a baseline source for further studies.

## CHAPTER 2. LITERATURE REVIEW

### 2.1 Clients perspective cost estimation of institutional delivery

#### 2.1.1 Overview of institutional delivery

Globally, 303,000 mothers died of complication of pregnancy and child(1). In 2015, maternal death related to delivery accounted to 830 per day(22).

Though global institutional delivery service has been seen an improvement from the 1990s coverage there are still greater disparities across the region. Worldwide about 81% & 61% of skilled birth attendants were found in Urban& rural respectively. Whereas in Sub-Saharan countries the resource limited approximate of 75% Urban & 40% the rural taken place at health facility. In Ethiopia, institutional delivery service is found to be the lowest in the world(23).

Nearly 75% of them had taken place at home without the assistance of skilled personnel. Only a significant amount of deliveries (79%) were attained in urban facilities and the rural were in the lowest percentages (21%)(14). Investing in maternal health is a wise health & economic policy decision. Both overall resources and government health spending remain crucial gaps in addressing maternal health. The United Nations Secretary General, Ban Ki-moon, estimates the global financial impact of maternal & newborn death to be \$15 billion per year in lost productivity(24).

#### 2.1.2 Globally cost of institutional delivery

According to the World Health Organization households spending more than 40% of their disposable income are considered to suffer financial catastrophe(25) As study conducted in western Nepal suggested the median of hidden cost of institutional delivery expenditure was 259.9 US\$ and Also the mean of institutional delivery expenditure on food and transportation were 5.07% and 7.3% respectively(26).

In this study methods of analysis was no more elaborated rather than only dealing with ( $X^2$ ) or association. As study conducted in India revealed that even though service at public health facility are supposed to be provided free of cost, the median out of pocket direct expenditure institutional delivery was accounted 11.48\$(27). Finally the average cost of normal vaginal delivery & caesarean section delivery in Pakistan was 79\$ and 204\$ while maternal health care is supposedly free(28).

### 2.1.3 Direct cost of institutional delivery

Most of the efforts designed to reduce inequities in maternal health in low income countries have been focused primarily on averting maternal death. As the study conducted in northern Ghana, the mean of direct non-medical cost was 11.10\$ & the median Transportation cost was 13.48\$ per person representing 32% from the total cost. The other also, median expenditure made on food for both patient and caretaker was estimated at US\$9.47 per person (20,29).

The other study conducted in Peri-urban Accra, Ghana from the total cost incurred by Women who delivered at health facility, direct non-medical cost such as food and transportation cost were 18% and 27 % respectively(30).The study conducted on hidden cost of a free Caesarean section policy in Mali suggested that ,transportation cost & food expenses cost were 14% and 16 % respectively(31).As study carried out in Northern Nigeria suggested that, from the direct non-medical cost, transportation costs were accounted US\$75.07(32).

As study conducted in India revealed that even though service at public health facility are supposed to be provided free of cost, the median out of pocket expenditure institutional delivery was accounted 11.48\$(27).There was a factor that hinder as not mother delivery under the supervision of health professionals in health institutions, from that Cost of normal vaginal delivery such as indirect cost, direct non -medical cost were 26.7% and 28.46% respectively and also the cost of caesarean section delivery such as ,direct non- medical, indirect cost was 29.67 % and 46.7% respectively(18).

The study conducted in Morocco suggested that, Food and opportunity costs also represent an extra cost for the family. Seventy-seven people spent money to buy extra food during the women's stay in hospital after the operation, the majority of these expenses were made from the third day after admission. The cost of extra food was US\$16 (95% CI: 11-20) for the SEGMA hospitals and US\$5 (95% CI: 0-10) for the university hospital. The majority of careers (64%) and 100% of women saw no reduction in their financial resources as a result of their temporary cessation of work due to hospitalization. For the 32 careers involved, the costs amounted to US\$24 (Standard deviation US\$14) on average. This the study use non-parametric test of statically analysis, this not more elaborated which one cause the other (33).In our study parametric analysis test is utilized.



According to health care financing proclamation, in Ethiopia Health facility should be providing maternity services free of charge, including drugs and supplies, however study done on EMONC Assessment in Ethiopia shows that the average cost for normal, instrumental and cesarean delivery was US \$4.7, US \$5.6 and 13.5 respectively. Even though, it is assumed that maternal health services are free of charge; most of the mothers are paying for the services. Other study conducted in Ethiopia Suggested that among the women who faced complication during delivery (29.7%) of them paid out of pocket to get medication(13,34).

#### 2.1.4 Indirect cost of institutional delivery

Indirect cost refers to resources lost as a result of the treatment and illness that involve morbidity and mortality. This includes both paid and unpaid productivity loss such as temporary sickness absenteeism. In line with prior research using the human capital approach a most commonly used method of calculating indirect cost in cost-of-illness studies, which estimates the value of human life as the value of the output produced by the individual over his/her lifetime expressed as a function of the individual's earnings in this study wage loss was defined absence of from daily work due to coming Hospital(35).

As study conducted in India indicated that, mean of indirect cost of institutional delivery was 4.3USD. The other median of indirect cost attributed to productivity losses/wage loss was estimated at US\$5.2 per person (18). As other study done in Western Nepal suggested that the mean loss of earnings for normal and Caesarean section deliveries were (84.1 US\$) and (81.9 US\$), respectively, which showed that loss of earnings by pregnant women during delivery was one of the important contributors to higher expenditures and, even though maternity services provided by the health institutions were free of costs(26).

#### 2.2 Factors associated with hidden costs of institutional delivery.

Cost burden was the barriers that make pregnant mother not served at hospital, whoever in a most African countries free maternity service was implemented. Study conducted in Western Nepal, shows that hidden cost had a statistically significant association with places of delivery ( $p = 0.0001$ ), modes of delivery ( $p = 0.0001$ ), duration of stay in hospital ( $p = 0.0001$ )(7).

According to study conducted in Indian there is a challenge related to transport, women may

need to hire private vehicles, but some villages do not have access to these as backup and some family cannot afford this. The prices of private transport vary depending on the mode, time of day and distance, some state it can be as low as 1.5\$ and as high as 47 \$(36).

Other, study conducted in Mali shows that the mean transportation cost was US\$ 13.1 for women who lived 5 km or less from an emergency obstetric care center and US\$ 59.1 for those who lived 40 km or more from one(16). In Lao people's democratic Republic (PDR) one –third of women lived 6 km or more away from health facility and that most women were poor with less than 120 US\$ of monthly income(37).In Ethiopia stable maternal source of income was also significantly associated with institutional delivery. In principle, health care in Ethiopia for pregnant women is free. However, healthcare facilities seldom run out of stock, requiring a pregnant woman to incur some expenses for supplies or services. Besides, some women must pay transportation fare to travel from home to the health facility. Therefore, pregnant women with good sources of income are better able to pay for transport and unexpected healthcare facility costs(38).

## CONCEPTUAL FRAMEWORK

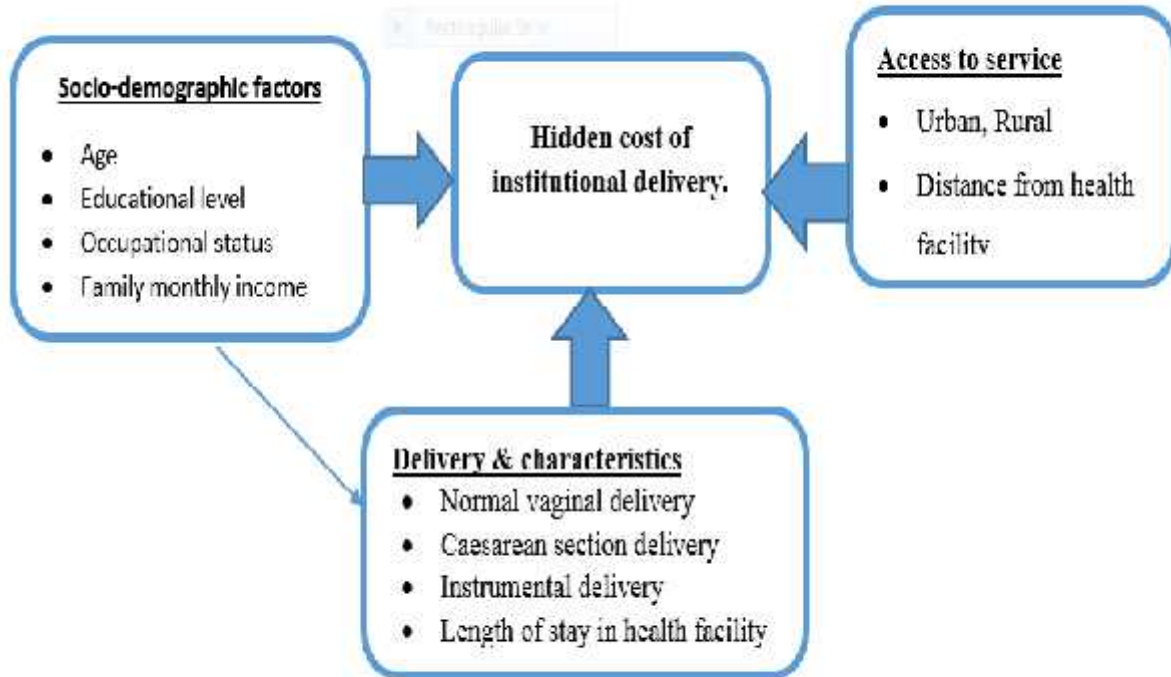


Figure 1: conceptual framework for hidden cost of institutional delivery( adapted after reviewing different literature) ,2018.

## CHAPTER 3. OBJECTIVE OF THE STUDY

### 3.1 General objective

To estimate hidden costs of institutional delivery and associated factors in Bale Zone Public Hospitals, 2018.

### 3.2 Specific objectives

To estimate the direct medical cost of institutional delivery.

To estimate the direct non-medical cost of institutional delivery.

To estimate the indirect cost of institutional delivery.

To identify the associated factors with the hidden costs of institutional delivery.

## CHAPTER 4. MATERIALS & METHOD

### 4.1 Study area and period

The study was conducted in Bale Zone, Oromia Regional state, southeast of Ethiopia from August 13 to September 9, 2018. The capital city of the Zone was located 430 km in the southeast direction from Addis Ababa, the capital city of the Ethiopia. Addition to this the Zone subdivided into 18 district and 2 town administration. Currently they had 4 functional public hospitals & 84 health centers. From this hospitals three were General hospitals and one was Referral hospital. Specifically, the study was employed in Goba referral hospital, Robe general hospital and Ginnir general.

The six-month actual data of each hospital, which had taken from health information system units indicate that, 798 mothers give birth at Ginnir Hospital, 1170 mothers were give birth at Robe hospital and 1800 mothers were give birth at Goba referral hospital. The three hospitals that were study employed in, give different clinical services for about more than 3 million people and other public health programs such as family planning, antenatal care, delivery, diagnosis and treatment of complicated cases for the catchments area of community [HMIS Bale Zone health department].

### 4.2 Study design

Institutional based cross sectional study design was employed.

### 4.3 Population

#### 4.3.1 Source population

All post-partum mothers who were found in Bale Zone, Oromia Region, southeast of Ethiopia.

#### 4.3.2 Study population

All post-partum mothers who were delivered in selected hospitals (Goba Referral, Robe Genera and Ginnir General) during the study period.

#### 4.3.3 Inclusion criteria

All mothers Who give birth in selected hospitals & who were willing to give information with oral consent in the study was included.

#### 4.3.4 Exclusion criteria

All post-partum mothers who were present in postnatal ward but didn't give birth at hospitals during study period were excluded.

#### 4.4 Sample size and sample procedure

##### 4.4.1 Sample size determination

The sample size was calculated using single population mean formula. Assumptions were taken from mean & standard deviation of drinking expenses from preliminary assessment one week before the main studies. The mean and standard deviation were 79.5birr and 65.5birr, respectively. d, assumed to be 6.5 ETB. Accordingly, the required sample size, n, at confidence interval of 95 %:

$$n = \frac{\left(\frac{Z\alpha}{2}\right)^2 \sigma^2}{d^2}$$
$$n = \frac{(1.9)^2 (65.5)^2}{(6.5)^2}$$
$$n = 390$$

Where: n= sample size

Z= Reliability coefficient for 95% confidence interval (1.96)

= standard deviation cost expenses for drinking (65.5 Birr)

d = 6.5 (assumed marginal error, equivalent to 0.24 USD)(39).

##### 4.4.2 Sampling procedure

The three hospitals were selected randomly by lottery method from the existing Hospitals. The total samples were allocated to the three hospitals according to six-month actual data report. In order to make sure sufficient sample size recruited for each hospital, proportional allocation formula was used. Finally, consecutive sampling technique was utilized to select the study participants.

$$n_i = \frac{nN_i}{N} \text{ where: } N_i = \text{Sample in each Hospitals, } n = \text{Total required sample in study,}$$

N =number of women in each group

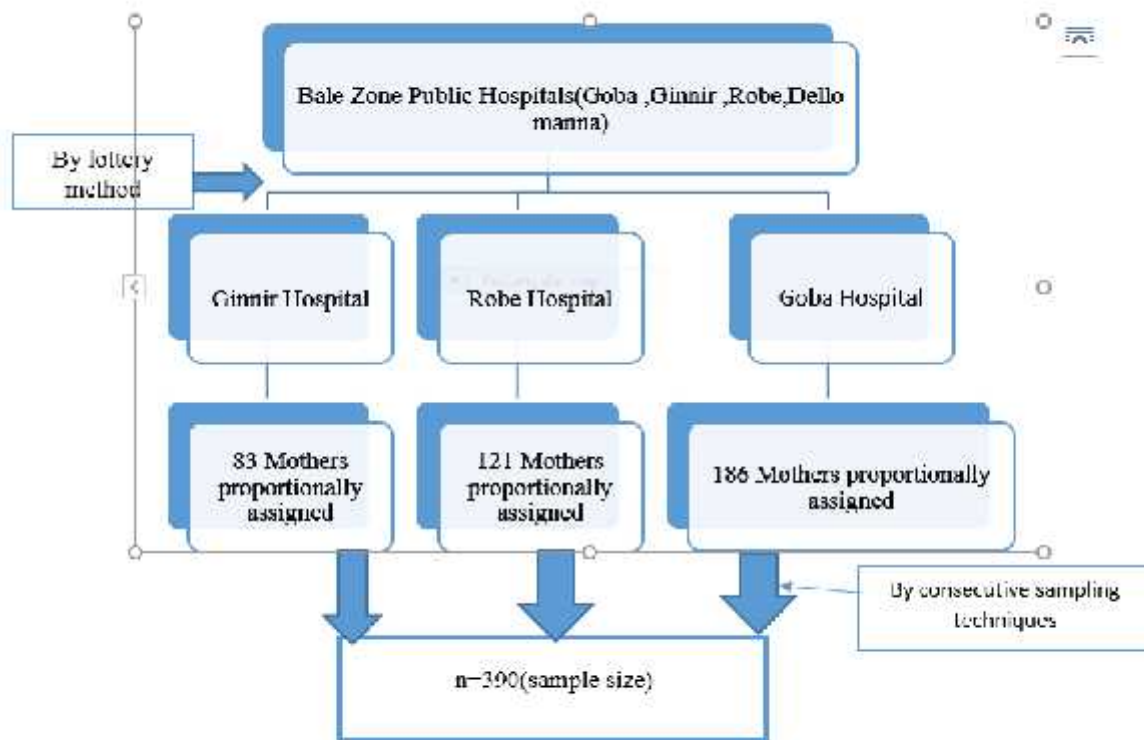


Figure 2: schematic presentation of sampling techniques.

#### 4.5 Data collection tools and Procedures

##### 4.5.1 Data collection tools

The interviewer administered questionnaires were used to estimate hidden costs of institutional delivery. The questionnaire has been adapted after reviewing of relevant literatures (3), (37). In order to improve the adapted questionnaire valuable comment was received from different sources. The first draft questionnaire was an English version & then translated to local language Afan Oromo to make the communication between the data collectors & respondents easy. The questionnaire had contained three parts: the first part about socio-demographic characteristics, the second part information about of delivery and the third part contain delivery related expenditures.

#### 4.5.2 Data collection personnel

For the purpose of this particular study four data collectors and two supervisors were recruited from the out of study health institutions. Their qualification was four diploma midwives and two BSc degree holders have data collection experience were assigned. All data collectors and supervisors were trained before the pre-test and actual data collection started. The submitted filled questionnaires by data collectors were checked for completeness at the spot by supervisors. Their roles, duties and expectation were explained for them during training was given.

#### 4.5.3 Data collection Methods.

After respondents were identified from the registration & structured questionnaires were checked; the data were collected by using face to face interview technique. The questionnaires were distributed to the selected data collectors and the interview were held all women at the time of exist/discharges from the facility with their care givers.

### 4.6 Variable of the study

#### 4.6.1 Dependent variable

- Hidden cost of institutional delivery.

#### 4.6.2 Independent variables

##### **Socio-demographic factors**

- Age of Mothers
- Educational level of mother and Husband
- Occupation of mother and Husband
- Family monthly income

##### **Mode of delivery**

- Normal vaginal delivery
- Caesarean section delivery
- Instrumental delivery
- Length of stay in health facility.

##### **Access to service**

- Urban
- Rural
- Distance of household from health facility.



#### 4.7 Operational definition

**Hidden cost:** The costs of institutional delivery service which, was estimated from total direct non-medical cost, total indirect cost plus total direct medical cost expenses out of stock during institutional delivery.

**High cost:** In this study the mothers who incurred hidden cost above the total median of hidden cost.

**Low cost:** In this study, the mothers who incurred hidden cost below the total median of hidden cost.

**Direct medical cost:** An amount of any money that has to be paid by mothers for direct medical cost out of stock in the study hospitals, during the study period.

**Direct non-medical costs:** An amount of any money that has to be paid for transportation, food/meal, and accommodation costs for both patient and care takers to visit the study facility during the study period.

**Indirect cost:** wage loss of self and/or care taker and cost that incurred due to institutional stay and which is calculated by using human capital approach.

*Income Loss of employed* =  $\frac{\text{previous monthly income(ETB)} * \text{length of stay}(40)}{\text{\# of working day in the month}}$ .

*Income loss of unemployed* =  $\frac{\text{self-reported daily/replacement income} * \text{length of stay}}{\text{\# of working day in the month}}$

#### 4.8 Data processing and Analysis

Data was checked for completeness, then it was cleaned, coded and entered into Epi-data version 3.1 and Exported to SPSS window version 23, for further analysis. Descriptive statistics was computed to determine socio-demographic and delivery related characteristics accordingly. Before conducting the regression analysis, normality, linearity & Multicollinearity among the variables were checked. Normality and linearity were checked by using histogram and normal probability plot, Multicollinearity was checked among the variable with tolerance & Variation infliction factor measures. Finally, any influential data was tested with Cook's distance. After here, logarithmic transformation was applied to those variables not satisfy the normality assumption for statistical analysis. Categorical variable was changed to counties variable by using dummy table before the bivariate analysis. The variables in bivariate  $<0.25$  were candidate

for multiple linear regression. Multiple linear regression analysis was done to identify significant predictors by proceed the Backward model selection methods.

Finally, significant independent predictors were declared at 95% confidence level & P-value less than 0.05.

#### 4.8.1 Methods of hidden cost estimation

Total hidden cost of institutional delivery service was measured from patient perspective, by combining all total direct medical cost out of stock purchasing, direct non-medical cost and indirect cost incurred during delivery service.

**Bottom- up approaches/Micro-costing:** Involves collecting data on the frequency of consumption of services directly from the patient, family, health professionals, or medical records. No gold standard exists, and each source of data has advantages and disadvantages. Collecting data from patients and families is useful, especially for reporting the use of several services (outpatient, emergency care, primary care), because each health service is not able to provide information on the consumption of services outside its unit(41). Before total hidden cost was combined bottom-up approaches cost estimation was employed to calculated direct cost of the patients. To describes the cost finally, unit of analysis per individual per visit was used.

**Estimation of Indirect costs:** Indirect cost refers to resources lost as a result of the treatment and illness that involve morbidity and mortality.

To calculated wage loss, human capital approaches. Daily income loss for daily paid patients were calculated based on the patients report daily earnings (cost replacement). For the non-paid work like mothers the income loss someone in paid work that closely matched the unpaid workers were used as a proxy(35).

Income Loss =  $\frac{\text{Previous monthly income} * \text{length of stay}}{\text{Number of working day in the month}}$

Number of working day in the month

All cost includes in the analysis were measured in terms of local currency Ethiopian birr(ETB) and were converted to US dollar using average exchanging rate during the period of the studies( **1USD=27.4595** ETB) was used(42).

The purchasing power parity of the country after adjustment, was used for comparative purpose(43,44).

Table 1: Table purchasing of power parity the country used for comparative purpose.

Country	Résult	Adjusted résultat	Ratio of Price(PPP)
Népal	267/259.9\$	34.9/33.8	0.13
Pakistan	79\$	22.9\$	0.29
	204\$	59.16\$	0.29
Ghana	5.2\$	9.7\$	1.8
Indian	6.75\$	11.8\$	1.7
	4.3\$	7.5\$	1.7
Mali	126\$	65\$	0.51
	22.9\$	11.7\$	0.51

Table 2: Data source & Method of data collection in selected public hospitals of Bale Zone 2018.

S/n	Cost item	Data source	Method of data collection	Data types
1	Direct medical cost	patient	Recite observation & care giver interview	Cost of medical out of stock expenses
2	Direct non- medical cost	patients	Patients interview/care giver	Transport cost, lodging ,food & drinking cost
3	Indirect cost	patients	Patient interview/care giver	Income loss by patient & their care giver

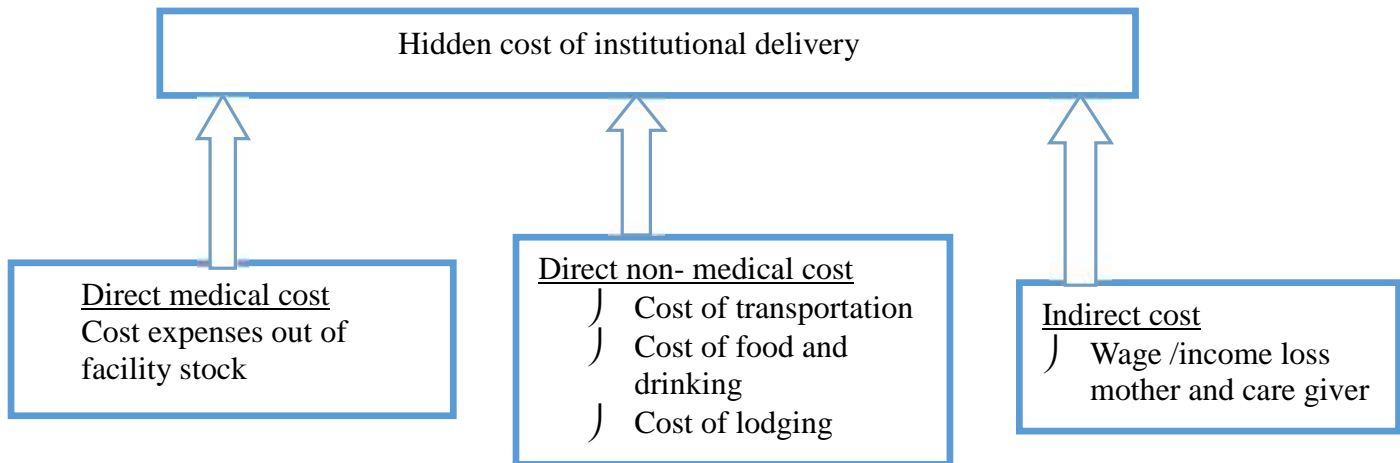


Figure 3: Cost categories of institutional delivery , in selected public hospitals in Bale Zone, 2018.

#### 4.9 Data quality management

Different measures had been taken to maintain the quality of the data. The questionnaire was translated to local language (i.e., Afan Oromo) then it was translated back into English to check for consistency by a translator who Know to the original questionnaire.

The questionnaire was pre-tested on 5% of the total sample size in Dodola Hospital and necessary adjustment was made prior to the actual data collection and by using tested questionnaire the preliminary assessment was conducted in Dello-manna hospital one week before the main study.

In order to ensure data quality, data collectors who were diploma midwife and who had experience on data collection were recruited. Data collectors and supervisor were trained for two days on the study instrument and data collection procedure. The collected data was daily checked by principal investigator again for its completeness. The other also in order to ensure quality of data Epi-data version 3.1 was employed for data entry.

#### 4.10 Ethical consideration

The proposal was approved by Ethical review board of Jimma University Institute of health and ethical clearance was obtained. After here, the permission letter was obtained from Oromia regional health bureau. Then formal letter of permission was produced from Bale Zonal health department and to respective hospitals before embarking on study.

Also verbal consent was obtained from the study subjects after informing about objectives and procedures of the study. Their right to refuse participation any time they want was assured and told that, as no remuneration was paid for participation. For this very purpose, a one-page consent letter was attached as a cover page of each questionnaire stating about the general objective of the study and issue of confidentiality which was discussed by the data collectors before proceeding with the interview.

#### 4.11 Dissemination of Findings.

The findings of this study were submitted to Jimma, University Institutes of public health, department of health Economics, management and policy. Copy of the result will also submit to Oromia Regional Health Bureau, Zonal Health department and to respective hospitals. Finally, Effort will be made to publish finding of the study on scientific journal.

## CHAPTER 5: RESULT

### 5.1: Socio demographic information of respondents

Out of the total 390 mothers recruited for the study, 390 were successfully interviewed, yielding the response rate of 100%. Among the total respondents 235(60.3%) came from the rural. From those came from the rural, respondents 161(41.35%) pass through referral system, whereas the remaining 229 (58.7%) respondents were self-referred. The out 390 respondents, 379(97%) were able report an estimate their monthly income. The remaining 11(2.8%) unable to mentioned their monthly income properly. Median monthly income of respondents was 3120 ETB (113.6US\$) per monthly.

The mean age of respondents were 25.25 years. The youngest respondent was 17 years old while the oldest was 38 years old. The total numbers of respondents in the age range 15-19 years were 53(13.3%). The proportion of respondents within age group 20-29 years old were 247 (63.3%) and only 90(23.1%) of respondents were range of 30-39 years of age.

In terms of educational status mother, most of respondents 286(73.3%) able to read and write followed by 104(26.7%) not able to read and write. From this 130(33.3%) of respondents were follow primary education and the only 51(13.35%) have college and above. The remaining 11(2.8%), 94(24.1%) follow adult education and secondary education respectively.

Education status of Husband, majority of husbands 315(80.8%) were able to read and write, 75(19.2%) not able to read and write respectively. From those able to read & write, 109(27.9%) of husbands follow primary education and only 85(21.8%) have college and above, while the remaining 14(3.6%), 107(27.4%) follow adult education and secondary education respectively.

Other variables considered in this section were occupational status of mother. Most of them 285(73.1%) who works as House wife whereas, 38(9.7%), 51(13.1%), 16(4.1%) were Governmental employee, merchant and daily laborer respectively.

The mean length of stay in the hospital for normal vaginal delivery was 1.6 days (range, 1-5 days), for caesarean section was 4.71 days (range 3-19 days) and for instrumental delivery 2.38 days (range, 1-9 days). (*Table 2*)

Table 3: Socio-demographic information of respondents in Bale Zone selected public Hospitals 2018.

<b>Variable</b>	<b>Category</b>	<b>frequency</b>	<b>Percent</b>
Residence of respondents	Urban	155	39.7%
	Rural	235	60.3
System of respondent arrived hospital.	Referral	161	41.3%
	By self	229	58.7%
Age mothers(years)	15-19 years age	53	13.6%
	20-29 years age	247	63.3%
	30-39 years age	90	23.1%
Educational status of Mother(n=390)	unable to read and write	104	26.7%
	Able to read and Write	286	73.3%
Level of education of Mothers(n=286)	Primary education	130	33.3%
	Secondary education	94	24.1%
	College or above	51	13.1%
	Others***	11	2.8%
Occupation of Mothers(n=390)	Government employee	38	9.7%
	Merchant	51	13.1%
	House wife	285	73.1%
	Daily laborer	10	2.6%
	Others**	6	1.5%
Educational status of Husband	Unable to read and write	75	19.2%
	Able to read and write	315	80.8%

Educational level of Husband	Primary education	109	27.9%
	Secondary education	107	27.4%
	College or University	85	21.8%
	Other ***	14	3.6%
Occupation of Husband	Government employee	71	18.2%
	Merchant	87	22.3%
	Farmer	182	46.75%
	Daily laborer	33	8.5%
	Other*	17	4.4%
Family monthly income	≤2320ETB	95	24.4%
	2320-3120ETB	95	24.4%
	3120-352ETB	95	24.4%
	>3521ETB	94	24%
Length of stay	≤ 5days	370	94.9%
	>5 days	20	5.1%

*\*=drivers, NGOs, \*\* =NGOs, \*\*\*=adult education*

Source of age category:(45).



## 5.2 Delivery characteristics of respondents.

### 5.2.1 Mode of delivery

The majority 240(61.5%) of respondents, had delivery through normal vaginal delivery, whereas 79(20.26%) of respondents gave birth through caesarean section and the remaining 71 (18.2%) underwent instrumental delivery. (Figure 4)

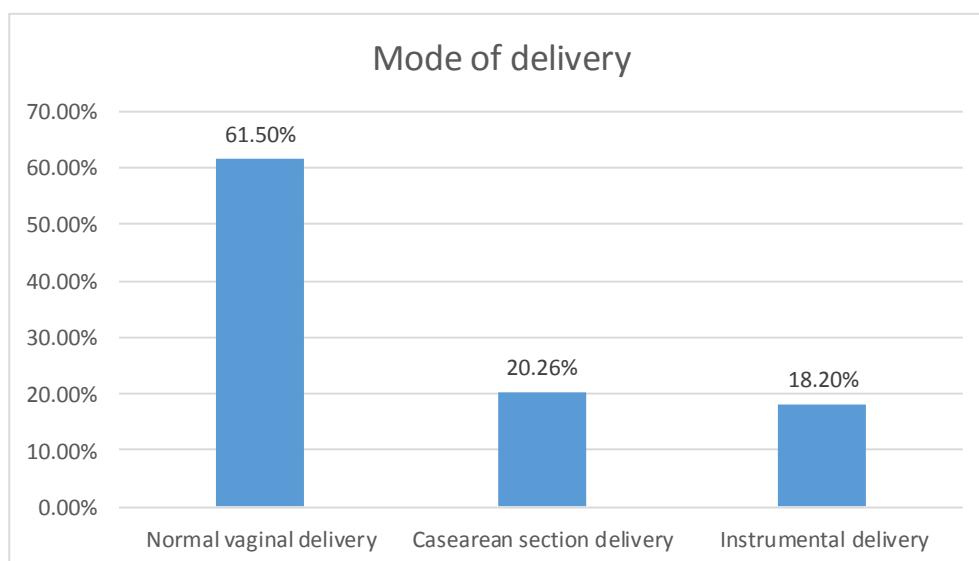


Figure 4:Percent of Mode of delivery in selected public hospitals of Bale Zone , 2018.

### 5.2.2 Transport modality Mothers Use during coming Hospital

Among mothers gave birth at hospital, 46.9% were got ambulance service & the remaining 53% of respondents were used other transport modality. (Table 4)

Table 4:Transport modality respondents use during coming selected Public Hospitals of Bale Zone ,2018.

variable	category	frequency	Percent
Transport Modality	Ambulance	183	46.9%
	Private car	73	18.7%
	Bajaj	89	22.8%
	Horse Cart	26	6.7%
	Others*	19	5%

\*=motor cyclic

### 5.3 Estimation of hidden cost of institutional delivery

#### 5.3.1 Cost expenses for drug from private pharmacy.

Out of total 390 mothers who gave birth at Hospital 48(12.3%) of mothers bought drug from private pharmacy. The median of direct cost expense was 4.7US\$ & interquartile range was 5.4US\$. The median of direct medical cost incurred by participants who underwent vaginal delivery, caesarean section delivery and instrumental delivery were 4.5US\$, 4.7US\$ and 4.9US\$ respectively. (Table 5)

Table 5: Cost of drug purchased from private by mode of delivery in selected hospital of Bale Zone 2018.

	<b>Normal vaginal delivery(n=12)</b>	<b>Caesarean section delivery(n=28)</b>	<b>Instrumental delivery(n=8)</b>
<b>Sum</b>	<b>57 US\$</b>	<b>197US\$</b>	<b>50US\$</b>
mean	4.75US\$	7US\$	6.3US\$
Median	4.5US\$	4.7US\$	4.9US\$
SD	2.9US\$	3.5US\$	4.1US\$
<i>Exchanging rate :(1US\$=27.4595ETB)</i>			

#### 5.3.2 Direct non-medical cost by mode of delivery.

In this study, out of the total hidden cost of institutional delivery, direct non-medical cost by mode of delivery accounts more cost when compare with the other cost. The median of direct non-medical cost of respondents underwent vaginal delivery, Caesarean section and instrumental delivery were 11.2US\$, 21.8US\$,14.8US\$ respectively. (Table 6)

Table 6: Direct non-medical cost by mode of delivery in Bale Zone selected Public Hospitals,2018.

	<b>Normal vaginal delivery, n=240</b>	<b>Caesarean section ,n=79</b>	<b>Instrumental delivery, n=71</b>
<b>Sum</b>	3310.9US\$	1641.9US\$	1212.2US\$
<b>Mean</b>	14US\$	20.7US\$	17US\$
<b>Median</b>	11.2US\$	21.8US\$	14.8US\$
<b>SD</b>	8.8US\$	11.2US\$	10.9US\$

1ETB=27.4595US\$(exchanging rate of august, 2018 by Ethiopian National Bank)

The total median of non-medical cost of mothers incurred were 14US\$ &13US\$ interquartile range respectively.

From the total non-medical cost, median of food expenses cost & drinking expenses cost of institutional delivery were 9.6\$ and 6.7\$ respectively. The other such as lodging expenses cost, transport expenses cost were 3.6\$ & 2.2\$ respectively. (Table 7)

Table 7: Direct non- medical cost of institutional delivery in selected public hospitals of Bale Zone 2018.

	<b>Sum</b>	<b>mean</b>	<b>Median</b>	<b>IQ</b>
<b>Direct non-medical cost(n=390)</b>	<b>6165US\$</b>	<b>15.8US\$</b>	<b>14US\$</b>	<b>13US\$</b>
Food expenses cost(n=202)	2212US\$	11US\$	9.6US\$	6.4US\$
Drinking expenses cost(n=358)	2374US\$	6.6US\$	6.7US\$	2.9US\$
Lodging expenses cost(n=38)	149US\$	3.9US\$	3.6US\$	0.9US\$
Transport expenses cost(n=390)	1430US\$	3.7US\$	2.2US\$	3.3US\$

The median cost of transportation for normal vaginal delivery, Caesarean section and Instrumental delivery were 2\$,4\$ and 2\$ respectively. Whereas, median cost of food by Normal vaginal delivery, caesarean section and instrumental delivery were 8.9\$,12.5\$ and 9\$ respectively. (Table 8)

Table 8: Non-medical cost component by Mode of delivery in selected Public Hospitals of Bale Zone 2018.

Variable	Normal Vaginal delivery(n=240)		Caesarean section(n=79)		Instrumental delivery(n=71)	
	mean	median	mean	median	mean	median
Transportation cost	3.3\$	2\$	5.3\$	4\$	3.5\$	2\$
Food expenses cost	10\$	8.9\$	12.5\$	12.5\$	10.8\$	9\$
Drinking expenses cost	6.6\$	6.8\$	6.7\$	6.8\$	6.5\$	6.3\$
Lodging expenses cost	4.2\$	3.6\$	3.4\$	2.9\$	4.3\$	3.6\$

### 5.3.2.1 Cost estimation of non-medical cost by distance respondents incurred.

Out of total delivery those visited Hospital 202(51.7%) were far as less than 15km while the others 73(18.7%),115(29.4%) were 15-30km and >30 km far from their house in order to arrive health facility respectively. Those who their house was greater than 30 km, median expenditures for transport, food, drinking and lodging were 5.8US\$, 10.2US\$, 10.2US\$ and 3.6 US\$ respectively. (Table 9)

Table 9: Cost of Mothers and their family expenses by distance, in selected public Hospitals of Bale Zone,2018.

Variable	Distance<15km(n=202)		Distance 15-30 km(n=73)		Distance>30km(n=115)	
	Mean	median	Mean	median	Mean	Median
Transport expenses	1.6US\$	1.3US\$	3.5US\$	2.7US\$	7.4US\$	5.8US\$
Food expenses	10.6US\$	9US\$	10US\$	8.7US\$	11.6US\$	10.2US\$
Drinking expenses	6.6US\$	6.8US\$	6.6US\$	6.5US\$	6.6US\$	10.2US\$
Lodging expenses			4.3US\$	3.6US\$	4S\$	3.6US\$

Source of distance category:(46)

### 5.3.3 Indirect cost of institutional delivery and other care givers

Indirect cost was including wage loss of mothers and care givers. The cost of individual was calculated by using human capital approaches for employed and for unemployed replacement income was used. The median income loss for both mothers and care givers were, 10.9\$ and day lost from work was 2 days. (Table 10)

Table 10: Indirect cost of institutional delivery & care givers, in selected Public Hospitals of Bale Zone,2018.

Variables	Mothers				Care givers			
	n	mean	median	IQR	n	mean	median	IQR
Amount of income loss	390	4.4\$	3.6\$	0.67\$	412	9.6\$	7.3\$	10\$
Day lost from work per person	390	2day	2	2	412	2	2	2
Time(hour) stay in hospital/ person	390	56.9	48	48	412	56.9	48	48

The total median of hidden cost of normal vaginal delivery, Caesarean section delivery and instrumental delivery were 22\$,43.6\$ and28\$ respectively. (Table 11)

Table 11: Total hidden cost by mode of delivery in selected public hospitals of Bale Zone, 2018.

	<i>Normal vaginal delivery(n=240)</i>			<i>Caesarean section(n=79)</i>			<i>Instrumental delivery(n=71)</i>		
	<i>Sum</i>	<i>mean</i>	<i>media n</i>	<i>Sum</i>	<i>mea n</i>	<i>media n</i>	<i>Sum</i>	<i>mean</i>	<i>Median</i>
<b>Total hidden cost(n=390)</b>	5865 \$	24\$	22\$	3521\$	44.6\$	43.6\$	2307.9\$	32.5\$	28\$

### 5.3.4 Summary of cost estimation of institutional delivery

The median total hidden costs expenditure was 25.5US\$. The interquartile range of institutional delivery was 22.8US\$. (Table 12)

Table 12: Summary of cost estimation of institutional delivery in selected public Hospitals of Bale Zone, 2018.

	<b>Sum</b>	<b>Mean(95%CI)</b>	<b>median</b>	<b>IQ</b>
<b>Hidden cost</b>	<b>11694\$</b>	<b>29.9\$(29-30.9\$)</b>	<b>25.5\$</b>	<b>22.8\$</b>
Drug purchased from private	304\$	6.3\$(5.3-7.3\$)	4.7\$	5.4\$
Direct non-medical cost	6165\$	15.8\$(14.9-16.8\$)	14\$	13\$
Indirect cost	5225\$	13.4\$(12.4-14.3\$)	10\$	13\$

From the total hidden cost of institutional delivery non-medical cost accounted 52.7%, indirect cost accounted 44.7% and direct out of stock expenses 2.6% respectively.

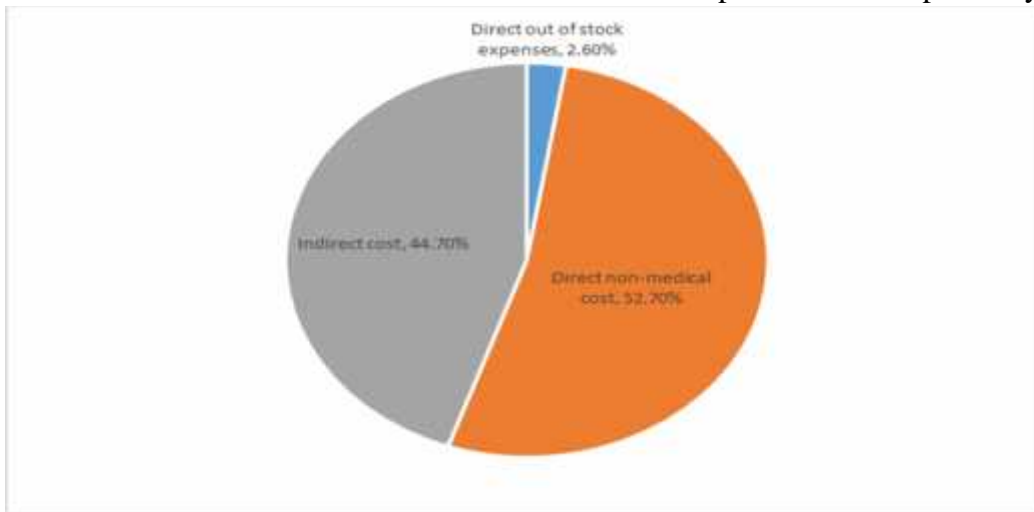


Figure 5: percent distribution of total hidden cost of institutional delivery in selected public hospitals of Bale Zone, 2018

As the results, indicate that total median hidden cost of institutional delivery expenditure was equivalent to 2% of annual family income. (Table 13)

Table 13: Out of pocket payment as percentages of average annually family income in selected public hospitals of Bale Zone, 2018.

Average out of pocket	% of annual family income
Direct cost expenses for drug out of stock	0.3%
Direct non- medical cost	1%
Indirect cost	0.7%
Total	2%

#### 5.4 Assumption test for total hidden cost of institutional delivery

Before regression analysis some assumption was checked. In the Tests of Normality, the results of the Kolmogorov–Smirnov and Shapiro–Wilk tests indicate that the distribution remains significantly different from a normal distribution at  $P < 0.0001$  and  $P < 0.0001$  respectively. The data was skewed to the right or positively skewed as follows

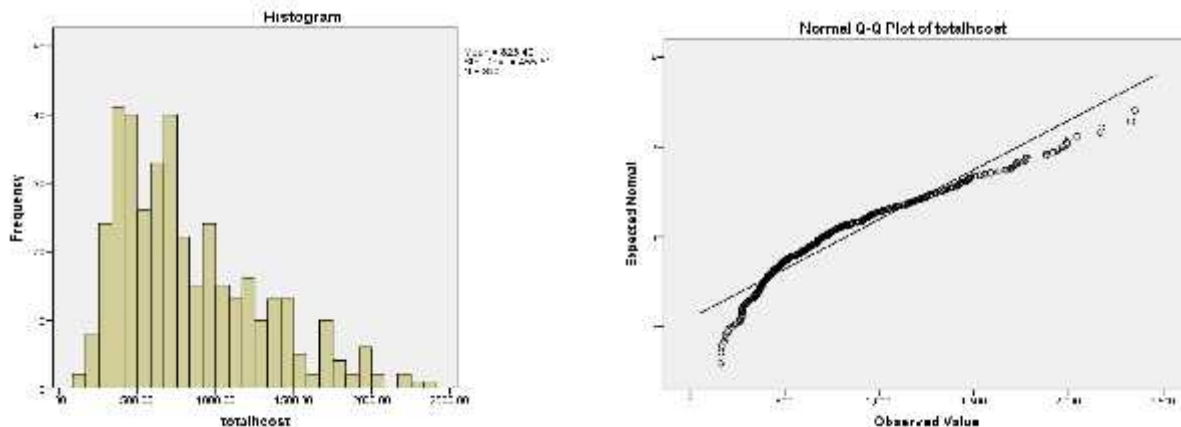


Figure 6: positive skewed of hidden cost of Institutional delivery, Bale Zone in selected Hospitals, 2018

After here, to correct the skewed data as normal distributed, log transformation (log10) was made for outcome variable and all other variable recoded accordingly. Variable which was nominal in nature, was rescored as binary variables. As our outcome variables were log transferred and some of the predictor variables were also log transferred.

The regression equation was:

$$\text{Log}y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 \log X_3 + \dots + \beta_k X_k + e$$

Where:  $\text{Log}y$  = Outcome variable (log transferred)

$X_1, X_2, X_3$  and  $X_k$  are predictors variable.

$\beta_0$ , represent regression constant

$\beta_1, \beta_2, \beta_3$  and  $\beta_k$  are the unstandardized regression coefficient, where  $k$ , represent the number of predictors variable  $e$ , is the error.

In the above regression equation, predictor variable  $x_3$  was log transferred.

After the log transform the positively skewed data, become normal distribution as figure below.

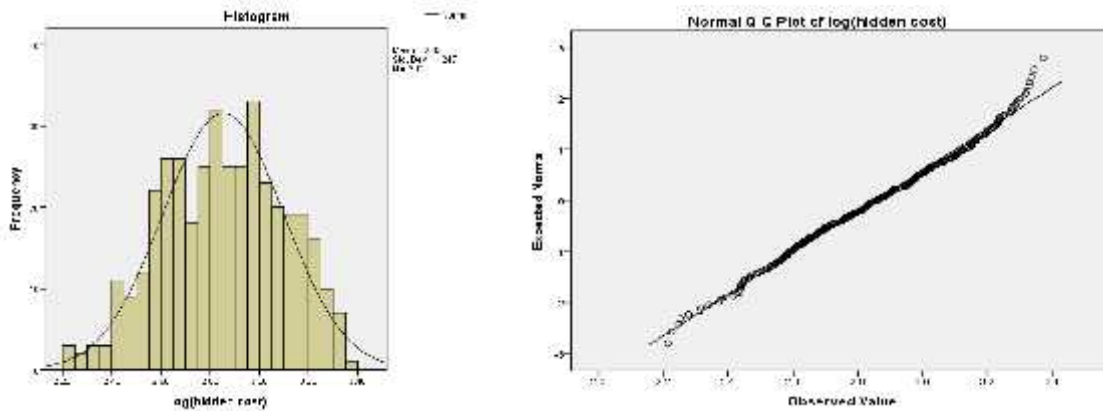


Figure 7: The result of log transform data of hidden cost of institutional delivery in selected Public Hospital of Bale Zone ,2018.



5.5 Factors associated with hidden cost of institutional delivery.

Explanatory variables such as Educational level of mother, occupational status of mothers, were not significant in bivariate linear regression at P<0.05 with total hidden cost of institutional delivery. But the other variables such as family monthly income, mode of delivery, distance of household from hospital, length of stay in hospital were significantly associated with hidden cost of institutional delivery in the bivariate linear regression at P<0.05. (Table 14)

Table 14: Bivariate linear regression model hidden cost of institutional delivery in selected Public Hospitals of Bale Zone, 2018.

		<i>Unstandardized coefficient</i>		<i>Standardized</i>	<i>t</i>	<i>Sig.</i>	<i>95.0% Confidence Interval for</i>	
			<i>Std.error</i>	<i>eta</i>			<i>Lower Bound</i>	<i>Upper Bound</i>
<b>(Constant)</b>		1.855	0.268		6.915	0.000	1.327	2.385
<i>Log(family monthly income)</i>		0.191	0.069	0.139	2.774	0.006	0.055	0.326
<i>Educational level of mothers</i>	<i>Primary</i>	-0.089	0.055	-0.069	-1.611	1.08	-0.197	0.020
	<i>Secondary</i>	-0.051	0.024	-0.104	-2.109	0.053	-0.099	0.004
	<i>Other(RC)*</i>							
<i>Occupational status of mother</i>	<i>Government</i>	-0.018	0.088	-0.021	-0.201	0.841	-0.190	0.155
	<i>Merchant</i>	-0.009	0.087	-0.013	-0.105	0.916	-0.181	0.162
	<i>Wife</i>	-0.031	0.085	-0.056	-0.366	0.715	-0.198	0.136
	<i>Laborer</i>	-0.008	0.105	-0.005	-0.075	0.941	-0.215	0.199
	<i>Other(RC)**</i>							
<i>Mode of delivery</i>	<i>Caesarean section</i>	0.046	0.034	0.075	1.360	0.043	-0.021	0.054
	<i>Instrumental</i>	0.063	0.028	0.098	2.253	0.025	0.008	0.117
	<i>Normal delivery(RC)</i>							
<i>Distance in km from household to facility</i>		0.111	0.017	0.393	6.498	0.000	0.077	0.144
<i>Day stay in hospital</i>		0.046	0.007	0.353	6.411	0.000	0.032	0.059

RC= Reference category,

\*= Adult education

\*\*NGOs

At the final reduced form of regression analysis variables that were significantly associated with total hidden cost of (P<0.05) were distance household from health institution, length of stay in health institution, family monthly income(log), and mode of delivery were the significant predictors variables.

The adjusted R<sup>2</sup> value for this model was 53.6% with [F (5,373) =88.44=>P=0.0001)]. This implies that about 53.6% of the variation in total hidden cost of institutional delivery in study area was explained by length of mother staying in hospital, Distance from household to hospital, mode of delivery, monthly family income and left percent was due to the other factors.

The distance household from hospital was positively associated with total hidden cost ( =0.072, P=0.0001), holding other factors constant, as distance from health facility increases by 1 KM, hidden cost increases by 0.072 birr per visit.

Length of day stay was positively related to total hidden cost ( =0.046, P=0.0001). As length of days stay increase, total hidden cost of institutional delivery was increase by .046birr by holding other variables constant. Family monthly income was positively related to total hidden cost ( =0.203, P=0.0001). One-unit increase family monthly income, total hidden cost of institutional delivery increase by 0.203birr by holding other variables constant.

Mode of delivery, with reference category other coded “0” Caesarean section delivery was positively associated with average total hidden cost ( =0.06, P=0.037). This implies that being mother gave birth by caesarean section when compare to the other, total hidden cost of institutional delivery was increase by 0.06birr by holding other variables constant.

Mode of delivery, with reference category other coded “0” Instrumental delivery was positively related with average total hidden cost ( =.07, P=0.003). This implies that being mother gave birth by instrumental delivery when compare to the other, approximately average total hidden cost increase by 0.07birr by hold other variable constant. (Table 15)

$$=1.787 +0.072X_1 +0.203X_2 +0.046X_3 +0.06X_4 +0.07X_5 +... i$$

Table 15: The final multiple linear regression model, Hidden cost of institution delivery in selected Public Hospitals of Bale Zone,2018.

<i>Variable</i>	<i>Unstandardized Coefficients</i>		<i>Standardized Coefficients</i>	<i>t</i>	<i>Sig.</i>	<i>95.0% Confidence Interval for</i>	
	<i>Std. error</i>	<i>Beta</i>	<i>ts</i>			<i>Lower Bound</i>	<i>Upper Bound</i>
<i>(Constant)</i>	<i>1.787</i>	<i>.180</i>		<i>9.918</i>	<i>.000</i>	<i>1.433</i>	<i>2.142</i>
<i>Distance in km</i>	<i>.072</i>	<i>.006</i>	<i>.501</i>	<i>13.081</i>	<i>.000*</i>	<i>.061</i>	<i>.083</i>
<i>Log(family monthly income)</i>	<i>.203</i>	<i>.050</i>	<i>.148</i>	<i>4.048</i>	<i>.000*</i>	<i>.104</i>	<i>.301</i>
<i>Length of stay(day)</i>	<i>.046</i>	<i>.006</i>	<i>.356</i>	<i>7.663</i>	<i>.000*</i>	<i>.034</i>	<i>.058</i>
<i>Mode of delivery</i>	<i>Normal vaginal delivery(RC)</i>						
	<i>.060</i>	<i>.029</i>	<i>.098</i>	<i>2.098</i>	<i>.037*</i>	<i>.004</i>	<i>.116</i>
	<i>.070</i>	<i>.024</i>	<i>.109</i>	<i>2.959</i>	<i>.003*</i>	<i>.023</i>	<i>.116</i>

*Dependent variable: log (total hidden cost) of institutional delivery n= (390), Adjusted R<sup>2</sup> =53.6%*

*\*= significant at P<0.05, RC =Reference category by using dummy table.*

## CHAPTER 6: DISCUSSION

In this study the median of hidden cost of institutional delivery was found to be 25.5\$. This was less than the study conducted in western Nepal which was 33.8\$(26). The difference might be due to, the items that cost could be calculated & service between the two settings.

In our findings, caesarean section caused higher mean patient expenditure of hidden cost compared to the other the mode of delivery. The Caesarean section and normal vaginal delivery were accounted 46\$,24\$ respectively. As regression analysis output indicate that the mothers gave birth by Caesarean section compare to normal vaginal delivery total hidden cost was increase by 0.06\$ by holding other variables constant. The cost of Caesarean section was less than that of study conducted in Pakistan which was 59.16\$. This discrepancy could be due to the socio economic factors difference of the two country and cost estimation method may be different, while the cost of normal vaginal delivery is slightly similar with the study conducted in Pakistan which was 23\$(28).The observed similarity could be due to normal vaginal delivery could related to the other less stay in the hospitals.

In this finding the mean of non- medical cost was 15.8\$. This was similar with the study conducted in the rural part of northern of Ghana in which the mean direct non-medical cost was 15\$(20).The reason of observed similarity could be due to the related socio economic factors & health system of the two country. Other study that conducted in India also which was accounted direct non-medical cost 11.82\$ less than our study(18). The observed discrepancy could be due to number of study subject which was less our study and unit of analysis made differ.

In this study, the total mean income loss for both patients and care givers was 13. 4\$. This was greater than study conducted in northern part of Ghana which was 9.7\$ per person(29). The possible explanation of, this difference could be due to the high number of mothers' visit hospital per day. Other studies conducted in Indian also revealed that average indirect cost was7.56\$ per person(18). The possible explanation of this discrepancy might be due to our study accounted income loss for both mothers & care givers visit hospital.

This study finding shows that, the mean patients cost expenditure on transportation, food and drinking expenses, from all over the total mean of hidden cost of institutional delivery were 12.3% and 58.8% respectively. The transportation cost was greater than the study conducted in Western Nepal which was a patient mean expenditure cost on transportation 7.3%. The possible explanation of the difference could be in our country most of the mothers come by passing long distance than Nepal. The patient mean expenditure on food and drinking was greater than the study conducted in Western Nepal which accounted 53.07%.The possible explanation of the inconsistent could be in our country, there was a number of care givers come with mother during giving birth than western Nepal study(26).

In this study transportation cost was higher for women living in distance more than 30km and their impacts were greater on the poorest women. The transportation cost of Caesarean section delivery was 5.3\$(34%) from the total non- medical cost. This was greater than study conducted on hidden cost of a free Caesarean section policy in Mali which accounted 14%. This difference might be due to ambulance utilization in our country being recently started and most mothers came from the long distance (31).

As this study revealed, among the women who gave birth in hospitals,48(12.3%) of women purchase drugs from private pharmacy, the unit of purchase were frequently larger than that required so leading to wastage and probably increasing costs, to the client. This was less than study conducted in Ethiopia on user fee & maternity service which was 65% of women charge for service out of pocket during institutional delivery. The possible explanation of this percent even though there was a resource problem, there is improvement of free maternity service through the time, the study on user fee & maternity service was conducted at the begging of free maternity launched after three years(13) .

In multiple linear regression analysis, explanatory variables such as distance of household from hospitals, length of stay in hospital, family monthly income and mode of delivery were a factors associated with the hidden cost of institutional delivery. In this study the mothers came from the remote area increase the total hidden cost 0.072\$ than those who were came from near to

hospital. The other total hidden cost of those gave birth by Caesarean section delivery was increase by 0.06\$ than those who gave birth by normal vaginal delivery.

In this study those mothers stay long days in the hospital increase total hidden cost by 0.046\$ than those stay few days. This was comparable with finding of study conducted in Nepal, distance of household from hospital (P= 0.0001), length of stay in hospital(P=0.0001) and also related with study conducted in Lao people's Democratic Republic & Pakistan length of stay which was (P=0.0001) (7,28,37).

## CHAPTER 7: LIMITATION OF THE STUDY.

- Due to shortage of time, the consecutive sampling technique was used in this study; this may be reducing the robustness of the study.
- Cost estimation method of indirect cost; Human capital approaches for employment may it gave underestimate for those who had low salary.
- Self-reported of costs (patient perspective) could gave an underestimated or exaggerated of cost.

## CHAPTER 8: CONCLUSION AND RECOMMENDATION

### 8.1 Conclusion

Although officially, maternal health service was free charges in Ethiopia, even though hidden cost which was not officially accounted on institutional delivery cost, till hindered mothers as not gave birth in health facility. Generally, as finding suggested that, the half percent of the mothers were incurred high total hidden cost. In addition to this, direct cost expense for drug from private pharmacy was low percent accounted from the total hidden cost.

Above the half of the hidden costs were attributed to direct non-medical cost and indirect cost proceed in this study. In this study total non-medical cost was accounted high percent compare to the indirect cost that both mother and care givers incurred. The length of stay in hospital, mode of delivery, family monthly income, and distance of household from hospitals were significantly associated with the total hidden cost of institutional deliver. As regression output revealed that those mother gave birth by caesarean section delivery incurred high hidden cost, when compare with normal vaginal delivery. Those mothers attend delivery from far distance incurred high cost than mothers near to the hospital. Therefore, the hidden cost can be critical factors for remote households who attend institutional delivery.

### 8.2 Recommendation of the study

From the study finding the recommendation was as follows:

#### **Federal Ministry of Health/Regional Health Bureau/Zonal Health Department**

- ✚ Strength the decentralization of the obstetric care to remote and under-privileged population to reduce transportation cost, food cost and lodging costs of institutional delivery.
- ✚ Should scale up in the hospital, health center experience of maternity waiting and Porridge providing to the mothers.
- ✚ Strengthen and scale up provision of Ambulance service through in catchment area.

#### **For Hospitals:**

- ✚ Attention should have given to Mothers, who came from remote rural area, who was poor and pass through referral system.
- ✚ The Hospital should compensate for those mother's purchase drug from private pharmacy.

#### **Researchers:**

- ✚ The researcher may be useful in the future to evaluate hidden cost incorporating with specially, provider side cost.

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## ANNEXES

Annex I: Information sheet

Questionnaire ID \_\_\_\_\_

Hello! My name is \_\_\_\_\_. I am working as data collector in the research conducted by **Melese Merga**, who is conducting his research for the partial fulfillment of his Master science in Health economics at Jimma University. We are trying to estimated hidden cost of institutional delivery and associated factor in Bale Zone Hospitals, we would like your honest opinion pertaining to the questions.

**Name of the organization:** Jimma university, department of health economics, management and policy.

**Purpose of the study:** You are invited to join the study because You are staying here for health care service and as you know maternity service are free charges, beside this the purpose of this study is to find out what extra money and time you and your care giver had to spend in hospital in order to support you. You are consecutively selected to participate in this study.

**What participation involves:** You are free to decide to participate in the study. We will ask you some questions about the costs that you incur from out of this Hospital. It may take about 20 minutes to go through the interview.

**Confidentiality:** All information collected from you will be kept confidential and will not be disclosed to others. It will only be used for the purpose of the study.

**Risks:** We do not expect any risk in participating in the study.

**Rights to withdraw and alternatives:** Taking part in the study is completely your choice. You can decide not to participate in the study therefore refuse the interview at any time even after starting it. Deciding not to participate in the study will not affect the service of you get from the Hospital.

**Who to contact:** If you have any question you can contact Mr. Melese Merga the principal investigator.

**Email:** [melesemerga@gmail.com](mailto:melesemerga@gmail.com)

**0924386556**

Do you have any question?

Annex II: Informed consent sheet

Dear respondent my name is Melese Merga and I am student of pursuing master science of Health economics program at University of Jimma school of public health, department of health economics management and policy. This interview is being conducted as part of research to estimate hidden costs of institutional delivery and associated factors in Bale Zone, Hospitals Oromia region, south east of Ethiopia. As part of this Data, we are collecting your information on socio-demographic and economic, hidden cost incurred and factor that incurred the hidden cost of women during stay at Hospital for delivery. Your genuine response will help us to find out the real hidden cost that burden on women and factor that incurred this cost. So that possible intervention will be conducted by responsible bodies and give the clue for those nongovernmental organization that done on maternal service. The interview will not take more than 20 minutes. You have the right not to participate or withdraw at the middle of the interview and there is no payment for the participation. All the information you giving us will be used for research purposes only and kept confidential. Your identification related issues will not be revealed for anybody. Is it clear?

Do you agree to participate?

1. Yes  No  if nspect the decision and thank her/him. if yes, continue the interview.

Interviewer name \_\_\_\_\_ signature \_\_\_\_\_ date \_\_\_\_\_

Supervisors name \_\_\_\_\_ signature \_\_\_\_\_ date \_\_\_\_\_

Annex III: Questionnaires

Questionnaires for research entitled of hidden cost of institutional delivery and associated factor in Bale Zone Hospitals Oromia region southeast Ethiopia. The questionnaires contain four parts as following: socio demographic characteristics, Delivery related information, maternity cost expenditure and care giver and labor travel cost.

**Part I: Socio- demographic characteristics.**

S/n	Question	Category/answer	Skip to
	Hospital	1.Gobba Referral 2 Robe General 3.Gindhir General	
1	What is your Age ?	.....	
2	From where residence did you come?	1=urban 2= Rural	
3	By what system you come here?	1= refer from health center 2=by your self	
5	Can you write and read?	1= No 2=Yes	
6	If yes, what is the level of education that you have attained?	1=Primary education 2=Secondary education 3=Collage /University education 4= Other specify .....	
7	Do you know your husband to Write and read?	1=No 2=Yes	
8	If yes, what is the level of education that your husband have attained?	1=Primary education 2=Secondary education 3= Colleges/University 4=Other specify.....	
9	What is your current occupation ?	1= Daily laborer 2=Government employee 3=Marchant	

		4=House Wife 5=private employee 6= Other specify .....							
10	What is the current occupation of your husband?	1=daily laborer 2=Government Employee 3.Non-government employee 3=Marchant 4=Farmer 5=Other specify.....							
11	How many children are there in the household?	.....							
12	What is the average monthly income of your family?	<table border="1"> <tr> <td>personnel</td> <td>Family</td> <td>total</td> </tr> <tr> <td>.....birr</td> <td>.....birr</td> <td>...birr</td> </tr> </table>	personnel	Family	total	.....birr	.....birr	...birr	
personnel	Family	total							
.....birr	.....birr	...birr							

**Part II: Delivery Related information**

s/n	Question	Category/answer	Skip to
13	Which number of pregnancy is it?	1=once 2= two 3= three 4= four and above	
14	By what method did you deliver?	1= Normal vaginal delivery 2= C-section 3=Instrumental vaginal delivery.	
15	What is the distance between your house and Hospital	.....km	
17	How many days do you stay hospital?	.....days..... hours	



### Part III: Maternity care expenditure

#### Direct medical cost

s/n	Items	Categories/answer	Skip to
19	Do you pay for medicine purchase from private pharmaceutical?	1= No 2=yes	If no skip to 21
20	If yes, Q 19 how many cost did you incurred for medicine?	.....ETB	
21	Do you pay for prescribed medication from hospital?	1=N0 2=yes	
22	If yes, Q 21 how many cost did you incurred for medicine?	.....ETB	
23	Do you pay for other medical equipment such as Sutures,IV Fluid etc.?	1=No 2=Yes	
24	If yes, Q 23 how many cost did you incurred for this equipment?	.....ETB	
25	Do you pay for Operation procedure during staying here?	1=No 2=Yes	
26	If yes ,Q 25 how many cost did you incurred for Operation procedure?	.....ETB	
27	Do you pay for Bed service during staying here?	1=No 2=yes	
28	If yes Q 26 how many cost did you incurred for Bed service?	.....ETB	
29	Do you pay for Dressing and Bandages?	1=No 2=Yes	
30	If yes, Q 29 how many cost did you incurred for Dressing and bandages?	.....ETB	
31	Do you pay for needle and syringes during staying here?	1=No 2=Yes	
32	If yes, Q 31 how many cost did you incurred for needle and syringes?	.....ETB	
33	Other (please specify ).....	.....ETB	

Part IV: Mother and Care takers travel costs

**Direct non-medical cost**

I will ask you about the costs of your traveling to health facilities visited during delivery				
34	Did you use transport to come Hospital?	1= No 2= Yes		If no Skip to q 38
35	If yes Q34 what transport modality have you used to travel from home to Hospital (H H)?	1=Ambulance 2= Private car 3= Bajaj 4= Horse cart 5=Other (specify.....)		
36	Is there any cost incurred for transport to come hospital?	1= No 2=Yes		
37	If yes, q 36 How many cost have you incurred to travel from Home to Facility?	No of person	Individual cost	Total cost
		..... .....	.....ETB	.....ETB
38	What is transport modality have you used or intend to use for return trip?	1=Ambulance 2= Private car 3=Bajaj 4=Horse cart 5=Other (specify.....)		
39	Is there any cost will you incurred for return trip?	1= No 2= Yes		If no skip to q 41
40	If yes, Q 39 how much cost have you incurred or will you incur for return trip?	No of person	Individual cost	Total cost
		..... ....	.....ETB	.....ETB
41	Is there any cost incurred for food during staying here?	1=No		If No skip to Q43

		2=Yes				
42	If yes, Q 41 How much cost for food did you incurred during staying here?	No of person	Individual cost	No of day of stay	Total cost	
		.....	.....	.....	..... .ETB	
43	Is there any cost incurred for drinking during staying here?	1=No 2=Yes				If no skip to q 45
44	If Yes, Q 43 how much cost for drinking did you incurred during staying here?	No of person	Individual cost	No of day stay	Total cost	
		.....	.....	.....	..... .ETB	
45	Did you use rent bed during staying here?	1=No 2=Yes				Care giver
46	If Q 45 yes, how much cost did you pay per day?	.....ETB				
47	Did you incurred cost for communication ?	1=No 2=yes				
48	If Q 47 yes, How much cost did you incurred?	.....ETB				
<b>Indirect cost</b>						
	What is your monthly family income?	.....ETB				
49	Have you been stayed from the beginning at hospital?	1= No 2=Yes				
50	If yes , how many days in total did you stay at the hospital?	.....day				

51	Averagely how many wage loss due to staying here?	.....ETB
52	Is there any cost except from the above?	1= No 2=Yes
53	If yes, other specify(.....	.....ETB

“Thank you for your participation”

**Afan Oromo version questionnaires:**

**Universitii Jimmaatti fakkaalti papilikii fayyaatti dipartimentii “health Economics, management fi policy”.**

Gaaffii Hospitaala Gindhiir, Roobe fi Gobbaatti, Godina Baale kan naannoo oromiyaa keessatti kan argamu waa’ee baasii seeran hin galma’ina Haadhollin da’umsa mana yaalatti taasissin fi wantoota baasi kanaf sabaabota ta’an dubartoota da’umsa booda hospital keessatti argaman irratti qorannoo gaggeeffamu.

1. Aanaa \_\_\_\_\_

**Seensa:** Akkam Jituu? Maqaan koo \_\_\_\_\_ jedhama. Yuunivarsiitiin Jimmaa baasii seeran hin galma’ini Haadhollin da’umsa mana yaalatti taasisan fi wantoota baasi kanaf sabaabota ta’an dubartoota da’umsa booda hospitala keessa turan irratti beekuuf qorannoo naannoo kanatti gaaggeessaa ykn taasissaa jira .Anis nama ragaa kana walitti qabu keessaa nama tokko

**Walii galtee** Ani amma gaaffii dhuunfaan sii gaafachuun barbaada. Iccitiin deebii kee ni eegama. Maqaan kee gaaffii waraqaa kana irratti hin barreeffamu. gaaffii deebisuu hin barbaanne hin deebistu. Sa’atii barbaaddetti gaaffii deebisuu dhiisuu keetti mirga guutuu qabda. Garuu, dhugummaa dhaan gaaffii kana yoo deebisten anaafis ummataafis qorannoon kun baay’ee faayidaa qaba. Kaayyoo guddaan qorannoo kana Hospitaloota baalee keessa jiran kan qorrannoo kanaaf filatamaan ,baasii seeran hin galma’ina Haadhollin da’umsa mana yaalatti taasissin fi wantoota baasi kanaf sabaabota ta’an dubartoota da’umsa booda hospital keessa turan irratti qorachuudha. Gaafiif deebbin kun yoo xiqqaate daqiiqaa 20 fudhata. Kanaafu gaaffii kana fedhiin akka nu deebistan kabajadhan isin gaafadha?

(mallattoo sirrii dhaan agarsiisi)

Eeyyee \_\_\_\_\_ lakki \_\_\_\_\_

Mallattoo gaafataa walii galtee kana mirkaneessu \_\_\_\_\_.

5. Kooddii Gaafatamaa \_\_\_\_\_

6. Guyyaa \_\_\_\_\_ Yeroo \_\_\_\_\_

7. Supparvayzaran mirkaneeffamuu:

Maqaa \_\_\_\_\_

Guyyaa \_\_\_\_\_

## Mata duree: I. Amaloota hawaasummaa (socio-demographic characteristics)

T/I	Gaafiwwan Hirmaattota adda baafachuuf dhihaatan	Filannoowwan deebii ta'uu malan	Darbi gara...
	Hospitaala	1.Goobbaa 2.Roobee 3.Gindhiir	
1	Umrii Haadha	.....	
2	Tajaajila kana eessaa dhuftani tajaajilamtan ?	1= Magaalaa 2= Baadiyaa	
3	Kaka'umsa kamiin tajaajila kana argaachuf dhufte?	1= Buufata fayyaa irraa ergamudhaan 2= ofi kooti.	
4	Dubbisuu yookiin barreessuu dandeessaa(dubarti deechef)?	1=Lakki 2=Eyyeen	1,dabri gara Ga.7
5	Eeyyee yoo ta'e sadarkaa barumsa ati barattee jirtu maali?	1= Barnoota ga'eessaa 2= Barnoota sadarkaa 1ffaa 3=Barnoota sadarkaa 2ffaa 4=Barnoota college/universitii 5=Kan biro (adda baasi) .....	
6	Abba mana kee dubbisuu ykn barreessu danda'a?	1=Lakki 2=Eyyeen	1,yoo ta'e dabrii gara,9
7	Eeyyee yoo ta'e sadarkaa barumsa Abban mana kee baratee jiru maali?	1= Barnoota ga'eessaa 2= Barnoota sadarkaa 1ffaa 3=Barnoota sadarkaa 2ffaa 4=Barnoota college/universitii 5=Kan biro (adda baasi).....	
8	Hojiin kee ji`oota kudha lamaan dabranii Maalii?(dubarti deechef)	1=Hojjaata mootuma 2=Daldalaa 3=haadha mana 4=Hojjaattu humna 5= kan biro adda habahuu.....	

9	Hojiin abbaa manaa keessan maali?	1=Hojjaata mootumma 2=Daldalaa 3=Qonnan Bulaa 4=Hojjaata humna 5= kan biro adda habahuu .....		
10	Maatiin manaa keessan keessa jiru meeqa?	.....		
11	Galiin Maati keessani gidugaleessan ji'ati argatu meeqa ta'a?	Kan Dhunfaa	Kan maatii	Ida'am
		.....qar.	.....qar.	.....qar

**Mata Duree: II.Odeeffannoo dhimmaa da'umsan waliqabate (delivery related information)**

T/L	Gaaffiiwwan hirmaatoota gaafachuuf dhiyaatan	Filaanno deebi ta'u malaan
12	Da'umsi keessan kun si'a meeqaaffadha.?	1= tokkoffaa 2= lammaffaa 3=sadaffaa 4=Arfaaffaa
13	Akkaakun da'umsa ati tajaajilamte maalidha?	1=Da'umsa gara qaama saalattiin 2=Tajaajila da'umsa garaa baqaqsan 3=Tajaajila da'umsa gargarsa meeshaa fayyadamuttin 4=Kan biro adda baasi.....
14	Fageenyi mana keessani fi hospitaala gidduu kilometiraan meeqa ta'a?	.....km .....sa'ati meeqa fudhata?
15	Guyyaa meeqa Hospitaala kana turtan?	guyyaa.....

**Mata Duree:III.Baasi Haadholeef bahu kan seeran galma’ame mootummaan bakka bu’amu.**

s/n	Akkaaku gaaficha	Filannoo deebii ta’u.	Kan anuti darbi
16	Turtii asi turtan keessatti qorichii dhabbaata dhunfaa irra bitatani fayyadamtan jira?	1= lakki 2=eyyeen	Lakk 1 yoo ta’e dabri gara 21
17	Gaafiin 16,Yoo eyyeen ta’e, qorichaa dhabbaata dhunfaa irraa qarshii meeqa baastani bitattan?	.....Qar.	
18	Turtii asi turtan keessatti qoricha hospitaala irra akka bitattanif isinif ajajame jira?	1=lakki 2=eyyeen	
19	Gaafiin 18 yoo eyyeen ta’e,qarshiin isin qoricha bitaachuf baastani meeqa?	.....Qar.	
20	Turtii asi turtan keessatti tajaala meeshale fayyaa kan akka (Sutures,IV Fluid etc.) dhaf basin isin baftan jira?	1=lakki 2=eyyeen	
21	Gaafiin 20 yoo eyyeen ta’e,qarshiin isin baftan meeqa?	.....Qar.	
22	Tajaajila baqaqsatiif(Operation) yeroo asi turtan keessatti Qarshiin baftan jira?	1=No 2=Yes	
23	Gaafiin 22 yoo eyyeen ta’e,qarshiin isin tajaajila kana argachuf baftan meeqa?	.....Qar.	
24	Yeroo asi turtan keessatti ,tajaajila sireetif qarshiin baftan jiraa?	1=lakki 2=Eyyeen	
25	Gaafii 24 yoo eyyeen ta’e qarshiin isin tajaajila kanaaf baftan meeqa?	.....Qar.	
26	Yeroo asi turtan keessatti tajaajila “ Dressing fi Bandages” tiif qarshiin isin baftan jira?	1=Lakki 2=Eyyeen	
27	Gaafii 26 yoo eyyeen ta’e qarshiin isin tajaajila kanaaf baftan meeqa?	.....Qar.	
28	Yeroo asi turtan keessatti tajaajila lilmee fi sirinjii argachuuf qarshiin isin baftan jira?	1=Lakki 2=Eyyeen	
29	Gaafiin 28 yoo eyyeen ta’e qarshiin tajaajila kana argachuf baftan meeqa?	.....Qar.	
30	Kan biro yoo jirate adda baasi.....	.....Qar.	
	Ida’ama (III)	.....	



**Mata Duree: IV Baasi mootumman bakka hin bune. (direct non-medical cost)**

31	Tajaajila dahumsaf gara hospitaala yeroo dhuftan Geejibni fayyadamtan jiraa?	1= Lakki 2= Eyyeen		1 Dabrii gara 35
32	Gaafiin 31 eeyyen yoo ta'e Geejibaa kanneen keessa gara Hospitaala yeroo dhuftan kami fayyadamtan?	1=Ambulansii 2= konkolaata dhunfa 3= Bajaajii 4= Gaarii farda 5= kan biro yaa ibsamu(.....)		
33	Baasiin isiin gara hospitalaa yeroo dhuftan geejibaaf baaftan jira?	1= Hin jiru 2=Eeyyeen		
34	Gaaffiin 33 eeyyen yoo ta'e, Baasiin isiin gara hospitalaa yeroo dhuftan geejibaaf baaftan qarshiin meeqa?	Baay'ina Nama	Gatii nama tokkof bahee	Ida'ama
		.....	.....Qar.	.....Qar.
35	Kanneen keessa Geejibni isiin gara mana keessani yeroo galtan fayyadamtan kami?	1=Ambulansii 2= konkolaata dhunfa 3= Bajaajii 4= Gaarii Farda 5=kan biro adda baasi.....		
36	Gara manatti yeroo galtan kafaltiin isin geejibaaf kafaltan jira?	1=hin jiru 2=eeyyen		
37	Gaaffiin 36 eeyyen yoo ta'e, Baasiin isiin gara mana yoo galtan geejibaaf baaftan qarshiin meeqa?	Baay'ina namaa	Gati nama tokkof bahee	qarshii waligalaa
		.....	.....Qar.	.....Qar.
38	Yeroo tajaajilaf asi turtanitti baasin nyaataf baaftan jira?	1=Hin jiru 2=Eeyyen		

39	Gaaffiin 38 eeyyen yoo ta'e basin isiin nyaataf baaftan meeqa?	Baay'ina namaa	Gatiin nama tokkof bahee	Baay'ina Guyya turti	Baay'ina qarshii waligalaa	
		.....	.....Qar	.....	.....Qar	
40	Yeroo tajaajilaaf asi turtan keessatti lallaafa dhugaatif baasin isiin baaftan jiraa?	1=Hin jiru 2=Eyyeen,jira				
41	Gaaffiin 40 eeyyen yoo ta'e baasin isiin baaftan meeqa?	Baay'ina namaa	Gati nama tokkof bahee	Baay'ina Guyya turti	Baay'ina qarshii waligalaa	
		.....	.....Qar.	.....	.....Qar.	
42	Tajaajila fayyaaf yeroo asi turtan keessatti tajaajiltotni keessan kan siree kireefatan jiru?	1= hin jiran 2=Eyyeen jiru				
43	Gaaffiin 42 eeyyeen yoo ta'e baasiin isiin baaftan meeqa?	Baay'ina namaa	Gati nama tokkof bahee	Baay'ina Guyya turti	Baay'ina qarshii waligalaa	
		.....	.....Qar.	.....	.....Qar.	
44	Dhimmaa da'umsaf jecha baasiin isiin bilbilaaf baaftan jira?	1=Hin jiru 2=eeyyeen ,jira				
45	Gaaffiin 44 eeyyeen yoo ta'e ,basin isin baaftan meeqa?	.....Qar.				
<b>Baasi al kallaatiin bahu(indirect cost)</b>						
46	Galikee ji'ati giddugalessan meeqa ta'a?	.....Qr				deggartoota f
47	Guyyaa Jalqaba irra egaltan tajaajilamtu bira turtani?	1=Lakki 2=Eyyeen				
48	Gaaffiin 47 eyyeen Yoo ta'e waluma galatti guyyaa meeqa hospitaala kana turtan?	.....guyyadhan				
49	Asi turu keessanif giddugalessan galii guyyaa qarshii meeqa dhabdan?	.....Qar.				
50	Baasiwwan kannen armaan olitiin alatti qarshiin isin baftan jira	1=Lakki 2=Eyyeen				

51	Gaafiin 50 Yoo eyyeen ta'e,qarshii meeqa ta'a?	.....Qar.	
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‘Hirmannaa keessanif Galatooma’

### **ASSURANCE OF PRINCIPAL INVESTIGATOR**

The undersigned agrees to accept responsibility for the scientific ethical and technical conduct of the research project and for provision of required progress reports as per terms and conditions of the Faculty of Public Health in effect at the time of grant is forwarded as the result of this application.

Name of the student: Melese Merga Negash(BSc)

Date. \_\_\_\_\_ Signature \_\_\_\_\_

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### **APPROVAL OF ADVISORS**

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