ADDIS ABABA UNIVERSITY
COLLEGE OF HEALTH SCIENCES
SCHOOL OF PUBLIC HEALTH

Association of Physical activity during third trimester pregnancy and birth weight at term in Butajira, SNNPR, Ethiopia, 2017

By: Meseret Legesse (BSC)

Advisor: Prof. Jemal Haidar (MD, MSc, CRM, CME, HD)

A thesis to be Submitted to Addis Ababa University School of Public Health in partial fulfillment for the Requirement for the Masters Degree in Public Health Nutrition, Addis Ababa University

November, 2017
Addis Ababa, Ethiopia

ADDIS ABABA UNIVERSITY
COLLEGE OF HEALTH SCIENCES
SCHOOL OF PUBLIC HEALTH

Association of Physical activity during third trimester pregnancy and birth weight at term in Butajira, SNNPR, Ethiopia, 2017

By: Meseret Legesse (BSc)

Advisor: Prof. Jemal Haidar (MD, MSc, CRM, CME, HD)

A thesis to be Submitted to Addis Ababa University School of Public Health in partial fulfillment for the Requirement for the Masters Degree in Public Health Nutrition, Addis Ababa University

November, 2017
Addis Ababa, Ethiopia

APPROVED BY THE BOARD OF EXAMINERS

This thesis, by Meseret Legesse is accepted in its present form by the board of examiners as fulfilling for the degree of masters in public health nutrition.

Advisor

Jemal Haider Ali (MD, MSc, CRM, CME, HD, professor) _____ _____

Full name Rank Signature Date

External Examiner

_____ _____ _____ _____

Full name Rank Signature Date

Internal Examiner

_____ _____ _____ _____

Full name Rank Signature Date

Chairman, Department Graduate committee

_____ _____ _____ _____

Full name Rank Signature Date

Acknowledgment

My most sincere acknowledgment goes to my advisor Prof. Jemal Haidar. He helped me a lot starting from reshaping my research idea till the end of thesis writing with his guidance and valuable comments. My gratitude also goes to Dr. Seifu Hagos for his unreserved support in all times of need. I am also grateful to nutrition unit for their comments, suggestion and unreserved guidance throughout the study period. My sencere gratitude also goes to Ethiopian Public Health Institiute (EPHI). Butajira woreda health office, data collectors and the study participants are duly acknowledged. Lastly, I thank Addis Ababa University School of Public Health and Themathic Research Project for all the favorable conditions and funding me this thesis work. I would also like to thank my families and riends for their support throughout my study and thesis work.

Table of Contents

List of Tables

List of Figures

List of Annexes

Acronyms

ANC	Antenatal Care
BMI	Body Mass Index
CM	Centimeter
CSA	Central Statistics Agency
DHS	Demographic Health Survey
EDD	Expected Date of Delivery
EDHS	Ethiopian Demographic Health Survey
FAO	Food and Agriculture Organization
FFQ	Food Frequency Questionnaire
FMOH	Federal Ministry of Health
GPAQ	Global Physical Activity Questionnaire
KG	Kilogram
LBW	Low Birth Weight
LMP	Last Menstrual Period
MD	Medical Doctor
Mg	Milligram
MUAC	Mid Upper Arm Circumference
NBW	Normal Birth Weight
PAL	Physical Activity Level
PCA	Principal Component Analysis
SGA	Small for Gestational Age
SNNPR	Southern Nations Nationalities People Region
SRS	Simple Random Sampling
TPA	Total Physical Activity
UNICEF	United Nations Child Fund
WHO	World Health Organization

Abstract

Background: Low birth weight is an important public health issue in both developed and developing countries accounting for nearly 80% of neonatal deaths globally. It is the main factor influencing child survival and occurrence of chronic diseases in adult life. In Ethiopia only 5% of babies are weighed at birth and prevalence of low birth weight varies from 10-28%.Women from poor communities often engage in heavy physical activities which continue to late pregnancy.

Objective: To assess maternal physical activity level during third trimester and its association with birth weight of newborns at term in Butajira, SNNPR, Ethiopia.

Methods: A community based cohort study was employed on 247 pregnant mothers during third trimester. The mothers were selected using simple random sampling technique using list obtained from each kebele's survey. Structured questionnaire containing list of activities in vigorous and moderate categories and pattern of selected activities was used to assess physical activity level. Anthropometric measure of the mothers was done and pre-pregnancy weight and gestational weight gain was reported by the mothers. Birth weight was measured within 72 hours of delivery. Data was entered using Epi-Data 3.1 and all statistical tests were done using STATA version 14 software.

Results: Out of 247 cohort of third trimester mothers, 235 were included in the final analysis among which 124(52.77%) and 111 (47.23%) of the mothers did moderate and vigorous physical activities during third trimester respectively. Low birth weight was 21.62% and 9.68% among newborns of mothers with vigorous and moderate physical activity levels respectively. After adjustment for important determinants of birth weight, doing vigorous physical activity [AOR=2.48:95% CI= (1.01-6.09], Prolonged standing [AOR=3.37:95% CI (1.14-9.93)] and squatting [AOR=2.61:95% CI (1.04-6.54)] during third trimester had significantly negative association birth weight at term.

Conclusion and Recommendation: In this study over half of mothers did moderate physical activity and nearly half of mothers did vigorous intensity physical activities during third trimester. Proportion of low birth weight at term was high among mothers who did vigorous physical activity compared to mothers with moderate physical activity. Doing vigorous intensity physical activity, physical activities done by standing for longer hours and squatting position

during third trimester had significantly negative association with birth weight at term. In order to improve child birth weight, pregnant women need to be counseled to reduce vigorous intensity physical activity, standing and squatting during third trimester.

1. Introduction

1.1 Background

World Health Organization (WHO) defined low birth weight as weight at birth less than 2500g (1).The prevalence of low birth weight across regions and within countries vary with great majorities of the occurring in low- and middle-income countries (2, 3).

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. More than 20 million infants are born each year weighing less than 2500gm, accounting for 17 percent of all births in the developing world (4).According to the 2016 Ethiopian demographic and health survey, 13 % of babies were low birth weight (5). In studies in Ethiopia the prevalence of LBW varies from 10-28 % (2,11).Low birth weight is an important public health issue in both developed and developing countries which is the main factor influencing health and nutritional conditions, physical growth psychosocial development, child survival and occurrence of chronic diseases in adult life (6).

It is considered the single most important predictor of infant death within the first month of delivery (7).Women from poor countries are at higher risk of poor birth outcomes among which low birth weight is the one and vital for prevention of childhood morbidity and mortality(8).

According to Kramer et al, the etiology of LBW is multifactorial and includes : unfavorable socioeconomic conditions, low maternal weight at the beginning of pregnancy, short maternal stature, maternal comorbidities (such as malaria and anemia), absence or inadequate prenatal care, unfavorable reproductive history, multiple pregnancy, illicit drug use and excessive physical activity during pregnancy (9).

Women from poor communities often engage in heavy physical activity at home and their farm. What makes it difficult is the fact that these activities continue into pregnancy and are closely linked birth outcomes (10).

A study in Kenya showed that women spent an average of 78% of their time on physical activities of which 37% and 16% of it is spent on domestic activities and personal care respectively and they do not decrease their activity level during third trimester pregnancy(10).

Pregnancy is the most nutritionally demanding period in a woman's life because optimal nutrition is crucial to support the growth of fetus and placenta, and to satisfy physiological changes that occur during pregnancy (11).

According to Ethiopian studies, LBW is associated with mother's age, nutritional status, health status, absence of antenatal care, birth order, residence (urban-rural difference), occupation, family's income and educational background (2, 12).

1.2 Statement of the Problem

Birth weight has emerged as the leading indicator of infant health and welfare and the fundamental focus of infant health policy (13). It has been estimated that LBW babies are approximately 20 times more likely to die than normal weight babies (14).

LBW babies account for nearly 80% of neonatal deaths globally and experience severe health and developmental difficulties that can impose large costs on the society (15).

Those who survived are more likely to have health problems and slower development from immediately after birth to later in life (13). According to 2016 EDHS, infant mortality for children who were reported to be small or very small at birth was 56 deaths per 1,000 live births compared with 43 deaths per 1,000 live births for children who were reported to be average or larger at birth(5).In 2012, the World Health Assembly Resolution 65.6 endorsed a Comprehensive implementation plan on maternal, infant and young child nutrition1, which specified six global nutrition targets for 2025 which include 30% reduction of low birth weight (16).Ethiopia is implementing different interventions to reduce LBW. The Ethiopian government set national nutrition strategy and program (NNP) to address maternal and child nutrition problem and signed scaling up nutrition (SUN) target to improve under nutrition focusing on first 1000 days. Furthermore, the country implemented Health sector development plan IV (HSDP IV) which involves nutritional interventions on health extension program. Regardless of efforts being made to alleviate nutritional problems, the magnitude of LBW and neonatal death is not decreasing as envisioned(17-19).

Evidences from studies conducted in different developed and developing countries of various socioeconomic backgrounds demonstrated an inverse relationship between daily maternal physical activity during pregnancy and birth weight (20).

Even though physical activity during pregnancy is known to be one of the risk factors for LBW elsewhere, little is known about level of daily maternal physical activity during pregnancy and its association with birth weight in Ethiopia. Therefore, this study assessed level of different domains of daily maternal physical activities such as vigorous, leisure time, walk, sleep and sedentary activities during third trimester and its association with birth weight at term in Butajira, Ethiopia.

1.3 Significance of the Study

This study will be used as baseline information for future studies and uncover the level of daily maternal physical activity during pregnancy and its association with birth weight of newborns at term. In addition to this, it could be used for policy makers and relevant stakeholders to design and implement an effective prevention and control strategies and programs that will help to reduce occurrence of LBW related to maternal work load and its detrimental effect on the neonates in the short term and later in adulthood as well as improvement of maternal health. Furthermore, Health worker providing ANC services will make use of the findings during the routine ANC follow up to counsel the mothers on levels of physical activity they should perform during third trimester. Generally this study is expected to help the efforts being made by the government and concerned bodies to reduce incidence and prevalence of LBW and improve child health by improving weight at birth.

2. Literature Review

2.1 Magnitude of Low Birth Weight

According to UNICEF and WHO, globally 15.5% of all births, more than 20 million babies, are born with LBW. The prevalence of LBW in least developed, less developed and developed countries were 18.6, 16.5 and 7.0 %, respectively. The lowest figures were reported in Europe (6.4%) and North America (7.7%) whereas the highest is in Asia (18.3%) and Africa (14.3%). About 72% and 22% of all LBW births happen in Asia and Africa, respectively (4).

According to 2016 EDHS, only 14% of children in Ethiopia are weighed at birth. Among children born in the five years before the survey with a reported birth weight, 13% weighed less than 2.5 kilograms(5).Studies conducted in Gondar and Tigray reported 17.4 % and 14.6 % prevalence of LBW respectively (21, 22). Findings from an in-depth analysis of 2011 EDHS reported 29.1 % prevalence of LBW(23).

2.2 Determinants of Birth Weight

Based on different studies several factors are attributed to LBW and are depicted in Figure 1.

Demographic and Socio-economic Determinants

Socio demographic and economic statuses has significant association with birth weight. According to a case control study from Iran most of the socioeconomic statuses (household income, mothers' education and unemployed husband) directly affected birth weight (24).

Another study in Ghana revealed that having infant birth weight ≥ 2.5 kg is highly associated with socioeconomic status of women household, occupation and maternal age. Mothers who were farmers, artisans and civil servants were more likely to have babies weighing ≥2.5kg compared to unemployed mothers suggesting poor socio economic status to have a significant association with birth weight (25).

Evidence from the 2013 Nigeria demographic and health survey showed LBW is significantly higher among neonates whose mothers were aged 15-24 years, without formal education, unemployed and non-married (26).

A prospective Study from Southwestern Ethiopia showed women aged 35 and above residing in rural area, being in the lowest wealth tertile were contributory factors to LBW (27). Another

institution based cross sectional study conducted in Mekelle revealed a statistically significant association between the age of the mothers and mean birth weight (28). A study done in Bahardar also shows being illiterate and non-rural residence had 73.7% and 68% rate of giving LBW deliveries respectively (29).Likewise,a study conducted in Bale showed rural residence of the mother was strongly associated with LBW compared to those mothers who live in urban areas (12).

Daily Maternal Physical Activity

In developing countries where majority of the people live in rural areas, women are responsible for house chores in addition to outdoor work and as a result are exposed to undesirable pregnancy complications such as low birth weight (8).

A study conducted in India documented a direct link between physical activity level (PAL) and birth weight. Higher Maternal PAL scores in earlier as well as later pregnancy and certain postures such as bending were associated with LBW (8).

On the other hand, a prospective cohort study in Iran showed increasing biomechanical load as a result of some maternal body postures is hazardous for general health of infants at birth (20).

Likewise,a systematic review in which twelve studies measured different domains of daily physical activity by pregnant women including occupational, household, leisure-time and commuting, have confirmed harmful effects of excessive physical exertion at work on birth weight (30).

A study conducted in the Netherlands indicated the largest reduction in birth weight among women with high job strain, who worked 32 or more hours per week, than with women with low levels of job strain who worked less than 32 hours per week. The combination of a high physical workload and a work week of 32 or more hours was also associated with even more reduced birth weight in this study (31).

Another study by Rao et al found that the daily activities of women in rural zones (predominantly household activities) were inversely associated with birth weight. Typical physical activities in rural areas, like carrying water from the well water source to the residence, increased the risk of low LBW (32).

Additionally,studies have indicated that leisure physical activities like listening to music, studying and resting reduce mothers' stress, appeared to increase their weight gain and blood supply to fetus which positively influence infants' birth weight (33).

An other case-control study in Iran found that an increase in the time spent on sport activities and home activities was accompanied by increased chance of giving LBW infants; while one hour increase of leisure activities decreased the probability of delivering LBW infants (24).

Certain body postures while performing various physical activities during pregnancy were also known to have negative association with birth weight of newborns.A study done in Iranrevealed mothers who did activities by standing for a longer time were 6.35 times more likely to have term LBW infants(33).

Maternal Anthropometry

A Cross-sectional study from poor communities of northern Brazil revealed mother being short was associated with LBW (34). A cross-sectional study conducted in Gondar also showed maternal height of below 155 cm was significantly associated with LBW(35).

A result from Sudanese study reported women with a height below 156cm had increased relative risk for LBW by about 52% (36). Comparable to this, a case-control study done in Nepal shows maternal height is a significant predictor of birth weight (37).

Regarding other anthropometric factors, a study from Ethiopia shows that maternal MUAC is significantly associated LBW (38). Gestational weight gain was also known to be among factors associated to offspring's birth weight on a cohort of 699 women and their offspring in Norway (39).

Obstetric Factors and reproductive characteristics

There are numerous obstetric and reproductive health related factors that contribute to occurrence of LBW.A study in Sudan showed parity as a significant predictor of birth weight that LBW rate of first born babies was found to be closely two fold that of newborns of multiparous mothers (36). This findings is similar to a result reported in Ghana, Nepal and South western Ethiopia (7, 37,40).

Studies show that ANC visit, iron and other micronutrient supplementation during pregnancy are recognized as significant predictors of LBW (40, 41).

Maternal Morbidity during Pregnancy

Regarding maternal morbidities, anemia, hypertension, diabetes mellitus and malaria infections are some of the risk factors of LBW (21,37).

A longitudinal study in Benin showed severe anemia during the third trimester is associated with an increased risk of LBW (42). In the same way, a study conducted in Neal reported anemia to be an independent risk factor for LBW(40).

Similarly a matched pair case control study in India and a hospital based study in Ethiopia found maternal anemia and hypertension are associated with LBW (29,43).

A finding from a longitudinal study in Japan also revealed a smaller reduction in hemoglobin was significantly associated with LBW (44). This is similar to a finding of case control study conducted in north shoa, Debre Birhan hospital (45).

Other cross-sectional studies conducted in Gondar and Jimma hospitals, showed occurrence of LBW is significantly associated to malaria attack and hypertension during pregnancy and other chronic diseases. (21,22).

Substance use during pregnancy

Different studies shown that maternal caffeine and alcohol consumption, history of khat chewing as well as using various substance such as tobacco during pregnancy are known to be associated with different adverse birth outcomes including LBW (43, 46).

In Ethiopia remarkably numerous studies are done on birth weight addressing its prevalence and risk factors. As far as we know, studies done on the level of maternal physical activity during pregnancy and its association with birth weight as well as other fetal outcomes are limited. The level of maternal physical activity during third trimester and its association with birth weight will be assessed in this study.

Conceptual Framework

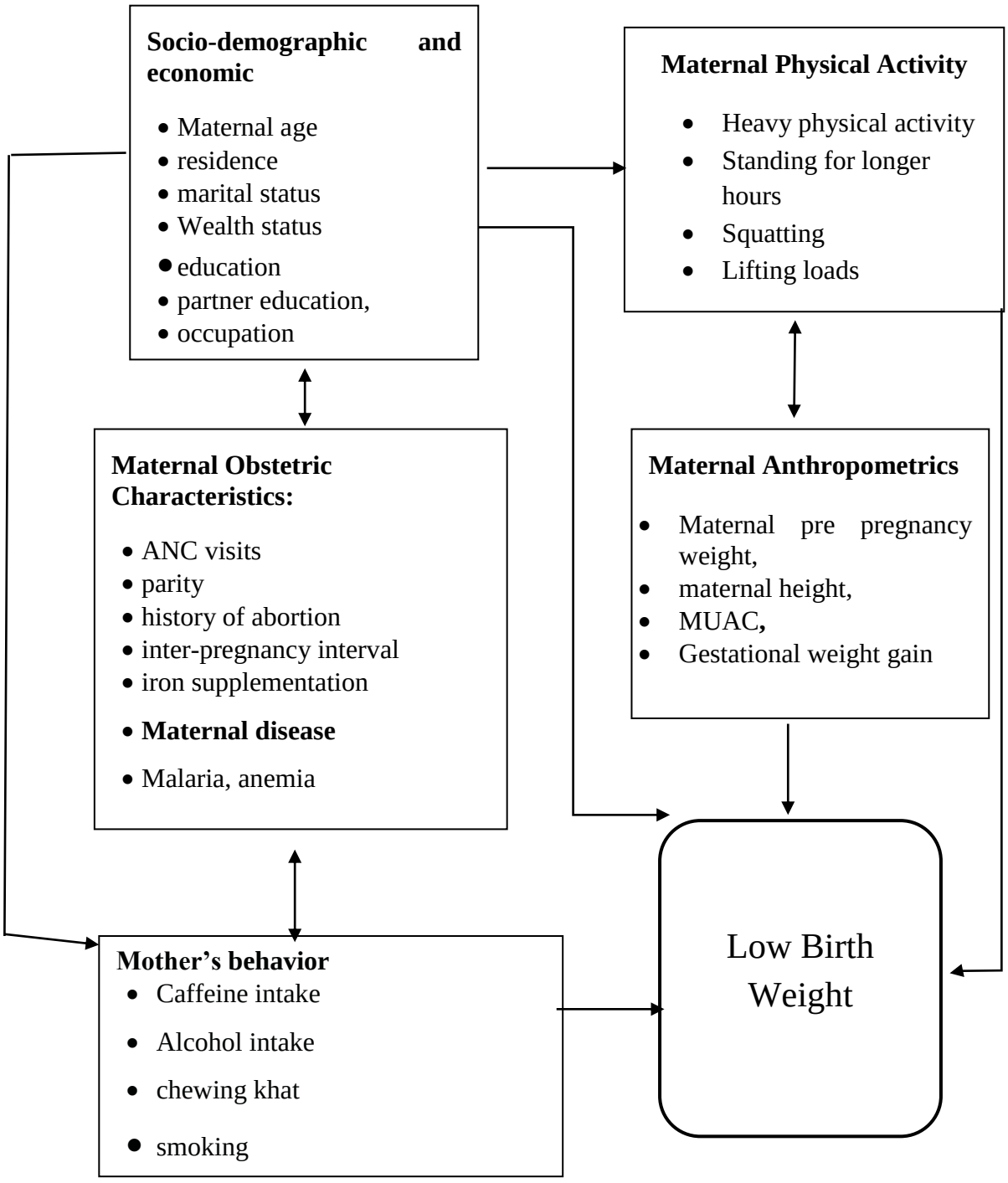

Figure 1: Conceptual Framework of low birth weight adapted from different literatures

4. Objectives

4.1 General Objective

- To assess the level of daily maternal physical activity during third trimester pregnancy and its effect on birth weight of newborns at term Butajira, Ethiopia.

4.2 Specific Objectives

- To assess the level of daily maternal physical activity during third trimester pregnancy in Butajira, Ethiopia
- To assess the effect of levels of daily maternal physical activity during third trimester on birth weight of newborns at term in Butajira, Ethiopia.

5. Method and Materials

5.1 Study Area and Period

The study was conducted in the Butajira Health and Demographic Surveillance site (HDSS) which is found in Butajira woreda in south central Ethiopia. The woreda is located at the base of the zebidar massif in the Gurage zone of the southern nations, nationalities and peoples' region (SNNPR) which is130 km south of Addis Ababa and 50 km west of Ziway town in the rift valley 8.20 north latitude and 38.50 east longitudes with an estimated size of 797 km2. The HDSS is found in Meskan and Mareko woredas. It covers 10 kebeles of which 9 are rural and 1 is urban with an estimated total population of 76,350. Meskan woreda consists of six kebeles namely Dirama, ShersheraBido, Bati, Dobena, MisrakMeskan and Wurib. MarekoWoreda consists of Hope and Mekakelegnajaredemeka kebeles. The other two kebeles, Dobena and Yeteker belongs to Silite Zone and the tenth kebele is Kebele 04 from Butajira town. Gurage is the main ethnic group and Islam is the major religion. Guragigna is the major language but Amharic, the national language, is also widely spoken in the area**.**

Data collection took place from March 2016 to June 2017.

5.2 Study Design

Community based prospective cohort study was employed.

5.3 Source and Study population

All pregnant women of third trimester pregnancy who are residents of the kebeles found in the DSS were the source population and all sampled pregnant women of third trimester pregnancy who are residents of the kebeles found in the DSS were the study population.

5.4 Sample Size Determination

Sample size is calculated using Epi-calc 2000 statistical software program. Double population proportion formula was used for assessment of effect of different domains of daily maternal physical activity during third trimester on birth weight of their newborns at term.

The prevalence of LBW of 9.8% reported for SNNPR was taken as a prevalence among unexposed groups with a 15% difference between exposed and unexposed groups as shown below;

$$n_1 = \frac{\left[Z_{\frac{\alpha}{2}} \sqrt{\left(1 + \frac{1}{r}\right) P(1-P)} + Z_{\beta} \sqrt{P_1(1-P_1) + \frac{P_2(1-P_2)}{r}} \right]^2}{(P_1 - P_2)^2}$$

Where,

n_1= Sample size for low birth weight among unexposed group (those who are not in the vigorous physical activity domain)

n_2 =Sample size for low birth weight among exposed group (prevalence of LBW among mothers who did vigorous physical activity)

r: n_1 / n_2=1 that is taken one to one ratio

P_1= Prevalence of LBW in SNNPR 9.8% (It is taken as prevalence among mothers who did moderate physical activity) (47).

P_2 =24.8 % Prevalence of LBW among exposed 15% difference was assumed because of lack of previous study

Z= Standard normal distribution curve value for the 95% confidence interval (1.96)

Considering 80% of Power to detect the difference between two groups

P (pooled population proportion): $P_1+rP_2/1+r$ =0.173(17.3%)

The sample size calculated is found to be n1=n2=112= 224.Taking 10 % for non-response it yields a total sample size of 247.

5.5 Sampling Procedure

All the ten kebeles that are found in the DSS were selected purposively. Sampling frame containing list of pregnant mothers who are supposed to be in their third trimester based on number of visits (3 visits) from all kebeles along with their house number was obtained from Butajira health and demographic surveillance site (HDSS) pregnancy survey list. By using the list, the mothers were visited at home and those who are in third trimester based LMP and willing to participate in the study were identified. Finally a total of 247 pregnant women of third trimester pregnancy were selected from the new list using simple random sampling technique until the required number of participants was obtained.Then the sample size was distributed proportionatey to the number of third trimester pregnant mothers living in each kebele.

The details is depicted in Figure 2.

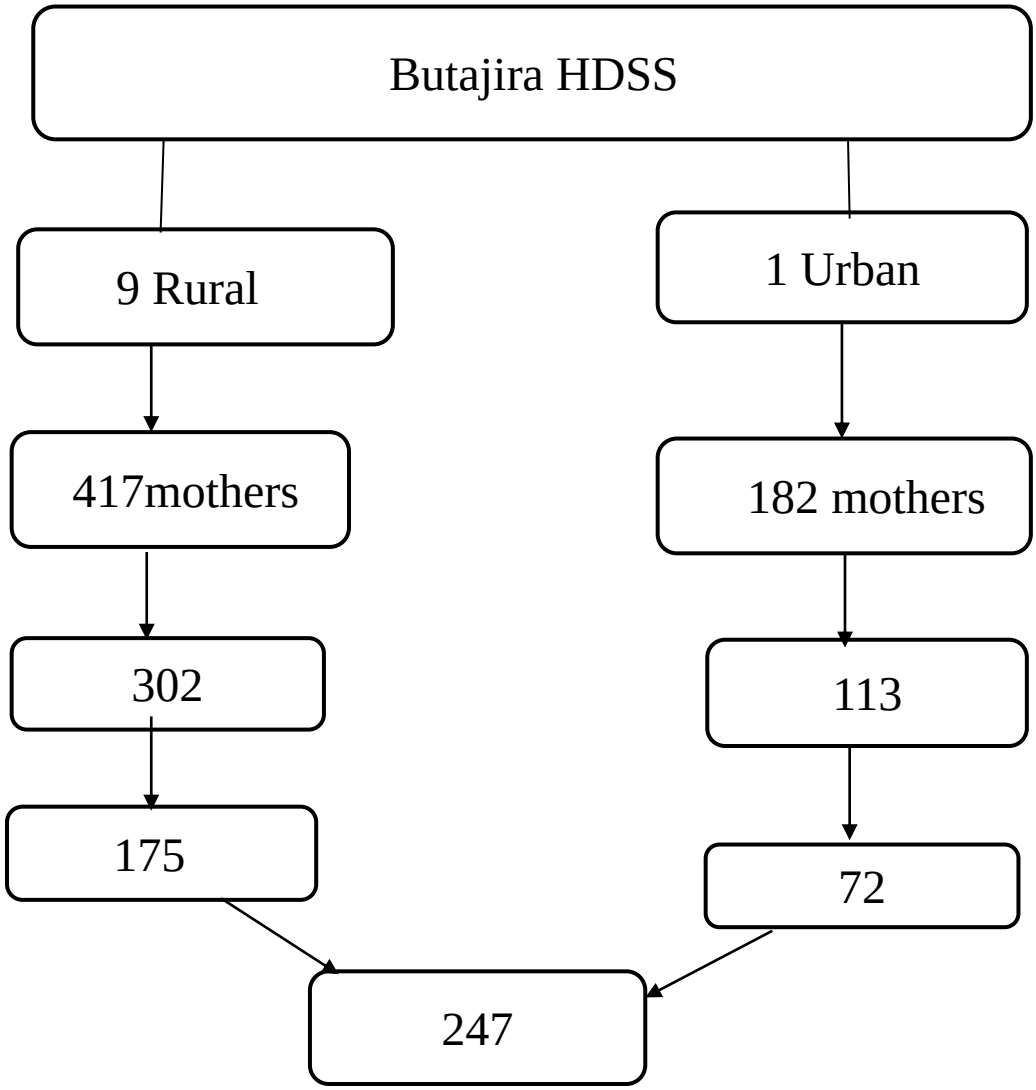

Figure 2: Schematic Presentation of the Sampling Procedure used in the study, Butajira, Ethiopia, 2017

5.6 Variables

Dependent Variable

Birth weight at term is the dependent variable. The study focusses on level of maternal physical activity of third trimester and its association with birth weight of newborns at term.

Independent Variables

Socio demographic and economic variables -Mother's age, residence, religion, ethnicity, marital status, educational status, educational status of the father, occupation of the mother, occupation of the father ,family income, wealth status).

Reproductive factors- parity, gravidity, history of previous abortion, inter-pregnancy interval, ANC visits, iron supplementation during pregnancy

Maternal anthropometric variables-height, MUAC, pre pregnancy weight and gestational weight gain.

Medical history and behavioral variables-prevalence of chronic disease, presence of pregnancy related health problems, malaria, alcohol drinking, smoking cigarette, chat chewing, and food consumption frequency

Physical activity level- moderate, vigorous, sitting/reclining, walking, sleep, standing jobs, lifting heavy loads and squatting.

5.7 Inclusion Criteria

Mothers who remembered their last menstrual period

Women who are residents of the HDSS in their third trimester pregnancy

5.8 Exclusion Criteria

Women who has health impairment which inhibits physical activity

Women who delivered still birth, preterm birth

Mothers with multiple birth (single and multiple births cannot be compared)

5.9 Operational and Standard Definitions

Term birth**:** Birth of a baby on 37 weeks and above

Pre-Pregnancy weight: Weight of the mother within 1 month before pregnancy using LMP

Standing for long period of time: Standing for more than 3hours per day.

Vigorous intensity activities: activities that require hard physical effort and cause large increases in breathing or heart rate.

Moderate intensity activities: activities that require moderate physical effort and cause small increases in breathing or heart rate.

Sedentary Behavior: sitting or reclining at work, at home, getting to and from places, or travelling in car, bus, bajaj, cart, reading or watching television.

Substance use: those mothers who use substances including alcoholic drinks of any type during the current pregnancy.

5.10 Data Collection Instruments and Methods

Data Collection Procedure

Data was collected using a structured pre-tested interviewer-administered questionnaire which was first prepared in English and translated to Amharic. Then the Amharic version of the questionnaire was checked by another person to ensure its consistency with the English version. Before the actual data collection, the questionnaire was pre tested on 5 % of the women who were later excluded from the study.

Maternal anthropometric measurement was taken during the baseline survey. Measures were taken two times using standard measurement scales and average measure was taken.

Maternal height was measured to the nearest 0.1 cm using a wooden stadiometer with sliding head bar and mothers were on bare foot during measurement.

MUAC was also measured to the nearest 0.1 cm using MUAC tape. Pre pregnancy weight and gestational weight gain of the mothers was obtained through mother's report.

Birth weight of the newborns was taken by the data collectors within 72 hours of birth using digital weight scale and at the same time, sex of the newborns was also documented. Gestational

age was calculated from LMP by recruited health professional (nurses and health officers) and used to classify preterm and term births.

Modified global physical activity questionnaire (GPAQ) validated for developing countries was used (10).It was modified based on the objective of the study, containing list of activities of different domain with frequency of each activity per week and duration per day was used to measure physical activity level. The list of physical activities were revised based on locality during the pretest. Then it was classified as moderate, vigorous, leisure activities, sitting/reclining, walking and sleep. Positions like standing for longer hours, and squatting during routine daily physical activity and lifting heavy loads were also assessed.

Food frequency questionnaire was used to assess the food consumption frequency of the mothers in the past one month.

Ten diploma holder data collectors for the interview and ten supervisors were recruited and a two days practical training was given by the principal investigator. The training comprised objectives of the study, sampling technique, data collection instruments, anthropometric measurement of the mothers and birth weight measurement.

5.11 Data quality assurance

Data quality assurance was done before, during and after data collection. A pretested questionnaire was used and practical two days training was given for the data collectors and supervisors on the study protocol. Measurement scales were handled carefully and calibrated before data collection starts and the data collectors check whether the scales are at 0.00 reading before each measurement. The data collectors created link with health extension workers, the mothers, member of the family or neighbor to identify birth. Phone number was taken and frequent visits were made as the expected date of delivery approaches. Supervisors and the principal investigator gave close supervision during different phases of data collection (interview, EDD calculation, anthropometric measurements, weight measurement and documentation). The filled questionnaires were checked by the supervisors and the principal investigator for completeness each day. Then it was entered into Epi-data 3.1 and exported to STATA 14 software.

5.12 Data Processing and Analysis Procedures

Data were coded, entered and cleaned using Epi data version 3.1. All statistical tests were performed using STATA version 14data analysis software. Frequencies, percentages, means and ranges of different variables were computed for description as appropriate. Principal component analysis (PCA) was conducted to see wealth status. The wealth score was divided into 5 wealth quintiles (Lowest, second, middle, fourth and highest).Depending on their daily physical activity, the women were classified as those who did moderate and vigorous intensity physical activity. Time spent on each of the activities in a typical week was calculated by multiplying its frequency (number of days in a week) by duration (minute or hours) spent on each activity in a day to obtain total physical activity level in minutes or hours for both categories. Other physical activity patterns were analyzed separately.

Bivariate analysis was carried out to see association of predictor variables and birth weight. Crude odds ratio was calculated with 95% confidence interval and P-value < 0.05 was used to declare statistical association.

Variables which showed significant association in the bivariate analysis were entered to the multivariate model and then stepwise backward regression procedure was applied to identify factors associated with birth weight after controlling possible confounders.

5.13 Ethical Consideration

Ethical clearance was obtained from Addis Ababa University School of Public Health ethical clearance committee. The purpose of the study and the expected benefit was explained to Butajira woreda health office administration to obtain official permission to carry out the research at the kebeles. Verbal consent was obtained from individual participants. All participants were informed that their participation is based on their willingness and the information they give will be kept confidential. Moreover, the purpose, procedures of the study and the time it takes was informed to all participants in a written and verbal consent form.

5.14 Dissemination of Results

The findings will be submitted and presented to Addis Ababa University school of public health and disseminated to Butajira woreda health office and other concerned bodies. In addition to this, attempts will be made to present the result in different seminars and conferences as well as to publish the findings through journals.

6. Results

A total of 247 cohort of third trimester pregnant women were recruited for this study and 235 of them were included in the final analysis yielding a response rate of 95.14%. There were 124(52.77%) mothers of third trimester pregnancy in moderate and 111 (47.23%) in vigorous physical activity groups.

6.1 Socio demographic and economic characteristics

Seventeen [(47.22%) of the mothers of LBW infants and 123(61.81%) of mothers of NBW babies] were found within 25-34 years of age. The Mean age (SD) of respondents was 29.1(± 5.4) years ranging from 17 to 45 years old.Majority (86.11%) and 136(68.34%) of the mothers of LBW and NBW infants were rural residents respectively.Twenty three (63.89%) of mothers who deliver LBW babies and 161(80.90%) of mothers who deliver NBW babies were Muslims. Two third (66.67%) of the participants who deliver LBW babies and slightly above two third (68.75%) of their partners were illiterates.Furthermore, 89(44.72%) of mothers who deliver NBW babies and 68(36.36%) of their partners were illiterates.Thirty two (88.89%) of mothers who deliver LBW babies and 163(81.91) of mothers of NBW infants were housewives. One fourth (25.00%) of mothers of LBW babies were found in the second wealth quintile while 42(21.11%) of mothers of NBW babies were found in the highest wealth quintile. (Table 1)

Table 1**:** Socio-demographic and economic characteristics of third trimester pregnant mothers, Butajira, Ethiopia, 2017

Variable	Birth Weight	
	Low n (%) n=36	Normal n (%) n=199
Age		
15-24	5(13.89)	40(20.10)
25-34	17(47.22)	123(61.81)
35-45	14(38.89)	36(18.09)
Residence		
Rural	31(86.11)	136(68.34)
Urban	5(13.89)	63(31.66)
Religion		
Muslim	23(63.89)	161(80.90)
Orthodox	8(22.22)	25(12.56)
*Other Christians	5(13.89)	13(6.53)
Ethnicity		
Gurage	25(69.44)	127(63.82)
Silte	6(16.67)	46(23.12)
**Others	5(13.89)	26(13.07)
Educational Status		
Illiterate	24(66.67)	89(44.72)
Literate	12(33.33)	110(55.28)
Husband education		
illiterate	22(68.75)	68(36.36)
literate	31(31.25)	119(63.64)
Occupation		
housewife	32(88.89)	163(81.91)
farmer	2(5.56)	18(9.05)
others***	2(5.56)	18(9.05)
Water source		
Improved	24(66.67)	167(83.92)
Non improved	12(33.33)	32(16.08)
Wealth status		
Lowest	7(19.44)	40(20.10)
Second	9(25.00)	39(19.60)
Middle	8(22.22)	38(19.10)
Fourth	7(19.44)	40(20.10)
Highest	5(13.89)	42(21.11)

Other Christians=Catholic, protestant

*Other =Oromo, Amara, Wolayta, Hadiya

**Other= Single, divorced,

*** Other= government/NGO employees, merchant

6.2 Obstetric and Behavioral Characteristics of Third Trimester Mothers

Among mothers of LBW babies, (86.11%) of them were multiparous while the proportion of mothers of NBW babies who are multiparous was (83.92%). History of previous abortion was reported by 8(22.22%) of mothers who deliver LBW babies and 15(7.54%) of mothers who deliver NBW babies. Majority (92.46%) of the mothers of NBW babies and (80.56%) of mothers of LBW babies had ANC attendance. About half (50.00%) of mothers who deliver LBW infants and above three fourth (79.40%) of respondents who deliver NBW infants had iron folic acid supplements. Among the mothers, 13(36.11%) of those who give birth to LBW babies and 66(33.17%) of mothers who deliver NBW babies had history of chewing khat during the current pregnancy. The vast majority [(97.22%) of mothers of LBW babies and (97.49%) of mothers of NBW babies] drink coffee. (Table 2)

Table 2: obstetric and behavioral characteristics of third trimester mothers, Butajira Ethiopia, 2017

Variable	Birth Weight	
	Low n (%) n=36	Normal n (%) n=199
Gravidity		
Multigravida	31(86.11)	167(83.92)
Primi gravida	5(13.89)	32(16.08)
Total	36(100)	199(100)
Parity		
1-2 children	9(29.03)	59(35.33)
≥3 children	22(70.97)	108(64.67)
Total	31(100)	199(100)
History of abortion		
Yes	8(22.22)	15(7.54)
No	28(77.78)	184(92.46)
Total	36(100)	199(100)
Birth interval(months)		
<23	15(48.39)	69(41.82)
≥24	16(51.61)	96(58.18)
Total	31(100)	165(100)
ANC		
Yes	29(80.56)	184(92.46)
No	7(19.44)	15(7.54)
Total	36(100)	199(100)
Iron folic acid supplement		
Yes	18(50.00)	158(79.40)
No	18(50.00)	41(20.60)
Total	36(100)	199(100)
Coffee consumption		
Yes	35(97.22)	194(97.49)
No	1(2.78)	5(2.51)
Total	36(100)	199(100)
Khat chewing		
Yes	13(36.11)	66(33.17)
No	23(63.89)	133(66.83)
Total	36(100)	199(100)

6.3 Anthropometric characteristics

Among mothers of LBW infants, 11(30.56%) were shorter than 155cm while 32(16.08%) of mothers who deliver NBW had height of <155cm.About 13(36.11%) of mothers who give birth to LBW and 37(18.59%) of mothers of NBW babies had MUAC of <23cm.The mean (SD) of birth weight for LBW and NBW babies was 2277(±144) and 3099 (±328) respectively. (Table 3)

Table 3: Anthropometric characteristics of third trimester mothers in Butajira, Ethiopia, 2017.

Variable	Birth Weight	
	Low n (%)	Normal n (%)
Maternal height(cm)		
<155	11(30.56)	32(16.08)
≥155	25(69.44)	167(83.92)
Total	36(100)	199(100)
Maternal MUAC		
<23	13(36.11)	37(18.59)
≥23	23(63.89	162(81.41)
Total	36(1000	199(100)
Pre-pregnancy weight		
<50Kg	3(60.00)	8(14.29)
50-60Kg	2(40.00)	39(69.64)
≥60Kg	0(00.00)	9(16.07)
Total	5(100)	56(100)
Gestational weight gain		
≤7Kg	3(75.00)	22(47.83)
8-12Kg	0(0.00)	20(43.48)
>12kg	1(25.00)	4(8.70)
Total	4(100)	46(100)
Mean(SD) birth weight	2277(±144)	3099 (±328)

6.4 Food Consumption Frequency

Majority of the mothers of NBW babies (92.46%) and 30(83.33%) of mothers of LBW babies consumed cereal based foods at least once per day in the past one month.One fourth (25.00%) and 43(21.61%) of mothers of LBW and NBW babies did not consume fruit at all in the past one month respectively.Oil or any fat was consumed by 72.22% of mothers who deleiver LBW babies at least once per day while 147(73.87%) of mothers of NBW babies consumed oil or any fat at least once per day .Twenty two (61.11%) of mothers of LBW and 84(42.21%) of the mothers of NBW babies did not consume meat at all in the past one month. (Table 4)

Table 4: Food consumption frequency of third trimester mothers. Butajira, Ethiopia, 2017

Food Items	Birth weight	
	Low (n=36) n (%)	Normal (n=199) n (%)
Cereals and bread		
≥ once/day	30(83.33)	184(92.46)
<once/day	6(16.67)	15(7.54)
Enset based		
≥ once/day	5(13.89)	24 (12.06)
2-3 times in a week	5 (13.89)	28(14.07)
4-6 times/week	2(5.56)	13(6.53)
once in a week	14(38.89)	62(31.16)
twice or less in a month	10(27.78)	72(36.18)
vegetables		
≥once/day	19(52.78)	114(57.29)
2-3 times/week	6(16.67)	53(26.63)
4-6 times/week	11(30.56)	32(16.08)
Fruits		
≥once/day	2(5.56)	22(11.06)
2-3 times/week	4(11.11)	34(17.09)
4-6 times/week	7(19.44)	37(18.59)
once in a week	11(30.56)	35(17.59)
Once in a month	3(8.33)	28(14.07)
Never	9(25.00)	43(21.61)
Meat		
≥once/day	2(5.56)	11(5.53)
4-6 times/week	2(5.56)	26(13.07)
once in a week	3(8.33)	30(15.08)
twice or less in a month	7(19.44)	48(24.12)
Never	22(61.11)	84(42.21)
egg		
≥once/day	15(41.67)	83(41.71)
2-3 times/week	21(58.33)	116(58.29)
Legumes		
≥once/day	10(27.78)	43(21.61)
2-3 times/week	5(13.89)	65(32.66)
4-6 times/week	2(5.56)	2(10.55)
once /week	3(8.33)	15(7.54)
≤2 times/month	2(5.56)	18(9.05)
Never	14(38.89)	37(18.59)
Milk, cheese, yoghurt		
≥once/day	2(5.56)	39(19.60)
2-3 times/week	15(41.67)	60(30.15)
≤2 times/month	9(25.00)	48(24.12)
Never	10(27.78)	52(26.13)
Oils and fat		
≤ once/day	26(72.22)	147(73.870
2-3 times/week	4(11.11)	27(13.57)
once in a week	6(16.67)	25(12.56)
Sweets		
> once/day	8(22.22)	44(22.11)
2-3 times/week	7(19.44)	37(18.59)
4-6 times/week	11(30.56)	56(28.14)
once in a week	10(27.78)	62(31.16)

Magnitude of low birth weight among newborns of

One hundred thirty two of the newborns (56.17%) were male. Low birth weight (LBW) was detected among 36 (15.32%) of newborns. (Figure 3).

Mean (SD) birth weight for NBW babies and LBW babies was 3099 (±328) and 2277(±144) grams respectively.

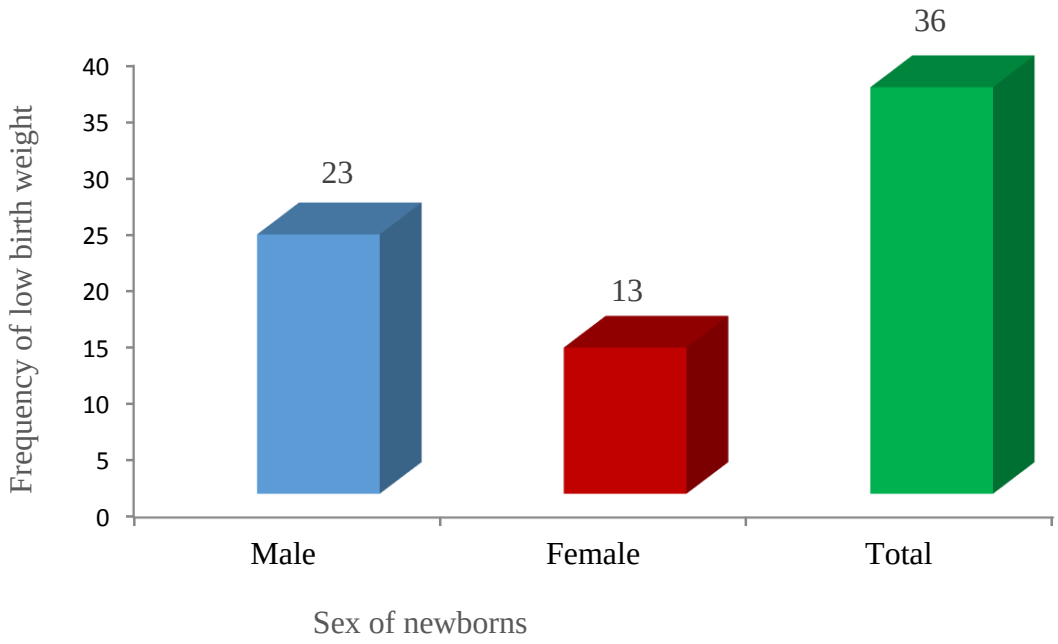

Figure 3: prevalence of low birth weight among newborns in Butajira, Ethiopia. 2017

6.5 Physical activity level and patterns of mothers and birth weight of their newborns

There was significant difference in vigorous physical activity level, standing for longer hours, walking and squatting during third trimester between mothers who deliver LBW and NBW babies. Mean (SD) of birth weight for newborns of mothers with vigorous physical activity was 2917(±472) grams while that of mothers with moderate physical activity group was 3024(±376) grams.

Higher proportion 24 (21.62%) of mothers who gave birth to LBW babies belong to vigorous physical activity group whereas 12 (9.68%) among those who deliver LBW babies were in moderate physical activity group. Majority (90.32%) and more than three fourth (78.38%) of mothers of NBW babies did moderate and vigorous physical activity during third trimester respectively.

Mothers who walk to and from places for ≥60 minutes per day account for 25 (21.19%) and 4(11.11%) mothers who walk for less than 30 minutes per day had LBW delivery. Majority (91.36%) of mothers of NBW babies are those who walk for 30-59 per day.

Certain physical activity patterns such as prolonged standing and squatting during pregnancy were assessed based on literatures on which types of physical activities in addition to intensity were found to have association with birth weight of a newborn.

About 10(29.41%) of mothers of LBW babies reported their routine physical activity involved standing position for ≥3 hours while 26(12.94%) of mothers of LBW babies did not do routine physical activity that required prolonged standing.Moreover, one fourth (25.40%) of mothers of LBW babies were engaged in routine daily physical activities in squatting position during third trimester. Fifteen 15(18.07) of mothers of LBW babies reported they used to lift heavy loads during third trimester.

Regarding sedentary physical activity, 34(15.74%) and 26(16.35%) of mothers who gave birth to LBW babies were those who sit or recline for <165 minutes per day and sleep≥8 hours respectively. Majority (83.65%) of mothers of LBW babies sleep for ≥8 hours per day. (Table 5)

Table 5: physical activity level, pattern and sedentary behavior during third trimester among mothers who deliver LBW babies in Butajira, 2017.

Physical activity	Birth Weight	
	Low n (%) (n=36)	Normal n (%) (n=199)
Vigorous physical activity	24(66.67)	87(43.72)
Moderate physical activity	12(33.33)	112(56.28)
Walk(minute/day)		
<30	4(11.11)	24(12.57)
30-59	7(19.44)	74(38.74)
≥ 60	25(69.44)	93(48.69)
Standing for longer hours		
Yes	10(27.78)	24(12.06)
No	26(72.22)	175(87.94)
Lifting heavy load		
Yes	15(41.67)	68(34.17)
No	21(58.33)	131(65.83)
Squatting		
Yes	16(44.44)	47(23.62)
No	20(55.56)	152(76.38)
Sitting (minute/day)		
<165	34(15.74)	182(84.26)
≥165	2(10.53)	17(89.47)
Sleep (hrs.)		
<8	10(13.16)	66(86.84)
≥8	26(16.35)	133(83.65)

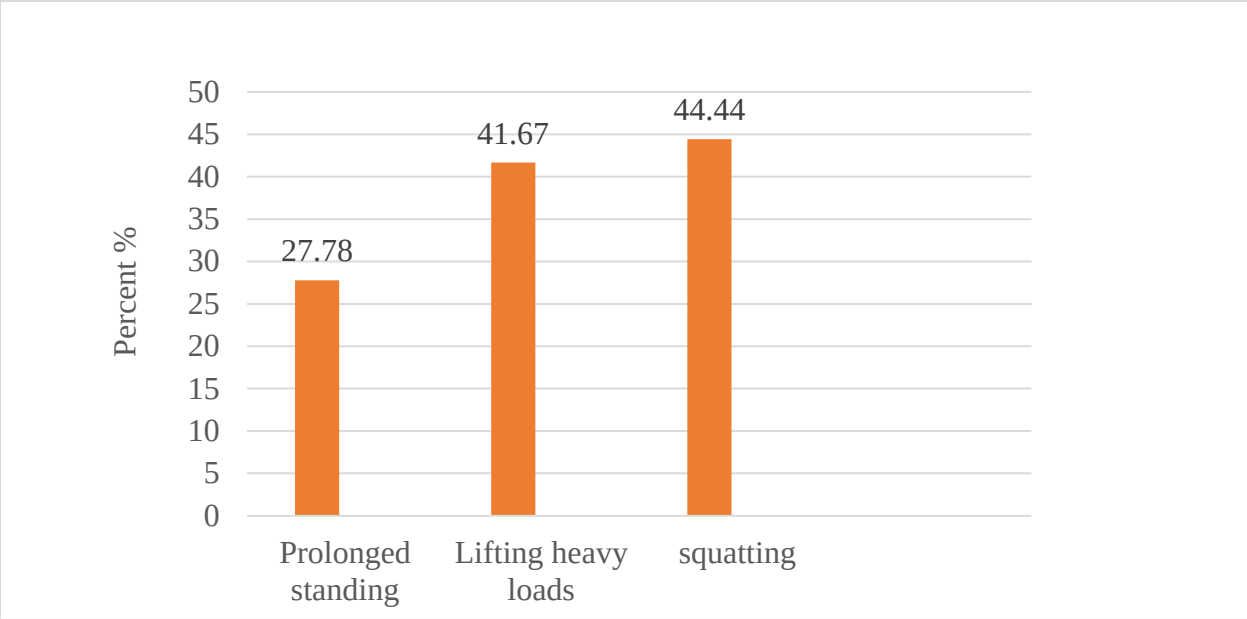

Figure 4: Proportion of LBW and NBW delivery among mothers who did physical activity in different patterns in Butajira, Ethiopia.2017

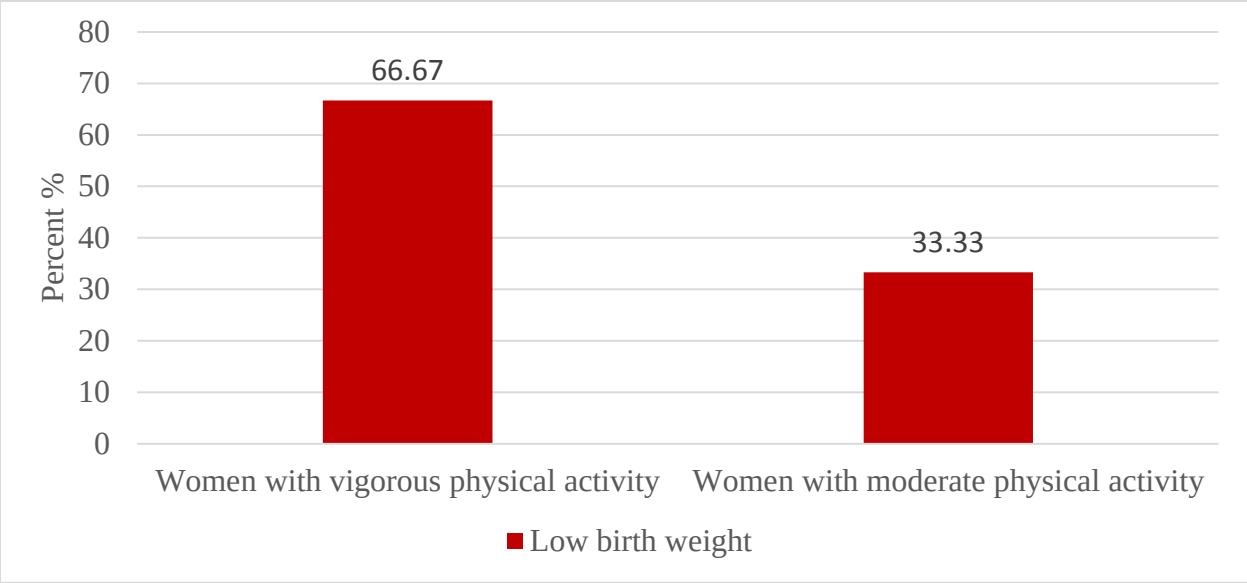

Figure 5: Proportion of LBW delivery among mothers with vigorous and moderate physical activity levels

6.6 Association of Physical activity, Socio-demographic and Reproductive health characteristics with low birth weight.

On bivariate analysis, maternal age, residence and educational status of the mother were among socio demographic variable that show association with LBW.

Maternal age of 35-45 years had 2.81 times more likelihood of LBW delivery compared to mothers whose age was 25-34 years in this study [COR=2.81:95%CI (1.26- 9.49)]. Correspondingly mothers who live in rural areas were found to have 2.87 times higher odds of LBW delivery than those who live in urban areas [COR =2.87: 95% CI (1.06-7.73)]. Illiterate mothers were 2.47 times more likely to have LBW babies than their literate counterparts [COR= 2.47:95% CI (1.17- 5.22)]. Mothers who used unimproved water source were found to have 2.6 times higher odds of having LBW babies than their counterparts [COR=2.60:95% CI (1.18-5.74)].

Mothers who did not take iron folic acid supplement during pregnancy were found to have 3.85 times higher odds of having LBW babies COR (95% CI) 3.85 (1.84-8.06) than the referent group. LBW was found to be significantly associated with vigorous physical activity per day during third trimester and certain patterns such as prolonged standing and squatting. Mothers who were engaged in vigorous physical activity during third trimester were 2.57 time more likely to deliver LBW babies compared to mothers who did moderate physical activity during third trimester [COR= 2.57: 95% CI(1.21-5.43)].

Furthermore, mothers whose activities involved prolonged standing were found to have 2.8 higher odds of giving birth to LBW babies COR (95% CI) 2.8 (1.20-6.52). In addition to this, mothers whose daily physical activity in squatting position had 2.58(1.24-5.39) times higher odds of LBW than the referent groups [(COR (95% CI) 2.58 (1.24-5.39)].

However, when some background characteristics of the mothers are controlled, unimproved sources of water supply, not taking iron folic acid supplements, vigorous maternal physical activity, prolonged standing and squatting positions during third trimester were the variables significantly associated with LBW among third trimester mothers in Butajira.

Mothers whose household use unimproved source of water had [AOR=3.16:95% CI (1.17-8.52)] times higher odds of having LBW babies than their counterparts who used improved source of water. The likelihood of having LBW babies was [AOR=6.13: 95% CI= (2.53-14.84)] times more high among mothers who were not supplemented with iron folic acid compared to mothers who took iron folic acid supplements.

Regarding maternal physical activity, mothers who had vigorous physical activity during third trimester were [AOR=2.48:95% CI= (1.01-6.09] times more likely to have LBW babies compared to mothers who had moderate physical activity during third trimester.

Furthermore, mothers whose daily physical activity involved prolonged standing had [AOR=3.37:95% CI (1.14-9.93)] odds of having LBW babies compared with mothers whose daily physical activity does not involve standing for longer hours. Besides, mothers who did physical activities that require squatting had [AOR=2.61:95% CI (1.04-6.54)] times higher odds of having LBW birth. (See table 6 below)

Table 6: Bivariate and Multivariate analysis of Association of physical activity, socio-demographic and reproductive health characteristics with LBW in Butajira, 2017

	Birth Weight			
Variable	Low n (%)	Normal n (%)	COR(95%CI)	AOR (95% CI)
Age group				
15-24	5(11.11)	40(88.89)	0.90(0.31- 2.61)	1.08 (0.33-3.51)
25-34	17(12.14)	123(87.86)	1.00	1.00
35-45	14(28.00)	36(72.00)	2.81 (1.26- 9.49)	2.36 (0.82-6.75)
Residence				
Rural	31(18.56)	136(81.44)	2.87 (1.06- 7.73)	2.07 (0.60-7.05)
urban	5(7.35)	63(92.65)	1.00	1.00
Educational Status				
illiterate	24(21.24)	89(78.76)	2.47 (1.17- 5.22)	0.92 (0.32-2.61)
literate	12(9.84)	110(90.16)	1.00	1.00
Water source				
Improved	24 (12.57)	167 (87.43)	1.00	1.00
Unimproved	12 (27.27)	32 (72.73)	2.60 (1.18-5.74)	3.16 (1.17-8.52)*
Iron folic acid				
Yes	18(10.23)	158(89.77)	1.00	1.00
No	18(30.51)	41(69.49)	3.85(1.84- 8.06)	6.13 (2.53-14.84)*
Vigorous activity	24(21.62)	87(78.38)	2.57(1.21- 5.43)	2.48 (1.01-6.09)*
Moderate activity	12(9.68)	112(90.32)	0.10(0.05-0.19)	1.00
Standing for longer hours				
Yes	10(29.41)	24(70.59)	2.80(1.20-6.52)	3.37 (1.14-9.93)*
No	26(12.94)	175(87.06)	1.00	1.00
Squatting				
Yes	16(25.40)	47(74.60)	2.58(1.24-5.39)	2.61 (1.04-6.54)*
No	20(11.63)	152(88.37)	1.00	1.00

*=Statistically significant association

7. Discussion

This was a cohort study of 247 third trimester mother in Butaira which assessed the level of maternal physical activity during third trimester and its associations with birth weight at term using modified global physical activity questionnaire (GPAQ) which contains list of activities in different domains with frequency of each activity per week and duration per day.

The proportion of LBW in this study is found to be 15.32% which is relatively consistent with the 2016 EDHS national figure, which reported 13% of LBW (5). However it lower compared to an in-depth analysis of 2011 EDHS which showed 29.1% proportion of LBW (23).

This study revealed higher proportion of LBW compared to a study conducted in the SNNPR previously which was 9.8 % (47). This discrepancy could be for the reason that the study was institution based study.

Nevertheless, the result of our study was lower than results of studies from Oromia region and Northern Ethiopia, which showed 28.3% and 17.4% respectively (21,38).

In the bivariate ananysis, this study found association between maternal age, residence, literacy and source of water supply among socio demographic factors that affect birth weight at term. Iron folic acid supplements was also associated with LBW at term.

Regarding the main independent variable of this study, physical activity level, doing vigorous physical activity, doing activities that involve prolonged standing and squatting positions during third trimester exhibited significantly negative association with term LBW.

Nevertheless after adjustment for potential confounders was made , the effect of the rest of the variables disappeared and using unimproved source of water, not taking iron supplements, being engaged in vigorous intensity physical activities, standing and squatting during third trimester remained to be the significant determinants of term LBW deserving the a remedial measures.

Using water from non-improved source was found to have significantly higher odds of having LBW in this study. A multilevel analysis from Ghana showed that Living in a community with a high concentration of poverty and a low coverage of safe water supply were found to be associated with a high prevalence LBW while living in areas with a high coverage of safe water supply reduced the odds of having a LBW infant by 28% (48). Pregnant women as part of a community are vulnerable to infectious diseases that result from poor hygiene and sanitation causing nutritional deprivation and hence LBW. In addition to this, mothers who do not have

improved water supply at their locality might travel far to bring water. This in turn imposes a physical strain which causes low gestational weight gain which is a risk factor for LBW birth. A study from rural India revealed fetching water was considered as a vigorous activity among pregnant mothers in a rural setup(32).

Similarly, mothers who did not take iron supplements during pregnancy were found to have increased odds of LBW delivery in this study. This is consistent with studies from Northern and Southwest Ethiopia(27,41). This again in line with a study in Eastern Nepal which showed iron and other micronutrient supplementation reduced risk of LBW(37).

Likewise, this study showed that performing vigorous physical activity during third trimester had higher odds of having LBW babies at term. This is concurrent with a cohort study in rural India which revealed higher maternal PAL in earlier as well as later pregnancy were associated with lower mean birth weight(8). This is expected because mothers who are engaged in high PAL demands extra energy and other nutrients which are probably not obtained.

Another study conducted in the Netherlands also indicated the largest reduction in birth weight among women with high job strain than women with low levels of job strains (31). Similarly a systematic review in which twelve studies measured different domains of daily physical activity by pregnant women including occupational, household, leisure-time and commuting, have confirmed the harmful effects of excessive physical exertion at work on birth weight (30).This is also consistent with a study in India that revealed vigorous activity by mothers had negative association birth weight(32).Another systematic literature review also revealed that Vigorous physical activity during pregnancy was associated with lower mean birth weight of newborns(30).

However, this finding is inconsistent with a prospective cohort study done in Iran which indicated that routine daily household activities during the last month of pregnancy did not show association with birth weight (20).This divergence could be due to difference of mother's level of physical activity intensity of routine household activities across countries and communities. Besides, women are responsible for a wide range of activities like household chores, as well as work outside the home such as farming activities as evidenced in the present study.

Mothers who did daily physical activity that require standing for more than three hours was considered as prolonged standing in this study. Thus, mothers who did activities by standing for a longer time were 6.35 times more likely to have term LBW infants(33). Similarly a systematic

review of different studies showed harmful effects of uninterrupted standing on birth weight that daily activities that require standing for more than 2.5 hours per day had 3.23 times higher odds of LBW delivery(30).In some studies, the reason for this could be due to the activity of sympathetic nervous system in the active muscles following activities that require prolonged standing results in the return of blood from visceral arteries to active muscles, increased sweating and decreased plasma volume and thus, reduced blood perfusion to uterine and placenta arteries (41).There are very few literatures on effect of standing for longer hours on birth weight.

A finding of a prospective study from developed world showed standing during first trimester had no effect on birth weight(31). Such inconsistency with the current study could be due to variation in trimester and other physical activity related exposures in the two settings and other socio demographic and economic factors.

Likewise, mothers performing routine physical activity during third trimester such as squatting were found to have 3.35 times more likely to deliver a term newborn with LBW in this study. This was in line with a study from Northern Thi that women who did different routine physical activities in squatting position were more likely to deliver LBW babies (49).This could be because due to bending while squatting, meanwhile bending due to different body postures during routine activity in pregnant women was found to have hazard on birth weight in India (42).

8. Strengths and Limitations

8.1 Strengths

- The study used prospective cohort study design which enables it to establish a temporal relationship.
- Recall bias was minimized as the interview was done during third trimester when the mothers were physically active.

8.2 Limitations

- Limitations of this study are that we collected data during third trimester only and thus it does not reveal level and effects of daily maternal physical activity during first and second trimester.
- The study was limited to GPAQ and excluded the objective methods of measurements of physical activity because of budgetary constraints
- The other limitation is that some study participants might not remember frequencies or estimate the time they spent on each activity correctly.
- The classification to some extent might not be adequate to truly discriminate moderate level from high level of physical activities.
- Although food frequency questionnaire was used to look at food frequency, maternal caloric intake and energy expenditure,
- Paternal factors other than education and occupation were not assessed.

9. Conclusion and Recommendation

9.1 Conclusion

In this study we found over half of mothers did moderate and nearly half did vigorous intensity physical activity during third trimester.

Mothers with vigorous physical activity had higher proportion of termLBW delivery compared to mothers with moderate physical activity level during third trimester.

Mothers who did vigorous physical activity had significantly negative association with LBW at term compared to mothers who did moderate physical activity during third trimester.

In addition to intensity of physical activities, maternal physical activities done by standing for longer hours and squatting position during third trimester had higher likelihood of having term LBW baby. Additionally, source water supply and not taking iron folic acid supplements were other factors associated with term LBW in Butajira, Ethiopia.

9.2 Recommendations

Based on the result of the study's finding the following recommendations are forwarded:

Pregnant mothers should be identified by their physical activity level and counseled on and level as well as types of their physical activity during ANC visits.

Minimizing vigorous physical activity, standing for longer hours and squatting positions during third trimester should be considered.

FMOH and other NGO working on LBW and health professionals should take into account monitoring physical activity level and patterns as one of the remedial in preventing LBW.

Policy makers should address problems of safe water supply and improving iron folic acid supplementation to bring about the changes regarding improvement of infant birth weight and hence health.

Further studies incorporating all trimesters and objective assessment of physical activity levels are recommended.

10. References

1.WHA Global Nutrition Targets 2025: Low Birth Weight Policy Brief. 2014.

2. Demelash H, Motbainor A, Nigatu D, Gashaw K , Melese A. Risk factors for low birth weight in Bale zone hospitals, South-East Ethiopia : acase–control study BMC Pregnancy and Childbirth 2015;15(264).

3.Takitol Y. L. Physical activity—the more we measure, the more we know how to measure. Eur J Epidemiol. 2009; 24:119–22.

4.unicef W. United Nations Children's Fund and World Health Organization. Low birth weight: Country regional and global estimates New York: UNICEF; 2004. 2004.

5.Central Statistical AgencyAddis Ababa ETDPIR, Maryland, USA. Demographic and Health Survey 2016. July 2017.

6.Takitoi MY, D'Aquino MH, Benício. Physical activity during pregnancy and fetal outcomes: a case-control study. Rev Saúde Pública. 2010;44(1):90-101.

7.Kwesi AM, Odonkor G, Akepene RE, AdjeiA, Narh-Bana S, Etsey DA, Gyapong M. . Socioeconomic and demographicdeterminants of birth weight in southernrural Ghana: evidence from Dodowa Healthand Demographic Surveillance System. . BMC Pregnancy and Childbirth. 2016 16(160).

8.Dwarkanath P, Vaz M, Thomas T, Mhaskar A, Mhaskar R , Thomas A,Bahat S,Kurpad A. The relationship between maternal physical activityduring pregnancy and birth weight. Asia Pac J Clin Nutr 2007;16 (4):704-10

9.Kramer MS. The Epidemiology of Adverse Pregnancy Outcomes: An Overview1

J Nutr 2003;133:1592S–6S.

10. Arony AF. Physical Activity Patterns of Pregnant Women in Rongo, Kenya Sch J Arts Humanit Soc Sci. 2016;4(2A):139-46.

11.Adefunke OE OE. Pattern and Determinants of Gestational Weight Gain an Important Predictor of Infant Birth Weight in a Developing Country. . Global Journal of Health Science 2014; 6 (4). Epub Epub April 14, 2014.

12.Gebremedhin M, Ambaw F, Admassu E, Berhane H. Maternal associated factors of low birth weight: a hospital based cross-sectional mixed study in Tigray, Northern Ethiopia. BMC Pregnancy and Childbirth 2015;15(222).

13.Badshah S ML, McKelvie K, Payne R,P JL. Risk factors for low birthweight in the public-hospitals at Peshawar, NWFP-Pakistan BMC Public Health. 2008;4(8)(197).

14.Kramer MS . Intrauterine growth and gestational duration determinants. . Pediatr 1987;80 (4):502-11.

15.CSA . International I, Calverton M, USA. Ethiopia Demographic and Health Survey 2011. 2012.

16.Resolution WHA 65.6. Comprehensive implementation plan on maternal, infant and young child nutrition. In: Sixty-fifth World Health Assembly Geneva. 2012.

17.FMOH. Health Sector Transformation Plan 2015/16 - 2019/20 (2008-2012 EFY). . Addis Ababa: August 2015.

18.FMOH. National newborn and child survival strategy document brief summary 2015/16-2019/20. Addis Ababa: June 2015.

19.National Nutrition Programme June 2013 - June 2015.

20.Koushkie JM BNJ, S Hojjati. Relationship between Daily Physical Activity During Last Month of Pregnancy and Pregnancy Outcome. Iranian Red Crescent Medical Journal. 2011;13 (1):15-20..

21.Awoke AA, Gedefaw AL, Destaw BB, Megabiaw ZB. Adverse birth outcomes among deliveries at Gondar University Hospital, Northwest Ethiopia BMC Pregnancy and Childbirth 2014, 14:90. 2014;14:90

22.Zenebe K , Birhan N. 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.

23.Alemu T. Umeta M. Prevalence and Predictors of "Small Size" Babies in Ethiopia: In-depth Analysis of the Ethiopian Demographic and Health Survey, 2011 Ethiop J Health Sci 2016;26 (3):243-9.

24. Mahmoodi Z KM, , Sajjadi H, Dejman M, Vameghi M, Dolatian M Working Conditions, Socioeconomic Factors and Low Birth Weight: Path Analysis. Iranian Red Crescent Medical Journal 2013;15(9):836-42.

25.Manyeh AK, Odonkor G, Ekey RA , Adjei A, Solomon Narh-Bana DEA, Gyapong M. Socioeconomic and demographic determinants of birth weight in southern rural Ghana: evidence from Dodowa Health and Demographic Surveillance System. BMC Pregnancy and Childbirth. 2016 16:160. Epub 9 July 2016.

26.Maznah Dahlui NA, Oche Mansur Oche, Aziz NA. Risk factors for low birth weight in Nigeria: evidence from the 2013 Nigeria Demographic and Health Survey. Global Health Action. 2016;9(28822).

27.Dibaba W.Y FMA, Michelle J. Hindin, . 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).

28.Bugssa G DB, Alemayehu.M. Socio Demographic and Maternal Determinants of Low Birth Weight at Mekelle Hospital, Northern Ethiopia: A Cross Sectional Study American Journal of Advanced Drug Delivery. 2014;2(5):609-1829.

29. Gebremedhin.G. Ynew Desalegne.B. Incidence Of Low Birth weights babies and associated factors among post partum mothers who gave birth at felegehiowt referral hospital, bahridar, ethiopia. world journal of pharmacy and pharmaceutical sciences. 2015; 4(04):152-65.

30.Bisson MM, Lavoie-Guénette J, Tremblay A, Marc I. Physical Activity Volumes during Pregnancy: A Systematic Review and Meta-Analysis of Observational Studies Assessing the Associationwith Infant's Birth Weight.Am J Perinatol Rep 2016;6:e170–e197. 2016;DOI (6).

31.Tanja G.M. Vrijkotte MFvdW, Manon van Eijsden,Gouke J. Bonsel. First-Trimester Working Conditions and Birthweight: A Prospective Cohort Study American Journal of Public Health. 2009;99(8):1409–16.

32.Rao S, Margetts BM, Yajnik CS, Lubree H, Rege S, Desai B, Jackson ACF. Maternal activity in relation to birth size in rural India. The Pune Maternal Nutrition Study. European Journal of Clinical Nutrition. 2003;57:531-42.

33.Mahmoodi Z KM, Sajjadi H , Dejman M , Vameghi M, Dolatian M, Baradarn EM. Physical Activity Pattern and Personal-Social Factors of Mothers During Pregnancy And Infant Birth Weight Based On MET Scale: A Case-Control Study. Iranian Red Crescent Medical Journal. 2013 15(7):573-80. Epub 2013 July 05.

34.Revilane Parente de Alencar Britto TMTF, Ana Amelia Benedito Silva, Ricardo Sesso JCC, Ana Lydia Sawaya. Influence of Maternal Height and Weight on Low Birth Weight: A Cross-Sectional Study in Poor Communities of Northeastern Brazil. PLoS ONE. 2013; 8 (11).

35.Melese H. Risk factors for low birth weight in Bale zone hospitals, South-East Ethiopia : a case–control study Demelash et al BMC Pregnancy and Childbirth 2015 15(264).

36.Eltahir M Elshibly GS. The effect of maternal anthropometric characteristics and social

factors on gestational age and birth weight in Sudanese newborn infants. BMC Public Health 2008, 8:244 doi:101186/1471-2458-8-244. 2008 8(244). Epub 18 July 2008.

37. Ravi Kumar Bhaskar KKD, Uttam Neupane SCB, Birendra Kumar Yadav, Hanoon P. Pokharel,6 and Paras Kumar Pokharel. A Case Control Study on Risk Factors Associated with Low Birth Weight Babies in Eastern Nepal International Journal of Pediatrics http://dxdoiorg/101155/2015/807373. 2015

38.Assefa N BY, Worku A. Wealth Status, Mid Upper Arm Circumference (MUAC) and Antenatal Care (ANC) Are Determinants for Low Birth Weight in Kersa, Ethiopia PLoS ONE. 2012; 7 (6). Epub June 29, 2012.

39.Christine Sommer LS, Kjersti Mørkrid, Anne Karen Jenum and Kåre Inge Birkeland. Effects of early pregnancy BMI, mid-gestational weight gain, glucose and lipid levels in pregnancy

on offspring's birth weight and subcutaneous fat: a population-based cohort study. BMC Pregnancy and Childbirth 2015;15(84):526–9. Epub 03 April 2015.

40.Dube L. Determinants of infant mortality in community of Gilgel Gibe Field Research Center, Southwest Ethiopia: a matched case control study Dube et al BMC Public Health http://wwwbiomedcentralcom/1471-2458/13/401. 2013;13(401).

41.Florence Bodeau-Livinec VB, Jacques Berger , Xu Xiong , Achille Massougbodji , Karen P. Day , Michel Cot. Maternal Anemia in Benin: Prevalence, Risk Factors, and Association with Low Birth Weight. Am J Trop Med Hyg. 2011;85(3):414-20.

42.SACHIN S MUMBARE GM, RAJESH DARADE, SUREKHA YENGE, MADHAV KUMAR TOLANI ,, PATOLE K. Maternal Risk Factors Associated with Term Low Birth Weight Neonates: A Matched-Pair Case Control Study. INDIAN PEDIATRICS. 2012; 49.

43. Seung Chik Jwa TF, Yuji Yamanobe, Kazuto Kozuka,Haruhiko Sago. Changes in maternal hemoglobin during pregnancy and birth outcomes BMC Pregnancy and Childbirth 2015;15(80).

44. Desalegn L. Determinants of Low Birth Weight in Debre Berehan Referal Hospital, North Shoa Zone, Amhara Regional State, Ethiopia (A Case – Control Study)

45.Ling-Wei Chen YW, Nithya Neelakantan, Mary Foong-Fong Chong, An Pan,Rob M van Dam. Maternal caffeine intake during pregnancy is associated with risk of low birth weight: a systematic review and dose–response meta analysis. BMC Medicine 2014; 12 (174). Epub 19 September 2014.

46. Abdo RA Endalemaw TB.Tesso FY. Prevalence and associated Factors of Adverse Birth Outcomes among Women Attended Maternity Ward at Negest Elene Mohammed Memorial General Hospital in Hosanna Town, SNNPR, Ethiopia.J Women's Health Care 2016;5 (4).

47. Gbenga A. Kayode1* MA-C, 2, Irene Akua Agyepong2,3, Evelyn Ansah2,, Diederick E. Grobbee1 KK-G, 4. Contextual Risk Factors for Low Birth Weight: A Multi level Analysis PLOS ONE | wwwplosoneorg 2014 9(10).

48. Ebrahim M. The relationship between occupational fatigue and preterm delivery. Iranian South Med J. 2012.

49. Tuntiseranee P, Geater, Alan, Wong C. Virasakdi, Kor-anantakul, Ounjai. The effect of heavy maternal workload on fetal growth retardation and Preterm Delivery: A study among Southern Thai women. Journal of occupational & environmental medicine: . 1998; 40 (11):(1013-21).

11. Annexes

Annex 1: Informed Consent and/or Ascent Form (English version)

Addis Ababa University School of Public Health

Dear participant, greetings to you.

My name is …….. I am here on behalf of Meseret Legesse student of Addis Ababa University School of public health. She is conducting a research on 'Effect of Physical activity level of pregnant women during pregnancy on birth weight of the newborns" Butajira woreda. She had received permission from Addis Ababa University and Butajira woreda health office to conduct this study.

The aim of this study is to measure level of physical activity of pregnant women during pregnancy and its effect on birth weight of their newborns .The study will help in providing a base line data for other researchers. It can also have a role in helping pregnant women to practice the recommended level of different activities outside home or domestic household chores and to improve health of the infants. You are selected randomly to participate in this study because you are a pregnant woman who is in the third trimester of pregnancy. Your participation is purely based on your willingness. If you choose to take part in the study you may respond to all the questions or you may not answer questions you don't want to, and have the right to stop the interview as well as the measurements at any time. Participating in this study will not have any risk or harm. Whether you are willing to participate, refuse or decide to withdraw later, you will not be subjected to any maltreatment.

If you agree to participate in the study, you will be asked to answer some questions about yourself, your working status or kind of physical activities you do in a typical week during this pregnancy. The interview with you will take about 20 minutes and the measurement will take 10 minutes which means you will stay for a total of 30 minutes. Your height will be measured bare foot and you may need to wear light closes and bare foot during weight measurement. In addition to this your baby's weight is going to be measured immediately after birth or within three days of delivery.

Any information that you provide will be kept confidential, names will not be written or specified and all the questionnaires will be coded for anonymity. The data will not be used for purposes other than the study. Your willingness and active participation is very important for the success of this study. If you have any question you can ask me now and you can also contact the principal investigator.

Name of principal investigator: Meseret Legesse Address: Phone No. 0913661006

E-mail: mesihlegesse@gmail.com

Informed Consent and/or Ascent Form

Based on the understanding of the information I gave you, are you willing to participate in this study?

A. Yes B. No

1. If yes, continue the interview.
2. If no, skip to the next participant by writing reasons for her refusal.

Informed consent Certified by:

Respondent's signature/Finger print_____ Date _____

Interviewer: Name _____ Signature_____ Date……..

Questionnaire number _____

Date of interview _____Time started _____Time completed _____

Result of interview:

1. Completed
2. Respondent not available
3. Refused
4. Partially completed

Checked by: Supervisor: Name _____ Signature_____

Annex 2: Questionnaire (English Version)

Addis Ababa University School of Public Health

Questionnaire to assess level of daily physical activity of pregnant women during third trimester of pregnancy and its effect on birth weight of a newborn in Butajira, 2017.

Questionnaire ID Number _____

Adress	Kebele _____House no. _____
Date of interview	————/dd/————/mm/———/yr/_____
Time started	Hour _____minuite _____
Time ended	Hour _____minute _____
Interviewer	Name ———————————— Phone number ————————signature ————
Checked by Supervisor	Name ———————————— Phone number ————————Signature ———

Part 1: Socio-demographic and economic Characteristics

No.	Question and filters	Response/Choices	Skip
101	How old are you? (Age in complete years)	……years	
102	Residence	Urban……1 Rural ……2	
103	What is your religion?	Orthodox……..…1 Muslim ……..…..2 Protestant…….……3 Catholic ……..….4 Traditional …….…….5 Other (specify)……..99	
104	What is your ethnicity?	Gurage ……1 Silte …….2 Oromo ……..…...3 Amhara……4 Tigree ……..…….....5 Wolayita …….6 Hadiya …….7 Kembata ……..8 Others specify ……99	

105	What is your current marital status?	Single……1 Married …….....2 Divorced…….....3 Separated ……...….4 Widowed…….....5 Cohabitating ……...6	
106	What is your educational status?	Illiterate…….…...1 Read and write……..…..….2 Primary…….....3 Secondary…….....4 Technical/vocational……5 Higher (specify)…….....6	
107	What is your spouse's educational status?	Illiterate…….……..1 Read/write…….……..2 Primary…….....3 Secondary…….....4 Technical/vocational……...5 Higher (specify)…….....6	
108	What do you do for a living?(occupational status) (NB. more than one answer is possible)	House wife ……..……1 Farmer…….……2 Merchant……3 Government/private employee……..4 Daily laborer…….....5 Student……....6 Other specify……..…99	
109	What does your Husband/partner do for a living?(occupational status of your husband/partner) (NB. more than one answer is possible)	Farmer……...1 Daily laborer…….....2 Merchant……....3 Government/private employee……..4 Student…….....5 other specify ……..….99	
110	What is the main source of drinking water for member of your house holds?	Piped water……....1 Protected well……..…..2 Unprotected well…….....3 Protected spring……..…..4 Unprotected spring……..…..5 lake……..…..6 river …….....7 pond…….……..….8 other specify…….……99	

111	Does your household own a toilet facility?	Yes ……..1 No …….....2	
112	In total how much is the monthly income of your household?	…….....Birr	
113	What type of fuel does your household mainly use for cooking?	Electricity……..…1 Solar……..…2 Kerosene……...3 Charcoal……..…..4 Wood……..…...5 Shrubs/grass……..…6 Animal dung…….....7 Other specify…….....99	
114	What is the main material of the floor of your house?	Mud……..……1 Sand……...……..2 Wood……3 Cement……..…4 Marble…….….5 Cane/bamboo ……...6 Other (specify)……..…...99	
115	What is the main material of the roof of your house?	Grass ……..…….....1 Wood……..……...2 Corrugated iron/metal …….....3 Cement……..4 Other(specify)…….....5	
116	What is the main material of the wall of your house?	Wood with mud……1 Wood with grass……...2 Blocks……...…3 Cement with stone……....4 Bricks…….5 Corrugated iron/meta ……6 Other(specify)……7	
117	Does your household have?		

	Electricity? A watch/ clock? A radio? A television? A mobile telephone? Non mobile telephone A refrigerator? A table? A chair? A bed with cotton/sponge/spring mattress? An electric mitad? A kerosene lamp/pressure lamp? A motorcycle? An animal-drawn cart? A boat? A Mill?	Yes No Electricity? 1 2 A watch/ clock? 1 2 A radio? 1 2 A television? 1 2 A mobile telephone? 1 2 Non mobile telephone 1 2 A refrigerator? 1 2 A table? 1 2 A chair? 1 2 A bed with cotton/sponge/spring mattress? 1 2 An electric mitad? 1 2 A kerosene lamp/pressure lamp? 1 2 A motorcycle? 1 2 An animal-drawn cart? 1 2 A boat? 1 2 A Mill? 1 2	
118	Does your house have windows?	Yes ……..1 No ……..2	
119	Does your household own any land (owned or rented) that can be used for agriculture?	Yes …….1 No ……..2	
120	How many of the following animals do this household own? Milk cows or oxen or bulls? Horses, donkeys, or mules? Goats or sheep? Chickens? Beehives? (NB: more than one answer is possible)	Yes No Milk cows or oxen or bulls…… 1 2 Horses, donkeys, or mules…… 1 2 Goats……. 1 2 Sheep ……. 1 2 Chickens …….. 1 2 Beehives …….. 1 2	

Part 2: Reproductive history

No.	**Questions and filter**	Responses/choices	Skip
201	When did your last menstrual period start?	___/____/____ (dd/mm/yy)	
202	Have you ever given birth before?	Yes ……1 No ……..2 ⟶	205

203	How many live births did you give before? *(*Data collector: Register live births only*)*	…… Child/Children	
204	What is the inter-pregnancy interval of the last pregnancy with the current pregnancy? (Please calculate in months)	Inter-pregnancy interval in months: _____	
205	Have you ever had abortion?	Yes……..1 No……2 →	301
206	How many times have you ever had abortion?	……time/s	
Part 3: Health Care and Medical Problems During Pregnancy			
No.	**Questions and filters**	**Responses/choices**	**Skip**
301	Have you received ANC services for the current pregnancy?	Yes……..1 No……2 →	303
302	How many months pregnant were you when you first received ANC for this pregnancy?	_____ months I don't remember/Not sure ……9	
303	During this pregnancy did you take Fe-Fol tablets?	Yes …….1 No ……..2 →	305
304	How many months pregnant were you when you first take Fe-fol?	Yes ……..…1 No ……...……...……..2	
305	During this pregnancy, did you have malaria infection?	Yes ……..……1 No ……..……..2	
306	Do you have any confirmed medical illness?	Yes …….…….…1 No …….…....2	
307	During this pregnancy, did you have symptoms of severe headache, generalized body swelling and blurring of vision?	Yes …….……...1 No …….…....2	
Part 4:Substance use during pregnancy			
No.	**Questions and filters**	**Responses/choices**	**Skip**
401	During this pregnancy did you ever drink coffee?	Yes …….1 No ……...2 →	403
402	On average, how many cups of coffee do you take in a typical day? (DC: Estimate in standard 70 ml coffee cup)	…….. Cups	
403	During this pregnancy did you ever drink alcohol drinks (Beer, Areke, Tela, and Tej)?	Yes……1 No……....2 →	405
404	How often were you taking alcohol drinks in the past 30 days?	…… day/s	

405	During your current pregnancy, did you ever chew Khat?	Yes …….1 No ……..2 →	407
406	How often were you chewing khat during the past 30 days?	……. day/s	
407	During your current pregnancy, did you ever smoke cigarettes?	Yes……1 No……..2 →	part 5

Part 5:Information Related to Dietary Intake (Food Frequency Questionnaire)

Instruction: (data collector);For each food item listed below, indicate with a checkmark **(√)** the category that best describes the frequency with which the mother usually eats that particular food items in **past one (1) month.**

501.Food items	>once/day	2-3 times/week	4-6 times/week	once/week	twice/ month	Never in a month
Cereals, bread, injera, food made from grains (e.g. made of maize, sorghum, millet, wheat, barley, teff)						
Any potatoes, sweet potatoes, onion, and other foods made from root and tubers?						
Enset and its products (kocho, bulla)						
Any vegetables, dark Green vegetables (kale, lettuce, cabbage)?						
Any fruits (mango, avocado, banana, etc)						
Any beef, lamb, goat, chicken or other organ meat?						
Any eggs						
Any fresh or dried fish, or shell fish?						
Any food made from beans (e.g., kidney beans, haricot beans, field peas, cowpeas, chickpeas others)?						
Any cheese or yogurt, whole milk,						
Any sugar or honey, sweet/soft drinks?						

Part 6: Modified Global Physical Activity Questionnaire (GPAQ)

Read: I am going to ask you about the time you spend doing different types of physical activity in a typical week. Please answer these questions even if you do not consider yourself to be a physically active person. Think first about the time you spend doing work. Think of work as the things that you have to do such as paid or unpaid work, household chores, harvesting food/crops, Terracing, seeking employment. [Insert other examples if needed].In answering the following questions 'vigorous-intensity activities' are activities that require hard physical effort and cause large increases in breathing or heart rate, NB: (interviewer: Please ask the questions carefully and fill up the boxes appropriately)

Code	Questions	Responses	Skip
601	Does your work involve vigorous-intensity activity that causes large increases in breathing or heart rate?	Yes …...1 No……..2	
Please note the number of days a week and time spent each day on the following activities listed below which are considered to be vigorous. Consider only those activities that are carried out by you in a typical week.			

code	Activities	Number of days/week	Time spent/ day
601a	Carrying, loading or stacking wood	|____|day	hr. |___|___| min: |___|___|
601b	Drawing water from the well, river and bringing water from other house	|____|day	hr. |___|___| min: |___|___|
601c	Manual grinding	|____|day	hr. |___|___| min: |___|___|
601d	Chopping wood-splitting logs	|____|day	hr. |___|___| min: |___|___|
601e	Plough or digging	|____|day	hr. |___|___| min: |___|___|
601f	Weeding	|____|day	hr. |___|___| min: |___|___|
601g	Any other…….(Please specify)	|____|day	hr. |___|___| min: |___|___|
602	Does your work involve moderate-intensity activity that causes small increases in breathing or heart rate?	Yes ……1 No…….…..2	skip
Please note the number of days a week and time spent each day on the following activities listed			

below which are considered to be moderate. Think of only those activities you carried out in a typical week. 'Moderate-intensity activities' are activities that require moderate physical effort and cause small increases in breathing or heart rate.			
602a	Washing clothes	____|days	hr.|__|__|:min |__|__|
602b	Washing dishes	____| days	hr.|__|__|:min |__|__|
602c	Sweeping floor (inside or outside house)	____| days	hr.|__|__|:min |__|__|
602d	Mopping floor(bend on knees and using hand)	____| days	hr.|__|__|:min |__|__|
602e	Drawing and bringing water from outside tap	____| days	hr.|__|__|:min |__|__|
602f	Animal care: feeding animals, washing, cleaning barn, etc.)	____| days	hr.|__|__|:min |__|__|
602g	Milking cow	____|days	hr.|__|__|:min |__|__|
602h	Gardening: watering plants, pruning, sowing seeds, cleaning, etc.	____| days	hr.|__|__|:min |__|__|
602i	Patient and elderly care	____| days	hr.|__|__|:min |__|__|
602j	Tailoring	____| days	hr.|__|__|:min |__|__|
602k	Child care, dressing, bathing, grooming, feeding etc.	____| days	hr.|__|__|:min |__|__|
602l	Cooking or food preparation, baking injera, bread, kocho	____| days	hr.|__|__|:min |__|__|
602 m	Shopping and carrying packages	____|days	hr.|__|__|:min |__|__|
602n	other_____(Please specify)	____| days	hr.|__|__|:min |__|__|
603	Do you walk to get to and from places?	Yes…….1 No …….2	
List of places		Day/week	Time spent/day

603a	To work	_____| days	hr.___|__|:min __|___|	
603b	To market	_____| days	hr.___|__|:min __|___|	
603c	To shops	_____| days	hr.___|__|:min __|___|	
603e	To bring children from school	_____| days	hr.___|__|:min __|___|	
603f	To see friends, relatives or others	_____| days	hr.___|__|:min __|___|	
603g	To church, mosque or temple	_____| days	hr.___|__|:min __|___|	

Recreational Activities

Read: The next questions exclude the work and transport activities that you have already mentioned. Now I would like to ask you about sports, fitness and recreational activities (leisure)

604	Do you do any vigorous-intensity sports, fitness or recreational (leisure) activities that cause large increases in breathing or heart rate like [running] for at least 10 minutes continuously?	Yes……..……1 No ……..…..….2 ⟶		**skip** 606
605	In a typical week, on how many days do you do vigorous-intensity sports, fitness or recreational (leisure) activities?	_____| days	hr.___|__|:min __|___|	
606	Do you do any moderate-intensity sports, fitness or recreational (leisure) activities that causes a small increase in breathing or heart rate such as brisk walking, swimming for at least 10 minutes continuously?	Yes ……1 No …….2 ⟶		608
607	In a typical week, on how many days do you do moderate-intensity sports, fitness or recreational (leisure) activities	_____|days	hr.__|__|:min__|__|	

Read: The following question is about sitting or reclining at work, at home, or with friends including time spent (sitting at a desk, sitting with friends, families travelling in car, bus, train, reading, playing cards or watching television) but do not include time spent sleeping.

608	How much time do you usually spend sitting or	hr.____|____|:min _____|_____|

	reclining on a typical day?	
609	How many hours do you sleep on average during night?	hr.|____|____|:min |____|_____|
610	Does your routine activity involve the following?	Yes No
	Standing for longer hours	1 2
	Lifting heavy loads	1 2
	Squatting	1 2

Thank you for your cooperation

Part 7. Maternal Anthropometric Measurement		
701	Height	|__|__|__|. |____|cm
702	MUAC	|__|__|__|. |____|cm
703	Pre pregnancy weight	|___|___|. |____| Kg
704	Gestational weight gain	|___|___|. |____| Kg
Part 8.Information on newborn (To be filled after delivery)		
801	Sex of the newborn	Male ……..……..1 Female ……..2
802	Birth weight	|___|___|. |____| grams

Data collector: Name ———————————————————

Phone number ———————————Signature ————

Checked by Supervisor: Name ———————————————————

Phone number ———————————Signature ————

Date: dd_____/mm_____yy_____

Annex 3: Informed Consent and/or Ascent Form (Amharic Version

አዲስ አበባ ዩኒቨርሲቲ ጤና ሣይንስ ፋኩልቲ የህብረተሰብ ጤና አጠባበቅ ትምህርት ክፍል

የተጠያቂው / መላሾች የመረጃ ቅፅ

ጤና ይስጥልን እንደምን ነዎት

ስሜ———————————— ይባላል፡፡

የመጣሁት በአዲስ አበባ ዩኒቨርስቲ የህብረተሰብ ጤና አጠባበቅ ትምህርት ክፍል ተማሪ የሆነችውን መሰረት ለገሰን ወክዬ ነው፡፡ነፍሰጡር እናቶች በእርግዝና ጊዜ የሚያደርጉት ማንኛውም የአካል እንቅስቃሴ በሚወለደው ልጅ ክብደት ላይ የሚያስከትለውን ተፅዕኖ ለማወቅ በቡታጅራ ጥናት እያደረገች ሲሆን ከአዲስ አበባ ዩኒቨርሲቲ እና ከቡታጅራ ወረዳ ጤና ጥበቃ ፅ/ቤት ፈቃድ አግኝታለች፡፡እርስዎ በዚህ ጥናት ላይ እንዲሳተፉ የተመረጡት በዘፈቀደ/በአጋጣሚ የናሙና አወሳሰድ ስልት ነው፡፡የእርስዎ ተሳትፎ ሙሉ በሙሉ በእርስዎ ሙሉ ፍቃደኝነት ላይ የተመሰረተ ነው፡፡በጥናቱ ላይ ያለመሳተፍ ሙሉ መብት አለዎት፡፡ለመሳተፍ ፈቃደኛ ከሆኑ በኋላም በፈለጉት ጊዜ ማቆም ወይም ማቋረጥ ይችላሉ፡፡በጥናቱ ባለመሳተፍዎ የሚደርስቦት ምንም አይነት ችግር አይኖርም፡፡

በጥናቱ ለመሳተፍ ከተስማሙ ክብደትዎና ቁመትዎን ደረጃቸውን በጠበቁ መሳሪያዎች እንለካለን፡፡ክብደት በሚለካበት ጊዜ ቀለል ያሉ ልብሶች እና በባዶ እግር እንዲሁም ቁመት በሚለካበት ጊዜ ደግሞ በባዶ እግር ይሆናል፡፡ በተጨማሪም የተወሰኑ ጥያቄዎችን እንጠይቆታለን፡፡በዚህ መጠይቅ ስለአመጋገብ ልምድዎ፤ስለ አካላዊ እንቅስቃሴዎ እና በመቀመጥ የሚያሳልፉትን ጊዜ እንዲሁም ስለቤተሰብዎ እንጠይቆታለን፡፡በመጠይቁ ጊዜ ጥሩ ስሜት ካልተሰማዎት በማንኛውም ጊዜ አቋርጠው መሄድ ይችላሉ፡፡መጠይቁና ልኬቱ 30 ደቂቃ ያህል ይፈጃል፡፡ ከወለዱ በኋላ ደግሞ የልጅዎን ክብደት እንለካለን፡፡

ይህ ጥናት ፖሊሲ አውጪዎችና የሚመለከታቸው አካላት ነፍሰጡር እናቶች በእርግዝና ወቅት ሚያደርጉት ማንኛውም የአካል እንቅስቃሴ እና የስራ ጫና በሚወለደው ልጅ ክብደት ላይ የሚያስከትለው ተፅዕኖ የመከላከያና መቆጣጠርያ መንገዶችን እንዲቀርፁና እንዲተገብሩ እንደ መነሻ ይሆናል የሚል ፅኑ እምነት አለን፡፡

በመጨረሻም ከእርስዎ የምንሰበስበው መረጃ ስምዎት እንደ ማይጠቀስና ለማንኛውም አካል አልፎ እንደማይሰጥ ልናረጋግጥልዎ እንወዳለን፡፡የዚህ ጥናት ውጤት ግን ተጠርዞ እና ተዘጋጅቶ ለሚመለከታቸው የጤና ድርጅቶች እንዲሁም ለሌሎች አካላት ሊሰጥ ይችላል፡፡የእርስዎ ተሳትፎ ለጥናቱ መሳካት ከፍተኛ አስተዋፅኦ አለው፡፡ ግልፅ ያልሆነልዎት ነገር ካለ ወይም ተጨማሪ መረጃ ከፈለጉ አሁን መጠየቅ ወይም ዋና አጥኚዋን ማግኘት ይችላሉ፡፡

የአጥኚዋ ስም ፡መሰረት ለገሰ

አድራሻ ፡ስ.ቁ. 0913661006

ኢሜል፡mesihlegesse@gmail.com

Informed Consent/Acent Form (Amharic version)

የስምምነት መጠየቂያ/ማረጋገጫ ቅፅ

ከላይ በሰጠዎት መረጃ መሰረት በጥናቱ ላይ ለመሳተፍ ፈቃደኛ ነዎት?

1. አዎ
2. አይደለሁም

ፍቃደኛ ካልሆኑ ምክኒያቱን ፅፈው ወደሚቀጥለው ተሳታፊ ይለፉ ——————————————————————————

የመረጃ ሰብሳቢ ስም——————————ፊርማ——————

የመጠይቁ ቁጥር——————

መጠይቁ የተካሄደበት ቀን——————————የተጀመረበት ሰአት———ያለቀበት ሰአት——

የቃለ መጠይቁ ውጤት

1. ሙሉ በሙሉ የተሞላ
2. በከፊል የተሞላ
3. ምንም ያልተሞላ

በተቆጣጣሪዎች ተረጋግጧል፡: ስም——————ፊርማ————

ለተጨማሪ ማብራሪያ የዋና አጥኚዋን አድራሻ ይጠቀሙ

ስም፡መሠረት ለገሰ

ኢሜይል: mesihlegesse@gmail.com

ስልክ 0913661006

Annex 4: Questionnaires (Amharic Version)

በአዲስ አበባ ዩኒቨርሲቲ ህክምና ሣይንስ ፋኩልቲ የህብረተሰብ ጤና አጠባበቅ ትምህርት ክፍል እናቶች በእርግዝና ወቅት የሚያደርጉትን የአካል እንቅስቃሴ በሚወልዱት ልጅ ክብደት ላይ ያለውን ተፅዕኖ በተመለከተ የተዘጋጀ የጥናታዊ ፅሁፍ መረጃ መሰብሰቢያ መጠይቅ

የመጠይቁ መለያ ቁጥር ————

አድራሻ	ቀበሌ _____ የቤት ቁጥር _____
መጠይቁ የተሞላበት ቀን	_____/ቀን/_____ /ወር/ _____ /ዓ.ም/
የተጀመረበት ሰአት	_____/ሰአት/_____ /ደቂቃ /
ያለቀበት ሰአት	_____/ሰአት/ _____/ደቂቃ /
ጠያቂ	ስም_____ ስ.ቁ. _____ ፊርማ _____
በተቆጣጣሪው ተረጋግጦአል	ስም_____ ስ.ቁ. _____ ፊርማ _____

ክፍል 1፡ተጠያቂዋን የተመለከተ አጠቃላይ መረጃ

ተ.ቁ.	ጥያቄዎች	መልሰ	እለፍ
101	ዕድሜዎ በሙሉ ዓመት ስንት ነው?	_____ዓመት	
102	የሚኖሩት የት ነው?	ገጠር ……1 ከተማ……..……...2	
103	የምን ሐይማኖት ተከታይ ነዎት?	ኦርቶዶክስ ……1 ሙስሊም ……2 ፕሮቴስታንት ……..3 ካቶሊክ ……4 የተለየ ከሆነ ይጠቀስ ……...……99	
104	የምን ብሔር ተወላጅ ነዎት?	ጉራጌ……1 ስልጤ……2 ኦሮሞ……3 አማራ……4 ትግሬ……5 ወላይታ ……6 ሀድያ ……7 ከምባታ ……8 የተለየ ከሆነ ይጠቀስ ……99	
105	የጋብቻ ሁኔታ ?	ያላገቡ……..1 ያገቡ……2 የተፋቱ ……..3 የተለያዩ ……4 ባል የሞተባቸው ……..5	

		ያላገቡ አብረው ሚኖሩ ……6	
106	የትምህርት ሁኔታ?	ያልተማሩ ……..…1 ማንበብና መጻፍ የሚችሉ…….....2 አንደኛ ደረጃ ……..3 ሁለተኛ ደረጃ ……4 ቴክኒክ እና ሙያ የተማሩ.……5 ከፍተኛ ትምህርት .. ……6	
107	የባለቤትዎ የትምህርት ሁኔታ?	ያልተማሩ ……...1 ማንበብና መጻፍ የሚችሉ/……..……2 አንደኛ ደረጃ ……...3 ሁለተኛ ደረጃ ……..4 ቴክኒክ እና ሙያ የተማሩ.……5 ከፍተኛ ትምህርት የተማሩ ……..6	
108	የእርስዎ የስራ ሁኔታ?	የቤት እመቤት ……1 አርሶ/አርብቶ አደር …….....2 ነጋዴ ……...3 የመንግሰት/የመ.ያ.ድ. ተቀጣሪ……..4 የጉልበት ሰራተኛ ……..5 ተማሪ ……...6 የተለየ ከሆነ ይጥቀሱ…….……...99	
109	የባለቤትዎ የስራ ሁኔታ?	አርሶ/አርብቶ አደር …….....1 ነጋዴ ……...2 የመንግሰት/የመ.ያ.ድ.ተቀጣሪ…….……3 የጉልበት ሰራተኛ ……4 ተማሪ ……5 የተለየ ከሆነ ይጥቀሱ……..…99	
110	በብዛኛውን ጊዜ ቤተሰብዎ የሚጠቀምበት የውሃ መገኛ ምንድነው?	የግል ወይም የጋራ ቧንቧ ……..……..1 የተጠቀ የጉድጓድ ዉሃ ……...2 ያልተጠበቀ የጉድጓድ ውሃ……...3 የተጠበቀ የምንጭ ውሃ ……..4 ያልተጠበቀ የምንጭ ውሃ ……5 ሐይቅ ……6 ወራጅ ውሃ……..7 ኩሬ……...8 ሌላ ከሆነ ይጠቀስ ……..……99	
111	ቤተሰብዎ የራሱ የሆነ መፀዳጃ ቤት አለው?	አዎን ……1 የለም ……2	
112	የቤተሰብዎ ወርሃዊ የገቢ መጠን ምን ያህል ይሆናል?	_____ ብር	
113	ቤተሰብዎ በአብዛኛው ምግብ ለማዘጋጀት ምን አይነት የሀይል ምንጭ ይጠቀማል?	ኤሌክትሪክ 1	

		የፀሀይ ሀይል .....2 ጋዝ/ላምባ.....3 ከሰል .....4 እንጨት.....5 ጉቶ/ሳር .....6 ኩበት /ፍግ .....7 የተለየ ከሆነ ይጠቀስ.....99	
114	ቤተሰብዎ የሚኖርበት ቤት ወለል የተሰራው ከምንድነው?	ከአፈር……1 ከአሸዋ ……..……..2 ከእንጨት ……..……..3 ከሲሚንቶ ……4 ከእምነበረድ ……5 ከሸምበቆ ……..6 የተለየ ከሆነ ይጠቀስ…….……...99	
115	ቤተሰብዎ የሚኖርበት ቤት ጣሪያ የተሰራው ከምንድነው?	ከሳር ……..…..1 ከእንጨት ……2 ከቆርቆሮ ……..3 ከሲሚንቶ ……4 የተለየ ከሆነ ይጠቀስ……..…99	
116	ቤተሰብዎ የሚኖርበት ቤት ግድግዳ የተሰራው ከምንድነው?	ከእንጨት እና ከጭቃ ……...1 ከእንጨት እና ከሳር ……..……2 ከብሎኬት ……3 ከሲሚንቶ እና ከድንጋይ ……4 ከሸክላ ……..5 ከቆርቆሮ ……6 የተለየ ከሆነ ይጠቀስ……...……..99	
117	ከሚከተሉት የትኛው በቤትዎ ይገኛል ወይም አለዎት?		
	ኤሌክትሪክ ሰዓት ሬድዮ ቴሌቪዥን ሞባይል ስልክ ሞባይል ያልሆነ ስልክ ፍሪጅ(ማቀዝቀዣ) ጠረጴዛ ወንበር አልጋ(የጥጥ ወይም የስፖንጅ ፍራሽ ያለው) የኤሌክትሪክ ምጣድ ፋኖስ	አዎን የለም ኤሌክትሪክ 1 2 ሰዓት 1 2 ሬድዮ 1 2 ቴሌቪዥን 1 2 ሞባይል ስልክ 1 2 ሞባይል ያልሆነ ስልክ 1 2 ፍሪጅ(ማቀዝቀዣ) 1 2 ጠረጴዛ 1 2 ወንበር 1 2 አልጋ(የጥጥ ወይም የስፖንጅ ፍራሽ ያለው) 1 2 የኤሌክትሪክ ምጣድ 1 2 ፋኖስ 1 2	

	ሞተር ሳይክል ጋሪ ጀልባ ወፍጮ	ሞተር ሳይክል 1 2 ጋሪ 1 2 ጀልባ 1 2 ወፍጮ 1 2	
118	ቤትዎ መስኮት አለውን?	አዎን ……..1 የለም ……..2	
119	ቤተሰብዎ ለእርሻ የሚሆን የኪራይ ወይም የይዞታ መሬት አለውን?	አዎን ……..1 የለም ……..2	
120	ቤተሰብዎ ከሚከተሉት ውስጥ የትኛው የቤት እንስሳት አለው?		
	የወተት ላም ወይም በሬ ፈረስ፣አህያ ወይም በቅሎ ፍየል ወይም በግ ዶሮ ወይም ጫጩት ንብ	አዎን የለም የወተት ላም ወይም በሬ 1 2 ፈረስ፣አህያ ወይም በቅሎ 1 2 ፍየል ወይም በግ 1 2 ዶሮ ወይም ጫጩት 1 2 ንብ 1 2 የተለየ ከሆነ ይጠቀስ _____	

ክፍል 2፡ ስነ-ተዋልዶን የተመለከቱ ጥያቄዎች

ተ.ቁ.	ጥያቄዎች	መልስ	እለፍ
201	የመጨረሻውን ያልተዛባ የወር አበባ ያዩበት ቀን መቼ ነበር?	_____/_____/_____/ቀቀ/ወወ/ዓ.ም	
202	ከዚህ በፊት ልጅ ወልደው ያውቃሉ?	አዎን ……..1 የለም ……..2 →	205
203	እስካሁን በጠቅላላው ስንት ልጅ ወልደዋል? (መረጃ ሰብሳቢ፡በሕይወት የተወለዱትን ብቻ ይመዝግቡ)	_____ልጅ/ልጆች	
204	በአሁኑ እና በመጨረሻው እርግዝና መካከል ያለው ርቀት ምን ያህል ነው?(መረጃ ሰብሳቢ፡በወራት ያስሉት)	_____ወር	
205	ውርጃ አጋጥሞዎት ያውቃል?	አዎን ……..1 የለም ……..2 →	301
206	ውርጃ ስንት ጊዜ አጋጥሞዎት ያውቃል ?	_____ጊዜ	

ክፍል 3፡ ህመምና የጤና አገልግሎትን የተመለከቱ ጥያቄዎች

ተ.ቁ.	ጥያቄዎች	መልስ	እለፍ
301	በዚህ እርግዝና የእርግዝና ክትትል አድርገዋል?	አዎን ……..1 የለም …….. →	303
302	በዚህ እርግዝና ለጀመጀመሪያ ጊዜ የእርግዝና ክትትል ሲያደርጉ የስንት ወር እርጉዝ ነበሩ?	_____ወራት አላስታውስም/እርግጠኛ አይደለሁም …….9	
303	በዚህ እርግዝና የአይረን/ፎሌት እንክብል ወስደዋልን?	አዎን ……..1 የለም ……..2 →	305
304	በዚህ እርግዝና የአይረን/ፎሌት እንክብል መውሰድ ሲጀምሩ	_____ ወር	

	የስንት ወር ነፍሰጡር ነበሩ?	አላስታውስም/እርግጠኛ አይደለሁም ……9	
305	በዚህ እርግዝና በወባ ህመም ተጠቅተው ነበርን?	አዎን ……..1 የለም ……..2	
306	በሀኪም የተረጋገጠ ማንኛውም ህመም አለብዎትን?	አዎን ……..1 የለም ……..2	
307	በዚህ እርግዝና ከባድ የራስ ምታት፣አጠቃላይ የሰውነት ማበጥ እና አይን ላይ ብዥ ማለት አጋጥሞዎት ያውቃል?	አዎን ……..1 የለም ……..2	

ክፍል 4፡የአኗኗርና ግላዊ ልምዶችን የተመለከቱ ጥያቄዎች

ተ.ቁ	ጥያቄዎች	መልስ	እለፍ
401	በዚህ እርግዝና ቡና ጠጥተው ያውቃሉ?	አዎን ……..1 የለም ……..2 ⟶	403
402	በቀን በአማካይ ስንት ሲኒ ቡና ይጠጣሉ? **(መረጃ ሰብሳቢ፡**መጠኑን በ70 ሚሊ በመካከለኛ የቡና ሲኒ ይተምኑ**)**	_____ሲኒ	
403	በዚህ እርግዝና አልኮልነት ያላቸው መጠጦች(ቢራ፣ጠላ፣አረቄ፣ጠጅ፣ወይን) ጠጥተው ያውቃሉ?	አዎን ……..1 የለም ……..2 ⟶	405
404	ባለፉት 30 ቀናት ምን ያህል ጊዜ የአልኮል መጠጦችን ጠጥተው ያውቃሉ?	_____ጊዜ	
405	በዚህ እርግዝና ጫት ቅመው ያውቃሉ?	አዎን ……..1 የለም ……..2 ⟶	407
406	ባለፉት 30 ቀናት ምን ያህል ጊዜ ጫት ቅመው ያውቃሉ?	_____ቀን	
407	በዚህ እርግዝና ሲጋራ አጭሰው ያውቃሉ?	አዎን ……1 የለም ……..2 ⟶	ክፍል 5

ክፍል 5፡የምግብ አመጋገብን የተመለከቱ ጥያቄዎች

መግለጫ፡አሁን ከተዘረዘሩት የምግብ አይነቶች ባለፈው አንድ ወር ውስጥ ስንት ጊዜ ተመግበው እንደነበር እንጠይቆታለሁ፡፡ (መረጃ ሰብሳቢ በምላሻቸው መሰረት (√) ምልክት ያስቀምጡ)

501 የምግብ አይነት ዝርዝር	በቀን ከ1 ጊዜ በላይ	በሳምንት 1ወይም2 ጊዜ	በሳምንት 3-6 ጊዜ	በወር 2 ጊዜ	በወር ከ 2 ጊዜ ያነሰ	በፍፁም አልበላሁም
ዳቦ፣ እንጀራ፣ወይም ከጥራጥሬ ወይም እንደ በቆሎ፣ማሽላ፣ ዘንጋዳ፣ዳጉሳ፣ ስንዴ፣ገብስ፣ጤፍ የተዘጋጀ ምግብ						
ከድንች፣ ስኳር ድንች፣ሽንኩርት እና ሌሎች ስራስሮች የተዘጋጀ ምግብ						
እንሰትን (ቆጮ፣ቡላ) የተዘጋጀ ምግብ						
ከአትክልት፣ አረንጓዴ ቅጠላቅጠል፣ሰላጣ፣ጥቅል ጎመን፣የሀበሻ ጎመን የተዘጋጀ ምግብ						

ማንኛውም ፍራፍሬ (ማንጎ፣አቮካዶ፣ፓፓያ፣ሙዝ)						
ማንውም ከበሬ ስጋ፣ከበግ ስጋ፣ከፍየል ስጋ፣ከዶሮ ስጋ የተዘጋጀ ምግብ						
ማንኛውም ከእንቁላል የተዘጋጀ ምግብ						
ማንኛውም ጥሬ ወይም የተጠበሰ ዓሳ						
ከባቄላ፣ ሽንብራ፣አተር፣ በሎቄ፣ጓያ የተዘጋጀ ምግብ						
አይብ፣እርጎ፣ወተት						
ዘይት፣ቅቤ፣ስብ ያለበት ምግብ						
ማንኛውንም ስኳር፣ ማር፣ጣፋጭ፣ለስላሳ መጠጦች						

ክፍል 6፡ የአካል እንቅስቃሴዎችን የተመለከቱ መረጃዎች

የሚነበብ፡በመቀጠል ባለፈው አንድ ሳምንት ውስጥ ስላደረጉአቸው የተለያዩ አካላዊ እንቅስቃሴዎች እጠይቆታለሁ፡፡ እባክዎን ራስዎን አካላዊ እንቅስቃሴ የሚያደርግ ሰው አድርገው ባይቆጥሩም ሁሉንም ተግባራት በመመልከት ጥያቄዎቹን ይመልሱ፡፡ እነዚህም በቤት ውስጥ በመስሪያ ቤት ወይም ከቦታ ወደ ቦታ ለመሄድ የሚያደርጉአቸውን መደበኛ እንቅስቃሴዎች እና በዕረፍት ጊዜዎ ውስጥ ለመዝናኛ ወይም ለስፖርት የሚሰሯቸውን እንቅስቃሴዎች ያጠቃልላሉ፡፡

ጥያቄዎቹን በሚመልሱበት ወቅት ጠንካራ የአካላዊ እንቅስቃሴዎች ማለት ከባድ ጥረት የሚጠይቁ ትንፋሽዎና የልብ ምትዎ ላይ ከፍተኛ ጭማሪ የሚያመጡ ማለትም ቶሎ ቶሎ መተንፈስ ወይም ፈጣን የልብ ምት ሊያስከትሉ የሚችሉ እንቅስቃሴዎች ናቸው፡፡ መካከለኛ የአካላዊ እንቅስቃሴዎች ደግሞ መካከለኛ ጥረት የሚጠይቁ ትንፋሽና የልብ ምት ላይ መጠነኛ ጭማሪ ሊያመጡ የሚችሉ አካላዊ እንቅስቃሴዎች ናቸው፡፡

መለያ	***ጥያቄዎች***	***መልስ***	***እለፍ***
601	መደበኛ አካላዊ እንቅስቃሴዎ ወይም የቤት ውስጥ ስራዎ ከፍተኛ የትንፋሽ ወይም የልብ ምት መጨመር የሚያመጡ ጠንካራ አካላዊ ተግባራትን ያካተተ ነበር?	አዎን ……1 የለም ……...2	

ከዚህ በታች የተዘረዘሩት ተግባራት ጠንካራ አካላዊ እንቅስቃሴዎች እንደሆኑ ይታመናል፡፡ እባክዎ እርስዎ እነዚህን እንቅስቃሴዎች በሳምንት ውስጥ ለምን ያህል ቀን እንዳከናወኗቸው እና በአንዱ ቀን ለስንት ሰዓት ያህል እንዳከናወኗቸው ያስቡ፡፡ ሁሉም እንቅስቃሴዎች እርስዎ የሰሯቸው ብቻ መሆን አለባቸው፡፡

የተግባራት ዝርዝር		በሳምንት ውስጥ የሰሩበት የቀናት ብዛት	በቀን ውስጥ የወሰደው ጊዜ	እለፍ
601*ሀ*	እንጨት፣ ኩበት መልቀም፣ሸክም መሸከም?	|_____| ቀናት	ሰአት : |__|__|ደቂቃ:|__|__|	
601*ለ*	ከጉድጓድ ወይም ከወንዝ ውሃ መቅዳት ከአንድ ቤት ወደ ሌላ ቤት ማመላለስ	|_____| ቀናት	ሰአት :|__|__|ደቂቃ:|__|___|	
601*ሐ*	ጥራጥሬ መፍጨት(ብቅል፣አሻሮ መፍጨት፣አተር፣ባቄላ መከካት)	|_____| ቀናት	ሰአት : |__|__|ደቂቃ :|__|__|	
601*መ*	እንጨት መፍለጥ፣መሰነጣጠቅ	|_____| ቀናት	ሰአት : |__|__|ደቂቃ :|__|__|	
601*ሠ*	እህል መውቀጥ	|_____| ቀናት	ሰአት : |__|__|ደቂቃ :|__|__|	
601*ረ*	ማረስ ወይም መቆፈር፣ መጎልጎል፣መንቀል	|_____| ቀናት	ሰአት : |__|__|ደቂቃ :|__|__|	
601*ሰ*	ማረም	|_____| ቀናት	ሰአት : |__|__|ደቂቃ :|__|__|	

601ሸ	ሌላ ካለ ይጥቀሱ_____	_____| ቀናት	ሰአት : |__|__|ደቂቃ :|__|__|	
602	በቤት ወይም ከቤት ውጪ የሚያደርጉት መደበኛ እንቅስቃሴ ወይም የቤት ውስጥ ስራዎች መጠነኛ የትንፋሽና የልብ ምት መጨመር የሚያስከትሉ መካከለኛ አካላዊ ተግባራትን ይጨምራል?	አዎን ……1 የለም ……..…2		

ከዚህ በታች የተዘረዘሩት ተግባራት መጠነኛ የትንፋሽና የልብ ምት መጨመር የሚያስከትሉ መካከለኛ አካላዊ እንቅስቃሴዎች እንደሆኑ ይታመናል፡፡ እባክዎን እርስዎ እነዚህን እንቅስቃሴዎች በሳምንት ውስጥ ለምን ያህል ቀን እንዳከናወኗቸው እና በአንዱ ቀን ለስንት ሰዓት ያህል እንዳከናወኗቸው ያስቡ፡፡ ሁሉም እንቅስቃሴዎች እርስዎ የሰሯቸው ብቻ መሆን አለባቸው፡፡

መለያ	የተግባራት ዝርዝር	በሳምንት ውስጥ የሰሩበት የቀናት ብዛት	የወሰደው ጊዜ	እለፍ
602ሀ	ልብስ ማጠብ	_____| ቀናት	ሰአት : |__|__|ደቂቃ :|__|__|	
602ለ	እቃ ማጠብ	_____| ቀናት	ሰአት : |__|__|ደቂቃ :|__|__|	
602ሐ	ቤት እና ግቢ መጥረግ	_____| ቀናት	ሰአት : |__|__|ደቂቃ :|__|__|	
602መ	ቤት መወልወል (ቆመው፣አጎንብሰው ወይም ተንበርክከው)	_____| ቀናት	ሰአት : |__|__|ደቂቃ :|__|__|	
602ሠ	ከቤት ውጪ ከሚገኝ ቧንቧ ውሃ መቅዳት እና ወደ ቤት ማስገባት	_____| ቀናት	ሰአት : |__|__|ደቂቃ :|__|__|	
602ረ	እንስሳት መንከባከብ (እንስሳቱን ማጠብ፣መመገብ፣በረት ወይም ጋጣ ማፅዳት	_____| ቀናት	ሰአት : |__|__|ደቂቃ :|__|__|	
602ሰ	ላም ማለብ	_____| ቀናት	ሰአት : |__|__|ደቂቃ :|__|__|	
602ሸ	አትክልት መንከባከብ(ውሃ ማጠጣት፣በከርከም፣ዘር መዝራት፣ ማፅዳት)	_____| ቀናት	ሰአት : |__|__|ደቂቃ :|__|__|	
602ቀ	የታመመ ወይም አዛውንት ሰው መንከባከብ	_____| ቀናት	ሰአት : |__|__|ደቂቃ :|__|__|	
602በ	ልብስ መስፋት (ጥልፍ፣እጅ ስራ መስራት)	_____| ቀናት	ሰአት : |__|__|ደቂቃ :|__|__|	
602ተ	ልጆች መንከባከብ ልብስ ማልበስ፣ማጠብ፣መመገብ፣አልፎ አልፎ ማቀፍ ወይም መሸከም	_____| ቀናት	ሰአት : |__|__|ደቂቃ :|__|__|	
602ቸ	ምግብ ማብሰል(ወጥ መስራት፣ቆጮ፣ እንጀራ ፣ዳቦ መጋገር)	_____| ቀናት	ሰአት : |__|__|ደቂቃ :|__|__|	
602አ	ሱቅ፣ሱፐርማርኬት ወይም ገበያ ውስጥ ተዘዋውሮ መገብየት	_____| ቀናት	ሰአት : |__|__|ደቂቃ :|__|__|	
602ነ	ሌላ ካለይዘርዝሩ_____	_____| ቀናት	ሰአት : |__|__|ደቂቃ :|__|__|	

ቀጥሎ ያሉት ጥያቄዎች ከላይ የጠቀሷቸውን በቤት ወይም በህዝብ የስፖርት ስፍራዎች ያደረጉትን መደበኛ እንቅስቃሴዎች አያካትቱም፡፡ በተለምዶ ከቦታ ቦታ የሚጓጓዙባቸውን ለምሳሌ ከቤት ወደ ገበያ ቦታ፣ ወደ አምልኮ የመሳሰሉ ቦታዎች በእግር የሚያደርጉትን ጉዞ የተመለከቱ ናቸው፡፡

መለያ	ጥያቄ	መልስ		እለፍ
603	ከአንድ ቦታ ወደ ሌላ ቦታ ለመጓዝ በእግር ጉዞ ያደርጋሉ?	አዎን ……1 አላደርግም ……2 ⟶		604
መለያ	የሚሄዱባቸው ቦታዎች ዝርዝር	በሳምንት ውስጥ የሚጓዙበት የቀናት ብዛት	የወሰደው ጊዜ	እለፍ
603ሀ	ወደ ስራ	_____| ቀናት	ሰአት : |__|__|ደቂቃ :|__|__|	
603ለ	ወደ ገበያ	_____| ቀናት	ሰአት : |__|__|ደቂቃ :|__|__|	
603ሐ	ወደ ሱቅ	_____| ቀናት	ሰአት : |__|__|ደቂቃ :|__|__|	
603መ	ልጆች ከትምህርት ቤት ለማምጣት	_____| ቀናት	ሰአት : |__|__|ደቂቃ :|__|__|	
603ሠ	ዘመድ፣ጓደኛ ለመጠየቅ	_____| ቀናት	ሰአት : |__|__|ደቂቃ :|__|__|	

603ረ	ወደ ቤተክርስቲያን፣መስኪድ	|____| ቀናት	ሰአት :|__|__|ደቂቃ :|__|__|	
603ሰ	ሌላ ካለ ይዘርዝሩ……	|____| ቀናት	ሰአት : |__|__|ደቂቃ :|__|__|	

ቀጥሎ ያሉት ጥያቄዎች ከላይ የጠቀሷቸውን በቤት/ በስራ ቦታ ወይም በህዝብ የስፖርት ስፍራዎች ያደረጉትን መደበኛ እንቅስቃሴዎች እና የመጓጓዣ ሁኔታ አያካትትም፡፡ አሁን የምንጠይቆት የመዝናኛ ተግባራትን ለምሳሌ በትርፍ ጊዜዎ በመስሪያ ቤት የእረፍት ሰአት ወይም በቤት ውስጥ ስለሚያደርጓቸው የመዝናኛ እንቅስቃሴዎች ነው፡፡

መለያ	ጥያቄ	መልስ	እለፍ
604	እንደ መዝናኛ/ የትርፍ ጊዜ እንቅስቃሴዎች ከፍተኛ የትንፋሽ ወይም የልብ ምት መጨመር የሚያመጡ ጠንካራ አካላዊ እንቅስቃሴዎችን ቢያንስ ለተከታታይ 10 ደቂቃ ያደርጋሉ? ለምሳሌ፡ ዳንስ (ጭፈራ)፣ ሶምሶማ ሩጫ	አዎን ……1 አላደርግም ……..2	→ 606
605	በሳምንቱ ለምን ያህል ቀናት ጠንካራ አካላዊ እንቅስቃሴዎችን ወይም የመዝናኛ/ የትርፍ ጊዜ እንቅስቃሴዎችን አድርገዋል?	|_____| ቀናት |___|___|ደቂቃ :|____|____| ሰአት	
606	እንደ መዝናኛ እንቅስቃሴ መጠነኛ የትንፋሽ ወይም የልብ ምት መጨመር የሚያመጡ መካከለኛ አካላዊ እንቅስቃሴዎችን ቢያንስ ለተከታታይ 10 ደቂቃ አድርገዋል? ለምሳሌ፡ ዋና	አዎን ……1 አላደርግም ……..2	→ 606
607	በሳምንቱ ለምን ያህል ቀናት መካከለኛ አካላዊ እንቅስቃሴዎችን ወይም የመዝናኛ/የትርፍ ጊዜ እንቅስቃሴዎችን አድርገዋል?	|_____| ቀናት |_____|____|ደቂቃ :|_____|____| ሰአት	

የሚቀጥለው ጥያቄ በቤት፣በመስሪያ ቤት ወይም በትርፍ ጊዜዎ በመቀመጥ ወይም ጋደም ብለው ያሳለፉትን ጊዜ ይመለከታል፡፡ (ቤት ውስጥ፣ በመኪና ውስጥ ፣ከቤተሰብዎ፣ ከዘመድዎ፣ከጓደኞችዎ ጋር ቴሌቭዥን ለመመልከት ተቀምጠው ወይም ጋደም ብለው ያሳለፉትን ጊዜ ይጨምራል፡፡ ነገር ግን በእንቅልፍ ያሳለፉትን ጊዜ አያካትትም፡፡

608	ከሳምንቱ አንዱን ቀን በጠቅላላው ምን ያህል ጊዜ ተቀምጠው ወይም ጋደም ብለው አሳልፈዋል?	|____|___|ደቂቃ :|____|____| ሰአት	
609	በአንድ ቀን በአማካይ ለስንት ሰዓት ይተኛሉ ?	|____|___|ደቂቃ :|____|____| ሰአት	
610	ከሚከተሉት መካከል በየዕለት ከዕለት እንቅስቃሴዎ ውስጥ የትኞቹን ያደርጋሉ?	አደርጋለሁ	አላደርግም
	ለረጅም ሰአት መቆም	1	2
	ከባድ ዕቃ ማንሳት	1	2
	መንበርከክ /ቁጢጥ ብሎ መስራት/	1	2

ስለ ትብብርዎ እናመሰግናለን

ክፍል 7. የእናት የሰውነት ልኬት የተመለከቱ መረጃዎች		
701	ቁመት	|___|___|.|___| ሴ.ሜ.
702	የላይኛው ክንድ ዙሪያ	|___|___|.|___|ሴ.ሜ.
703	ከማርገዝዎ በፊት የነበረዎት ክብደት መጠን	|___|___|.|___| ኪ.ግ
704	በእርግዝና ወቅት የጨመሩት ክብደት መጠን	|___|___|. |___| ኪ.ግ
ክፍል 8.የተወለደውን/ችውን ህፃን የተመለከቱ መረጃዎች (ከወሊድ በኋላ የሚሞላ)		
801	ጾታ	ወንድ…..……..……1 ሴት ……...……..2
802	ክብደት	|___|___|. |____| ግራም

መረጃ ሰብሳቢ	ስም_____ ስ.ቁ. _____ ፊርማ _____
በተቆጣጣሪው ተረጋግጦአል	ስም_____ ስ.ቁ. _____ ፊርማ _____ ቀን _____/ወር_____ /ዓ.ም_____

CURRICULUM VITAE

Identification

Name : Meseret Legesse Hurisa

Profession : Health officer

Date of birth : January 2, 1989

Place of birth : North Shewa, Mullo

Nationality : Ethiopian

Marital Status : single

Sex : Female

Address : Tel +251 913 661006

+251 911 404797

E-mail: mesihlegesse@gmail.com

P.O. Box: 46129, Addis Ababa, Ethiopia.

EDUCATION: B.SC. Degree in public Health from Medco Bio Medical College, Addis Ababa

SUMMARY OF EXPERIENCE RECORDED

Health officer at Amhara regional Health Bureau, Ambowuha Health Center from January, 2013 to January, 2014.

Deputy Head at Amhara Regional State Health Bureau, Antsokia Gemza Woreda Health Office from January, 2014 to July, 2014.

Health worker and child protection officer at Compassion International Ethiopia, located in Wolkite town, SNNPR from November, 2014 to October 2015.

ON JOB TRAINING

- Training on Prevention, management and control of Malaria, at Kombolcha town.
- Health Management Information Systems (HMIS), Expanded Program for Immunization (EPI).
- Training on Health Development Army given at Gondar town, Amhara Region.
- Training on National Nutrition Program by Save the children Engine Project.
- Training on Rota virus vaccine and Ebola outbreak prevention and control
- Training on child protection

Language:

	Reading	Writing	Speaking
1. Amharic	Excellent	Excellent	Excellent
2. English	V.Good	V.Good	V.Good
3. Affan Oromo	-	-	Good

REFERENCES

1. Ayalew Mengesha /MPH/

Head of Department of public Health (Medco Bio Medical College)

Tel: 09 11 16 92 14 Addis Ababa, Ethiopia

2. Mizan Kiros /MD/ Lecturer at Medco Bio Medical College

Tel: 09 11 35 66 84 Addis Ababa, Ethiopia

3. Abebaw Solomon /Mr. / Head of Antsokia /G/W/H/Office.

Tel. 0913 73 82 67

4. Solomon Mamo /Mr. / Project coordinator at MKC-RDA/

Tel. 0911 15 56 06

Professor JEMAL HAIDAR ALI (PHN-consultant)

P.O. BOX 27285/1000

ADDIS ABABA

ETHIOPIA

Phone: 251-911-505465(mob), 251-1-262341 (Res.)

E-mail: hjemal@gmail.com OR hjema2009l@gmail.com

School of Public Health, Addis Ababa University P.O.BOX: 27285-1000

Educational Background

- **Doctorate in Medicine** from Addis Ababa University Medical Faculty, Ethiopia, 1986,
- **MSc in Applied Human Nutrition (Speciality)** from Nairobi University, Kenya, 2001,
- **sub-speciality**, (**Certificates in Vitamin/Serum Retinol Analysis)** Stellenbosch University, South Africa, 1998 (**Sub-speciality**),
- **Certificates in qualitative and quantitative data management (CDM) f**rom Nairobi University, Kenya, 2002 (January-March),
- **Certified in medical education (CME)** from University of Toronto, Faculty of Medicine, Department of Family and Community Medicine, Graduate Studies & Academic Fellowship Programs, 2009 (March-November, 2009),
- Completed **Higher Diploma Program** in teaching, AAU, March 2016 (HD).

Other Trainings: **Over** 20 overseas and national Certificates

Academic Experience

Dec.21/2016 - present	• Professor of PHN
2007– Dec. 21/2016	• Associate Professor of public health & nutrtition (PHN), School of Public Health; • Dean School of Public Health (SPH), AAU;

27/05/12-01/02/2013

13/01/12 - 27/05/12	• Head-Department of Reproductive Family Health an Nutrition, School of Public Health, College of Health Sciences, Addis Ababa University (AAU);
2003 – 2006	• Assistant Professor (Hon.); Department of Community Health, Faculty of Medicine, AAU.
27/05/12-01/02/2013	• Dean School of Public Health (SPH), AAU;
13/01/12 - 27/05/12	• Head-Department of Reproductive Family Health an Nutrition, School of Public Health, College of Health Sciences, Addis Ababa University (AAU);
2007– Dec. 21/2016	• Associate Professor of public health & nutrtition (PHN), School of Public Health;

Professional Experiences: Over 29 years of experiences in teaching and operational research (both qualitative (PRA) and quantitative) in the field of public health; participated in the training of medical doctors and other public health workers on the control and prevention of micronutrient deficiencies; research methodology and reproductive health;

At National Level, I served as a deputy director general of the Ethiopian Health and Nutrition Research Institute, a member of the National technical working group of nutrition; Micronutrient Control and Prevention Committee; a member of National Health Council, National Ethical Review Committee at Ministry of Ethiopian Science and Technology as well as Research and Ethical Review Ethical Review Committee of the of EHNRI/EPHI; a founder and memebr of Food and nutrtion society of Ethiopia (FONSE).

Presently; work as a Professor at school of Public Health.

Manual Production

1. Amahric Manual on Child Feeding Practice, 2000 Chapter in a Book : 2

e -Book:

- Published 4 with Lamberts Academic Publisher, Germany.

MPH Theses Supervised

- As primary advisor – over 100

PhD Theses Supervised/ Examined

- Advised four & examined three

MPH/MSc Theses Examined

- As external and internal – over 100 (Mekele, Jimma, Gonder, AAU, Hawassa , Arsi colleges, Ethiopia

Publications

- Authored and co-authored over 80 in national and international reputable journals

Abstract presentations

- Over 30

Missions delegated

- Led a team from EHNRI and member from traditional Healer Association to Beijing, China, 2006;
- Led a group of researchers representing Evipnet-Ethiopia to WHO-Afro, 2006.

Award

- Swiss Trans-disciplinarily Award. Zurich, March 2000;
- Certificate of Recognition, the Development. Market place Global Competition, 2003, December 4-5, 2003, Washington.
- Certificate of Recognition by school of Medicine as a Teacher of the year from the school of Public Health in recognition of the outstanding contributions made to the academic achievement and personal growth of 2011
- Gold medal award and certificate of Recognition by EPHA for the senior reseracher position in the year 2017.

Community Services/Contributions:

- Provided various consultancy service to local and international organisations on public health nutrition that included Child health days, vitamin A surveys, evaluation of therapeutic/supplementary feeding program, impact of micronutrient powder in the control of child anaemia, Formative research to introduce zinc for diarrheal diseases treatment in Ethiopia, linked dairy project to human nutrition, emergency nutrition surveys and IYCF, and many more.