DOES MATERNAL COFFEE CONSUMPTION AFFECT BIRTH WEIGHT? A COMPARATIVE CROSS SECTIONAL STUDY ON POSTNATAL MOTHERS FROM HEALTH FACILITIES IN SOUTHWEST SHOWA, OROMIA REGION

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JIMMA, ETHIOPIA

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Abstract

Background;-World Health Organization estimates that 26 million low birth weight infants are born each year(birth weight less than 2.5kg), constituting 17% of all births, nearly 95% of them in the developing world. Babies with LBW are more prone to death in neonatal and infancy periods than those with normal birth weight. LBW is a major problem for developing countries. Caffeine intake during pregnancy has also been suggested as a risk factor for birth weight like coffee, tea, chocolate/cocoa, and cola soft drinks which are a major source of caffeine.

Objective;- The objective of this study was to assess level of coffee consumption during pregnancy and its association with birth weight among postnatal mothers in health facilities 4 selected woredas in south west Shewa zone, Oromiya.

Methods: Facility based comparative cross sectional study design was conducted on post natal mothers from randomly selected four woredas in south west Shewa zone of Oromiya. 342 total study subjects were classified into 171(48.6%) normal coffee consumers mothers who were consume $\leq$ 5 cups($\leq$ 350ml) of coffee per day & 171(48.6%) high coffee consumer with > 5 cups (> 350ml) of coffee per day sampled mothers were studied from March 25 –April 23,2014.Multivariate analysis was used to identify independent predictors of birth weight.

Result;- Female new born were seven times more likely to had LBW when compared to male new born **(AOR.**7.361(95% CI =1.025, 52.864) and women who had pregnancy interval of < 2 yrs. were 14 times as have LBW baby when compared to those with birth inter pregnancy interval of two years and above(AOR=13.7(95%=CI 2.580,.217) . Mothers with $\geq$21 cm MUAC were 97 times less likely to deliver LBW when compared to mothers <21cm MUAC (AOR= 0.031(CI= 0.006, 0.171) and Mothers with current pregnancy medical problem were eight times more likely to deliver LBW baby when compared with those mothers with no medical problem on the current pregnancy with (AOR=7.763(CI= 1.256, 47.983).

Conclusion;-This study showed that maternal coffee consumption had insignificant association with birth weight, rather other factors like maternal MUAC, pregnancy birth interval ,sex of the new born and maternal current pregnancy medical problem was independently significant predictors with birth weight.

Acknowledgments

Table of content

List of tables

List of figures   Page

ACRONYMS ;-

1st	First
2nd	Second
3rd	Third
ACOG	America College of Obstetrics And Gynecology
ANC	Antenatal Care
APH	Antepartum Hemorrhage
Fig	Figure
FSA	Food Standards Agency
HEW	Health Extension Worker
Hx	History
ITN	Insecticide Treated Bed Net.
IUGR	Intrauterine Growth Retardation
Kg	Kilo Gram
Km	Kilo Meter
LBW	Low Birth Weights
Mg	Milligram
MUAC	Mid Upper Arm Circumference
NGO	Nongovernmental Organization
NNR	Nordic Nutrition Recommendations
PIH	Pregnancy Induced Hypertension
SE	Side Effect
SPSS	Statistical Program For Social Science
St	Saint
USA	United States of America
WHO	World Health Organization

1. Introduction

1.1 Background

As of today, 90% of the world's entire populations and 75% of pregnant mothers consume caffeine regularly in the form of coffee or energy drink (1). Coffee is consumed in large quantities worldwide and any adverse effects would likely have important public health consequences (2).

Coffee is an important cash crop in many developing countries. It is also an important commodity traded in major commodity exchanges around the world. The largest coffee producers include: Burundi, Ethiopia, Rwanda, Honduras, Uganda, and Nicaragua among others, and coffee consumption around the world is estimated at 1.3 Kilograms per person per year, Ethiopia is ranked on the 65th of the world by annual consumption of 1.3 kg per capita(3).

Coffee production and consumption is believed to have originated in Africa, more specifically in the province of Kaffa,and Ethiopia considered to be the birthplace of the coffee plant as long ago as the ninth century and today over 12 million people in Ethiopia are involved in the cultivation and picking of coffee, and coffee remains a central part of Ethiopian culture.(4)

The potential health benefits associated with drinking coffee include: protecting against type2 diabetes, Parkinson's, liver disease, liver cancer, and promoting a healthy heart, and high coffee intake may help against prostate cancer and on the other hand drinking too much coffee can result in some very unpleasant adverse effects like anxiety symptoms in normal individuals, especially in vulnerable patients, like those with pre-existing anxiety disorders, symptoms of depression due to changes in mood and regular coffee may reduce a woman's chances of becoming pregnant(5).

Caffeine intake during pregnancy has also been suggested as a risk factor for birth weight like coffee, tea, chocolate/cocoa, and cola soft drinks which are a major source of caffeine(6).

In pregnant women, clearance of caffeine from the body is delayed, mainly in the second and third trimesters and it crosses the placental barrier so that maternal blood levels are virtually

equal to fetal blood levels and the enzymes needed for caffeine metabolism, are absent in the fetus up to the eighth month after delivery, which have indicated a decrease in intrauterine fetal growth and lower birth weight(7).

Globally, World Health Organization estimates that 26 million low birth weight infants are born each year(birth weight less than 2.5kg), constituting 17% of all births, nearly 95% of them in the developing world. Babies with low birth weight are more prone to death in neonatal and infancy periods than those with normal birth weight. Low birth weight is a major problem for developing countries. Some studies indicate the incidence of LBW to be 13% in Ethiopia, 13% in east Africa, 14-15% for Africa, 26.4% in India. It was established that early delivery and retarded fetal growth to be the major reason to the cause of low birth weight.(8)

Babies born with a LBW are more likely to have health problems and slower development from immediately after birth to later lifelong problems include adult-onset diabetes, coronary heart disease, high blood pressure, intellectual, physical and sensory disabilities, and psychological and emotional distress which need extra hospital care, and there is a constant concern and uncertainty over future health outcomes. However, little attention is paid to birth weight improvement as a means of reducing child mortality(9) .

1.2 Statement of the problem

The World Health Organization (WHO) defines Low birth Weight (LBW) as having a weight of less than 2500 grams at birth, An estimated 18 million babies worldwide are born each year with low birth weight of which about 3.1 million are in Sub-Sahara(10) where the incidence of LBW was estimated around 13% to 15%(11),(12). About 70% of all LBW babies are born preterm, the remaining 30% at full term (13). Low birth weight (LBW) is a major factor contributing towards high infant morbidity and mortality in developing countries which is associated with many socio-economic factors such as residence (urban-rural difference), education, mother's age and occupation, birth order, the family's income and many maternal conditions such as nutritional status, tobacco use, and health status (14-18).

Exposure to caffeine in adults like coffee, tea, chocolate and cola soft drinks during pregnancy has been suggested as a risk factor(19) . The half-life of caffeine is 2.5 to 4.5 hours in non-pregnant women but longer during pregnancy, especially in late pregnancy. Caffeine is rapidly

absorbed from the digestive system and passes freely across the placenta and fetuses do not metabolize caffeine well because of absence of enzyme, of this the levels of circulating catecholamine increase which may cause utero placental vasoconstriction and fetal hypoxia, all of which possibly reduce fetal growth. Caffeine also increases cellular cyclic adenosine monophosphate, which may influence cell development ,pregnant women with a high caffeine intake (>300 mg a day) have been shown to give birth to babies with a birth weight 100-200 g lower than those of women with a low caffeine intake and they are at risk of giving birth to small for gestational age or low birth weight (<2500 gm) babies(20).

Caffeine passes through body tissues and crosses blood-brain and placental barriers, and its half-life increases in the second and third trimester on average of 10- 18 hours, so the fetus is exposed to caffeine for long periods because neither the fetus nor the placenta can metabolize caffeine which leads to impairment of utero placental, fetoplacental, or villous blood flow(2).

Caffeine consumption has been linked to longer pregnancies and lower birth weight in babies reveled by a Swedish study found that caffeine intake is linked to longer pregnancies and low birth weights in babies by conducting study on 60,000 women in Sweden found that babies' birth weight decreased 21 to 28g for every 100mg of caffeine consumed a day (33).

Study done in   Norwegian University of Science and Technology in Trondheim, examined the effects of caffeine on birth weight, by comparing 111 mothers of babies who were small for their gestation with 747 women whose babies were not small. All the mothers recorded their diets during the 33rd week of pregnancy & researchers found that mothers of small babies were nearly twice as likely to have drunk at least 205mg of caffeine a day compared with mothers of larger babies. (87).

A baby's low weight at birth is either the result of preterm birth (before 37 weeks of gestation) or of restricted fetal (intrauterine) growth, which is closely associated with fetal and neonatal Mortality and morbidity, inhibited growth and cognitive development, and chronic diseases later in life that is relate to the infant, the mother or the physical environment and play an important role in determining the infant's birth weight and future health, and is affected to a great extent by the mother's own fetal growth and her diet from birth to pregnancy, and thus, her body composition at conception low and due to restricted fetal growth affects the person throughout life and is associated with poor growth in childhood and a higher incidence of adult

diseases, and an additional risk for girls for having smaller babies when they become mothers(22).

In Ethiopia there is limited information on prevalence of coffee consumer pregnant mother and weight of the new born in relation with their coffee intake, and other determinants factors during the current pregnancy like nutritional, medical, obstetrical history of mothers in the study area which provide basic information for program planers & policy makers to formulate & strengthen coffee consumption strategies with the national nutrition guide line.

2. Literature review

Birth weight is a major risk factor for morbidity and mortality in the first year of life which may result from intrauterine growth retardation (IUGR) or from preterm delivery(23).

An estimated 18 million babies worldwide are born each year with low birth weight of which about 3.1 million are in sub-Saharan Africa(7). One of the goals of the 1990 World Summit for Children was to reduce the incidence of LBW to less than 10% by the year 2000. Despite this, LBW continues to remain a major public health problem in many sub-Saharan African countries where the incidence of LBW was estimated around 13% to 15% (24)(6). About 70% of all LBW babies are born preterm, the remaining 30% at full term (25).

2.1 Associated factors

2.1.1 Socio demographic factors

Causes of low birth weight are associated with socio demographic factors, the study done

In Jimma zone showed that the prevalence rate of low birth become 22.5%,of those mothers residing in urban areas had high proportion of delivering LBW babies compared to rural (25)early and late maternal age which is less than 20 and greater than 35 ,less educational status and poverty contribute for low birth weight deliveries (26-27) similar study done in Northern Tanzania, shows rural areas gave more low birth weight infants from urban residents and unmarried women were almost twice more likely to give LBW neonates than the married and house wife mothers are less likely from mothers those have occupation (28).

2.1.2 Nutritional factors

Studies from India demonstrated that dietary intervention during pregnancy is almost always associated with increased birth weights, determinants of LBW in developing countries include maternal nutritional status before and during pregnancy, maternal diet, smoking and infection rates during pregnancy are the main factors for the cause of low birth weight(29). Poor dietary practice like, less consumption of diets rich in vitamin C which enhance iron absorption, drinking coffee and tea immediately after meal ,fibrous diet and heavy metals like calcium, zinc, magnesium inhibits iron absorption and, surgical problems like gastrointestinal tract operation or diseases and consumption of antacids, can cause mal absorption(30).

Normally, the required amount of caffeine intake is not more than 400mg every day to provide enough energy and brain alertness that people need in their everyday living ,according to the classification of Customary caffeine consumption to become moderate caffeine consumer, from the classified list of Low caffeine users less than 200mg per day; moderate caffeine users: 200-400mg per day; high caffeine users: more than 400mg per day,and 200mg to 300mg during pregnancy not to be associated with lower birth weight (31-33).

Drinking coffee and tea immediately after meal inhibits iron absorption, deficient absorption of nutrients including iron, zinc, calcium and magnesium that have a role in the growth of the fetus. Usually follows results from Poor dietary practice like, less consumption of diets rich in vitamin C which enhance iron absorption, it may also occur in chronic mal absorption states and consumption of fibrous diet and heavy metals like calcium, zinc, magnesium(21).

There are hundreds of different coffee species, the two most common being Robusta and Arabica. Robusta is a hardier plant that grows at lower altitudes and produces beans with a harsher flavor and higher caffeine content. The Arabica plant grows at high altitudes (3,000 to 6,500 feet or approximately 914 to 1,828 meters) and produces beans with a smoother, more elegant flavor and slightly less caffeine.

Roasting times greatly affect the color and flavor of coffee—the longer the beans are roasted, the stronger the flavor. Instant coffee is a powdered coffee made by heat-drying freshly brewed coffee. Freeze-drying coffee removes water content by means of a vacuum, with the coffee solidly frozen and preserved during the process. Bottled coffee drinks are also available, with

milk, sugar, and other sweeteners and flavors. No matter the variety, all types of coffee contain significant amounts of caffeine, with the exception, of course, of decaffeinated coffee. (34-35).

Low maternal anthropometric measurements have a definite role in causing LBW babies at term were found to be significantly associated with maternal nutritional status and age, chances of having LBW infant varies with mother's nutritional status as determined by MUAC reflected by a single low MUAC (<22.5 cm) during pregnancy, is associated with higher risk of LBW with A low-MUAC mother who loses >1.5 cm in upper-arm circumference during pregnancy is nearly 2.5 times more likely to have LBW newborn than a woman not experiencing such a loss in body mass which a single MUAC provides a simple, inexpensive and reliable approach to identify mothers at high risk of bearing LBW infant (36-39).

Maternal mid-upper arm circumference is a potential indicator of maternal nutritional status. It could be used in association with other anthropometric measurements, instead of pre-pregnancy weight, as an alternative indicator to assess women at risk of poor pregnancy outcome and show from different studies as women who had MUAC of less than 23 cm had more LBW babies than those who had MUAC of 23 cm and more (40).

According to MUAC protocol used as a screening tool for Pregnant women for entry into a feeding program state that cut-off points for risk vary by country and range from 21 cm to 23 cm and suggests <21 cm as an appropriate cut-off for selection of pregnant women at risk for growth retardation during emergencies. Some nutritional protocols enroll pregnant women based on gestational age (mostly only in the third trimester) regardless of any anthropometric measurement (41).

The United Nations High Commissioner for Refugees recommends <23 cm but states also to use <21cm.depending on the proportions of women falling under each category of MUAC and available resources (35).

2.1.3 Obstetrical factors

Studies done in Ethiopia and USA on maternal obstetric history revealed that those mothers who delivered before 37 weeks of gestation, teen age pregnancy, Inter birth interval below 24 months, number of antenatal visits and parity (primipara and parity of 7+) had higher risk of delivering LBW babies(26),(40),(42-44).

Other study shows that birth *to pregnancy interval and* increasing parity has no association on having a child with low birth weight at normative ranges; such effects only manifest at extremely high parities - nine or more children(45)(46).

From the study conducted in Brazil show the birth weight of new born was statistically associated with pregnancy induced hypertensive cases presented an average birth weight between 2.963g and 1.607g,and study in IRAN also show the risk factors associated with LBW were first and second pregnancies, teenage pregnancy, maternal diseases ,pregnancy-induced hypertension, childbirth interval of less than three years, especially less than one year from the previous birth, preterm labor and antepartum hemorrhage(47)(48).

The study done in in Jimma University Specialized hospital also concluded **as** the rates of low and very low birth weight infants among 146 deliveries in the study subjects were 35.6% and 12.3%, among pregnancy induced cases of both pre-eclampsia and eclampsia respectively(49).

2.1.4 Medical factors

According to WHO's estimate, the global prevalence of anemia in pregnant women is 68%. In Africa its prevalence is estimated to be 66.8% (50). In Ethiopia, anemia is the severe problem affecting 62.7% of pregnant mothers and 52.3% non-pregnant women(51)(52). According to EDHS report of 2005, the prevalence of anemia in pregnant women was 30.6% at the country level and 24.9% in Oromia Regional State (53).

The main risk factors for iron deficiency anemia include low intake of iron, poor absorption of iron from diets, high phytate or phenolic compounds or increased requirements during childhood and pregnancy (54).

There is an increased iron requirement during pregnancy due to greater expansion in plasma volume that results in a decrease in hemoglobin level to 11g/dl. Therefore, any hemoglobin level below 11g/dl in pregnancy is considered as anemia (with its consequences of anemia in pregnancy include: still-birth, low birth weight and pre-term births, etc…(55)(56).

Study done on prevalence of anemia with pregnant mothers indicate that parity greater than four, intake of vegetables and fruits less than once per day, taking tea always after meal and recurrence of acute febrile illnesses were found to be factors independently affecting anemia during pregnancy. The same study indicated that the magnitude of anemia was higher among pregnant women who had been taking tea, coffee and chat more frequently than less frequent

users of these substances, pregnant women who do not use bed net every night and in those who do not wear shoes consistently, pregnant women having parity greater than four are more susceptible to develop anemia during pregnancy (57).

Maternal malaria during pregnancy was associated with an increased risk of LBW, anemia, and SGA whereas intestinal helminthes, especially hookworms cause anemia through blood loss, impaired nutrient absorption, and damage to the mucosal lining (58).

2.1.5 Coffee related factors

The World Health Organization's daily recommended caffeine intake for pregnant women is 300 mg a day and ,In 2008 the Food Standards Agency and the American College of Obstetricians and Gynecologists stated in 2010 that pregnant women could consume up to 200 milligrams a day without increasing their risk of miscarriage or preterm birth, after studies indicated drinking more than that could increase the risk of miscarriage and low birth weight(59)(60).

Several human studies on birth defects have been conducted in Brazil showed an evidence that consumption of three or more cups of coffee per day may have a modest effect on lowering infant birth weight, According to new research, for every 100 mg of caffeine consumed a day, babies of average expected birth weight 3.6 kg –- lost 21 to 28 g in weight among the 60,000 Norwegian women studied (2)(61-62).

Caffeine passes through the placenta and is absorbed by the baby and active in the maternal body for up to 11 hours, but up to 100 hours in the fetus because the developing babies still lack the necessary enzymes to detoxify and break it down (63).

Other study from American Journal of Obstetrics and Gynecology, suggested that caffeine is a stimulant and a diuretic and, it increases your blood pressure and heart rate, both of which are not recommended during pregnancy and also caffeine have an effect to increases the frequency of urination which leads to reduction in your body fluid levels and can lead to dehydration which affect fetal growth. (64)

Other study published from Fact Buster reveled that stimulant effect of Caffeine influences the sympathetic nervous system to give you a buzz, sending messages to and from the brain more rapidly and body energy levels begin to surge along with heart rate and blood pressure that need to be kept within a healthy range during pregnancy and if blood pressure will often increase

during pregnancy as the body works to handle an increased blood volume and fluids, what caffeine can do is raise your blood pressure and heart rate even further due to its effect on the sympathetic nerve system, and this puts more of a load on the body and the baby(65).

Lower birth weights in anemic women have been reported from the study done with mothers in rural Nepal, shows that the odds for low birth weight were increased across the range of anemia, increasing with lower and an imbalance of micronutrients as a result of low nutrient intake, poor absorption and increased nutrient loss or demand predictably occurs in many developing countries(58)(2).

Other study from Massachusetts shows as small association between coffee and birth weight by having small decrease in birth weight, observed for maternal caffeine consumption, is unlikely to be clinically important except for women consuming 600 mg of caffeine daily (23) and from the study done in Brazil show as caffeine consumption during pregnancy is not associated with increased risks of low birth weight, intrauterine growth retardation, or preterm deliveries and study from Italy show as inverse association for coffee consumption in the third trimester of pregnancy in low birth weight cases compared to normal birth in comparison with not drinkers (66-68).

Study released by Epidemiology stated that there was no increased risk in women who drank a minimal amount of coffee daily (between 200-350mg per day.) and due to conflicting conclusions from numerous studies, the March of Dimes states that until more conclusive studies are done, pregnant women should limit caffeine intake to less than 200 mg per day. Experts have stated that moderate levels of caffeine have not been found to have a negative effect on pregnancy. The definition of moderate varies anywhere from 150 mg – 300 mg a day.(83)

 The type of coffee is differ depending upon the beans, the roast, the brew, etc., one cup of coffee can greatly vary in caffeine content from the next. Generic coffee, drip brewed contain around 102- 200 mg caffeine with 8 ounce (240ml). While other type of coffee i.e. Starbucks 16 oz. cup of regular drip coffee that packs a powerful 320-410 milligrams of caffeine (84)

2.1.6 Alcohol and cigarette consumption

The birth weight of new born associated with the maternal intake of alcohol during pregnancy, Studies done from American journal public health on alcohol consumption during pregnancy shows that consumers of alcohol had a small but statistically significant reduction in risk relative to total abstainers and the risk then appears to increase with alcohol intake, especially for low birth weight(69).

Studies from American Journal of Public Health on smoking show as greater effect of smoking on birth weight by directly retards fetal growth. The higher ratio of placental to infant weight that we found in smokers has also been observed that women who stopped smoking during the first trimester had little or no risk of smokers having a low-birth-weight infant than smokers(70).

However the above studies especially in developing country try to show the effect of obstetrical factors, nutritional, socio demographic and medical factors on birth weight, without association on coffee conducted in India and Ethiopia, Addis Ababa consecutively. Most of the study done in delivered mother with sample size of 226-5602 and majority of the studies design retrospective record review, cross sectional and case control which doesn't tells about the impact of coffee in relation with birth weight.

2.2 Significance of the study

Caffeine is absorbed rapidly into the bloodstream from the gastro-intestinal tract between 15-30 minutes and reach your baby after consumption and remain in maternal blood for around 12 hours with its ability to cross the placenta and make its way into the system of a growing baby, to have an impact on an unborn child, for lower birth weights and an increased chance of a baby being small for its gestational age with a higher risk of both short- and long-term health problems. While it is rare, women who consume excessive amounts of caffeine during pregnancy also run the risk of delivering a baby that will suffer caffeine withdrawal symptoms

after birth and the effect of coffee intake is depend on the dose for making mal absorption of nutrients that is mandatory for the growth of the fetus (71).

Maternal nutritional intake before and after coffee has a strong impact on fetal birth weight to enhance or inhibit iron, zinc and other micro nutrients which determine the length of pregnancy that have a direct effect on the birth weight of the baby, iron deficiency anemia early in pregnancy can result in low birth weight subsequent to preterm delivery show high prevalence of anemia in pregnancy and serious adverse consequences in both mother and baby. Starting to attend ANC during 1st trimester will help mothers to achieve a better follow up by giving appropriate health education to protect from iron absorption inhibitors by adjusting the dose and the time of coffee consumption, by giving supplementary iron to prevent anemia during pregnancy for intrauterine growth retardation, to prevent the mothers from such medical problem like malaria which is the main cause of anemia during pregnancy and to give a special attention for obstetrical problems like twin pregnancy PIH,APH and nutritional supplementation for those malnouritioed pregnant mothers to bring a positive effect on baby birth weight (72).

Even if there are studies conducted on different factors associated on low birth weight in Ethiopia, studies on the effect of coffee on birth weight is limited so to fill this gap it is crucial to study the association and the magnitude of low birth weight babies because of on the level coffee consumption during pregnancy in the study area and after knowing the result its help full to do further researches for the development of relevant policies.
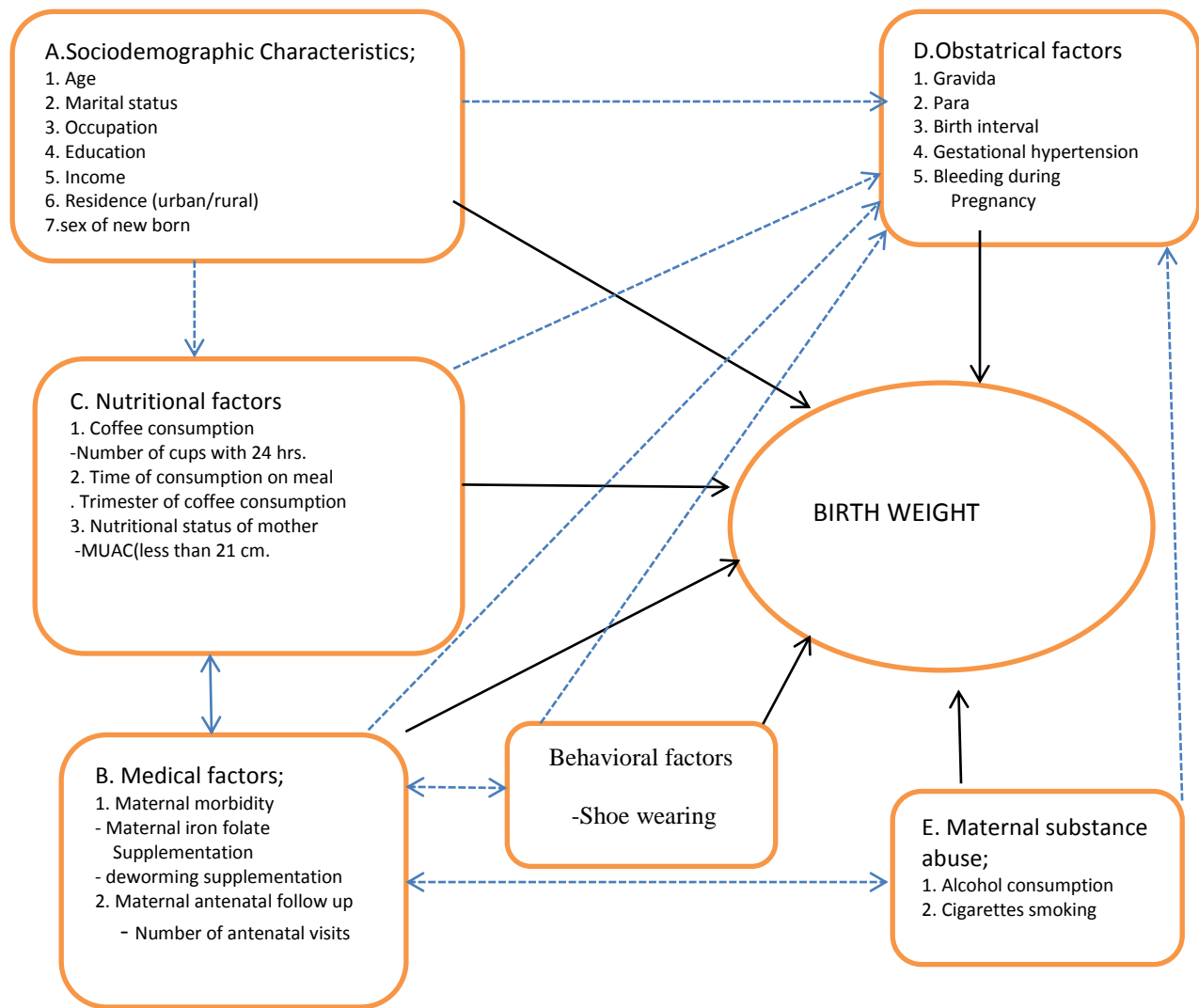
Fig.1 Conceptual frame work for level of coffee consumption and associated factors on birth weight from Health facilities of SWS, March 2014.

N.B; The study analysis consider for those variables with full line arrows ,arrows with dot line shows as a factors that link to each other but not included in this study.

Research question:

Is there a difference in birth weight of newborns by their mothers' level of daily coffee consumption during pregnancy?

Hypothesis:

There is a significant difference in birth weight of newborns among mothers with different level of daily coffee consumption during pregnancy.

3. Objectives

3.1 General objective

To assess level of coffee consumption during pregnancy and its association with birth weight among postnatal mothers in health facilities 4 selected Woredas in SouthWest Showa Zone, Oromia.

3.2 Specific objectives

- To determine the magnitude of coffee consumption during pregnancy.
- To determine the association between coffee consumption during pregnancy and birth weight.
- To determine factors that is associated with birth weight.

4. Methods and Materials

4.1. Study area and study period

The study was conducted in 4 districts (Wolisso, Goro and Wonchi Woredas) under Southwest Showa zone of Oromia Regional State. Southwest Showa Zone has a total population of 1.1 million living under 12 administrative districts (Woredas) with the zonal capital-Wolisso- located 115 km southwest of Addis Ababa. The four study districts contain 36% (397,319) of the Zone's population. Under the zonal health office there are 125 Health Posts, 52 health centers, and 2 Hospitals (1 NGO and 1 Governmental). In this study, data gathered from postnatal mothers who were attend in 1 NGO Hospital(St. Luke Chatolic hospital & colledge of nursing& midwifery) and 8 Health Centers (Wonchi,Dulele,Dilela,Gurura,Goro,Korke,Obi,& Wolisso -1) by considering their daily coffee consumption in a number of cups,& latter on it classify to normal coffee consumers for those mothers consume coffee $\leq$ 5 cups(< 300mg caffeine) & high coffee consumers for mothers who had > 5 cups (> 300 mg caffeine) of coffee per day. The daily coffee caffeine consumption was calculated by 0.86 mg of caffeine per one milliliter of Ethiopian boiled & filtered coffee. The period of data collection was from March to April 2014.

4.2 Study design

Facility based comparative cross-sectional study design were used to compare birth weight of infants by the level of maternal coffee consumption during pregnancy.

4.3 Population

4.3.1 Source population
All post natal mothers attending delivery service in health facilities of South West Showa zone

4.3.2 Study population
Postnatal mothers attending delivery services in selected health facilities during the study period.

4.4 Inclusion and exclusion criteria

4.4.1 Inclusion
All mothers who were delivered in study health facilities in March 2014 and willing to participate in the study.

4.4.2 Exclusion

➢ Post natal admitted mothers without baby during the study period
➢ Preterm deliveries
➢ Twin or multiple deliveries.
➢ Induction of labour before 38 weeks of gestation
➢ Newborn with any congenital malformation.
➢ Mothers with puerperal depression & psychosis
➢ Critically ill mothers.
➢ Mothers who drank coffee with milk

4.5 Sampling technique
All women who delivered during the study period fulfilling the inclusion criteria were included in the study starting from March 25 –Apr 23, 2014 i.e. (consecutive sampling technique).

4.6 Sample size determination
Sample size was calculated by EPI-Info 7.0 using sample size function for comparison of two population proportions with 1:1 ratio of exposed: non-exposed subjects. A total of 354 subjects (177 normal coffee consumers &177 high coffee consumers) are required to estimate an OR of 2 comparing low birth weight prevalence between exposed group and non-exposed group with 95% level of confidence and 80% power. This calculation assumed the prevalence of low birth weight un exposed group to be 22.5% and taking a design effect of 2 and 10% non-response rate and a total of 352 subjects were required.

4.7 Study variables and measurement

4.7.1 Dependent variables
Birth weight

4.7.2 Independent variables

A. Socio demographic and economic factors of post natal mothers

- ✓ Age
- ✓ Marital status
- ✓ Occupation
- ✓ Education
- ✓ Income
- ✓ Residence (urban/rural)
- ✓ New born sex

B. Nutritional factors

- ✓ Coffee consumption
- ✓ Time of coffee consumption in relation to meal.
- ✓ Number of cups of first round (Abol) coffee consumption within 24 hrs.
- ✓ Trimester for coffee consumption.
- ✓ Nutritional status of the mother (MUAC)

C. Obstetrical history

- ✓ Gravida
- ✓ para
- ✓ Birth interval
- ✓ Gestational hypertension
- ✓ Bleeding during pregnancy

D. Medical history

- ✓ Maternal morbidity
- ✓ Maternal iron folate supplementation

- ✓ Maternal deworming supplementation
- ✓ Maternal antenatal check up

Maternal substance abuse

- ✓ Alcohol
- ✓ Cigarettes

F. Maternal behavioral factor
- ✓ Shoe wearing behavior

4.7.3 Data collection technique

Data were collected with interview by data collectors on structured questionnaire. The questionnaire has five parts which assess, obstetric information, medical information, sociodemographic , together with nutritional factors for post natal mothers.

The mothers were asked her usual 24 hrs. Coffee consumption with a cup, during her pregnancy period. The cups size were measured by milliliter prior to data collection & it was varied from 60-75 ml and the data collectors took average measurement of cups i.e. 70 ml.

Data for the nutritional status of mothers were measured by the data collectors by using MUAC tap with cut- point of 21 cm according to nutritional assessment guideline. Data for obstetric factors like current pregnancy induced hypertension was asked for mothers who had antenatal follow up.

4.7.4 Data entry and analysis

After the completion of data collection the data were checked for completeness and editing, coding were done and enter into EPI data version 3.1 and exported to SPSS 16.120 statistical software for analysis frequencies and percentages of variables were produced and odds ratio were calculated on some selected variables to determine the association between independent variables with the outcome variable through binary logistic regression with P value ≤ 0.25 and multivariate logistic regression for P value ≤ 0.05.

4.7.5 Data quality control

To maintain the data quality questionnaires were prepared first in English then translated to Afan Oromo and Amharic, then back to English by another person in order to ensure consistency at every step of data management. A pretest was done on 35 study subject other than the study area. The facilitator and supervisor were trained for one days before and after pretest. Feedback from the supervisor and facilitator were incorporated to enrich the questioner and make more applicable to the local situation. The interview were conducted in class room by trained nurse and mid wife out of the department and unclear and ambiguous matters were clarify for the data collectors by the principal investigator.

4.7.6 Operational definition

Low birth weight: birth weight less than 2.5 kg

Post natal period: a period of 1 hr. after delivery of placenta up to 42 days for term delivered. mothers.

Coffee preparation

Coffee preparation implies that Ethiopian cultural coffee boiled, brewed and filtered.

Caffeine concentration

8 ounce cup of coffee brewed contain maximum of 200mg Caffeine. (83)

1 ounce contains 30ml of brewed coffee (35) = 1ml brewed coffee contains 0.8 mg caffeine. And/or

Caffeine content in a cup (125ml) of coffee 80 -135 mg. = 0.64 to1.08mg per 1ml brewed coffee (85)

For this study 0.86 mg of caffeine /ml of coffee used to know the daily caffeine consumption.

Level of coffee

Normal level coffee consumers;-coffee consumer mothers of ≤ 5 cups

High coffee consumers ;-coffee consumer mothers of > 5 cups.

Size of cup

Locally available Ethiopian cup contains 60-75 ml of boiled and filtered coffee.

Pre term delivery: delivery before completion of 37 week of gestation.

Parity: women who has been delivered a baby.

Gravid: A woman who has been pregnant.

Abortion: expulsion of the fetus and placenta before 24 weeks of gestation less than 1 kg. Trimester: is a period of three month during pregnancy.

1st tri mister: period of pregnancy up to 12 weeks of gestation.

2nd trimester: period of pregnancy from 12 to 28 weeks of gestation.

3rd trimester: period of pregnancy above 28 weeks of gestation.

Twin delivery; having delivery of two infants within one time

Multiple deliveries; having delivery of more than one fetus in a time

Substance abuse; pregnant mothers that use alcohol and smoking or either of one regularly (weekly)

Income; mother's monthly income and /or annual income after conversion to monthly

4.7.7 Ethical consideration

The study was carried out after getting approval from the ethical clearance committee of Jimma University, College of public health and medical science through department of population and family health. Letter of cooperation was obtained from Wolisso Urban and Rural, Goro and Wonchi Woreda health office to the respective health facilities and from St.Luke catholic hospital and college of nursing to the respective department for data collection, verbal informed consent was obtained from study participant by informing the purpose of the study and respondents have full right to refuse for their response.

4.7.8 Dissemination plan

The findings of this study will be present to Jimma University, distributed to Wolisso woredas and Zonal health office, to St. Luke Hospital and College of nursing and midwifery respectively and to other organizations working on child health service and for national nutritional agency. The findings may also be presented in different seminars, meetings and workshops and will publish in scientific journals.

5. Result

5.1 Characteristics of the study participants

From 354 subjects aimed to be studied, two of them were incomplete and the response rate was 99.4%. 10(2.8%) of them were non-coffee participants, so, the analysis was based on 342 or 97.2% of them had a background of coffee consumption. Half of those subjects, 171 (48.6%), would drink ≤5 cups of coffee per day, assuming them as normal coffee consumer and the remaining 171 subjects (48.6%) showed high consumption of coffee which was more than 5 cups per day.

Considering the age of those study subjects, majority, 254(72.2%), were 20-29 years old with the mean age of 29 ± 10. Taking the majority part in consideration, 136 (53.5%) were under normal consumers category while 118 (46.5%) were under high consumers category.

Regarding their maternal marital status, 339 (96.3%) were married and 167 (49%) of those were under normal consumers category and 162 (47.7%) were under high consumers category.

According to population distribution, majority of study subjects, 183 (53.5%), were from rural areas. 63 (11.5%) of those would be put under normal coffee consumers category while high coffee consumers were 120 (88.5%). Minority subject samples or urban areas were 159 (46.5%) and normal consumers of those were 108 (68%) and 51 (32%) were under high coffee consumers category.

The educational status of the majority 256 (72.7%) were attended up to primary school and few amount of participants, 96 (27.3%) went high school and above. 153 (62%) who attended primary school, majority, were under high coffee consumers category.

The occupational status of the participants indicates that, 214 (63%) of them are house-wives and 98 (46%) of them consumed normal amount of coffee while high amount of coffee were 116 (54%) of those house-wives.

From the total delivered mothers, 178 (50.6%) gave male new born while female new born were delivered from 174 (49.4%) of the total delivered mothers.

Considering their economy status, the minimum monthly income that mothers would earn 200EB and 6000EB maximum monthly income with the mean of 1221±807.4. Majority, 216(63%), would earn 500 -800 EB and 112 (51%) of them were high coffee consumers. (table1)

Table 1:- Characteristics of study participants by usual coffee consumption status & birth weight of new born from facilities of SWS Zone, March 2014.

VARIABLES	Frequency	NORMAL (≤5 CUPS)	HIGH (> 5 CUPS)	P value
MATERNAL AGE (YEARS)				
≤ 19	21(6.0%)	10 (47.6%)	11(52.4%)	<.001
20 - 29	254(72.2%)	136(53.5%)	118(46.5%)	
30 - 39	69(19.6%)	30(43.5%)	39(56.5%)	
≥ 40	8(2.3%)	5(62.5%)	3(37.5%)	
RESIDENCE				
Urban	159(46.4%)	107(67.2%)	52(32.8%)	0.398
Rural	183(53.6%)	64(35%)	119(65%)	
EDUCATION				
Primary	247(72.7%)	94(38.1%)	153(61.9%)	0.569
Secondary & above	95(27.3%)	77(81%)	18(19%)	
MARRITAL STATUS				
Married	329(96%)	167(51%)	162(49%)	0.697
Others	13(4%)	4(31%)	9(69%)	
OCCUPATION				
Government	39(11.4%)	34(87.1%)	5(22.9%)	0.697
Housewife	13(56%)	91(47%)	102(53%)	
Farmer	29(8%)	8(27%)	21(72%)	
Merchant	48(14%)	22(46%)	26(54%)	
Others	33(9.6%)	16(48.4%)	17(51.6)	
INCOME, EB				
< 500	58(16%)	19(33%)	39(67%)	0.051
501 – 1,800	216(63%)	104(48%)	112(52%)	
< 1,800	68(19%)	48(70.5%)	20(29.5%)	
SEX				<.001
Male	175(50.6%)	87(49%)	88(51%)	
Female	167(40.4%)	84(48%)	83(52%)	

5.2 Nutritional factors

Representing the overall status of coffee consumption by the means of normal and high consumption, 171 (48.6%) of subjects samples were normal consumers while high coffee consumption was discovered on 171 (48.6%) of subject samples.(fig;2)
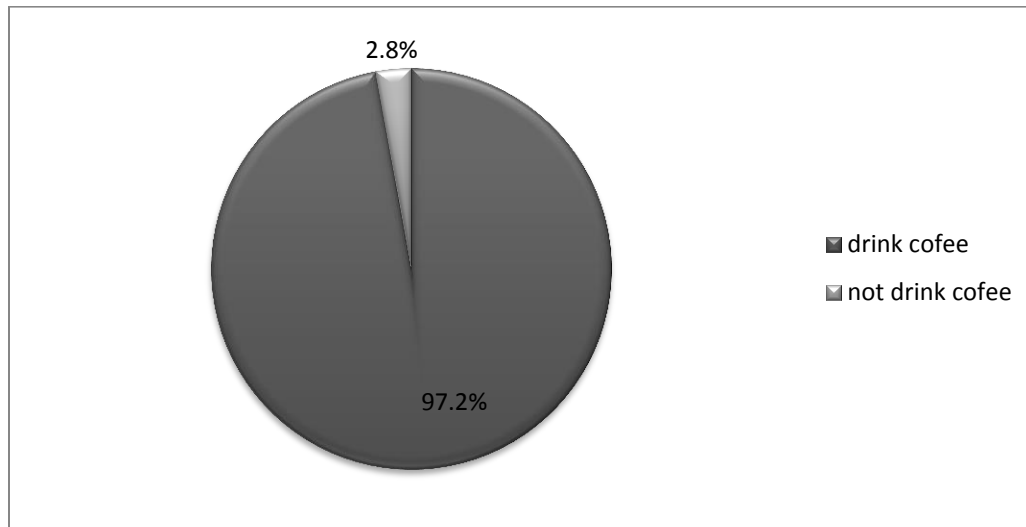
Fig. 2: status of coffee consumption of study participants from Health Facilities of SWS Zone, March 2014.

Out of normal coffee consumers, 130 (76%) of them would drink two to three cups of coffee in the first round but high coffee consumer mothers, 115(67.2%), would drink from six to eight cups in the first round. 225 (65%) would drink coffee in the second round but only 45 (13%) mothers would have coffee in third round. (fig;3)
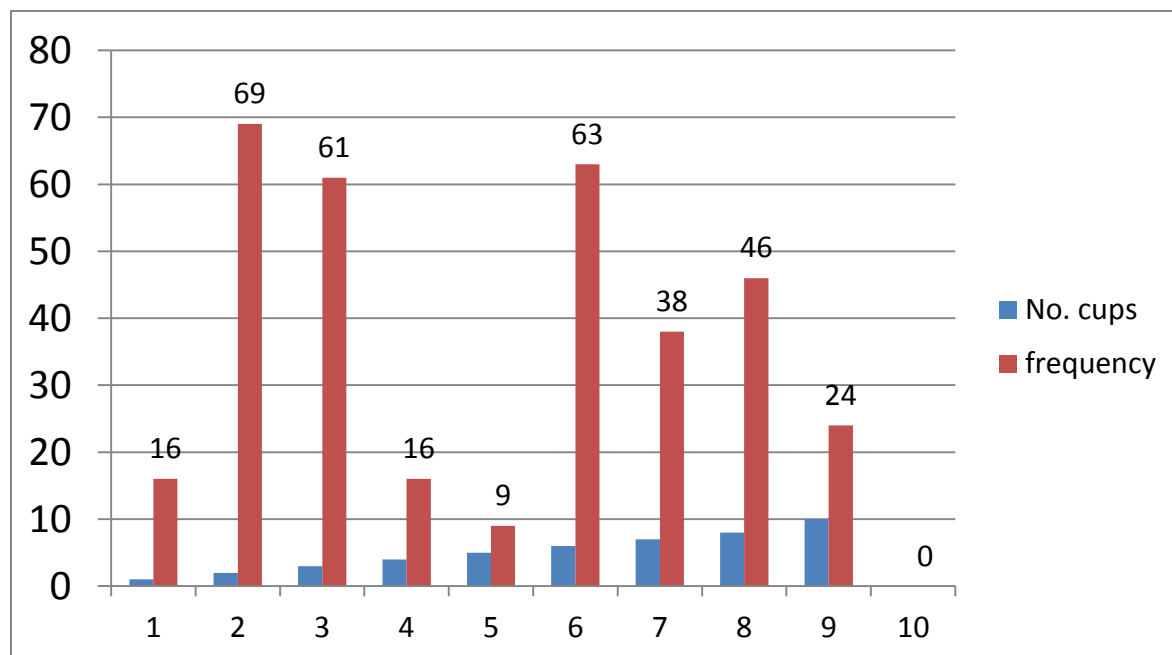
Fig.3; Number of cups for 1st round coffee consumption of the study participants from SWS Zone Health facilities, March 2014.

While realizing the relation between time – after or before meal- and coffee consumption, the study shows that 249 (72.8%) mothers would drink coffee immediately after they had meal. Out of those mothers, 136(54.6%) of them were normal coffee consumers and 113(45.4%) were high coffee consumers. 52 (15%) of mothers would drink coffee while having meal and of those 39 (75%) were high consumers and the remaining 13 (25%) were normal consumers.
Maternal coffee consumption during pregnancy shows variation as it depends on trimesters of pregnancy. In most cases mothers consumed more coffee on late pregnancy period than early pregnancy period. It was observed that 134 (39%) of them drank coffee during their 3rd tri mister and 115(33%) had coffee throughout their pregnancy period.

The mid upper arm circumference of the total population showed that 173 (50.5%) mothers had $\geq$ 21cm MUAC; 102(59%) study participant were from normal coffee consumption. 169(49.5%) of participants had < 21cm MUAC and from those 100(59%) mothers were under high coffee category. (Table 2)

Table 2: Characteristics of study participant on their time, trimester & MUAC measurement comparing with coffee consumption & birth weight of new born from SWS Zone Health facilities, March 2014.

Variable	Frequency	Normal Coffee con.	High Coffee.cons.	P value
Time of coffee with meal				
Before meal	16(5)	8(50%)	8(50%)	.562
As soon as after meal	249(72)	113(46%)	136(54%)	
After some hrs. after meal	22(6)	9(41%)	13(59%)	
Together with meal	52(15%)	39(75%)	13(25%)	
Anytime	3(0.8%)	2(67%)	1(33%)	
Trimester for coffee cons.				
Beginning to 3mon	11(3.2%)	4(36%)	7(64%)	.712
3mon-7mon	22(6.4%)	8(36%)	14(64%)	
3mon-delivery	60(17.5%)	30(50%)	30(50%)	
7mon-delivery	134(39%)	54(40%)	80(60%)	
Throughout pregnancy	115(33.6%)	75(65%)	40(35%)	
MUAC				
< 21cm	173(50.5%)	71(41%)	102(59%)	.000
>=21 cm	169(49.5%)	100(59%)	69(41%)	

5.3 Maternal obstetric factors

Out of the total participants, 195 (56.8%) were Multigravida and 101 (50.5%) of were high Coffee consumers and 94 (49.5%) were normal coffee consumers. 97 (29.2%) Primigravida Mothers were found from the study and 57 (59%) of them consumed normal amount of coffee while high amount of coffee was consumed by 40 (41%) In the case of Grand multigravida mothers which were 50(14.6%), normal coffee consumers were 20 (40%) and 30 (60%) of them were high coffee consumers. From the study participants Primipra was discovered on 102 (31%) mothers and from those 61 (60%) were normal coffee consumers whereas high amount of coffee w as taken by 41 (40%).

 Multipara was found on 190 (55.5%) participants with 88 (46%) normal coffee consumers and 102 (54%) high coffee consumers.
  46 (13.4%) of study participants were Grand multipara and18 (39%) of those were found as normal coffee consumers while high amount of coffee was consumed by 28 (61%).

The year interval between pregnancy from the previous child and the current child of the study participants indicates that out of 246(69%)mothers majority 169(69%)of them delivered >2 yrs interval .The level of coffee consumption for 115(46.7%) mothers were normal and high coffee consumers were 131(53.3%).

Data were collected from study participants based on the background of birth weight. 6 (1.7%), out of 342 participants experienced low birth weight and 5 (83.3%) of those mother were high coffee consumers. Out of those 342 participants, the ones who didn't have a background were 128 (37.4%) and from those 62 (48%) took normal amount of coffee and 66 (52%) took high amount of coffee. The other 106 (31%) had no clue about the previous birth weight and 47 (44.3%) of them used normal amount of coffee and 59 (55.7%) of them used high amount of coffee.

 According to current obstetric background, only 16 (4.8%) experienced pregnancy induced Hypertension and from them 11(68.7%) used normal amount of coffee and the remaining 5

(31.3%) used high amount of coffee. In the case of Antepartum hemorrhage, 9 (2.6%) were found having it with 4 (44.4%) as normal and 5 (55.6%) as high coffee consumption. (Table 3)

Table 3; Study participant obstetric characteristics comparing with their coffee Consumption & birth weight of new born from SWS Zone Health facilities, March 2014.

Variables	Normal coffee cons.	High coffee Cons.	Frequency	P value
Gravida				
Primi gravida	57(58.7)	40(41.3%)	97(28.3)	.852
Multi gravida	94(48.2)	101(51.8%)	195(57.1)	
Grand tigravida	20(40)	30(60%)	50(14.6)	
Para				
Primipara	65(61)	41(39)	106(31)	.562
Multipara	88(46)	102(54)	190(55)	
Grandmultipara	18(39)	28(61)	46(14)	
Yr. Interval				< 0.001
<2yrs	44(57.1%)	33(42.9%)	77(25.5)	
Above2 yrs.	71(42%)	98(58%)	169(49.4)	
Hx. Of LBW				
Yes	1(17)	5(83)	6(2.5)	.658
No	62(48)	66(52)	128(53)	
No response	47(44)	59(56)	106(44)	
PIH				
Yes	11(69%)	5(31%)	16(4.6%)	.983
No	160(49%)	166(51%)	326(95.4%)	
APH				
Yes	4(44)	5(56)	9(2.7)	.346
No	167(50)	166(50)	333(97.3)	

5.4 Medical factors

The study point out, 138 (40.3%) of mothers had medical problems but it was not found on 204 (59.7%) of them out of the total study subjects. During pregnancy, the main medical problem was Anemia and it was counted on 42 (30%) mothers. 41 (29.7%) of study subjects had pregnancy induced Gastritis and Malaria was found on 23 (16.7%) of total participants. From all those affected mothers, 126 (93%) were coffee consumers and 62 (47%) of them took normal amount of coffee and the rest 64 (53%) were high coffee consumers.(Fig,4)
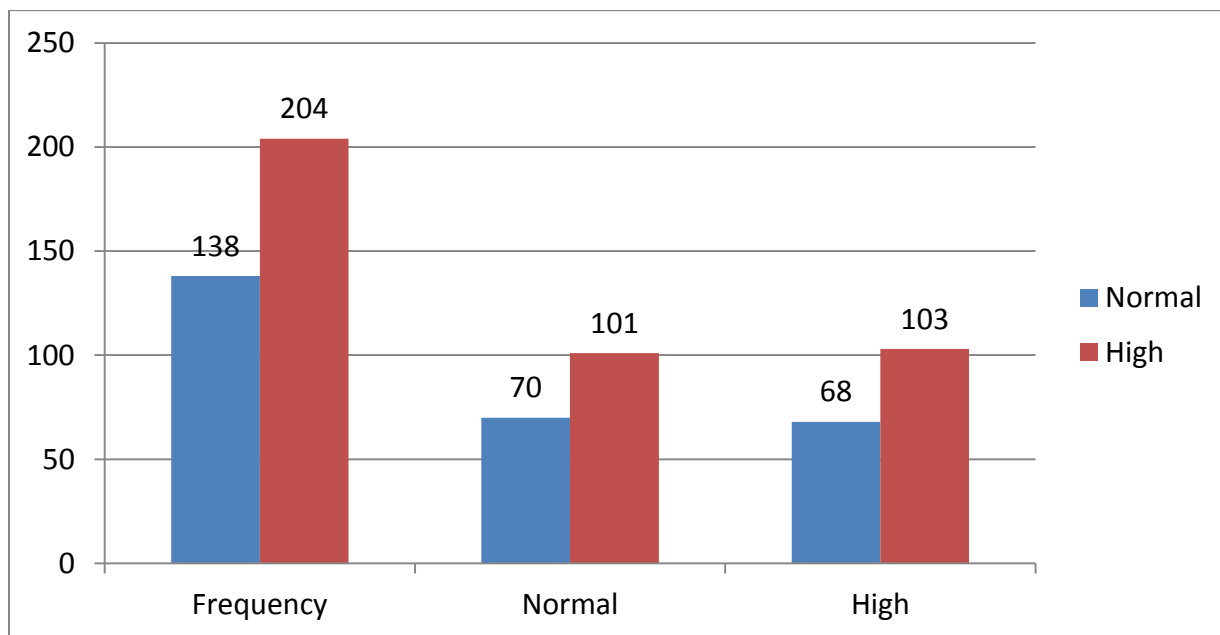
Fig.4 Medical characteristics of study subjects comparing to the level of coffee consumption from SWS Zone Health Facilities March 2014.

As the study showed, a health facility was 100% available in the areas of study participants and 330 (96.0%) of mothers had ANC and 14(4.0%) hadn't ANC follow up with 167(51%) and 163 (49%) were normal and high coffee consumers consecutively.

Concerning the number of antenatal visits mothers who had four visits were 151(42.9%) and 87(24.7%) had three visits.

Out of 330 antenatal follower mothers only 109(32%) were provided with deworming and out of dewormed mothers, 88 (80%) were having it properly but 229 (68%) didn't get the drug while they were on Antenatal follow up period.

Out of 109 dewormed pregnant mothers, 57 (52 .2%%) were found out consuming coffee in normal amount while high consumers were 52 (47.8%).

Concerning on Iron folate supplementation 217 (65%) mothers had the drug, - 180(81%)mothers took it properly the rest 116(35%) of mothers didn't got the drug during their antenatal follow up period. From the study subjects who had the drug, 119 (53.6%) were normal consumers and 98(44%) were high consumers.

Table 4; Study subject ANC and prophylactic drug supplementation comparing with coffee consumption from SWS Zone Health facilities, March 2014.

Variable	Normal	High	Frequency	P value
ANC F/up				
Yes	167(51%)	163(49%)	338(96%)	.273
No.	4(33.3%)	8(66.7%)	14(4%)	
No .of ANC visit				
1 visit	2(11.8%)	15(88.2%)	17(5.2%)	
2 visits	13(39.7%)	19(59.3%)	34(10%)	.050
3 visits	40(46%)	47(54%)	87(26.3%)	
4 visits	85(57.9%)	62(42.1%)	151(44.5%)	
More	27(57.5%)	20(42.5%)	49(14.5%)	
Fefol				
Yes	119(55%)	98(45%)	223(66%)	.390
No	48(42%)	65(58%)	115(34%)	
Deworming				
Yes	57(52.2%)	52(47.8%)	109(33%)	.365
No	110(50%)	111(50%)	229(67%)	

5.5 Behavioural factors

Shoe wearing was one of the behavioural factors in the study and the number of mothers who would wear shoes regularly was 339 (96.3%). Only 13 (3.7%) were not wearing shoes regulary and the reason for 8 (2.3%) of them was economical difficulty and uncomfrtability was mentioned as a reason for 5 (1.4%) of those study subjects. The study on the level of coffee

consumption for those who was wearing shose shows that 165 (52%) consumed normal amount and 164 (48%) consumed high amount. (Fig 5)
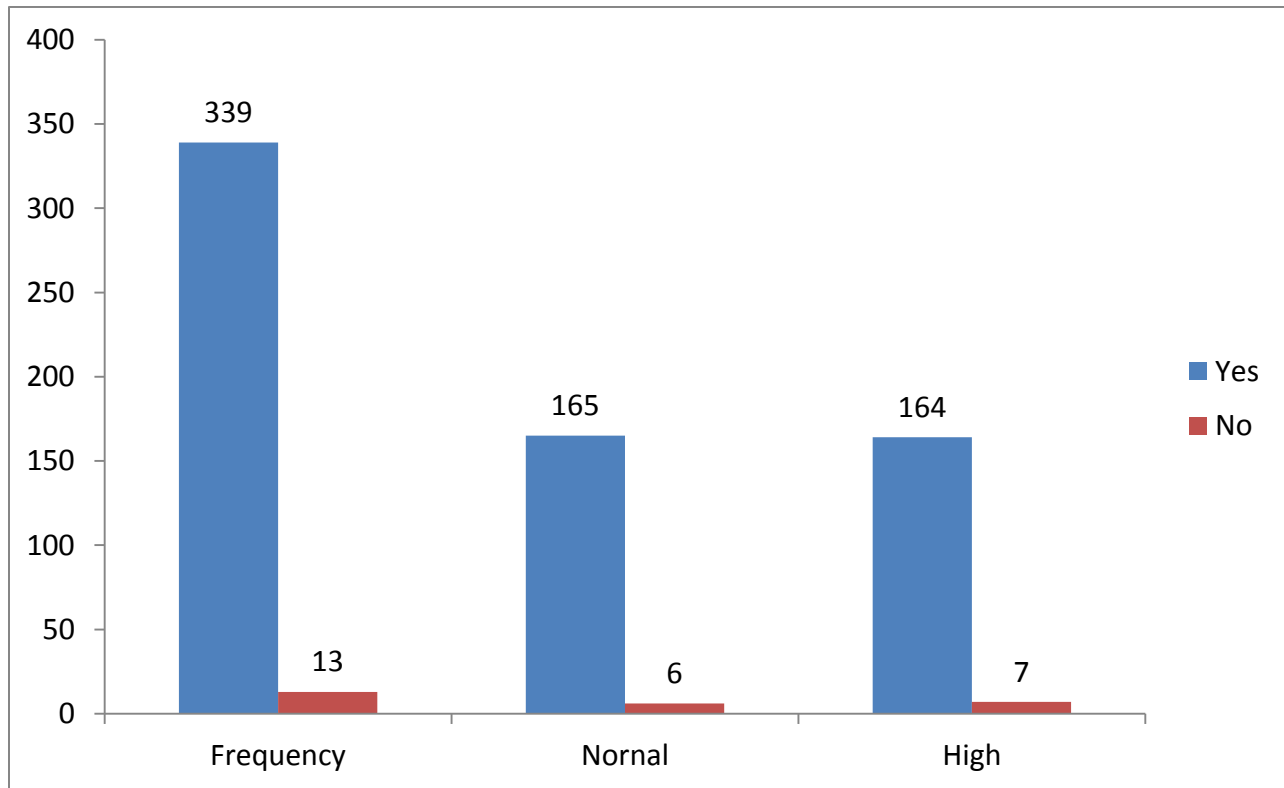
.Fig 5. Behavioural factores on regular shoe wearing among the study participants from SWS
     Zone Health facilities,March 2014.

5.6 Maternal substance use

 The maternal alcohol consumption of the study says that, from the total study participants 151 (43.7%) of mothers, had a habit of getting alcohols; 136 (90%) of them used to have it by occasion but 12 (3.4%) would do it weekly. Normal coffee consumption was calculated for 67 (43.5%) of them and high consumption was shown on 84 (54.5%). Maternal cigarettes smoking majority 350 (99.4%) mothers didn't use cigarettes and 168(49%) normal & 172(50%)high coffee consumers.(Fig 6)

Fig; Maternal substance use with level of coffee consumption
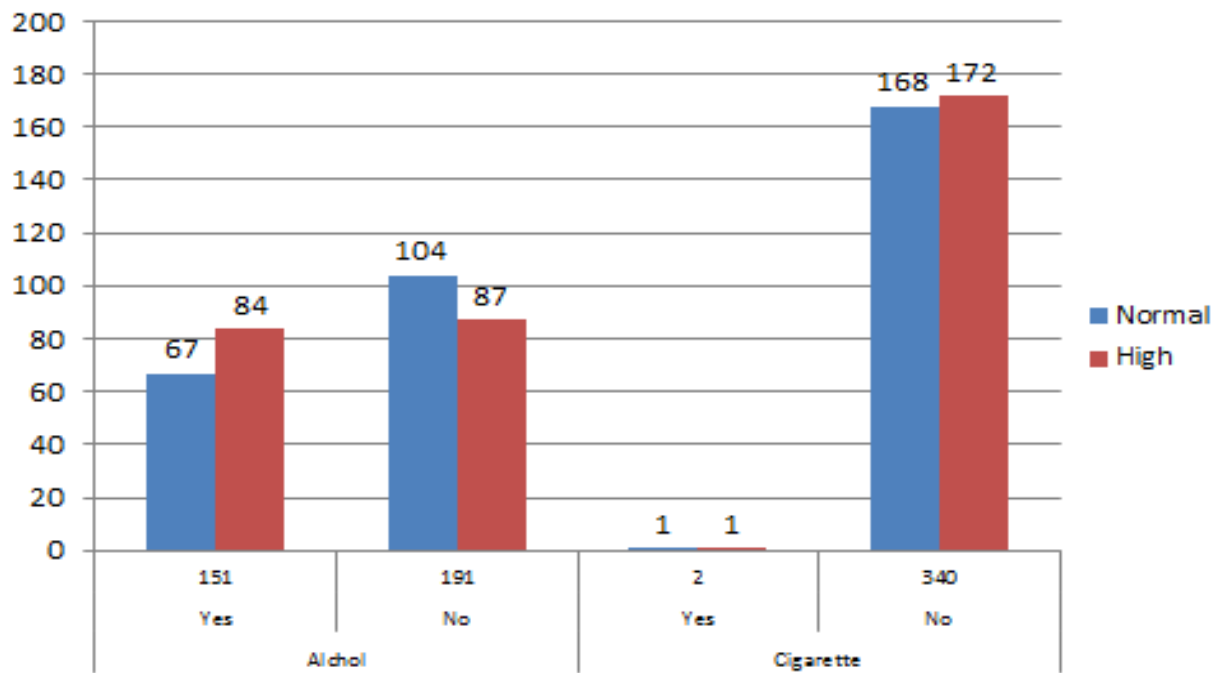
Fig 6; Maternal substance (alcohol and cigarette) use with level of coffee consumption coffee consumption from SWS Zone Health facilities, March 2014.

Birth weight distribution among the study participants.

Out of total study participants 310(88.1%) babies had a normal birth weight and 42(11.9%) were low birth babies, which accounts 24 (57.1%) were born from high coffee consumers and 18(42.9%) were from low coffee consumer mothers.
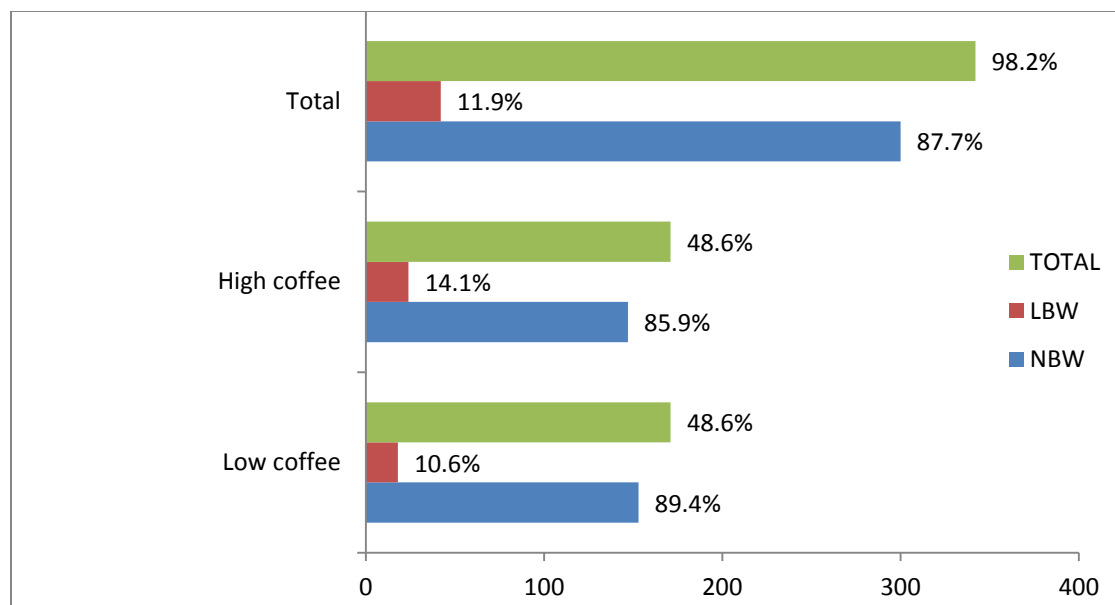
Fig 7;New born weight distribution among study participants from SWS Zone Health facilities, March 2014.

Factors associated with birth weight in bivariate analysis.

On the analysis maternal socio demographic factors, maternal nutritional factors, current medical history, maternal behavioral and substance use were those predictors to see the birth weight of the new born.

sex of the new born and maternal residence from socio demographic factors were significantly associated for birth weight with p value <0.001(CL2.034,9.494)& (CL.392, 1.452) respectively.

From nutritional factor those mothers with less than 21cm MUAC measurement were significantly associated with p value <0.001 with (*CL.024,.128*) and mothers having delivery with short years birth interval ,by having p value <0.001 & *(CL.156,.559))* and

from medical factor, maternal morbidity show an association with p <0.001 *(CL .036,.218)*& alcohol consumption from maternal substance use were another predictors of p <0.001&*(CL .251,.934)* for the final model.(Table 5)

Table: 5 Associated variables for birth weight in bivariate analysis from SWS Zone Health
         facilities, March 2014.

Variables	Frequency(%)	Low BW (%)	COR (95%CI)	P value
Sex Male Female	178(50.5%) 174(49.5)	9(21.5%) 33(78.5%)	0.228 (CL2.034,9.494) .234	<0.001
Residence Rural Urban	188(53.4) 164(46.6)	25(59.5) 17(40.5)	.153 (CL.392,1.452)	<0.001
MUAC *<21cm* *>=21cm*	*173(49.1%)* *179(50.9%)*	*42(100%)*	*0.055(CL.024,.128)*	*<0.001*
Year interval *1-2 yrs.*	*77(30.450*	*29(69%)*	*10.5(CL.156,.559)*	*<0.001*
Medical *Yes* *No*	*144(40.9%)* *208(59.1%)*	*36(85.7%)* *6(14%)*	*11.2(CL .036, .218)*	*<0.001*
Alcohol *Yes* *no*	*154(43.7%)* *198(56.3)*	*25(59.5%))* *17(40.4%)*	*2.06(CL .251, .934)*	*0.031*

Final model result of predictors for low birth weight.

Among underling predictors for birth weight like sex, residence, maternal mid upper arm circumference, pregnancy interval, maternal gestational age, current pregnancy medical problems and maternal alcohol consumption during pregnancy period were included in the model and after controlling those confounding factors sex of the new born, mid upper arm circumference, pregnancy interval and maternal current medical problem were those predictors for birth weight.

The sex of the new born were significantly associated by showing female new borne are seven times more likely to be low birth weight when compared to male new borne**(AOR.**7.361

(95% CI =1.025, 52.864) and women who had pregnancy interval of less than two years were 14 times as have LBW baby when compared to those with birth inter pregnancy interval of two years and above(AOR=13.7(95%=CI 2.580,.217).

The association between maternal mid upper arm circumference and birth weight was maintained after adjustment of possible confounding. Mothers with greater than 21 cm mid upper arm circumference were 97 times less likely to deliver low birth weight when compared to mothers with low mid upper arm circumference (AOR= 0.031(CI= 0.006, 0.171).

Maternal current pregnancy medical problem were another predictor for birth weight by showing those mothers with medical morbidity were eight times more likely to deliver low birth weight baby when compared with those mothers with no medical problem on the current pregnancy(AOR=7.763(CI= 1.256, 47.983,).

From the final model other predictors like maternal residence, and maternal alcohol intake were not show an association for birth weight in final model.(Table 6)

Table 6;Multivariable logistic regression model predicting the likelihood of low birth weight among women who delivered in health institutions of Woliso Town, Central Ethiopia June 2014.

Predictors	NBW	COR & 95%CI	LBW	COR & 95%CI	AOR & 95% CI
Sex					
Male	166(55.3%)	4.395(CI=2.0349.494)	9(21.5%)	0.228(CL=2.034,9.494)	1
Female	134(44.7%)		33(78.5%)		7.361 (1.025,52.864)**
MUAC(cm)					
MUAC>=21cm	179(60)	*.055(CI=.024,.128)*	42(100%)	*0.055(CL.024,.128)*	0.031(0.006,0.171)**
MUAC< 21cm	131(40%)				1
Pregnancy Interval					
≥2yrs	161(74%)	*7.875(CI=3.304,18.772)*	29(69%)	10.5(CL.156,.559)	1
<2yrs	56(26%)				13.744(2.580,73.217)**
History of Medical illness during current Pregnancy					
No	198(66%)	*.089 (CI=.036,.218)*	36(85.7%)	*11.2(CL .036, .218)*	1
Yes	102(34%)		6(14%)		7.763(1.256,47.983)**
Maternal Coffee Consu.					
Normal(<=5 cups)					
High (> 5cup)/day	153(51%)	1.388(CI=.723,2.663)	18(43.9%)	1.388(CI 723,2.6630	1
	147(49%)		24(57.1%)		0.770(0.150,3.964)

** P value less than 0.001.

AOR= Adjusted Odds Ration, Hosmer Limeshow Test (P=1.00), Cox and Snell Psed0 R^2= 0.42

6. Discussion

Birth weight is a very important and potent indicator for both mortality and morbidity of the neonate. Low birth weight (LBW) is a major factor contributing towards high infant mortality in developing countries(73)Thus, this study attempted to assess the effect of maternal coffee consumption on birth weight of the new born to design prevention and intervention strategy to reduce the prevalence of low birth weight as well as child morbidity and mortality rate.

This study shows that almost all mothers during pregnancy period consume coffee with in different amount in different trimester indicates that 75% of pregnant mothers consume caffeine regularly in the form of coffee or energy drink(1).

Most of the studies conducted on coffee consumption and birth weight of the newborn showed that drinking coffee above 300 mg during pregnancy period has an association to cause low birth weight.

The finding of this study showed that no statistically significant difference among the two study population by their level of coffee consumption to affect the birth weight of the new born. Also different studies shows that no relation between low birth weight and heavy coffee consumption (23).

Special attention was paid to variations in caffeine content with in a coffee, the

size of the cup or drink, low socioeconomic groups who prefer inexpensive coffee brands for economic reasons. The brands are often found to be adulterated by mixtures of maize and barley. The type (the beans) and method of preparation of coffee (the roast, the brew, etc)is also related to its caffeine content, the precise estimation of caffeine intake has also to rely on mothers' information rather than direct measurement.

In retrospective studies, recall bias may contribute to exposure misclassification.

Alternatively, mothers with unfavorable outcomes might underreport their consumption, if they were embarrassed to admit to high intakes. Changes in the habits of consumption in different periods of pregnancy could also lead to non-differential misclassification of the exposure.

It is possible that the differences between studies are due to genetic or cultural factors in the study populations, although unknown and study bias may also be involved. (74).

Malnutrition is one of the main health problems facing many women and children in Ethiopia. Ethiopia has the second highest rate of malnutrition in Sub-Saharan Africa (SSA). One major contributing factor for LBW is the poor nutritional status of women both before and during pregnancy Malnutrition impacts on health, mental development, and work productivity of mothers which have enormous impact on the economic growth and poverty reduction effort of the country, reduction of maternal and child health and affects the achievement of MDG(75).

Periods of fetal and infant growth are vital predictors of child's health status which are largely determined by maternal characteristics. Hence, maternal anthropometry and indicators of maternal nutritional status are crucial prognosticators of pregnancy outcomes (76).

This study shows that mothers with low measurement of mid upper arm circumference accounts 49 % of those total LBW of the new born and shows almost equal level of coffee consumption with (49.5%) the mothers were high coffee consumers MUAC were decreased, this indicates that from this study maternal level of coffee consumption were not significantly affect the nutritional status of those mothers.

Other studies revealed that LBW infants were found to be significantly associated with maternal nutritional status as determined by their MUAC (40).

Birth interval played significant role on infant and child mortality if the interval between births is short, the probability of dying becomes very high. The probability of dying before age five for children born less than two years after a previous birth is more than double than for those children born four or more years after a previous birth by affecting fetal growth resulting in low birth weight and increased death risks due to endogenous causes, impair the potential milk production for the child whose birth closed the intervals and also affects the distribution of resources increasing maternal care among children in the household (77).

Fetal sex has an independent effect on the relationship between each of the commonly used biometric indices and their ratios and gestational age, that female fetuses grow considerably slower than male fetuses observed from early second gestation, especially with regard to the growth of the fetal head & influences macrocosmic potential during fetal development that male infants tend to weigh more than female infants at any gestational age (85).

From this study the sex of the new born was significantly associated to cause LBW by showing 33(78.5%) of females were LBW, concerning the maternal coffee consumption for both sexes almost equal number(49.7%) of mothers were with high coffee consumption were tend to deliver female new born.

Different Studies showed from India & Ethiopia shows that as the incidence of low birth weight of the newborns was significantly higher for females, and was found that male infants were 124gm heavier than female infants (73).

In Ethiopia maternal and child health care services are implemented throughout the country with HEW, community health developmental army, almost in all rural Kebele and urban in some extent these health workers are expected to provide house to house health promotion services emphasize providing ANC for the pregnant women identity high risk pregnant mothers, health education and intervention such as provision of iron and deworming tables, family planning, referral linkages, in addition, empowering women, families and neighborhoods to work on their own health care such as peer discussion to use those maternal health services, would reduce the number of babies borne having LBW by spacing inter pregnancy periods. These activities would prevent not only the occurrence of LBW but also problems associated with LBW such as child morbidity and mortality thereby helps the country to achieve maternal and child MDG targets. (40).

Even those with the availability of the above interventions, this study also showed that year interval from the last pregnancy had an impact on low birth weight of the new born which accounts 69% of the total LBW. Concerning the level of maternal coffee consumption form the total participants except primigravida (51%) of the mothers were high coffee consumers which indicates those mothers who deliver early from the past delivery had higher number of LBW and they are also high coffee consumers. Also evidenced by different study done on the Prevalence and risk factors for low birth weight in Yazd, Iran & Ethiopia also showed that the risk factors associated with LBW were childbirth interval of less than three years, especially less than one year from the previous birth (47).

Other studies also show maternal education has a protective effect for short birth interval practice to use modern contraception to prolong their birth interval and to minimize LBW which is a

major cause child mortality and child poor survival. The child death rate decreases with the increasing of birth interval with previous child. This implies that birth interval with previous child plays significant role on child mortality (78).

Studies   have reported the role of social support in better birth outcomes hypothesized that social support has a mediating effect on the relationship between life stress and poor pregnancy outcomes such as LBW(79).

Study from Southwestern Ethiopia reveled that short years intervals between pregnancies can lead to depression during pregnancy because of poor social support, from families, friends and the partner during pregnancy, was significantly associated with LBW by having less antenatal follow up which affect not to get health information from care providers for a series of medical, nutritional and education interventions to reduce the incidence of LBW and adverse pregnancy conditions(80)

 Health of mother and her general medical conditions can affect the fetus in many ways. Supply of several nutrients and oxygen are the two key factors for the growth of fetus. Any alteration in this can result in alter fetal growth. Maternal infection transmitted through the placenta can also affect the growth. Beside this medical conditions affecting oxygen carrying capacity, utero placental blood flow and the size of uterus can also affect the gestational period and the growth of the fetus .These factors may include maternal infections like malaria (where it is endemic), anemia, and acute and chronic infections like urinary tract infection also associated with intra uterine growth retardation to cause LBW (81).

In this study maternal medical factor is one of associated predictor for low birth weight to show 37(88%) of LBW with current pregnancy medical problem like anemia during pregnancy which account 50% of those LBW followed by23% of malaria cases and majority (96.5%)of those mothers were coffee consumer.

 Studies done from California shows those pregnancies together with anemia clearly indicate that favorable pregnancy outcomes are less frequent among anemic mothers found higher rates of fetal deaths and abnormalities, premature deaths, and low birth weight newborns among anemic mothers. These risks were evident even among mothers who had anemia only in the first half of pregnancy. Significant correlations between the severity of anemia, premature birth, and low

birth weight were very evident and show the positive results obtained in birth weights and perinatal deaths by the successful treatment of anemia with iron and folic acid is good solution for the reduction of low birth weight from 50% to 7% and perinatal mortality dropped from 38% to 4% in a study in Nigeria &in terms of infant health and development, the low birth weight child is at a disadvantage particularly in the developing world where the risk of malnutrition, infection and death are markedly increased. An additional risk to the infant may come from the fact that iron deficiency and anemia in children, as well as in adults, produce alterations in brain function that may result in poor mother-child interactions and impaired schooling later. There is mounting evidence that in infants iron deficiency anemia may produce long-lasting defects in mental development and performance that my further impair the child's learning capacity (82).

Strength and limitation of the study

Strength

The study gives a clue on how to consume the wide spread cultural coffee with in the society during pregnancy period and its consequence on the fetus.

Limitation

✓ The study depends on the information provided by mothers subject to recall bias on the level and period of coffee consumption.

✓ Irregularity of coffee consumption throughout pregnancy period

✓ Using of only first round coffee to classify maternal level of coffee consumption.

✓ Unable to identify the type of anemia from maternal history.

✓ Different cut off point for MUAC in different researches to compare with this study limited literatures to compare coffee consumption with those associated predictors.

✓ The last out come from the finding was inconsistent with the expected outcome it may be Due to small Sample size.

✓ Difficult to get history of low birth weight for those mothers who had home delivery.

7. Conclusion & Recommendation

7.1. Conclusion

The aim of this study was to know the effect of coffee consumption of mothers during pregnancy on their new born birth weight.

This study revealed that almost all pregnant mothers (97.2%) consume coffee during their pregnancy period.

The overall prevalence of LBW become 11.9%,and 24(57%) in high coffee consumer mothers & 18(43%) from normal coffee consumer mothers which show a slight difference, but the final model result shows as there is no significant association between coffee and birth weight ,thus a complete prohibition of caffeine contents specially coffee during pregnancy seems not to be recommended. .

The study also show others factors were associated for birth weight like maternal mid upper arm circumference accounts 42(100%), current pregnancy maternal medical problem 36(87.7%), sex of the new born (female) 33(78.5%) & birth interval between pregnancy< 2 yrs. 29(69%) of LBW were discovered respectively.

7.2. Recommendation

1 Regional health bureau and concerned body better to create awareness about advantages and disadvantages of high coffee consumption on reproduction out comes & health problems.

2 Zonal health bureau try to strengthen IEC/BCC on importance and benefits of exclusive breast feeding for six months and continue breast feeding for two or more years, on FP service to maximize delivery year interval.

3 Program planner and policy makers should consider & strengthen collaboration and coordination of nutritional program and family health program to have a routine nutritional assessment, prophylaxis and nutrition supplementation for malnuouritioed pregnant mothers and to have alternative drugs for prophylaxis and treatment.

4 Strengthen family planning service for early enrollment of those mothers with poor obstetric outcome like stile birth and intrauterine fetal death, early neonatal loss by giving awareness about early ovulation.

5   Regional, zonal and woreda health offices should strengthen the referral linkage of HEW for management of those clinically sick pregnant mothers and regular distribution of ITN in malaria endemic areas.

6   Further researches should be conducted to assess the impact of caffeine drinks on birth weight.

8. References

1.   Admin. What is Caffeine? 2013.

2.   Bracken MB, Triche EW, Belanger K, Hellenbrand K, Leaderer BP. Association of Maternal Caffeine Consumption with Decrements in Fetal Growth. 2003;157(5):456–66.

3.   Goodwin L. cultural coffe in Ethiopia. 2014;

4.   Soria C. percapita coffee consumption.

5.   What are the health benefits of coffee ? 2013;(December).

6.   African E, Journal M. Factors predisposing to low birth weight in jimma hospital south western ethiopia a. gebremariam. 2005;82(11):554–8.

7.   Access O. Incidence and correlates of low birth weight at a referral hospital in Northwest Ethiopia. 2012;8688:1–8.

8.   Silvia de Sanjosé, MD P. Coffee during pregnancy: A reproductive hazard. 2013;2.

9.   Http://www.expectantmothersguide.com/library/newjersey/lowbirthweight F. Coalition for Prevention of Developmental Disabilities. Addressing Low Birth Weight Infants. 2013;

10. Fikre Enquoselassie1, Aklilu Minyilshewa2 Changes in birth-weight of hospital-delivered neonates in Addis Ababa,2008

11.   York. D of RHRN. Low Birth Weight, Country, Regional and Global estimates. WHO,.

12.   PubMed. Data on birth weight in developing countries: can surveys help? Bull World Health Organ. 1996.

13.   Ezugwu E. Singleton Low Birth Weight Babies At A Tertiary Hospital In Enugu, South East Nigeria. The Internet Journal of Gynecology and Obstetrics. 2010; 14 (1). 2010.

14.   Viengsakhone L, Yoshida Y, Harun-Or-Rashid M S. Factors affecting low birth weight at four central hospitals in vientiane, Lao PDR. Nagoya J Med Sci. 2010 Feb;72(1-2):51-8. This article on PubMed. 2010.

15.   A. G. Factors predisposing to low birth weight in Jimma Hospital, South Western Ethiopia.2005-558. This article on PubMed.

16. JE. S. Risk factors associated with low birth weight of neonates among pregnant women attending a referral hospital in northern Tanzania.T 2010.

17. JN.O. mathernal mutrition and birth weight (india. 2011.

18. WHO. 9 Determinants of low birth weight: methodological assessment and meta-analysis. Bull World Health Organ. 2010.

19. Weathersbee PS LJ. Caffeine: its direct and indirect influenceon reproduction.

20. Epidemiol1987;126(5):813-21. AJ. The association between low birth weightand caffeine consumption during pregnancy.

21. Alemayehu G., Belay A., Fethi M., Jemal S., Haji K., Melake D., Mistrak B. MG, Nega A., Negga B., Nigist O., Selamawit D. SG, Tamrat G., Tekabe A., TesfayeG. FT, University H. Module for iron deficiency anemia. 2004.

22. UNICEF NY. lowbirth weight from global,regional and national. 2004.

23. American Journal of Epidemiology. Caffeine Intake and Low Birth Weight : A Population-based Case-Control Study. 1998;147(7):21–5.

24. Estimates G. GLOBAL ESTIMATES. 2004.

25. Tema T. PREVALENCE AND DETERMINANTS OF LOW BIRTH WEIGHT IN JIMMA ZONE , SOUTHWEST ETHIOPIA. 2006;83(7):366–71.

26. Koblinsky M, Tain F, Tesfaye S. of Reproductive Health. 2010;4(1).

27. Nega Assefa mail, 0399Yemane Berhane AWPD 10. 1371/journal. pone. 05. Wealth Status, Mid Upper Arm Circumference (MUAC) and Antenatal Care (ANC) Are Determinants for Low Birth Weight in Kersa, Ethiopia Nega. 2012;June 29, 2.

28. Siza JE. Risk factors associated with low birth weight of neonates among pregnant women attending a referral hospital in northern Tanzania. 2008;10(1):1–8.

29. Aje.c. Mathernal nutrition and birth weight. 2012;

30. Alemayehu G, Belay A, Fethi M, Jemal S, Haji K, Melake D, et al. Iron Deficiency Anemia. 2003;

31. Admin B. What is Caffeine? on October 17, 2013 in Caffeine FYI). 2013;2013.

32. Food Technology I of F. international coffee organization classification of coffee consumer. 1987;

33. Sengpiel V, Elind E, Bacelis J, Nilsson S, Grove J, Myhre R, et al. Maternal caffeine intake during pregnancy is associated with birth weight but not with gestational length :

34. Cancer IA for R on. 6cromatografia liqude. 2013;51:51.

35. Nutritional high light,Truestar Health & Healthnotes 2014

36. Bo L, Dewey G, Costa R. among consumption as a factor in iron deficiency anemia pregnant women and their infants in Costa Rica14 women. 1987;

37. Rah JH, Shamim AA, Labrique AB, Rashid M. Change in Maternal Mid-upper Arm Circumference in Pregnancy As a Predictor of Low Birth-weight. 2012;077(183):183.

38. To H. Low birth weight at term: relationship with maternal anthropometry.

39. Corporation HP. Journal of Anthropology. 2012;

40. Assefa N, Berhane Y, Worku A. Wealth Status , Mid Upper Arm Circumference (MUAC) and Antenatal Care (ANC) Are Determinants for Low Birth Weight in Kersa , Ethiopia. 2012;7(6).

41. Paulo UDS, Ricalde AE, Velásquez-meléndez G, Cristina A, Tanaka A, De AAF. Revista de Saúde Pública. 1998;32(2).

42. Anjum F, Javed T, Afzal MF, Sheikh GA. Maternal Risk Factors Associated with Low Birth Weight : A Case Control Study. 2011;17(3):223–8.

43. Hospital S. THE EFFECT OF MATERNAL AGE , GESTATIONAL AGE AND PARITY ON THE SIZE OF THE NEWBORN. 2004;2–6.

44. Feleke Y1 EF. Maternal age, parity and gestational age on the size of the newborn in Addis Ababa. 1999;76(8).

45. Kodzi IA, Kravdal Ø. DEMOGRAPHIC RESEARCH VOLUME 28 , ARTICLE 25 , PAGES 713-732 What has high fertility got to do with the low birth weight problem in Africa ? Ivy A . Kodzi Øystein Kravdal Table of Contents. 2013;28(April):713–32.

46. Regina S, Chaim P, Maria S, Vasconcellos J. Pregnancy-induced hypertension and the neonatal outcome *. 2008;21(1):53–8.

47. Golestan M, S AK, Fallah R. Prevalence and risk factors for low birth weight in Yazd , Iran. 2011;52(10):730–3.

48. Singhal S, Nanda S. Maternal And Perinatal Outcome In Antepartum Hemorrhage : A Study At A Tertiary Care Referral Institute. 2007;5–10.

49.   Article O. HYPERTENSIVE DISORDERS OF PREGNANCY IN JIMMA
        UNIVERSITY SPECIALIZED HOSPITAL. 2011;

50.   WHO. Worldwide prevalence of anaemia 1993–2005 WHO global database on anaemia,.
        2008.

51.   McLean E, Cogswell M, Egli I, Wojdyla D de B. B. Worldwide Prevalence of Anemia.
        WHO Vitamin and Mineral Nutrition Information System, 1993-2005. Pub Health Nutr.
        2009.

52.   UNICEF, PAHO, FAO, the Micronutrient Initiative W. . Anemia Prevention and Control:
        What Works USAID, The World Bank, HO,. 2003.

53.   Agency. P report. CS. Measure DH. ORC Macro. Calverton, Maryland, USA. November
        2005. 2005.

54.   TH. B. Overview and Mechanisms of Iron Regulation. Nutr Rev. 1995; 53:237–45.

55.   DO. ST and B. Maternal, Fetal, & Neonatal Physiology: A Clinical Perspective.
        Qualitative Health Research.

56.   Sullivan KM, Mei Z LI urenc. G-S. Haemoglobin adjustments to define anemia. Trop
        Med and Intern Health.

57.   Gynaecology BJ of O and, , Vol. 105 pp. 385-390, REVIEWS. magnitude of anemia and
        birth weight.

58.   Journal B, This A, Americar L, The L, It L. Anaemia in pregnancy in developing
        countries. 1998;105(April):385–90.

59.   Dr Verena Sengpiel. Caffeine guidelines in pregnancy "may need to be lowered."2013;

60.   By ANAHAD O'CONNOR. Caffeine Linked to Lower Birth Weight Babies. 2010;2013.

61.   Steven A. Narod Md, • Silvia de Sanjosé, MD P, • Cesar Victora, MD P. Coffee during
        pregnancy: A reproductive hazard? •. 1960;1960.

62.   HeyesTue by: JD. Coffee drinking causes low birth weight in babies and prolonged birth.
        2013;

63.   American Journal of Obstetrics and Gynecology, 198 (3), e1-8.. Weng, X., Odouli, R. &
        Li DK (2008). Facts About Caffeine: 2008;

64.   McGrice M. Do pregnant women need to give up caffeine? 2013;

65.   Allen LH. Anemia and iron deficiency : effects on pregnancy outcome 1 – 3. 2000;71:1280–4.

66.   Medicine BC open access journal B. Caffeine during pregnancy linked to longer terms, lower birth weights: study. 2013;

67.   Chiaffarino F, Parazzini F, Chatenoud L, Ricci E, Tozzi L, Chiantera V, et al. Coffee drinking and risk of preterm birth. 2006;(October 2004):610–3.

68.   Clausson B, Granath F, Ekbom A, Lundgren S, Nordmark A, Signorello LB. Effect of Caffeine Exposure during Pregnancy on Birth Weight and Gestational Age. 2002;155(5):429–36.

69.   JR.C. Cigarets alchol and coffee consumption and low birth weight. 2010.

70.   AF.KA. cigareets alchol and coffee for IUGR. 2011.

71.   Department of Reproductive Biomedicine NI of H& FW. Prevalence & consequences of anaemia in pregnancy.

72.   A. Gebremariam. Factors predisposing to low birth weight in jimma hospital South Western Ethiopia.

73   Effect of Socio-economic and Biological Variables on Birth Weight in Madhya Pradesh , 50 India.

74. *U.S. News & World Report and caffeine intake and low birth weight.ACOG*

75. Nutrition HEAT Module, food diet and nutrition.

76. Maternal Predictors of Newborn Somato metrics.

77. Infant and child mortality in Ethiopia: a statistical analysis approach.

78. Determinants of inter birth interval among married Sable R, Wilkinson D (2000) impact of

     Perceived Stress, Major Life Events and Pregnancy Attitudes on Low Birth Weight, Family

79. Planning Perspectives. 32(6): 288–294

80. Effects of Maternal Pregnancy Intention, Depressive Symptoms and Social Support on Risk

     of Low Birth Weight)
.
81.. Maternal risk factors and consequences of low birth weight in Infants *Volume 13, Issue 4 Jul. - Aug. 2013),*

82. The Consequences of Iron Deficiency and Anemia in Pregnancy on Maternal Health, the Fetus and the Infant

83 Williams Obstetrics Twenty-Second Ed. Cunningham,F. Gary, et al, Ch. 8.March of Dimes,

http://www.marchofdimes.com/2011

84. Amount of coffee during pregnancy

 85.How Much Caffeine in a Cup Of Coffee?2013

86.Fetal Sex and Intrauterine Growth Patterns *Nir Melamed, MD, MSc,et. al.2012.*
87 Danger of coffee in pregnancy ,Dr Torstein Vik and colleagues at the Norwegian University of Science and Technology 2012.

Consent form

 My name is Meskerem Mulugeta, I am working as data collector in this study to assess the association of coffee consumption during pregnancy and its effect on birth weight of the new born .the information that I got from you will never be used for other purposes. You don't have to answer any questions that you don't want to answer and you may end this interview at any time you want. However, your honest answer to these questions is very important for the purpose of the study. We would very much appreciate your participation in this study by genuinely responding to the interviews. Would you be willing to participate?

It would take 10 minutes to complete the questionnaire

Signature of the interviewer certifying that informed consent has been given verbally by

respondent_____

ANNEX

questionnaire English version

Table; 1 Questionnaire to be filled by interviewer (data collector).

Instruction: For each of the following questions, please circle the number of the of the alternatives and fill in the blank space according to the respondent response.

S.no	PARTI.SOCIO-DEMOGRAPHIC FACTORES	CHOICE	Skip pattern
101	Mother MRN number	_____.	
102	How old are you (in year)	_____.	

103	Weight of the new born in kg	_____kg	
104	Sex of the new born	1. Male 2. Female	
105	Residence	**1.**Urban 2.Rural	
106	Educational status:	1.Can not read and right 2.Read & write only 3.1st cycle (1-4) 4.2nd cycle (5-8) 5.Secondary (9-10) 6.Preparatory (11-12) 7.12+	
107	Marital status	1.Married 2.Single 3.Separated 4.Divorced 5.Widowed	
108	Occupational status:	1.Governmental worker 2.Farmer 3.Merchant 4.House wife 5.Daily labor 6.Student 7.NGO worker 8.Unemployed 9.other specify	

109	Monthly income		

Section II NUTRITIONAL FACTORES

201	Did you consume coffee in your pregnancy period?	1.yes 2.no	skip
202	If yes for Q201 At what month of your pregnancy?	1.begining to three mon 2.after three month to seven month 3.After 3 month to delivery 4.after seven month to last pregnancy period 5.throughout pregnancy	
203	How much cup of coffee(Abol) did you consume within a day?	_____.	
204	How much cup of coffee (2nd round) did you consume within a day?	_____.	
205	How much cup of coffee (3rdround)did you consume within a day?	_____.	
206	In relation to your meal intake, at what time did you consume the coffee?	1.before meal 2.as soon as after meal 3.after some hrs after meal 4.toget her with meal 5.with out meal time	

207	Mid upper arm circumference of the mother in cm.	_____ cm.	
PART III.OBSTATRICAL FACTORES			
301	Number of gravida,	_____	
302	para	-----------	
303	In Q.no 301 if she is not primi,how many yrs interval with your last and current delivery?(in a complete month)	_____.	
304	In Q.no 301 if she is not primi,hasn't Hx of abortion &IUFD before current pregnancy,do you have a history of low birth weight before?	1.yes 2.no	
305	Currently did you have vaginal bleeding before the onset of labour?	1.yes 2.no 3.Ido't know	
306	In this pregnancy did you develop pregnancy induced hyper tension?	1yes 2.no	
PART IV. MEDICAL HISTORY			

401	Is there health facility in your area?	1 yes 2.no	skip
402	If yes for q.no 401, did you have antenatal check up?	1yes 2.no	skip
403	If yes for q.no 402 how many visit did you visited by medical professionals?	1.only one visit 2.two visits 3.three visits 4.four visits 5.more	
404	Is there any medical problem during your pregnancy period?	1.yes 2.no	skip
405	If yes for Q.no.404 what is your medical case?	_____.	
406	If yes for Q.no.402,did you got deworming during your antenatal checkup period?	1.yes 2.no	
407	Did you got iron supplementation during your antenatal checkup period?	1.yes 2.no	
V. Behavioral factors			
501	Did you use shoes regularly?	1.yes 2.no	skip
502	If no for Q.no 501 specify your reason?	_____	

PART VI;SUBSTANCE USE;			
601	Did you use alcoholic drinks during your pregnancy period?(any type)	1. Yes 2. No	skip
602	If yes for Q.no.601how frequently did you use?	1. daily 2. weekly 3. sometimes	
603	Did you smoke cigarettes during your pregnancy?	1. yes 2. No	skip
604	If yes for Q.no.603,how frequently did you smoke?	1.daily 2.weekly 3.sometimes(occasionally)	
605	During your smoking time, how many cigarettes did you use?	1.1cigareet 2.2 cigarettes 3.3 cigarettes 4.more	

Questionnaire in Amharic version

ጤና ይስጥልኝ፣ **ስሜ** -------------------------------------እባላለሁ። በጅማ ዩንቨርስቲ የማህበረሰብ ጤና ሳይንስ የሁለተኛ ዲግሪ ተመራቂ ተማሪ ስሆን ይህንን መረጃ የምሰበስበው በርግዝና ወቅት ቡና መጠጣትና ሌሎች ተገዳኝ ነገሮች በጽንስ ክብደት ላይ የሚያመጡትን ተጽኦና ለማወቅ ነው፤፤ ለዚህ ጥናት የሚሰጡትን ሀሳብ ለሴላ አላማ የማይውል መሆኑን አየገለጽኩኝ ሀሳቦትን ላለመግለጽና በማንኛውም ሰዐት የማቋረጥ መብት የተጠበቀ ሲሆን የሚሰጡት የተመነ ሀሳብ ለጥናቱ በጣም ጠቃሚ መሆኑን አየገለጽኩኝ ጊዜትን መስዋት አርገው ላደረጉልኝ ትብብር በጣም አመስግነናለሁ፤፤

ክፍል 1፤አጠቃላይ የግለሰብ መረጃ

101.½ምመርመሪያ ካርድ ቁጥር ----------------------------------

102.የወላድዋ ዕድሜ በአመት ----------------------------------

103.የህጻኑ ክብደት በኪ..ግ ----------------------------------

104.የህጻኑ ጸታ

      1.┐ �.ዋ   2.ሰ፝

105.የመነሪያ ቦታ   1.ከተማ   2.Î ፋ.ር

106.½ትምህርት Ãረቻ

1. መጸፍነ ማንበብ የማትችል   2. መፍነማንበብ ብቻ የምትችል   3. ከ1-4ኛ ክፍል ብቻ የተማረች

   4. »5-8ክፍል የተማረች .ከ9ኛ-10ኛ ክፍል የተማረች   6. የመሰነዶ ትምህርት(11-12)   7.ከፍተኛ ትምህርት

107.የትዳር ሁኔታ   1.ያገባች   2.ያላገባች   3.ለየብቻ የምነኖር 4.የተፋታች 5.ባለቤትዋ ½ሞተባት

109.የስራ ሁኔታ   1.የመንግስት ሰራተኛ   2.የቤት እመቤት 3.በእርሻ ስራ የምትተዳደር   4.ነጋዴ

   5.የቀን ሰራተኛ 6. ተማሪ 7.መንግስታ ያልሆነ ድርጅት 8. ስራ የሊላት 9.ሌላ

ክፍል 2. የአመጋገብ ሁኔታ

201.በእርግዝነ ወቅት ቡነ ትጠጪ ነበር   1.እ   2.እደዬሠሮ

202. ለጥያቄ ተራ ቁጥር 201 መልሱ እ ከሆነ በየትኛው የኦርግዝና ወራትሽ ውስጥ ነው

    1.ከመጀመሪያው• አስከ ሶስት ¨ ር የኦርግዝና ፮ኃያት ¨ ·ስØ

    2.ከሶስት ወር አስከ ሰባት ወር

    3.ከሰባት ወር አስከምወልድ ጊዜ ድረስ

    4.በሁሉም የርግዝና ወራቶች ውስጥ

203. በቀን (በ24 ሰአት)ውስጥ ስንት ሲኒ አቦል ቡና ትጠጪ ነበር?---------------.

 204. በቀን (በ24 ሰአት)ውስጥ ስንት ሲኒ ሁለተኛ ቡና ትጠጪ ነበር?

---------------------.

205. በቀን (በ24 ሰአት)ውስጥ ስንት ሲኒ ሶስተኛ ቡና ትጠጪ ነበር?--------------.

206. ከአመጋገብ ጋር በተያያዘ ቡናን የምትጠጪው ምን ጊዜ ነው?

   1.ከምግብ በፊት   2.ከምግብ በሁዋላ ወዲያውኑ   3.ከምግብ በሁዋላ ቆይቼ

   ከምግብ ጋር   4.በማንኛ ¨ም ፎ² ̖

   3.ከምግብ ጋር   4.በማንኛ ¨ም ፎ² ̖

207. ¾ ላትª ³ልÃኛው የአጅ ክንድ አጋማሽ ልኬት በሴሜ. --------------

ክፍል 3፤ የስነ ወሊድ /ፒቾፖሻ

301. ይህ አርግዝና ስንተኛ • አርግዝናሽ ነው? --------------------

302. ስንት ልጆችን ወልደሻል ------------------

303. የአሁኑ አርግዝናሽ መጨረሻ ከነበረሽ አርግዝና በምን ያህል አመት የተራራቀ ነው?

   --------------(በወራት)

304. ከዚህ በፊት ስትወልጂ፣ የልጆሽ ክብደት በወሊድ ጊዜ አናሳ ሆኖ ያውቃል(ከ2.5 ኪ./ግ ያነስ)

    1.አ   2.አይደለም

305. በአሁኑ • አርግዝናሽ ከምጥ በፊት በማህጸን ደም ይፈስሽ ነበር?

    1.አ   2.አይደለም

306. በአሁኑ • አርግዝናሽ በርግዝና ምክንያት ³ኛ ̖ መ× ³Åም ግፊት Ãዞሽ ነበር?

ክፍል 4፤የወላድዋ የህመም /ፒቾፖሻ

401. በምትኖሪበት አከባቢ የህክምና ተቀም አለ?

    1.አ   2.አይደለም

402 .ለጥያቄ ቁጥር 401 መልሱ አ ከሆነ የርግዝና ክትትል ተደርጊ ነበር?

    1.አ   2.አይደለም

403. ለጥያቄ ቁጥር 402 መልሱ አ ከሆነ በአጠቃላይ ስንት ጊዜ ክትትል ነበረህ?

   1.1 ጊዜ   2. 2 ጊዜ   3.3 ጊዜ   4. 4 ጊዜ   5 ከዚያ በላይ

404. በአሁኑ የአርግዝና ወቅትሽ ማንኛውም አይነት የህመም (በሽተ) ችግር ነበረብሽ?

   1.አ   2.አይደለም

405. ለጥያቄ ቁጥር 404 መልሱ አ ከሆነ ምን አይነት የህመም(በሽተ)ችግር ነበረብሽ?

   ---------------------.

406. ለፀጸቁ ቁፀር 402 መልሱ አ ከሆነ በርግዝና ክትትልሽ ወቅት የሆድ ትላትል መድሀኒት
   ተሰጥቶሽ ነበር?

      1.አ   2.አይደለም

407. በርግዝና ክትትልሽ ወቅት የደም ማነስ መድሀኒት ተሰጥቶሽ ነበርበ?

      1.አ   2.አይደለም

   5. የግለስቡ የባህሪ ሁኔታ

501 .በአርግዝናሽ ወቅት ጫማ አዘውትረህሽ ትለብሺ ነበር

         1.አ   2.አይደለም

502. ለጥያቄ ቁጥር 501 መልሱ አይደለም ከሆነ ምክንያቱ ምንድን ነው --------------

ክፍል 6፤ሱስ አምጪ ነገሮችን የመጠቀም ሁኔታ• • • • •

601.በርግዝናሽ ወቅት ማንኛውንም አልኮል ነክ መጠጦችን ትጠጪ ነበር?

         1.አ   2.አይደለም

602 ለጥያቄ ቁጥር 601 መልሱ አ ከሆነ በምን ያህል ጊዜ ትጠጪ ነበር?

      1. በየቀኑ   2.በሳምንት   3.አልፎ አልፎ

603. በርግዝናሽ ወቅት ሲጋራ ተጨሺ ነበር?

      1.አ   2.አይደለም

604. ለጥያቄ ቁጥር 603 መልሱ አ ከሆነ በምን ያህል ጊዜ ተጨሼ ነበር?

      1.በየቀኑ   ᐧ2.በሳምንት   3.አልፎ አልፎ

605. በምተጨሺበት ወቅት ስንት ሲ.ጋራ ተጨሺያለሽ?

     1.1 ሲ.ዕራ   2. 2 ሲ.ዕራችን   3.3 ሲ.ጋራችን   4.ከዚያ በላይ

Afan Oromo version of questionnaires and consent forms
5.4.1 Guuca Eyyama Fi Gaafilee Afaanin Gaafataman afaan Oromotiin

Yuniversitii Jimmatti Kollejjii Fayya Hawasaa Fi Saayinsii Meedikaala, Muummee

Hawasumma fi Fayyaa Maatii

Akkam jirtuu, Nagaa kessanii

Ani maqaan koo_____ Ani yuniversitii Jimmaatti digirii lammafan barachaa jira.Akka qaama barnootaa kennamutti, waggaa dhumaa ebbifamuuf qorannoo gaggeessun qaba.kanaafuu mata dureen qorannoo kootii haala Fayyadamuu bunnaa yeroo ulfaa rakkoo innii ulfatiinaa da'immaa dhalatuurrattiifidu irratii xiyyeeffata.

Sababii kaanaf gaaffilee muuraasa Kan dhima kana illaalan siigafachuun barbaada.Bu'aan qoraanoo kanas tajaajila fayyaa da'immanii amma keenama jiruu foyyeesudhaaf ni fayyada. Deebin isiin kennitan fedhii keessanin ala eenyumatuu hin himamu. Akkasumas maqaan fi eenyumaan keessan asirratti hinkatabamu. Hirmaannaan keessan fedhii irrati kan hunda'eedha. Yaadnii isiin keennitaan Kun tajaajila fayyaa haadholee isin argatan irraati takkumaa isiin miidhuu hin danda'u waan ta'eesuu hin sodaatina. Yeroo barbaaddanis gaaffii fi deebii kana dhaabu/dhissuu ni dandessu. Gaafii fi deebiin qorannoo Kun daqiiqqa 10 fudhachuu danda'a.

Nii hirmmata janee abdii qaba.Illalchii atti qabduus baay'issee nu fayyada.

Gaaffii si gafachuu eegaluu?   1. Eyyee   2.Lakki

Yoo eyyamamee gaaffii gaafachuu ni jalqabama.

Maqaa gaaffii gaafaataa_____mallaattoo_____guyyaa_____

Maqaa to'aata_____mallattoo_____guyyaa----------------

Kuta 1^{ffaa}**:** *Odeefannoo Hawaasumaafi Haala Ummataa Gaafatamanii*

Lakk.	Gaaffiiwwan	Filannoowwan	Gaaffilee irra darbuuf	Yaada
101.	Mana jireenyaa gaaffile deebistuu	Lakkofsa gaaffii------------- Lakkofsa Kaardii----------------------		
102.	Umriin kee meqaa	--------------------------------waggadhan		
103.	Guyyaa dhloota da'immaa dhalatuu	……………………………………..		
104.	Ulfatiinaa da'imma dhalatuu	……………………………….kiloo gramidhaan		
105	Saala da'immaa dhalatuu	1. Dhiraa 2. Dhalaa		

106	Bakka Jireenyaa	1. Magalaa 2. Badiyaa		
107	Haala Heerumaa	1. Heerumte 2. Hin heerumne 3.kan hiktee 4.Garagara kan jiratan 5. Abaan manaa irraa du'ee		
110	Sadarkaa barumsa keetii meeqa?	Hin barannee Dubbisuu fi barreessu nan danda'a Sadarkaa tokkoffaa (1-8) Sadarkaa lammaffaa (9-10, 10+1,2, 3,11-12) Sadarka sadaffaa (digirii fi isa oli)		
111.	Hojiin kee maali?	1. Hojeetu Motuumaa 2. Qottee bulla 3. Daladalatu 4. Hadha Manaa 5. Hojjataa guyaa 6. Hojjettuu Dhabbata Dhuunfaa 7. Barattuu 8. Hojii dhabduu Kan birroo yoo ta'e --- -----------------------		

Kuta 2ffaa: Gaaffii Waa'ee rakkoo Nyaataa waaliin walqabatuu

Lakk.	Gaaffiwwan	Filannoowwan	Gaaffilee irra darbuuf	yaada
201.	Yeroo ulfaa turtee bunaa ni dhugdaa turee?	Eyyeen Lakki		
202.	Eyyo yoo jette gaaffii **201** irratti yeroo ulfii kee ji,a meeqaa turee?	1. Ji'aa sadaa 3ffaa bodaa 2. Ji'a 3-7 bodaa 3. Ji'a 7ffaa hangaa dhumaa ulfaatii 4. Yeroo ulfaa hundaa.		
203.	Guyyaatii bunaa isaa aboolii irra sinii meeqaa dhugdaa?	_____		
204.	Guyyatii bunaa isaa 2ffaa irra sanii meeqaa dhugdaa?	_____.		
205.	Guyyatii bunaa isaa 3ffaa irra sanii meeqaa dhugdaa?	_____.		
206.	Haala yeroo nyaataa	1. Nayaataa duraa		

		waliin yeroo kam bunaa dhgdaa?	2. Batalumaa nyaataa bodaa		
			3. Sa'a muraasaa nyataa bodaa		
			4. Nyataa waliin		
			5. Nyaata maalee		
207.	Safarii ciiqiilee gubaa giddugaleesaa seentii meetiriidha	…………………………cm		

Kuta 3^ffaa: Gaaffii Waa'ee Tajajiilaa gadameesaa fi rakkoo walii jiruu ilaaluf qopha'ee ((Obstaterical factor)

Lakk.	Gaaffiwwan	Filannowwan	Gaaffilee irra darbuuf	yaada
301.	Bayyaa Ulfaa	------------------------		
302.	Garagaruumaa waggaa ulfaa da'umsaa amma fi isaa duraa meeqaa?	Waggaa---------------------		
303.	Seena da'imma dhalatuu ulfaatiina gadii tattee qabda?	1. Eeyee 2. Mitii		
304.	Yeroo ulfaa amma qamma gadameessatiin dhignii ciniisuu durasi qunameerra?	1. Eeyee 2. Mitii		
305.	Yeroo ulfaa kana	1. Eeyee		

		2. Mitii		
	rakkoo dabaliinsaa dhiggaa ulfaa fana walqabatuu qada turee?			

Kuta 4^{ffaa}: Gaaffii Waa'ee Dahinsa booda Haadholeen tajaajila yaalaa fayyadamuu Fi Sababa Isaa Qorachuuf Haadholeef Qophaa'e.

Lakk.	Gaaffiwwan	Filannoowwan	Gaaffile irra darbuuf	yaada
401.	Nannoo keetii dhabiileen fayya jira?	1. Eyyen **2.** Lakki		
402.	Eeyyee yoo ta'ee gafii 401f taajajiila da,umsaa duraa argattee beekta?	1.Eyyen 2. Lakki		
403.	Eeyyee yoo ta'ee gafii 402f yeroo meeqaa ogeessa fayyatii ilaalamtee?	1. Yeroo 1 qofa 2. Marsaa 2 3. Marsaa 3 4. Marsaa 4 5. Kana ool		
404.	Yeroo ulfaa keetii rakkoo fayya qabda turee?	1. Eeyee 2. Mitii		

405.	Eeyyee yoo ta'ee gafii 404f rakkoo fayyaa siiqunamee mal turee	1. Hirinaa dhigaa 2. Dabaliinsii dhigaa turee 3. Busaa 4. Rammoo gara keessaa 5. Kan biro…………………		
406.	Eeyyee yoo ta'ee gafii 402f tajajiilaa walansaa ramoo gara keessa argattee jirtaa?	1. Eeyee 2. Mitii		
407	Tajajiila rabsaa qorichaa hiriinaa dhigaa(ayiraanii) yeroo ulfaa keetii argattee jirtaa?	1. Eeyee 2. Mitii		

Kutaa 5faa: Gaafiilee Ammalaa waliin wlaqabatan

Lakk.	Gaaffiwwan	Filannoowwan
01	Yeroo hundaa kophee ni keewwataa?	1. Eeyee 2. Mitii
502	Yoo gaafiin 501 mitii ta'ee sababa isaa ibsii	………………….
Kutaa 6ffaa: Gaafiilee Watoota Aradaa fidaan gafachuu qophee		
601	Dhugatii alkolii qaban yeroo ulfaa ni fayyadamtaa (any type)	1. Eeyee 2. Miti
602	Yoo gaafiin 601 Eeyee ta'ee yeroo ammamitiin fayyadamtaa(dhugdaa)	1. Gyyaa guyyadhan 2. Torbeedhan 3. Darbee darbee
603	Yeroo ulfaa Taboo ni arsiitaa	1. Eeyee 2. Miti
604	Yoo gaafii 603 Eeyee ta'ee yeroo ammatii fayyadamtaa	1. Gyyaa guyyadhan 2. Torbeedhan 3. Darbee darbee
605	Yeroo taboo arsiituu taboo meeqaa fayyadamtaa	1. Sijaaraa 1 2. Siijaraa 2 3. Siijaraa 3 4. Kana ool