



**JIMMA UNIVERSITY
COLLEGE OF HEALTH SCIENCE
EPIDEMIOLOGY DEPARTMENT**

**DETERMINANTS OF LOW BIRTH WEIGHT IN KAMBATA
TEMBARO ZONE HEALTH FACILITIES IN SNNPR
ETHIOPIA, CASE CONTROL STUDY**

BY SIMEGN ALEMU (BSc.)

**A THESIS RESEARCH SUBMITTED TO DEPARTMENT OF
EPIDEMIOLOGY COLLEGE OF HEALTH SCIENCE, JIMMA
UNIVERSITY IN PARTIAL FULFILLMENT OF THE REQUIREMENT
FOR MASTER OF PUBLIC HEALTH IN EPIDEMIOLOGY.**

JUNE, 2016

JIMMA, ETHIOPIA

Jimma University
College of Health Science,
Department of Epidemiology

**Determinants of low birth weight in Kembata Tembaro Zone Health facilities
in SNNPR Ethiopia, Case Control study.**

By Simegn Alemu (BSc)

Advisors

Abdulhalik Wrkicho (BSc, MPHE)

Mamo Gebre (BSc, MPHE)

Abstract

Background

Birth weight plays an important role in infant mortality and morbidity, development, and future health of the child. Weight at birth is directly influenced by general level of the status of the mother, but, little information is known on identifying determining factors of term low birth weight. Therefore, this study is aimed to assess the determinants of low birth weight among term neonates in health facilities of Kmbata Tembaro Zone, SNNP Ethiopia.

Objective: the objective of the research was to assess the determinant factors associated with low birth weight in kambata Tembaro Zone

Methods: Institution-based case control study was conducted among mother-newborn pairs. Cases and controls were selected consecutively from health facilities. Term Neonates born with birth weight less than 2500 gm were grouped into cases and those term neonates with weight greater or equal to 2500 were grouped as Controls. The sample size was computed by using open Epi version 2.3 by considering the following assumptions; a ratio of controls to cases 4:1, power 80%, confidence level 95%, and precision level 5%, odds ratio of 3.3 and percentage of control exposed 9.1%. Data were entered using Epidata version 3.1 and exported to SPSS version 20 for analysis. Bi variant and multivariate analyses were done to get candidate variables. Then, the adjusted odd ratio was used to determine strength of the association and the corresponding confidence interval was used to determine statistical significant between the explanatory and outcome variables.

Results: A total of 282 mothers (57 cases and 225 controls) were included .Only household food in-security (AOR= 6.74; 95% CI(2.78-16.36).Sex of neonates(AOR=2.74;95%CI(1.24-6.05) Iron supplementation (AOR=9.71;95%CI(3.51-26.88) ,additional food during pregnancy (AOR=5.49 ;95%CI (2.49,12.11) and anemia AOR=3.51;95%CI(1.56-7.85) were significantly associated with LBW at term. However, no significant association was observed between Number of antenatal care visits and Morbidity related factors with low birth weight.

Conclusion and Recommendation: Modifiable factors such as additional food intake, Iron, and food insecurity were significantly associated with low birth weight at term. Therefore, public health interventions targeting on antenatal additional dietary advice and iron intake and giving special emphasis for food in secured women during pregnancy is recommended to reduce LBW at term in this setup.

Acronyms and Abbreviations

ANC	Antenatal Care
BMI	Body Mass Index
EDHS	Ethiopian Demographic and Health survey
HIV/AIDS	Human Immune deficiency Virus/Acquired Immune deficiency syndrome
IUGR	Intra Uterine Growth Retardation
IFA	Iron-Folic Acid
LBW	Low Birth Weight
MUAC	Mid Upper Arm Circumference
NNP	National Nutrition Program
SGA	Small-for-Gestational Age
WHO	World Health Organization
UNICEF	United Nations Children's Fund
VLBW	Very Low Birth Weight

Acknowledgement

First of all I would like to thank almighty God. My heartfelt gratitude goes to my advisors Mr Abdulhalik Workicho and Mr. Mamo Gebre for their guidance, invaluable support and encouragement. Then I would like to explain my acknowledgments and thanks to Jimma University for providing me the chance to conduct this study. My acknowledgment also extends to Kambata Tembaro Zone Health Department, each health facilities, data collectors, my families and friend for their Cooperation and support.

Contents

Abstract.....	ii
Background of the Study	ii
Acronyms and Abbreviations	iii
Acknowledgement	iv
1. Introduction.....	i
1.2 Statement of the problem	2
2. Literature Review.....	4
Conceptual frame work.....	8
Significance of Study.....	9
3. Objectives	10
4.1 Study area and period.....	11
4.3 Population	11
4.3.2 Study population and Study Unit.....	11
4.4 Eligibility criteria.....	11
4.5.2 Sampling Technique	13
4.6 Study Variable.....	14
4.7 Data Collection Instrument and Procedures	15
4.7.1 Data Collection instrument.....	15
4.7.2 Data Collection and Procedure	15
4.8 Data Processing and Analysis	15
4.9 Data Quality Management	16
4.10 Ethical Consideration	16
4.11 Operational definition	16
5 Result.....	18
6. Discussion.....	26
7. Conclusion.....	29
8 Recommendation.....	29
Referance	30
Questionnaire	33

List of Tables

Table 1 Tabular presentation of total sample size needed for each exposure variables	12
Table 2 Maternal Socio demographic characteristics of cases and Controls in Kambata Tembaro zone, SNNPR, April 2016.....	19
Table 3 obstetric profile of mothers among cases and controls in Kambata Tembaro zone, SNNPR, April 2016	21
Table 4 co-morbidities during pregnancy among Cases and Controls in Kambata Tembaro zone SNNPR, April 2016.....	22
Table 5 Nutrition related factors among women with Cases and Controls in health facilities in Kambata Tembaro Zone SNNP Ethiopia Ethiopia, 2016.....	23
Table 6 Factors affecting birth weight status at term in health facilities of Kambata Tembaro Zone SNNPR Ethiopia,2016	24

List of Figures

Figure 1 Conceptual frame work adapted from literature	8
Figure 2 Recruitment summaries of study populations among health facilities in Kambata Tembaro Zone, SNNP Ethiopia, 2016	13

1. Introduction

Low birth weight (LBW) is defined by the World Health Organization (WHO) as weight at birth of less than (2,500) gm. This is based on epidemiological observations that infants weighing less than 2,500gm were approximately 20 times more likely to die than heavier babies. More commonly, in developing than developed countries, a birth weight below 2,500gm contributes to several poor health outcomes. Birth weight is affected to a great extent by the mother's own fetal growth and her diet from birth to pregnancy[1].

According to WHO technical consultation report on promoting optimal fetal development, birth weight of an infant is dependent on amount of growth during pregnancy and gestational age, and these factors are related to the genetic makeup of the infant and the mother, her lifestyle, her status of health and health care services[2]. It is a complex syndrome that includes preterm and small for gestational age neonates at term. These two groups (preterm neonates and small for gestational age neonates at term) are linked to different causal factors and their long term effects/sequels are also different [3-5].

Low birth weight, thus defines a heterogeneous group of infants: The predominant cause of LBW in the developed countries is pre term birth, whereas in developing countries, it is frequently caused by IUGR[6].The United Nations Children's Fund (UNICEF) report noted that, the global LBW rate was 15.5% and more than 95% of these LBW infants lived in developing countries[1].

1.2 Statement of the problem

There is Strong consensus that birth weight plays an important role in infant mortality, morbidity, development, and future health of the child. Particularly, low birth weight is a most significant risk factor for adverse health outcomes including common childhood diseases [7].

More than 20 million infants worldwide, representing 15.5 percent of all births, are born with low birth weight, 95.6 percent of them in developing countries[8].The level of low birth weight in developing countries (16.5 percent) is more than double the level in developed regions (7 per cent). Half of all low birth weight babies are born in South-central Asia, where more than a quarter (27 percent) of all infants weighs less than 2,500 gm. at birth. A low birth weight level in sub-Saharan Africa is around 15 percent [8]. Studies have indicated that the mean birth weight of African babies is significantly lower than those of developed countries[9]. The WHO country cooperation strategy 2008 – 2011 showed that the prevalence of low birth weight in Ethiopia, estimated to be 14%, it was one of the highest in the world[10] .

It is generally recognized that being born with low birth weight is a disadvantage for the baby [1].Low birth weight is a major determinant of mortality, morbidity and disability in infancy and Childhood and also has a long–term impact on health outcomes in adult life Half of all prenatal and one third of all infant deaths are directly or indirectly related to LBW and Mortality of LBW babies is 40 times more than the normal weight babies and the mortality range can vary 100 fold across the spectrum of birth weight and rises continuously with the decrease of weight[1, 8, 11].

Preterm and small for gestations births accounted for 52% of newborn deaths [12, 13]. Low birth weight due to restricted fetal growth affects the person throughout life and is associated with poor growth in childhood and a higher incidence of adult diseases. Low birth weight (LBW) increases the risk of neonatal deaths and further increases the likelihood of developing the risk of infection (sepsis) and chronic disease such as; hypertension, cardiovascular diseases, type II diabetes, metabolic syndrome and heart disease[7, 8]. World Health Organization (WHO) shows that factors contributing to LBW in developing countries in order of importance include; malaria and female sex of the fetus, illness, especially infections, social factors such as lower status of women, malnutrition, lack of antenatal care (ANC) etc. [14].

Ethiopia has achieved millennium development goal 4, three years earlier to 2015 deadlines[15].It was also reported that the current trends of infant mortality has declined to 59% in 2011 from 97% in 2002.but, neonatal mortality which accounts 42% of under-five mortality was declined marginally compared to other child health indicators [16].The national newborn and child survival strategy has targeted to decrease neonatal mortality from 28% to 11% by 2020 [17].Thus, to address the challenges associated with neonatal mortality reduction, the contribution of adverse birth outcomes such as LBW and preterm births to neonatal morbidity and mortality should not be ignored.

But, the trends of LBW were declining in Ethiopia from 14.6%in 2005 to 11 % in 2011[18]. However, if this trend continues in this way, Ethiopia will not achieve the global nutrition target of LBW reduction by 30% in 2025. A 30 % (3.9 % annual) reduction of LBW is one of the global nutrition target for 2025 endorsed by world health assembly in 2012 [19]. This shows that, even though, attention is paid to birth weight improvement as a means of reducing child mortality. In most developing countries including Ethiopia, it was approximated that every ten seconds an infant dies from a disease or infection that can be attributed to LBW [20]. Thus, this study was conducted to identify the determining factors of low birth weight on term neonates.

2. Literature Review

Factors determining LBW

Scio- demographic, factors

Survey conducted in Jimma hospital showed that the age of most of the mothers in both groups lies between the age group of 25-29 years, which is 18.4% and 35.8% for LBW and NBW, respectively [11]. But this study showed that mothers of cases of LBW are older than control mothers. It is evident from India study that as maternal age increased from 20 to 36, the birth weight increased from 2.9 to 3.4 kg [21].

The cause of LBW is multi-faceted. Term small for gestational age is associated with socioeconomic factors ,Education status of the mother [22],Wealth status [23, 24]and marital status [25, 26]. Wealth status is one of the strong predictor of LBW. Studies conducted in developing countries including sub- Saharan Africa showed that women from poor households would have poor feeding patterns and failure to achieve adequate weight gain during pregnancy eventually affecting birth weight [27-29].

As study finding in Ethiopia showed, the more distal factors such as urban rural difference, maternal occupational and educational status; religion and marital status were not found statistically associated with low birth weight [23, 30-33]. In contrary to this, a study finding in rural hospital from Gambia showed the pattern of low birth weight varies with geographical difference and low birth weight was significantly associated with being rural residence

Obstetric factors.

The risk of low birth weight is also significantly linked with the obstetric profiles of mothers such as parity[34]. And pregnancy intention [24, 33]. The study from India showed that pregnant women who were pregnant for the second and third time gave birth to neonates with the mean birth weight of 3.5 kg, while women with first gravida gave birth to neonates with 2.9 kg [7]. Survey conducted in Jimma hospital showed that the higher the parity, the lesser the chance of having LBW baby [35] . The examination in the trend of proportion of LBW decreases from 0.05 to 0.1 as one move from one parity to a higher one (the mothers of cases are less parous

than controls) indicating a negative association between LBW and parity[35].EDHS 2011 data showed that children of birth order six and above (16 percent) and first-order births were the most likely to be reported as very small [36]. Some studies show us LBW is associated with genetic factors such as the sex of new born. In some studies being female sex was identified as a significant and independent risk factor of low birth weight [14, 32].

Antenatal care

Antenatal care can have a beneficial impact on intrauterine growth of the fetus and gestational duration; hence birth weight, through prevention and timely treatment of complication of Pregnancy. Empirical studies in this regard have examined three dimensions of antenatal care that means timing of first antenatal care visit, number of antenatal care visit and the quality of antenatal Care separately /and/ or using an aggregate indicator of adequacy. Generally, the results show that adequate and intermediate (compared with inadequate) antenatal care was significantly associated with a lower risk of low birth weight [21, 32, 37].

Early iron supplementation with a dose around 100gm/day improves the biochemical status of the mother independently of her pregnancy iron status and supplementation during pregnancy improves newborn weight in those women who start pregnancy with iron deficiencies [38]. A double blinded randomized community trial in Nepal revealed that iron folic acid supplementation increase mean birth weight by 39 gm. and reduces the percentage of low birth weight babies by 16%. However, no significant association was reported among preterm babies [39]. A positive relationship between total iron intakes from food. and supplements in early pregnancy and birth weight was also found among a cohort of pregnant women in Britain [40].A large population based study in India also revealed that iron folic acid supplementation was significantly associated with 23% reduction in the odds of LBW [41] . which is supported with another national survey in Nepal where mothers not consuming iron supplementation during their pregnancy were more likely to have LBW infants [42].

In most public clinics iron is provided in combination with folic acid. Studies found that iron but not folic acid supplementation reduces the risk of low birth weight among pregnant women [39, 43]. Iron deficiency anemia during pregnancy is an important cause of restricted fetal growth leading to low birth weight [44].

Maternal morbidity during pregnancy

Gestational hypertension has a major influence on maternal and neonatal morbidity and Mortality. As institutional based studies in Ethiopia showed approximately 3% - 4% of all pregnancies were complicated by pregnancy induced hypertensive disorders [31, 32]. Studies in Ethiopia and other countries also showed that pregnancy induced hypertension is significantly associated with weight at birth [31, 45]. HIV/AIDS during pregnancy was also identified as potential and significant factors that contribute to LBW [25, 46] .

In other studies, maternal exposure to urinary tract infection and malaria attack during pregnancy were also reported as risk factor for low birth [34, 45]. Malaria is of special interest in Ethiopia because it is endemic in many parts of country, and known to affect pregnant women more (than non- pregnant woman, for instance).Malaria is suspected to have an importance adverse effect on birth on weight through the mechanism mentioned above as well as through other more direct mechanisms. Chronic medical illness and infections during pregnancy, such as rubella cytomegalovirus, toxoplasmosis, and syphilis that affect the fetus may also to low birth weight [21, 47].

Nutrition Related Factors

Food insecurity

The influences of food insecurity on health outcomes during pregnancy are important concern. A paradoxical finding was reported about the effect of food insecurity on birth weight. Study finding in America [48].Revealed that living in food in secured households during pregnancy increase the risk of greater weight gain and pregnancy complication such as gestational. Diabetic and it was also found that food insecurity was not significantly associated with anemia and pregnancy induced hypertension which is found potential determinants of LBW in other studies [31, 32, 45, 46]. On the other hand, a study conducted in Tehran found that food insecurity in family and existence of stress during pregnancy independently contributes to LBW. And it was

reported that the risk of LBW in families who experience food insecurity was 2.34 times higher than household with food security with p value of <0.001[37].

Additional food intake

Maternal caloric intake during pregnancy and maternal nutritional stores are found to have affected intrauterine growth of fetus. Hence, gestational weight gain has often been taken as a summary indicator and proxy for availability of adequate sources for fetal energy requirements and was found to have an impact on birth weight. Studies that separately investigated of caloric intake, protein intake and energy expenditure, work and physical activity also found a significant impact on LBW [49, 50].

Conceptual frame work

To identify the proximal and distal factors associated with the outcome variable (low birth weight) in the context of this study area, an analytical approach similar to the conceptual framework used Dharmalingam et al. 2009 [50].adopted and modified to fit in to this study.

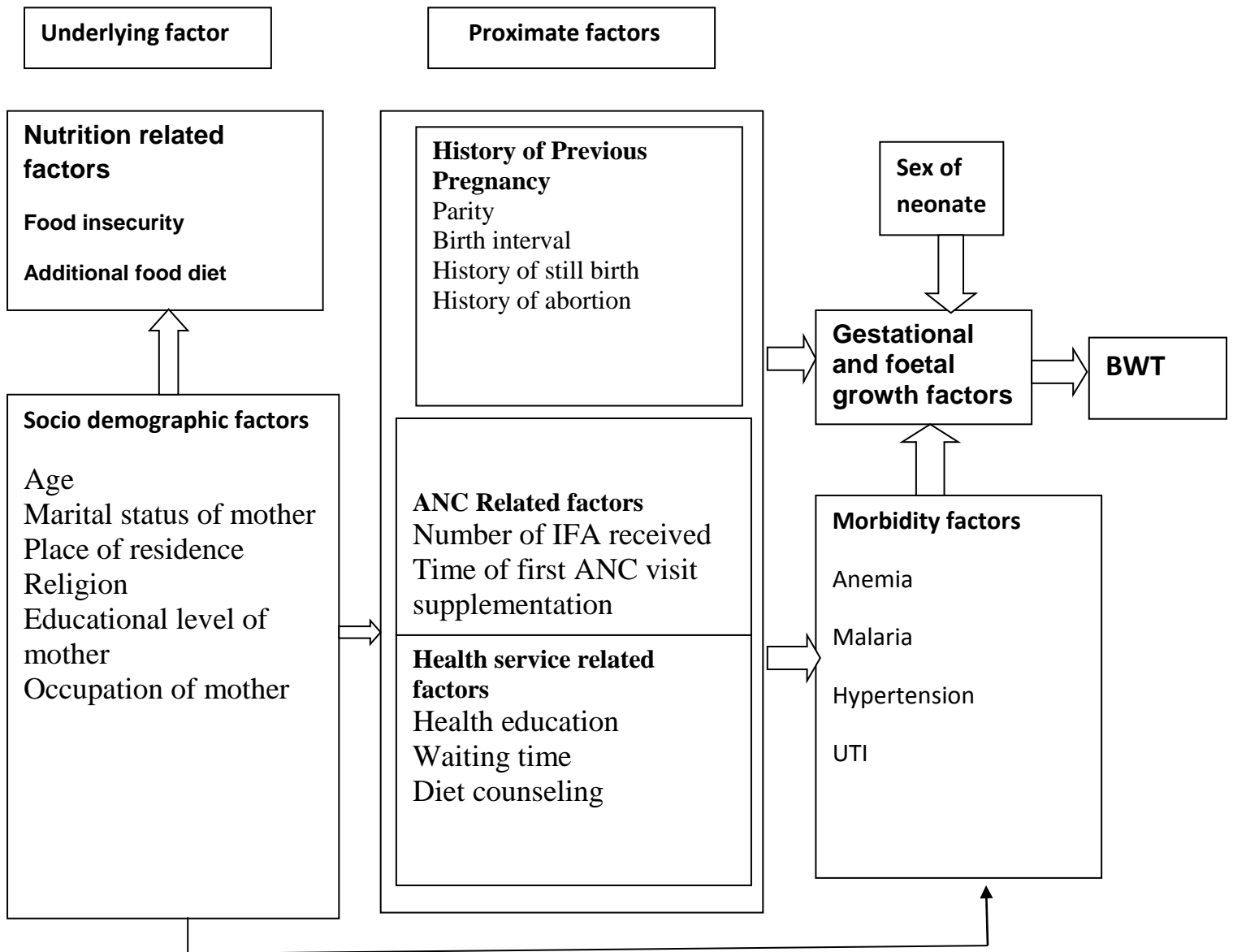


Figure 1 Conceptual frame work adapted from literature

Significance of Study

Generally, identifying the risk factors associated with low birth weight is important for policymakers, planners and other collaborators to design well-timed and contextual based interventions to tackle this important public health problem. In particular, identifying the determining factors of term neonatal low birth weight may be important for improving and restructuring the process of intervention for women who are at risk of low birth weight. Furthermore, it can be used as a base line for further study. The finding of this study will be used for further researchers and policy makers to know the determinants of low birth weight and to intervene on specific problem.

3. Objective

The Objective of the study was assessing the determining factors of term low birth weight among Mothers who attended birth in Kembata Tembaro Zone Health Facilities 2016.

4. Methods and Materials

4.1 Study area and period

Kembata Tembaro Zone has seven administrative Districts: namely Doyogena, Angacha, Damboya, Hadero and Tunto Zuria, Tembaro, Kedida Gamela, and Kacha Bira Districts and one Town Administration with a total of 118 rural and 16 urban kebeles. It is located 352Km from Addis Ababa and 125 Km from the regional capital. The zonal town is called Durame, home to the zone's administrative departments and general hospital. KT zone is bordered in the north by Hadiya zone, in the south by Hadiya and Wolaita zones, to the west by the Omo River and in the east by Halaba Special District. Based on the 2007 Census conducted by the Central Statistical Agency of Ethiopia (CSA), KT Zone has a total population of 683,167, of which 337,852 are men and 345,315 are women; within an area of 1523.6 square kilometers. Kembata Tembaro has a population density of 502.13 people/sq km. study was conducted from. The zone has two Hospitals (One General Hospital and one primary hospital) and 29 Health centers. All health facilities gives ANC and delivery services.

4.2 Study design

Facility based unmatched case control study was conducted.

4.3 Population

4.3.1 Source Population

The study populations were all newborns who were delivered in the health facility during the study period.

4.3.2 Study population and Study Unit

Cases: all term neonates born with Birth weight < 2500gm at the health facilities in Kambata Tembaro Zone during the study period.

Controls: all term neonates born with birth weight \geq 2500gm at the health facilities in Kambata Tembaro Zone during the study period.

4.4 Eligibility criteria

4.4.1 Inclusion Criteria

- All term neonates, who delivered at health facilities during the study period, were included.

4.4.2 Exclusion Criteria

- Neonates, whose Mother were mentally and physically not capable of being interviewed.

4.5 sample size determination and sampling techniques

4.5.1 Sample size determination

The sample size was computed by using open Epi version 2.3 by considering the following assumptions; a ratio of controls to cases 4:1, power 80%, confidence level 95%, and precision level 5%. By comparing, the controls exposed and the odds ratio of different factors as following.

Table 1 Tabular presentation of total sample size needed for each exposure variables

Factors	CI	Pow er	Percent of controls Exposed	OR	case	Control	Total Sample	Reference
Anemia	95%	80%	25.9%	3.36	32	128	160	[51]
In adequate ANC <3times	95%	80%	31.7%	4.98	19	75	92	[51]
Preclamsia	95%	80%	9.1%	3.32	57	225	282	[51]

From the above table, the final sample size was taken from the last factor (Hypertension) which gives maximum sample size.

Total sample size calculated was 282.

Cases 57 and controls 225 neonates.

4.5.2 Sampling Technique

There are 31 Public health facilities which give delivery service in Kambata Tembaro Zone, (Seven Districts) 29 Health Centers and 2 Hospitals. All Health facilities were included to get maximum number of cases within a specified period. Then, cases were selected consecutively and four controls were assigned for each case. In case, where there were more than four controls for one case at the same time of case ascertainment; four of them were selected randomly. This procedure continued until the desired sample size was obtained.

Schematic presentation of sampling procedure

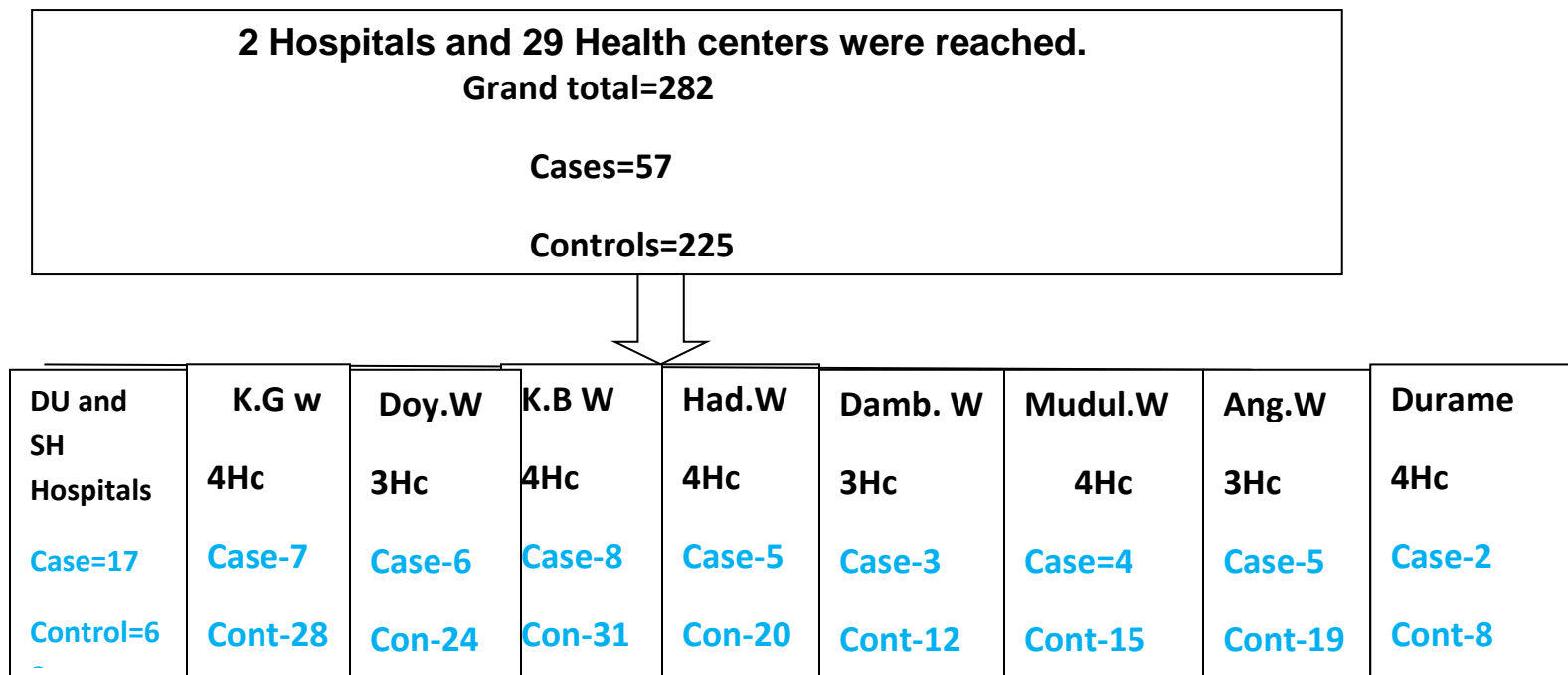


Figure 2 Recruitment summaries of study populations among health facilities in Kambata Tembaro Zone, SNNP Ethiopia, 2016

4.6 Study Variable

4.6.1 Outcome variable

Low birth weight

4.6.2 Explanatory Variables

I. Socio demographic factors

- Age of the mother
- Marital status of mother
- Educational level of Mother
- Occupation of Mother
- Religion of Mother
- Resident

II. Pregnancy and Health Related Factors

- Parity
- History of still birth
- History of abortion
- Number of ANC visit
- Maternal morbidity
- Anemia

III. ANC related factors

- Number of iron folate received
- Time of the first supplementation
- Time of last supplementation
- Health education
- Dietary Counseling
- Number of ANC followed

IV. Nutritional factors

- food security
- additional food

4.7 Data Collection Instrument and Procedures

4.7.1 Data Collection instrument

Structured questionnaires, Clients' chart and standard beam balance were used.

4.7.2 Data Collection and Procedure

The neonates' weights were measured by using standard beam balance in the delivery room immediately after birth (preferably within one hour) by trained data collectors.

Clients' charts were reviewed by using data extraction format to retrieve medical information and mother's test results that could not be captured by the interview.

Then face to face interview was used to collect data on socioeconomic, behavioral, obstetric, food security and Health service related factors.

The neonates' weights were measured using standard beam balance in the delivery room immediately after birth by trained data collectors. The nine standard household food insecurity measurement tools were used to assess the household food security status of the mother [52]

4.8 Data Processing and Analysis

After editing, coding and cleaning data was entered Data was entered in to EPiData version 3.1. After data cleaning and checking for missing value in Epidata then, exported to SPSS windows version 20. Descriptive analysis was carried out and findings were presented in the frequency distribution tables and proportion. Chi-square test statistics were done to check assumption. Binary logistic regression analysis was carried out to examine the relationship between Low Birth weight status and explanatory variables. Only Variables that had p value less than 0.25 in the bivariate analysis were candidate variable for multivariate logistic regressions model to control the confounding variables then, the Model fitness were checked by using Hosmer Lemshow test. The degree of association between independent and dependent variables were assessed using odds ratio with 95% confidence interval. P-value <0.05 were considered as statistically significant.

4.9 Data Quality Management

The questionnaire was prepared in English and then translated from English to Amharic and re-translated back to English. The interviewers were recruited from the study area of health workers, speaking Local language (Kambatissa), and have previous experience of data collection. The interviewers were consisted of sixty six midwife and nurse data collectors and eight Health Officer Supervisors were participated in the data collection. Both interviewers and supervisors were trained, demonstrated, and practiced the data collection technique. At the time of data collection, supportive supervision was made and data were reviewed by supervisors. Data were checked before data entry.

4.10 Ethical Consideration

Ethical rules approval and clearance were obtained from Ethical review committee of Jimma University Collage of Health Science. Official letter of cooperation was also written from SNNPR Health Bureau to Zone Health Department then, to all District health offices. Then District health offices wrote to each health facilities having permission from health facility administrations, informed written consent were obtained from pregnant women in the study after clear explanation about the purpose of the study. Confidentiality of the information was also assured by the use of ID variables from the questionnaire.

4.11 Operational definition

Household food security: exists when all households did not have anxiety and uncertainty about the household's food supply or worried rarely and no problem of insufficient quality and insufficient food intake and its physical consequences.

Mild food insecurity: worries about not having enough food sometimes or Often, and/or is unable to eat preferred foods, and/or eats a more monotonous Diet than desired and/or some foods considered undesirable, but only rarely.

Moderate food insecurity: household sacrifices quality more frequently, by eating a monotonous diet or undesirable foods sometimes or often, and/or has started to cut back on quantity by reducing the size of meals or number of meals, rarely or sometimes.

Severe food insecurity: households has graduated to cutting back on meal size or number of meals often, and/or experiences any of the three most severe conditions (running out of food, going to bed hungry, or going a whole day and night without eating), even as infrequently as rarely.

Household food insecurity: having anxiety and uncertainty about the household's food supply or worried sometimes or often or households experience problems of insufficient quality of food or insufficient food intake or its physical consequences[52].

Additional food: having at least one additional meal than regular due to pregnancy.

4.12 Dissemination Plan

The finding Report will be submitted to the department of Epidemiology collage of health science., Jimma University .It will be distributed to SNNP region Health Bureau, Kambata Tembaro Zone and Durame town Health Office .As necessarily it will be communicated in scientific Conformances and will be sent for Publication to relevant scientific journal.

5. RESULTS

5.1 Description of Maternal Characteristics of cases and Controls

5.1.1 Socio demographic characteristics of the participants

A total of 282 term neonates (57 cases and 225 controls) who delivered in the Health facilities, were included in the study.

The mean birth weight of the Neonate was 2041.23 gm. (S.D± 339.001) for the neonates with low birth weight and 3376.00gm (S.D± 438.572) for the neonates with normal birth weight. Among mothers of neonates 38 (66.7%) cases' and 146(64.9%) controls' were age > 24years old. And majority 40 (91.2%) of cases 'and 184 (81.8%) controls 'were protestant religion followers and 40(70.2%) cases' and 164(72.9 %) controls' were living in rural area.

Looking at the occupation status of mothers, Majority 44 (77.2%) cases' and 180 (80%) controls 'were housewives. When we observe Educational status, among mothers 16(28.1%) cases'and39 (17.3%) controls' had not attended formal education,

Bivariate analysis of socio demographic factors showed that only educational status of the mother was significantly associated with term low birth weight.

Table 2 Maternal Socio demographic characteristics of cases and Controls in Kambata Tembaro zone, SNNPR, April 2016

Variable	Category	Total percent	Birth Weight		COR in 95%CI	p. value
			Case	Control		
Age of mothers	15-24	98(34.8%)	19(33.3%)	79(35.1%)	0.92(0.50-1.71)	0.80
	>24	184(65.2%)	38(66.7%)	146(64.9%)	1	
Residence	Rural	204(72.3%)	40(70.2%)	164(72.9%)	1	0.68
	Urban	78(27.7%)	17(29.8%)	61(27.1%)	1.14(0.6-1.1)	
Education status	No formal education	55(19.4%)	16(28.1%)	39(17.3%)	1.86(0.95-3.6)	0.07
	formal education	227(80.5%)	41(71.9%)	186(82.7%)	1	
Occupational status	Housewife	224(79.4%)	44(77.2%)	180(80%)	1.18(0.59-2.38)	0.64
	Non house wife	58(20.6%)	13(22.8%)	45(20%)	1	

5.1.2 Obstetric characteristics

Among mothers of neonates 19(48.7%) Cases' and 55(40.7%) of Controls' had parity ≥ 4 births. Among mothers of neonates who had history of previous pregnancy, 10 (17.5%) cases' and 16(7.2%) controls' had history of still birth, 6(10.5%) cases' and 14(6.2%) Controls' Mothers were reported history of abortion.

30(52.6%) Cases' and 94 (41.8%) Controls' Mothers gave the current birth before birth interval of 3 years. Among mothers of neonates 14(26.4%) Cases' and 25 (11.1%) controls' were unplanned pregnancy, From Mothers of neonates 35 (62.5%) Cases' and 103 (46.4%) Controls' were attended less than four antenatal care during their

pregnancy. However, 9(16.1%) Cases' and only 22 (9.8%) controls' started their ANC visiting during the first trimester.

From mothers of neonate 38 (66.7%) Cases' and 204 (90.7%) Controls'reported that they were given iron during their ANC follow up. In terms of dietary advice from the mother of neonates44 (77.2%) of cases' and 203(90.2%) of controls' responded that they had got dietary advice during ANC visiting.

On bivariate analysis of Obstetric profile of mothers Only Pervious still birth history of the mother, type of pregnancy, number of ANC follow up, Time of the first ANC visit, Nutritional counseling and Iron folate supplementation were significantly associated with term low birth weight.

Table 3 Obstetric profiles of mothers among cases and controls in Kambata Tembaro zone, SNNPR, April 2016

Variables	Category	Total percent	Birth weight status		COR in 95%CI	P. value
			Case	Control		
Parity	< 4births	102(58%)	20(51.3%)	82(59.9%)	1	0.34
	>=4births	74(42%)	19(48.7%)	55(40.1%)	1.42(0.69-2.89)	
Previous Still birth	Yes	26(9.3%)	10(17.5%)	16(7.2%)	2.75(1.17-6.45)*	0.02
	No	254(90.7%)	47(82.5%)	207(92.8%)	1	
History of Abortion	Yes	20(7.1%)	6(10.5%)	14(6.2%)	1.77(0.65-4.84)	0.26
	No	262(92.9%)	51(89.5%)	211(93.8%)	1	
Birth spacing in a year	>=3years	55(30.7%)	10(25%)	45(32.4%)	0.69(0.31-1.56)	0.37
	<3years	124(69.3%)	30(75%)	94(67.6%)	1	
Pregnancy type	planned	242(85.5%)	43(75.4%)	200(88.9%)	1	0.01
	Unplanned	40(14.2%)	14(24.6%)	25(11.1%)	2.6(1.25-5.42)*	
Number of ANC	<4	138(49.6%)	35(62.5%)	103(46.4%)	1.9(1.05-3.51)*	0.03
	>=4	140(50.4%)	21(37.5%)	119(53.6%)	1	
Time of first ANC	1 st Trimester	31(11.2%)	9(16.1%)	22(9.9%)	1	0.12
	2 nd Trimester	193(69.4%)	33(58.9%)	160(72.1%)	0.50(0.2-1.2)	
	3 rd Trimester	54(19.4%)	14(25%)	40(18%)	0.85(0.32-2.3)	
Nutritional counseling	Yes	247(87.6%)	44(77.2%)	203(90.2%)	1	0.010
	No	35(12.4%)	13(22.8%)	22(9.8%)	2.73(1.27-5.82)*	
Iron folate Received	Yes	242(85.8%)	38(66.7%)	204(90.7%)	1	<0.001
	No	40(14.2%)	19(33.3%)	21(9.3%)	4.86(2.39-9.89)*	

5.1.3 Co-morbidities during pregnancy

In this study, 8(14%) cases' and 12 (5.3%) controls' Mothers had reported history of hypertension during current pregnancy. Half of 29 (50.9%) cases' and 38(16.9%) controls' Mothers had history of anemia during pregnancy and 6(10.5%) of cases' and 24 (10.7%) of controls' Mothers had history of Urinary tract infection and 6(10.5%) of mothers with low birth weight babies and 17 (7.6%) of mothers with normal birth babies reported malaria attack during

current pregnancy. Among co morbidity factors only HTN and anemia were significantly associated with term low birth weight in bivariate analysis.

Table 4 co-morbidities during pregnancy among Cases and Controls in Kambata Tembaro zone SNNPR, April 2016

Variables	Category	Total percent	Birth Weight		COR in 95%CI	P value
			Case	Control		
HTN	Yes	20(7.1%)	8(14%)	12(5.3%)	2.89(1.12-7.47) 1	0.028
	No	262(92.9%)	49(86%)	213(94.7%)		
Anemia	Yes	67(23.8%)	29(50.9%)	38(16.9%)	5.09(2.7-9.5)* 1	<0.001
	No	215(76.2%)	28(49.1%)	187(83.1%)		
UTI	Yes	30(10.6%)	6(10.5%)	24(10.7%)	0.98(0.38-2.5) 1	0.97
	No	252(89.4%)	51(89.5%)	201(89.3%)		
Malaria	Yes	23(8.2%)	6(10.5%)	17(7.6%)	1.43(0.54-3.8) 1	0.46
	No	259(91.8%)	51(89.5%)	208(92.4%)		

5.1.4 Nutrition Related Factors

48 (84.2%) Cases' and 86 (38.2%) Controls' Mothers reported some form of household food insecurity in the last four weeks preceding the study. And few 14 (24.6%) Cases' and 164 (72.9%) Controls' have taken additional food during pregnancy.

On bivariate analysis of nutrition related factors, both house hold food insecurity and additional food during pregnancy were significantly associated with term low birth weight.

5.1.5 Neonatal genetic characteristics

Among neonates 38 (66.7%) of cases and 104(46.2%) of Controls were females

On bivariate analysis the sex of neonate was significantly associated with term low birth weight.

Table 5 Nutrition related factors among women with Cases and Controls in health facilities in Kambata Tembaro Zone SNNP Ethiopia Ethiopia, 2016

Variables	Category	Total percent	Birth weight status		COR in 95% CI	P value
			Case	Controls		
Food insecurity	Yes	134(47.5%)	48(84.2%)	86(38.2%)	8.6(4.02-18.45)*	<0.001
	No [Ⓞ]	148(52.5%)	9(15.8%)	139(61.8%)	1	
Additional food	Yes [Ⓞ]	178(63.1%)	14(24.6%)	164(72.9%)	1	<0.001
	No	104(36.9%)	43(75.4%)	61(27.1%)	8.26(4.22-16.15)*	

Neonatal genetic characteristics of cases and controls in Kembata Tembaro zone.

Variable	Category	Total percent	Birth weight status		COR in 95%CI	P value
			Case	Control		
Neonatal sex	Male	137(49.6%)	19(33.3%)	121(53.8%)	1	0.007
	Female	139(50.4%)	38(66.7%)	104(46.2%)	2.32(1.26,4.28)*	

After entering each explanatory variables in to bivariate analysis, educational status of the mother, still birth history of the mother, sex of neonates, house hold food in security, numbers of ANC visits, time of first ANC visit, additional food, HTN, anemia and Iron folate supplementation during pregnancy become statically significant with term low birth weight at p value <0.25 in 95%CI

5.3Basic characteristics of study participants associated with low birth weight

After entering all Candidate variables in to multivariable analysis only household food insecurity, Sex of neonates, Iron supplementation and additional food during pregnancy were significantly associated with LBW at term.

When food secured households Compared to food in secured households, Neonates from food in-secured households mother had more than six times at risks of LBW at term (AOR= 6.74;95% CI; (2.78-16.36) than neonates from food secured women. Also those neonates whose mothers hadn't additional food were more than 5 times (AOR= 5.49; 95%CI; (2.49, 12.11) more likely at risk for term LBW than those neonates' mothers who had additional food during pregnancy. When we see iron folate supplementation during pregnancy neonates' Mothers Who didn't

receive Iron folate during pregnancy were more than eight times at risk for term LBW than neonates' mothers who had received iron folate.(AOR=9.71;95%CI(3.51-26.88).the neonates mother who have anemia were more than three times more likely to give low birth weight than non-anemic mothers AOR=3.51;95%CI(1.56-7.85)* and the sex of new born being female is two times more likely to cause LBW than being male.(AOR=2.74;95%CI; (1.24-6.05)

Table 6 Factors affecting birth weight status at term in health facilities of Kembata Tembaro Zone SNNPR Ethiopia,2016

<i>Variables</i>	<i>Category</i>	<i>Birth Weight</i>		<i>COR in 95%CI</i>	<i>AOR in 95% CI</i>
		<i>Low</i>	<i>Normal</i>		
School Attended	Yes	41(71.9%)	186(82.7%)	1	1.47(0.55,3.92)
	No	16(28.1%)	39(17.3%)	1.86(0.95-3.65)	1
Previous still birth	Yes	10(17.5%)	16(7.2%)	2.75(1.17-6.45)	1.44(0.44-4.85)
	No	47(82.5%)	207(92.8%)	1	1
Type of pregnancy	Planned	43(75.4%)	200(88.9%)	1	1
	unplanned	14(24.6%)	25(11.1%)	2.6(1.25-5.42)	1.45(0.55-3.85)
Number of ANC	<4	35(62.5%)	103(46.4%)	1.93(1.05-3.51)*	1.26(0.56-2.87)
	≥4	21(37.5%)	119(53.6%)	1	1
Nutritional Counseling	Yes	44(77.2%)	203(90.2%)	1	1
	No	13(22.8%)	22 (9.8%)	2.73(1.28-5.82)	1.10(0.38-3.15)
Iron folate Received	Yes	38(66.7%)	204(90.7%)	1	1
	No	19(33.3%)	21(9.3%)	4.86(2.39-9.89)*	9.71(3.51-26.88)*
HTN	Yes	8(14%)	12(5.3%)	2.89(1.12-7.47)	1.76(0.53-5.77)
	No	49(86%)	213(94.7%)	1	1
Anemia	Yes	29(50.9%)	38(16.9%)	5.09(2.70-9.50)*	3.51(1.56-7.85)*
	No	28(49.1%)	187(83.1%)	1	1
food insecurity	Yes	48(84.2%)	86(38.2%)	8.62(4.02-18.45)*	6.74(2.78-16.36)*
	No	9(15.8%)	139(61.8%)	1	1
Additional Food	Yes	14(24.6%)	164(72.9%)	1	1
	No	43(75.4)	61(27.1%)	8.26(4.22-16.15)*	5.49(2.49,12.11)*
Sex of infant	Male	19(33.3%)	121(53.8%)	1	1
	Female	38(66.7%)	104(46.2%)	2.32(1.26-4.28)*	2.74(1.24-6.05)*

6. Discussion

This study is mainly aimed to assess the determinants of low birth weight at term. Based on the main objective of this study, an iron intake, Additional diet during pregnancy, food insecurity, anemia and sex of neonates were found significantly associated with low birth weight at term. The significant association between houses holds food insecurity of the mother and term low birth weight at term was found both at bivariate and multivariate analysis. The odd of term LBW was 6.74 times higher among mothers from food in secured households as compared to secured households with corresponding 95% CI of (2.78-16.36).

This finding is in line with a case control study finding in Tehran [53]. Possible explanation for the significant association between food insecurity and low birth weight may be food insecurity reduces the quality and quantity of food available to mothers, reducing weight gain and impair the nutritional status of the mother which subsequently reduces weight at birth. Food in secured mothers may often restrict their food and scarify their own nutrition in order to protect their children from hunger which in turn impairs the nutritional status of the mother and consequently reduces weight at birth. Other possible explanation may be women from food in secured households may be at risk of depression and stress which are potential determinants of term LBW as documented in some studies [24]

The more distal factors such as urban rural difference, maternal occupational and educational status; religion and marital status of the mothers were not found statistically associated with term low birth weight

A finding of this study is also in line with different studies Conducted in Ethiopia[23, 30, 31]. In contrary to this, a study finding in rural hospital from Gambia showed the pattern of low birth weight varies with geographical difference and term low birth weight was significantly associated with being rural residence [54]. This difference may be due to sample size, Geographical location or study methods followed.

Mothers Intake of iron supplements during pregnancy was also found to have a protective effect with respect to term LBW (AOR=0.103; 95%CI=0.04, 0.28). Women can develop iron

deficiency anemia from the loss of blood during menstruation and from repeated pregnancies; it can also be caused by lack of iron in the diet. During pregnancy, women may develop anemia because the growing fetus draws upon the mother's iron for the development of red blood cells and other tissues. Intake of iron supplements during pregnancy was also found to have a protective effect with respect to term LBW. This finding is consistent with the findings of some other studies on iron supplementation and pregnancy outcome. A double blinded randomized community trial in Nepal revealed that iron folic acid supplementation increase mean birth weight by 39 gm. and reduces the percentage of low birth weight babies by 16%. However, no significant association was reported among preterm babies [54].

A positive relationship between total iron intake from food and supplements in early pregnancy and birth weight was also found significant among a cohort of pregnant women in Britain [40]. A large population based study in India also revealed that iron folic acid supplementation was significantly associated with 23% reduction in the odds of LBW [41]. Which is supported with another national survey in Nepal where mothers not consuming iron supplementation during their pregnancy were more likely to have LBW infants [42].

In most public clinics iron is provided in combination with folic acid. Studies found that iron but not folic acid supplementation reduces the risk of low birth weight among pregnant women [39, 43]. Iron deficiency anemia during pregnancy is an important cause of restricted fetal growth leading to low birth weight [44]. Iron supplementation during pregnancy protects a woman from becoming anemic because the required amounts may not be supplied from dietary intake during this period.

In this Study medical factors (hypertension, malaria and UTI) were not significantly associated with term LBW. Which is not in line with different studies. Such as; maternal exposure to Hypertension, urinary tract infection and malaria attack during pregnancy were also reported as risk factor for low birth [32, 34, 45].

This difference may be owing to the fewer number of cases and controls exposed as observed in the result section (table 4). This sample may be insufficient to detect the existing exposure difference between cases and controls which in turn result insignificant association between medical factors with term LBW.

But those mothers with anemia during pregnancy were more than three times more likely to give LBW than non-anemic mothers AOR=3.51;95%CI(1.56-7.85). Anemia is caused when by decrease of hemoglobin level, this may decrease the amount of blood production in the mother, through that the neonate receives nutrients. The reduction of nutrient may cause impairs birth weight. This finding in line with other study that showed as Iron deficiency anemia during pregnancy is an important cause of restricted fetal growth leading to low birth weight[44].

Obstetric factors such as birth interval and parity were not significantly associated with LBW. That is not in consistence with other studies [24, 33]. This may be ascribed because of 38.3% respondents was their first birth so that information with regard to birth interval and previous history of low birth weight was not obtained. This large missing value hinders to detect the existing difference and under estimate the significant association between these variables with LBW.

This study also found that Mothers of neonates not taking additional diet during pregnancy was found to a risk factor for low birth weight AOR=5.49;95%CI (2.49,12.11).

Nutrition and weight management before and during pregnancy has a profound effect on development of infants. This is a critical time for healthy fetal development as infants rely heavily on maternal stores and nutrients for optimal growth and health outcomes in later in life. This finding is similar with the study done in other area[55].

And not in line with the finding from study in Dhulikhel Nepal and community based survey in Laelay Axum and Michew district[32, 56]. This discrepancy might be due to differences in study population, the time gap between the study periods, geographical location, in the study. This study shows us LBW is associated with genetic factors such as the sex of new born. In this study the sex of new born being female is more than two times more likely to cause LBW than being male. AOR=2.74; 95% CI (1.24-6.05). This may be due to genetic characteristics of nutritional intake of female differs from males.

this finding is in line with the study conducted in Axum Laelay Maichew Districts, North Ethiopia and Jimma Hospital [14, 32].

7. Limitations of the study

- Anthropometric nutritional status of the mother and depression status of the mother were not assessed,

8. Conclusion

In general, the risk of term low birth weight was associated with modifiable risk factors.

Particularly, Low birth weight at term was associated with contents of ANC that are likely to improve birth outcome such as iron intake during pregnancy.

Additional diet during pregnancy was also significantly associated with term Low birth weight

Therefore, the key elements of antenatal care such as iron intake and dietary advice which are likely to improve low birth weight need to be addressed in this study setup.

It was also found that low birth weight at term was strongly associated with house hold food insecurity,

9. Recommendation

For health facilities

- Identification of women at risk of malnutrition (such as poor and food in secure women) Provision of nutritional support (in the form of food supplements, micronutrient Supplements) during pregnancy.

- Empowering and training front line health workers to provide effective nutritional Counseling during pregnancy.
- Provision of daily iron intake and reinforcing women not to withdraw the recommended iron intake.

For government officials and policy makers

- Design strategies to decrease house hold food in security and supplementation of additional food for food in secured pregnant mothers.

For researchers

- Additional research such as large scale (community based with large sample size), strong designed study (prospective cohort or experimental study) including nutritional status and depression status of the mother need to be conducted

Reference

1. United Nations Children's Fund and World Health Organization:, *Low Birth weight: Country, regional and global estimates*. New York: . 2004.
 2. World Health Organization, *Promoting optimal fetal development report of a technicalconsultation*. Also available at:www.who.int/nutrition/topics/fetal_dev_report_EN.pdf. accessed julay,2015 2006.
 3. Risnes KR *etal*, *Birth weight and mortality in adulthood*. . Epidemiology Int, 2011;. **40**.
 4. Goldenberg RL, et al., *Epidemiology and causes of preterm birth*. . Lancet, 2008. **371**(9606).
 5. Villar J, et al., . *Heterogeneity of perinatal outcomes in the preterm delivery syndrome*. . Obstet Gynecol, 2004. **104**(1).
 6. Rebecca Norton, *Maternal Nutrition During Pregnancy as it Affects Infant Growth, Development and health*. 2012.
 7. University of Mysore, *Maternal anthropometric measurements and other factors: relation with birth weight of neonates* Department of Studies in Food Science and Nutrition. . India, Nutrition Research and Practice, 2012. **6**(2): p. 500.
 8. Leonardo R MR, *long term consequence of low birth weight*. 2005.
 9. WHO, *International statistical classification of available information .World health disease and related health problems*. 1992.
 10. *Kahsay Z, Tadese A, Nigusie B , Low Birth Weight & Associated Factors Among Newborns in Gondar Town, North West Ethiopia: Institutional Based Cross Sectional Study, Indo Global Journal of Pharmaceutical Sciences, 2014; 4(2): 74-80.*
 11. Gessesew B , Balem D, and Mussie A *Socio Demographic and Maternal Determinants of Low Birth Weight at Mekelle Hospital, Northern Ethiopia: A Cross Sectional Study*. American Journal of Advanced Drug Delivery 2015.
 12. WHO, *Regional Office for Europe the Introduction to Health for all policy for the WHO European Region*. Copenhagen: Health 21; . 1998.
 13. Marchant T, et al., *Neonatal Mortality Risk Associated with Preterm Birth in East Africa, Adjusted by Weight for Gestational Age: Individual Participant Level Meta-Analysis*. journal pmed1001292. , 2012. **9**(8).
 14. Tema T, *Prevalence and determinants of low birth weight in Jimma Zone, Southwest Ethiopia*. . East African Medical Journal 2006. **83**:: p. 366-371
 15. UNICEF, *Committing to Child Survival: 2013*.UNICEF2013.[www.unicef.org/.../Committing to Child Survival APR 9 Sept](http://www.unicef.org/.../Committing_to_Child_Survival_APR_9_Sept) .Accessed September 2015
- A Promise Renewed Progress Report 2013.
16. Agency, C.S., . *Ethiopian Demographic and Health Survey*.CSA . . 2012.
 17. *FMOH/MCH Directorate, National Newborn and Child Survival Strategy Document Brief Summary 2015/16-2019/20*. June 2015
 18. ZAKIA M, et al., *Assessment of Adherence to Iron and Folic Acid Supplementation and Prevalence of Anemia in Pregnant Women Ismailia governorate* Egypt. Med. J. Cairo Univ., 2011. **79**(2).

19. Resolution WHA 65.6, *Comprehensive implementation plan on maternal, infant and young child nutrition.*

. World Health Organization, 2012.

20. Chang M, Chun H, and Kuei-Feng C. *the effects of pre-pregnancy body mass index and gestational weight gain on neonatal birth weight in Taiwan. International Journal of Nursing and Midwifery 2010 ; 2: 28-34*
21. Gebremariam A. *Factors predisposing to low birth weight in Jimma Hospital South Western Ethiopia. East African Medical Journal 2005; 82: 554-8.*
22. Sebayang SK, Dibley MJ, Kelly PJ, Shankar AV, Shankar AH. *Determinants of low birth weight, small for gestational age and preterm birth in Lombok, Indonesia: analyses of the birth weight cohort of the SUMMIT trial. Trop Med Int Health 2012;17 938-50*
23. Assefa N, Berhane Y, Worku A. *Wealth Status, Mid Upper Arm Circumference and Antenatal Care (ANC) Are Determinants for Low Birth Weight in Kersa, Ethiopia. PLoS ONE ; 2012;7(6)*
24. Wado YD, Afework MF, Hindin MJ. *Effects of Maternal Pregnancy Intention, Depressive Symptoms and Social Support on Risk of Low Birth Weight: A Prospective Study from Southwestern Ethiopia. PLoS ONE 2014; 9(5)*
25. Hillemeier M, Weisman CS, Chase GA, Dyer AM .*Individual and community predictors of preterm birth and low birth weight along the rural urban continuum in central Pennsylvania. J Rural Health 2007; 23: 42-48*
26. Eshete A, Birhanu D, Wassie B. *Birth outcomes among laboring mothers in selected health facilities of North Wollo Zone, Northeast Ethiopia. open access 2013; 5:7*
27. Badshah S, Mason L, Mckelvie K, Payne R, Lisboa PJ. *Risk Factors for low birth weight in the public-hospitals at Peshawar, NWFP-Pakistan. BMC 2008; 8:197*
28. Vahdaninia M, Tavafian SS, Montazeri A. *Correlates of low birth weight in term pregnancies: a retrospective study from Iran. Tehran, Iran. BioMed central. BMC pregnancy and childbirth 2008; 8:12*
29. Feresu SA, Harlow SD, Welch K, Gillespie BW. *Incidence of and socio-demographic risk factors for stillbirth, preterm birth and low birth weight among Zimbabwean women. Harare, Zimbabwe. Blackwell Publishing LTD Pediatric and prenatal Epidemiology 2004; 18: 154-163.*
30. Megabiaw B, Zelalem M, Mohammed N. *Incidence and correlates of low birth weight at referral hospital in Northwest Ethiopia. Pan African Medical Journal 2012;12:4*
31. Adane AA, Ayele TA, Ararsa LG, Bitew BD and Zeleke BM .*Adverse birth outcomes among deliveries at Gondar University Hospital, Northwest Ethiopia. BMC Pregnancy and Childbirth 2014, 14:90*

32. Teklehaimanot N, Hailu T, Assefa H. *Prevalence and Factors Associated with Low Birth Weight in Axum and Laelay Maichew Districts, North Ethiopia. International Journal of Nutrition and Food Sciences* 2014; 3(6): 560-66
33. Merry KM. *Prenatal care Limitations and opportunities. JOGNN* 2006; 35: 278-86
34. Siza, J. *Risk factors associated with low birth weight of neonates among pregnant women attending a referral hospital in Northern Tanzania. Tanzania Journal of Health Research* 2008; 1-8,
35. Gebremariam A, *Factors predisposing to low birth weight in Jimma hospital south western Ethiopia, . East African Medical Journal* 2005. **82**(11).
36. EDHS, *Ethiopia Demographic and Health Survey, .*
. 2011.
37. Idris U, Mohammed B, BalaM .*A prospective study of maternal risk factors for low birth weight babies in Maiduguri, North-Eastern Nigeria Nigerian Journal of Basic and Clinical Sciences* 2014 11(2).
38. Aranda N, Ribot B, Garcia E, Viteri FE, Arija V: *Pre-pregnancy iron reserves, iron supplementation during pregnancy and birth weight. Early Hum Dev* 2011, 87:791-97
39. Christian etal. *Effects of alternative maternal micronutrient supplements on low birthweight in rural Nepal: double blind randomized community trial. BMJ* 2003;326:571
40. Alwan NA, Greenwood DC, Simpson NAB, McArdle HJ, Godfrey KM, Cade JE: *Dietary iron intake during early pregnancy and birth outcomes in a cohort of Britishwomen. Hum Reprod* 2011; 26:911-19.
41. Balarajan Y, Subramanian S, Fawzi WW. *Maternal iron and folic acid supplementation is associated with lower risk of low birth weight in India. J Nutr* 2013 :143 :1309-1315
42. Khanal V, Zhao Y and Sauer K. *Role of antenatal care and iron supplementation during pregnancy in preventing low birth weight in Nepal: comparison of national surveys 2006 and 2011. BioMed Central Ltd* 2014; 72:4
43. Palma S, Perez-Inglesias R, Prieto D, Pardo R, Llorca J, Delgado-Rodriguez M. *Iron but not folic acid supplementation reduces the risk of low birth weight in pregnant women without anemia. Journal of Epidemiology and Community Health.* 2008; 62:120-24.
44. Allen LH *Anemia and iron deficiency: effects on pregnancy outcome. Am J Clin Nutr*(2000)
45. Nekatibeb G, G/Mariam A. *Analysis of birth weight in Metu Karl hospital South West Ethiopia. Ethiopian Medical Journal* 2007, 45: 195-202
46. Zenebe K, Awoke T, Birhan N. *Low Birth Weight & Associated Factors Among Newborns in Gondar Town, North West Ethiopia. Indo Global Journal of Pharmaceutical Sciences* 2014; 4(2): 74-80

47. Michael F. Iddrisu A, Riskatu Y. *Maternal Risk Factors for Low Birth Weight in a District Hospital in Ashanti Region of Ghana Research in Obstetrics and Gynecology*. 2013;2(4):48-34
48. Barbara A. Laraia, Anna Maria Siega-Riz and Craig Gundersen. *Household food insecurity is associated with self-reported pregravid weight status, gestational weight gain and pregnancy complications*. *J Am Diet Assoc* 2010; 110(5): 692-701.
49. MS K. *Determinants of low birth weight: weight neonates. Essence of pediatrics. 3rd edition. methodological assessment and meta-analysis*. *Bull World Health Organ*. 1987;65:663-73.
50. Negassi T, T.H., Huruy A, *Prevalence and factors associated with low birth weight in Axum and Laelay Miche Districts, North Ethiopia: A Comparative cross-sectional study.*; 3(6).
- . *International Journal of Nutrition and Food Sciences*, 2014. 3(6).
51. SACHIN S *Maternal Risk Factors Associated with Term Low Birth Weight Neonates .A Matched-Pair Case Control Study*. 2011.
52. Coates J, Swindale A, and Bilinsky P, *Household Food Insecurity Access Scale (HFAS) for measurement of food access*. FANTA. Available at www.fantaproject.org <<http://www.fantaproject.org>>. 2007.
53. Mozayeni M, Motlagh A, Eshraghian M, Davaei M .*relationship between food security and stress in pregnant mothers and low birth weight infant in childbirth in Tehran akbar abadi hospital*. *international journal of current life sciences* 2014;4:2915-21).
- . 54. Jammeh A, Sundby J, Vangen S. *Maternal and obstetric risk factors for low birth weight and preterm birth in rural Gambia: a hospital-based study of 1579 deliveries*. *Open Journal of Obstetrics and Gynecology* 2011; 1: 94-103
55. Birhan.M, Meseret Z. Nuru M. *Incident and correlates of low birth weight at a referral hospital in North West Ethiopia*. *Pan Africa Medical Journal*. 2012;12(4):1-4., and 34
56. FMOH. *National Nutrition Programme from June 2013 - June 2015*. 2013 but many

Annex

Questionnaire

I. Participant Information Sheet

Code number of the participant _____

My Name is _____ I am working as a data collector for the study being conducted in this health institution on the determinants of low birth weight ,by Simegn Alemu , who is studying his master’s degree at Jimma University, College of Health Science, School Of Graduate Studies.

I kindly request you to lend me your attention to explain you about the Study and being selected as a study participant.

The study title: The determinants of low birth weight among Women in Durame health facilities kambata Tembaro Zone SNNP Ethiopia.

Purpose of the study:

The aim of this study is to write a thesis as a partial requirement for the fulfillment of a Master’s Program in Public Health for the principal investigator. And the finding will help for intervention to decrease low birth weight in the study Area.

Procedure and duration: I will interview you using a questionnaire to provide me with pertinent data that is helpful to the study. There are questions to answer where I will fill the questionnaire by interviewing you. The interview will take 30 minutes, so I kindly request you to spare me this time for the interview. In addition to interview measurement weight of your baby will be taken.

Risks and benefits: The risk of participating in this study is very minimal, but only taking 30 minutes from your time. There would not be any direct payment for participating in this study. But the findings from this research may reveal important information for the district health office and local health partners.

Confidentiality: The information you will provide us will be confidential. There will be no information that will identify you in particular. The findings of the study will be general for the study community and will not reflect anything particularly of individual persons. The questionnaire will be coded to exclude showing names. No reference will be made in oral or written reports that could link participants to the research.

Rights: Participation in this study is fully voluntary. You have the right to declare to participate or not in this study. If you decide to participate, you have the right to withdraw from the study at any time and this will not label you for any loss of benefits which you otherwise are entitled. You do not have to answer any question that you do not want to answer.

Participants Informed Consent

I have read (she/he have read) the participant information sheet. I have clearly understood the purpose of the research, the procedures, the risks and benefits, issues of confidentiality, the right of participation and the contact address for any queries. I have been given the opportunity to ask any questions for things that may have been unclear. I was informed that I have the right to withdraw from the study at any time or not to answer any question that I do not want. Therefore, I declare my voluntary consent to participate in this study.

Questionnaire on the link between determinants with low birth weight to be filled by data collectors

Interviewer's name _____ Signature _____

Code number of the respondent _____

Region _____ Zone _____ health institution _____

Date/Month/Year of interview: ____ / ____ / ____ E.C.

The questionnaire checked by supervisor or investigator: Name _____
signature _____

Weight of the baby-----gms

No	Questions	Response	Code	Skip
	1. Scio-economic and demographic related questions			
101	How old were you at your last birthday?			
102	What is your religion?	Orthodox Catholic Protestant Muslim Other(Specify _____)	1 2 3 4 5	
103	Where do you stay? (Type of residential settlement)	Rural Urban	1 2	
104	What is your occupational status?	House wife Farmer Merchant Government worker Student Other (Specify) _____	1 2 3 4 5 6	
105	Have ever attended formal school?	Yes No	1 2	If no to107
106	What is highest level of school you attended?	Primary (1-8) Secondary(9-12) Technical /vocational Higher Education (12+)	1 2 3 4	
107	What is your current marital status?	Single Married Divorced Widowed	1 2 3 4	
	2. Questions on obstetric characteristics			
201	Was this child pregnancy your first, second, third, fourth pregnancy or more than four?	First Second Third Fourth Above four	1 2 3 4 5	If 1 to 208
202	Have you had any other live births before the birth of this child?	Yes No	1 2	If no to204
203	How money live births Have you had including this birth?	_____Number		
204	Since the birth of this child, have you had any other pregnancies that did not result in a live birth? 35	Yes No	1 2	If no to 206
205	How many of pregnancies did not result in a live	_____number of still		

	birth?	birth		
206	When the previous child was born, was he/she large, average, and small?	Very large large average small very small	1 2 3 4 5	
207	How many months are there b/n your current child and the previous one.	_____completed months		
208	How old were you when you first gave birth?	_____completed years		
209	At the time you became pregnant did you want to become pregnant?	Yes No	1 2	
210	What is the sex of this baby?	Male Female	1 2	
3	ANC related questions			
301	Have you been following antenatal care during your current pregnancy?	Yes No	1 2	
302	How many times you visited the ANC care	1time 2time 3time More than 3time	1 2 3 4	
303	At what months of your conception you started ANC follow up?	_____completed months		
	.4.Co-morbidity related questions			
401	Did you encounter hypertension during this child Pregnancy?	Yes No	1 2	
402	Did you encounter urinary tract infection during this child pregnancy?	Yes No	1 2	
403	Did you encounter anemia during this child pregnancy?	Yes No	1 2	
404	Did you encounter malaria during this child pregnancy?	Yes No	1 2	
405	Do you encounter another disease?	_____specify		
	5. Food security Condition			
501	In the past four weeks, did you worry that your household would not have enough food? Probe: By “household” we mean those of you that sleep under the same roof and take meals together atleast four days a week.	Yes No	1 2	If 2 to 503
502	If yes How often did this happen?	Rarely (Once or twice in the past four weeks)	1	

		Sometimes (3 to 10 times in the past four weeks)	2	
		Often (more than 10 times in the past four weeks)	3	
503	In the past four weeks, were you or any household member not able to eat the kinds of foods you/he/she preferred because of a lack of resources ? Probe: By “ kinds of foods you preferred ” we mean foods that food secure people eat that food insecure people cannot afford to eat. E.g. Eggs, meat, fish, “Doro wot”, etc By “ lack of resources ” we mean not having money or the ability to grow or trade for the food	Yes No	1 2	If 2 to 505
504	If yes How often did this happen?	Rarely (Once or twice in the past four weeks) Sometimes (3 to 10 times in the past four weeks) Often (more than 10 times in the past four weeks)	1 2 3	
505	In the past four weeks, did you or any household member have to eat a limited variety of foods due to a lack of resources? Probe: When we say “ limited variety of foods ”, we want to mean an undesired monotonous diet for an extended period of days	Yes No	1 2	If 2 to 507
506	If yes How often did this happen?	Rarely (Once or twice in the past four weeks) Sometimes (3 to 10 times in the past four weeks) Often (more than 10 times in the past four weeks)	1 2 3	
507	In the past four weeks, did you or any household	Yes	1	If 2 to

	member have to eat some foods that you really did not want to eat because of a lack of resources to obtain other types of food? Probe: Foods that you really did not want to eat is Food that is considered to be undesirable or socially unacceptable.	No	2	509
508	If yes How often did this happen?	Rarely (Once or twice in the past four weeks) Sometimes (3 to 10 times in the past four weeks) Often (more than 10 times in the past four weeks)	1 2 3	
509	In the past four weeks, did you or any household member have to eat a smaller meal than you felt you needed because there was not enough food? Probe: By “ meal ” we mean the major eating occasions (not including snacks).	Yes No	1 2	
510	If yes How often did this happen?	Rarely (Once or twice in the past four weeks) Sometimes (3 to 10 times in the past four weeks) Often (more than 10 times in the past four weeks)	1 2 3	
511	In the past four weeks, did you or any other household member have to eat fewer meals in a day because there was not enough food? Probe: “ fewer meals in a day ” than the social norm, eat fewer than three meals in a day.	Yes No	1 2	
512	If yes How often did this happen?	Rarely Sometimes often	1 2 3	
513	In the past four weeks, was there ever no food to eat of any kind in your household because of lack of resources to get food?	Yes No	1 2	

514	If yes How often did this happen?	Rarely Sometimes often	1 2 3	
515	In the past four weeks, did you or any household member go to sleep at night hungry because there was not enough food?	Yes No	1 2	
516	If yes How often did this happen?	Rarely Sometimes often	1 2 3	
517	In the past four weeks, did you or any household member go a whole day and night without eating anything because there was not enough food?	Yes No	1 2	
518	If yes How often did this happen?	Rarely Sometimes often	1 2 3	
	6.Iron folate supplementation			
601	During this pregnancy, were you given or did you buy any iron tablets Probe by telling the color of iron or by showing iron tablet	Yes No	1 2	If 2
602	When did you receive the first tablets	1 st Trimester 2 nd Trimester 3 rd trimester	1 2 3	
603	For how long did you take the supplement?	One month Two months Three months More than three months	1 2 3 4	
604	How did you take your supplement?	On daily base..... Weekly..... When I think am sick..--- Other(specify	1 2 3 4	
605	How many tablets did you collect per visit?	30 table..... 60 table..... 90 table....., >90 table..... Other (specify).....	1 2 3 4 5	
606	How many tablets per a week you receive	Seven days 4-7 days <4 days	1 2 3	
607	Is there any health education about iron/folate supplement during collecting your supplement?	Yes No	1 2	

608	If yes ,what was the issue	Purpose of supplement..... Duration of the supply Side effect ... Follow up visit.....	1 2 3 4	
7	Health care and system related questions			
701	How long it take to reach Health institution from your residence?	_____Hrs		
702	What is the average Waiting time in the health facility while you were collecting iron/folate Supplement.	_____minutes		
8	Nutritional status			
801	During this pregnancy have you got nutritional counseling during pregnancy	Yes No	1 2	
802	During this pregnancy, did you take additional diet than the usual?	Yes No		
803	If yes how many times additional food per day	One Two Three More than three	1 2 3 4	

Medical conditions of the mother to be retrieved from patient card

Medical conditions	Yes	No
Hypertension		
UTI		
Anemia		
HIV		

Amharic questionnaire

የተሳተፉዎች መረጃ እና ስምምነት ማረጋገጫ ቅጽ በአማራኛ

የተሳተፉዎች መረጃ ቅፅ

የተሳተፉዎቹ መለያ ቁጥር _____

እኔ _____ እባላሁ፡፡ በጂማ ዩኒቨርሲቲ የምሩቃን ጤና ስይንስ ኮሌጅ የድህረ ምረቃ ትምህርቱን በመከታተል ላይ የሚገኘው ስመኝ ዓለሙ በሚሰራው ጥናት መረጃ ሰብሳቢ ነኝ፡፡ እርስዎ ለቃለ መጠይቅ ለምን እንደተመረጡ እንድገልፅልዎት ሀሳብዎን ሠብሠብ አድርገው እንዲከታተሉኝ በትህትና እጠይቅዎታለሁ፡፡

የጥናቱ ርዕስ: የደም ማነስ መድኃኒት ከእርግዝና በፊት መጠቀም ና ሌሎች ተጉዋዳኝ ነገሮች በተወለደው ጨቅላ ህጻን ክብደት ላይ የሚያመጣው ተጽኖ፡፡

የጥናቱ ዓላማ:

ይህ ጥናት ለተመራማርው በህብረተሠብ ጤና ሳይንስ የሁለተኛ

ዲግሪውን ለማግኘት ይጠቅመዋል፡፡ በተጨማሪም የጥናቱ ግኝት ለ ከምባታ ጠምባሮ ዞን ጤና መምሪያ ይገባና እርምጃ መውሰድ ያለባቸውን ቦታዎች ይጠቁማል፡፡

አካሄድ እና የሚወሰደው ጊዜ: እኔ በመጠይቅ በመታገዝ ስጠይቅዎ ትክክለኛ መረጃ ቢሰጡኝ ለጥናቱ ጠቃሚ ነው፡፡ በአጠቃላይ

ቃለምልልሁ 30 ደቂቃ ይወስዳል፤ ስለዚህ ይህን ጊዜዎን ለቃለምልልሁ መስዋዕት እንዲያደርጉልኝ በትህትና እጠይቃለሁ፡፡ ከቃለ መጠይቁ በተጨማሪ የልጅዎ ክብደት ይለካል፡፡

ጉዳት እና ጥቅሙ: በዚህ ጥናት መሳተፍ 30 ደቂቃ ከጊዜዎ ከመውሰድ ውጭ ጉዳት የለውም፡፡ በጥናቱ ሲሳተፉ ምንም አይነት ክፍያ ባይኖረውም ጥናቱ ለዞኑ ጤና መምሪያ እና በአካባቢው ለሚገኙ የጤና አጋር ድርጅቶች ጠቃሚ መረጃ ሊያስገኝ ይችላል፡፡

ሚስጥራዊነት፡ እርስዎ የሚሠጡን መረጃ በሚስጠር የሚያዝ ነው። የዚህ ጥናት ዉጤት እርስዎን ወይም ልጅዎን የሚያመለክት ምንም አይነት መረጃ አይኖርም። መጠይቆቹ የመለያ ቁጥር ስለሚሠጣቸው ስምዎን አይናገሩም። እርስዎን እና ጥናቱን የሚያገናኝ የቃል ወይም የፅሁፍ መረጃ አይወሰድም።

መብት፡ በዚህ ጥናት መሳተፍ በፍላጎት ላይ የተመሠረተ ነው። እርስዎም የማይፈልጉትን ጥያቄ ያለመመለስ እና በፈለጉት ጊዜ የማቋረጥ መብት አልዎት።

በፍቃደኝነት የተመሰረተ የስምምነት ማረጋገጫ ቅጽ

የተሳተፈዎት የመረጃ ቅፅ ተነቦልኛል(አንብቤዋለሁ)። የጥናቱ ዓላማ፣ አካሄድ እና የሚወስደውን ጊዜ፣ ጉዳት እና ጥቅሙን

ሚስጥራዊነት፣ ያለኝን መብት እንዲሁም የአቤቱታ አድራሻዎችን በግልፅ ተረድቼዋለሁ። ግልፅ ያልሆኑ ነገሮችን እንድጠይቅ

እድል ተሠጥቶኛል። የማልፈልገውን ጥያቄ ያለመመጠስ እና በፈለኩት ጊዜ የማቋረጥ መብት እንዳለኝ ተነግሮኛል። ስጤዚህ

ለመሳተፍ በፍቃደኝነት መስማማቴን አረጋግጣለሁ።

የጨቅላው ክብደት-----ግራም

ተ.፤ ቁ	ጥያቄ	አማራጭ መልሶች	ኮድ	ይለፉ
101	ዕድሜዎ ስንት ነው?	-----ዓመት		
102	የምን ሀይማኖት ተከታይ ነዎት?	አርቶዶክስ ካቶልክ ፕሮቴስታንት ሙስሊም ሌላ(ይገለፅ) _____	1 2 3 4	
103	የትነው የሚኖሩት ?	ገጠር ከተማ	1 2	
104	የእርስዎ ስራ ምን ድነው?	የቤትእመቤት አርሶ አደር ነጋዴ የመንግስት ሠራተኛ ተማሪ ሌላ(ይገለፅ) _____	1 2 3 4 5	
105	የመደበኛ ትምህርት ተከታትለው ያወቃሉ?	አዎ አልተከታተልኩም	1 2	2 ከሆነው ደ107

1 0 6	እስከ ስንት የትምህርት ደረጃ ተምረዋል?	የ መጀመርያ ደረጃ (1-8) የ ሁለተኛ ደረጃ እና መሰናዶ (9-12) የ ሙያ ና ቴክኒክ የ ከፍተኛ ትምህርት(12)	1 2 3 4	
1 0 7	በአሁኑ ወቅት የእርሶዎ የጋብቻ ሁኔታ ምንድን ነው?	ያላገባች ባለትዳር የ ፈታች ባለ የሞተባት	1 2 3 4	
2	ከእና ቶች ስነ -ተዋልዶ ጋር የተያያዙ ጥቂዎች			
2 0 1	ይህን ን ጨቅላ ህፃን ስታረግሻር እርግዝና ወ ስንተኛሽ ነው?	የ መጀመሪያ ሁለተኛ ሶስተኛ አራተኛ ከአራት በላይ	1 2 3 4 5	2 ከ ሆ ነ ው ደ 2 0 8
2 0 2	ከዚህ ጨቅላ ህፃን ውጭ በህይወት የ ተወለዱ ልጆች አሉሽ?	አ ም የሉኝም	1 2	2 ከ ሆ ነ ው ደ 2 0 4
2 0 3	ይህን ጨቅላ ህፃን ጨምሮ ምን ያክል በህይወት የተወለዱ ልጆች አሉሽ?	_____ያክል		
2 0 4	በህይወት ያልተወለዱ (ሞተው) የተወለዱ ነበሩሽ?	አ ም የሉኝም	1 2	2 ከ ሆ ነ ው ደ 2 0 6
2 0	በህይወት ያልተወለዱ (ሞተው) የ ተወለዱ ስንት ነበሩሽ?	_____ያክል		

5				
2 0 6	ከዚህ ልጅ በፊት የተወለደው/ቺው ልጅ ትልቅ፣ መካከለኛ፣ ትንሽ ነበር/ች?	በጣም ትልቅ ትልቅ መካከለኛ ትንሽ በጣም ትንሽ		
2 0 7	በዚህ ጨቅላ ህፃን ን እና ከዚህ በፊት ባለው ልጅ መካከል ምን ያክል የወርልዩ ነት/ነበር?	_____ ወር		
2 0 8	የ መጀመርያ ልጅሽን ስትወልድ ስንት ዓመትሽ ነበር?	_____ ዓመት		
2 0 9	ይህንን ጨቅላ ህፃን በረገዝሽበት ጊዜ እርግዝናውን ፈልገሽው ነበር?	አዎ አልፈለኩም	1 2	
2 1 0	የ ዚህ/የዚች ጨቅላ ህፃን ጾታ ምንድ ነው?	ወንድ ሴት	1 2	
3	ከወልድ በፊት(ቅድመ ወልድ) ክትትል ጋር የተያያዙ ጥያቄዎች			
3 0 1	ለዚህ ጨቅላ ህፃን የቅድመ ወልድ ክትትል አድርገው ያውቃሉ?	አዎ አላደረኩም	1 2	
3 0 2	ለዚህ/ች ጨቅላ ህፃን ስንት የቅድመ ወልድ ክትትል አድርገዋል?	1ጊዜ 2ጊዜ 3ጊዜ ከ3ጊዜ በላይ	1 2 3 4	
3 0 3	የ መጀመርያ የቅድመ ወልድ ክትትል ሲያደርጉ እርግዝናው የስንት ወርነበር?	_____ ወር		
4	በእርግዝና ወቅት ከሚከሰቱ በሽታዎች ጋር የተያያዙ ጥያቄዎች			
4 0 1	በዚህ ጨቅላ ህፃን እርግዝና ዎቅት የደምግፊት ህመም ይሞሽኑ ነበር ?	አዎ አልያዘኝም	1 2	
4 0 2	በዚህ ጨቅላ ህፃን እርግዝና ዎቅት የሽንት-ቱቦ ህመም ይሞሽኑ ነበር?	አዎ አልያዘኝም	1 2	
4 0 3	በዚህ ጨቅላ ህፃን እርግዝና ወቅት የደም ማነስ በሽታ ይሞሽኑ ነበር?	አዎ አልያዘኝም	1 2	
4	በዚህ ጨቅላ ህፃን እርግዝና ወቅት የውሳኔ በሽታ ይሞሽኑ ነበር?	አዎ	1	

04	ር?	አልያዘኝም	2	
405	ሌላበእርግዝናዎቅት ያመሙ ሽበሽታዎችካሉ	----- ግለጽ		
5	የምግብዋስትና ሁኔታ በተመለከተ የሚጠየቁ ጥያቄዎች			
501	ባለፉት አራት ሳምንታት ጊዜ ውስጥ ቤተሰቤ በቁምግብ የለው ምን ዓይነት ልሰጋት ገብቷችሁ ነበር? ቤተሰብ ማለት ቢያንስ በሳምንት ለአራት ቀን ያህል በአንድ ጣሪ ያስር አብራችሁ የምታድሩና የምትመገቡ ለማለት ነው።	አዎ አይ	1 2	
502	አዎ ከሆነ ለምን ያህል ጊዜ ትሰጉ ነበር?	1. በጣም አልፎ አልፎ (ባለፉት አራት ሳምንታት አንዴ ወይም ሁለት) 2. አንድ አንድ ጊዜ (ባለፉት አራት ሳምንታት ከ3 እስከ 10 ጊዜ) 3. ብዙ ጊዜ (ባለፉት አራት ሳምንታት ከ10 ጊዜ በላይ ነበር)	1 2 3	
503	ባለፉት አራት ሳምንታት ጊዜ ውስጥ አንተ/ቺ ወይም ሌላ የቤተሰብ አባል የፈለገውን ወይም የመረጠውን የምግብ አይነት ለመብላት የአቅም ማነስ ችግር ገጥሟችሁ ነበር? የመረጠውን የምግብ ዐይነት ማለት ማንኛውም በምግብ እራሱ ገደብ ለቤተሰብ የሚመገበው ዐይነት ማለት ነው። ለምሳሌ እንቁላል; ስጋ; አሣ; ዶሮ ወጥና የመሳሳሉት ማለት ነው። የአቅም ማነስ ችግር ማለት ለመግዛት የሚሆን ገንዘብ ጠጣት ወይም ማምረት አለመቻል ማለት ነው።	አዎ አይ	1 2	
504	አዎ ከሆነ ለምን ያህል ጊዜ ትሰጉ ነበር?	1. በጣም አልፎ አልፎ (ባለፉት አራት ሳምንታት አንዴ ወይም ሁለት) 2.	1 2 3	

		አንድአንድጊዜ (ባለፉትአራትሳምንታትከ3 እስከ 10ጊዜ) 3. ብዙጊዜ (ባለፉትአራትሳምንታትከ10ጊዜ በላይነበር)		
5 0 5	ባለፉትአራትሳምንታትጊዜወስጥአንተ/ቺወይምሌላየቤተሰቡአ ባል የሚያስፈልገውንአቅምከማጣትየተነሳወስንየሆኑየምግብዐይነቶችንለመመገብተገዳችሁነበር? ወስንየሆኑሲባልተመጋቢወመመገብየማይፈልገው አንድዐይነትምግብለብዙጊዜያትለማለትነው።	አዎ አይ	1 2	
5 0 6	አዎከሆነለምንያህልጊዜነበርየተከሰተወ?	1. በጣምአልፎአልፎ (ባለፉትአራትሳምንታት አንዴወይምሁለቴ) 2. አንድአንድጊዜ (ባለፉትአራትሳምንታትከ3 እስከ 10ጊዜ) 3. ብዙጊዜ (ባለፉትአራትሳምንታትከ10ጊዜ በላይነበር)	1 2 3	
5 0 7	ባለፉትአራትሳምንታትጊዜወስጥአንተ/ቺወይምሌላየቤተሰቡአ ባልአቅምስለማይፈቅድና ሌላምግብመመገብስላልቻላችሁፈጽሞልትመገቡየማትፈልጉት ንምግብለመመገብተገዳችሁነበር? ፈጽሞልትመገቡየማትፈልጉትምግብማለትበህብረተሰቡዘንድየ ማይወደድናተቀባይነትየሌለዉለማለትነው።	አዎ አይ	1 2	
5 0 8	አዎከሆነለምንያህልጊዜነበርየተገደዳችሁት	1. በጣምአልፎአልፎ (ባለፉትአራትሳምንታት አንዴወይምሁለቴ)	1 2 3	

		2. አንድአንድጊዜ (ባለፉትአራትሳምንታትከ3 እስከ 10ጊዜ) 3. ብዙጊዜ (ባለፉትአራትሳምንታትከ10ጊዜ በላይነበር)		
509	ባለፉትአራትሳምንታትጊዜወስጥአንተ/ቺወይምሌላየቤተፍቡአ ባልበቁምግብስለሌላችሁበቀንከምትመገቡት 3 ዋናዋናምግቦችከምትፈልጉትበመጠን ያነሰየመሰላችሁንምግብለመመገብተገዳችሁነበር?	አዎ አይ	1 2	
510	አዎከሆነለምንያህልጊዜነበርየተገደዳችሁት	1. በጣምአልፎአልፎ (ባለፉትአራትሳምንታት አንዴወይምሁለቴ) 2. አንድአንድጊዜ (ባለፉትአራትሳምንታትከ3 እስከ 10ጊዜ) 3. ብዙጊዜ (ባለፉትአራትሳምንታትከ10ጊዜ በላይነበር)	1 2 3	
511	ባለፉትአራትሳምንታትጊዜወስጥአንተ/ቺወይምሌላየቤተሰቡአ ባልበቁምግብስለሌላችሁበቀንመመገብከነበረባችሁ 3 ዋናዋናምግቦችበታችሉመመገብተገዳችሁነበር? ምሳሌ: ከሶስቱአንዱንወይምከዛበላይመተወማለትነወ።	አዎ አይ	1 2	
512	አዎከሆነለምንያህልጊዜነበርየተገደዳችሁት	1. በጣምአልፎአልፎ (ባለፉትአራትሳምንታት አንዴወይምሁለቴ) 2. አንድአንድጊዜ (ባለፉትአራትሳምንታትከ3 እስከ 10ጊዜ) 3. ብዙጊዜ (ባለፉትአራትሳምንታትከ10ጊዜ በላይነበር)	1 2 3	

		ምንታትከ3 እስከ 10ጊዜ) 3. ብዙጊዜ (ባለፉትአራትሳ ምንታትከ10ጊዜ በላይነበር)		
5 1 3	ባለፉትአራትሳምንታትጊዜውስጥምግብለማግኘትየሚያስፈልጋ ችሁአቅምስላልነበራችሁምንምዐይነትምግብናለምግብየሚሆንነ ገርከቤታችሁጠፍቶ ነበር?	አዎ አይ	1 2	
5 1 4	አዎከሆነለምንያህልግዜነበርይህችግርየገጠማችሁ?	1. በጣምአልፎአል ፎ (ባለፉትአራትሳ ምንታት አንዴወይምሁለ ቴ) 2. አንድአንድጊዜ (ባለፉትአራትሳ ምንታትከ3 እስከ 10ጊዜ) 3. ብዙጊዜ (ባለፉትአራትሳ ምንታትከ10ጊዜ በላይነበር)	1 2 3	
5 1 5	ባለፉትሳምንታትጊዜውስጥበቂምግብስላልነበረአንተ/ቺወይም ሌላ የቤተሰቡአባልሳይመገብወደመኝታየሄደበትጊዜነበረ?	አዎ አይ	1 2	
5 1 6	አዎከሆነለምንያህልጊዜነበርየተከሰተዉ?	1. በጣምአልፎአል ፎ (ባለፉትአራትሳ ምንታት አንዴወይምሁለ ቴ) 2. አንድአንድጊዜ (ባለፉትአራትሳ ምንታትከ3 እስከ 10ጊዜ) 3. ብዙጊዜ (ባለፉትአራትሳ	1 2 3	

		ምንታትከ10ጊዜ በላይነበር)		
5 1 7	ባለፉትአራትሳምንታትጊዜውስጥበቂምግብስላልነበረአንተ/ቺ ወይምሌላ የቤተሰቡአባልምንምዐይነትምግብሳይመገብቀኑንሙሉውሎለ ሊትምያደረ አለ?	አዎ አይ	1 2	
5 1 8	አዎከሆነለምንያህልጊዜነበርየተከሰተው?	1. በጣምአልፎአልፎ (ባለፉትአራትሳምንታት አንዴወይምሁለቱ) 2. አንድአንድጊዜ (ባለፉትአራትሳምንታትከ3 እስከ 10ጊዜ) 3. ብዙጊዜ (ባለፉትአራትሳምንታትከ10ጊዜ በላይነበር)	1 2 3	
6	የደምማነስመድኃኒትአጠቃቀምበተመለከተጥያቄዎች			
6 0 1	በቅድመወልድክትትልወቅትየደምማነስመድኃኒትተሠጥ ቶዎትነበር?የመድኃኒቱንቀለምበመናገር/መድኃኒቱንበ ማሳየትእንዲያስታወሱያድርጉ	አዎ አልተሠጠኝም	1 2	
6 0 2	ለመጀመሪያጊዜመድኃኒቱንየተጠቀሙትመቼነው?	ከ1- 3ወርበለእርግዝናዎቅት ከ3- 6ባለእርግዝናዎቅት ከ6- 9ባለእርግዝናዎቅት	1 2 3	
6 0 3	በቅድመወልድክትትልወቅትየደምማነስመድኃኒትለስንት ወርወስደሻል?	ከ1ወርለነሰጊዜ ለ1 ወር ለ2 ወራት ለ3ወራት ከ3ወራትበላይ	1 2 3 4 5	
6 0 4	በምንአይነትሁኔታነውመድኃኒቱንየምትዎስጅዉ?	በየቀኑ በየሳምንቱ በሚያመኝጊዜ	1 2 3	

		ሌላካለይገለጽ(-----)	4
6 0 5	በአንድጊዜምንያህልመድኃኒትነወየሚሰጥሽ?	30 ፍሬ 60ፍሬ 90ፍሬ ከ90ፍሬየሚበልጥ	1 2 3 4
6 0 6	በሳምንትምንያህልየደምማነስመድኃኒትነወየምትዎስጅዉ?	ሰባትቀናት ከ4-7 ቀናት ከ4 ላነሱቀናት	1 2 3
6 0 7	ስለደምማነስመድኃኒትየተሰጠሽትምህርትአለ?	አዎ የለም	1 2
6 0 8	አዎከሆነበምንላይነወያሰተማሩሽ?	የመድኃኒቱጥቅም ለምንያህልግዜመዉሰ ድእንዳለብሽ ስለጉዳቱ ስለክትትል	1 2 3 4
7	ከጤናአጠባበቅገርየተገናኙጥያቂዎች?		
7 0 1	ከቤትዎወደጤናጣቢያ/ሆስፕታልለመድረስስንትሰዓትይፈጃል?	-----ሰዓት	
7 0 2	የቅደመዎልድክትትልስታደርግለምንያህልሰዓትትጠብቅያለሽ?	-----ደቂቃ	
8	የአመጋገብሁኔታ		
8 0 1	በዚህእርግዝናዎቅትስለተጨማሪምግብምክርወስደዋል?	አዎ አልዎሰድኩም	1 2
8 0 2	በዚህእርግዝናዎቅትተጨማሪምግብትመገቢነበር?	አዎ አልተመገብኩም	1 2
8 0 3	አዎከሆነምንያህልተጨማሪጊዜበቀንትመገቢነበር	1ጊዜ 2ጊዜ 3ጊዜ ከሦስትጊዜበላይ	1 2 3 4

ከመዝገብላይየሚሞላየእናትየወየጤናሁኔታ

የህክምናዎች	አለ	የለም
የደምግፊት		
የሽንት-ቱቦህመም		
የደምማነስበሽታ		
ኤችአይቪ		

Declaration

I, the undersigned, declare that this Thesis is my original work, has not been presented for a degree in this or any other university and that all sources of materials used for the thesis have been fully acknowledged

Name of investigator__Simegn Alemu

Signature_____

Name of the institute_ Jimma University

Date of submission _____

This Thesis has been submitted for examination with my approval as

Approval of Advisors

Name of the primary advisor: Abdulalik Wrkicho (B.Sc, MPHE, Asst .professor)

Date ____/____/____ Signature: _____

Name of the Secondary advisor: Mamo Gebre (B.Sc, MPHE)

Date ____/____/____ Signature: _____

