ADDIS ABABA UNIVERSITY

COLLEGE OF HEALTH SCIENCE

SCHOOL OF PUBLIC HEALTH

SYMPHYSIS FUNDAL HEIGHT MEASUREMENT IN GESTATIONAL AGE DATING DURING SECOND HALF OF PREGNANCY AMONG PREGNANT WOMEN IN BUTAJIRA

By: DIRIBA KUMARA (BSc)

A THESIS SUBMITTED TO THE SCHOOL OF GRADUATE STUDIES OF ADDISABABA UNIVERSITY IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTERS OF PUBLIC HEALTH IN EPIDEMIOLOGY AND BIOSTATISTICS

OCTOBER, 2019

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APPROVAL BY THE BOARD OF EXAMINATION

The thesis by **Diriba Kumara Abdisa**, entitled "**Symphysis fundal height measurement in gestational age dating during second half of pregnancy among pregnant women in Butajira**" is accepted in its present form by the board of examiners as fulfilling thesis requirement for the degree of master's in Epidemiology and Biostatistics.

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STATEMENT OF DECLARATION

By my signature below, I declare and affirm that this thesis entitled "**Symphysis fundal height measurement in gestational age dating during second half of pregnancy among pregnant women in Butajira"** is my own work. I have followed all ethical principles of scholarship in the preparation, data collection, data analysis and completion of this thesis. All scholarly matter that is included in the thesis has been given recognition through citation. I affirm that I have cited and referenced all sources used in this document. Every effort has been made to avoid plagiarism in the preparation of this thesis.

This thesis is submitted in partial fulfillment of the requirement for a graduate degree from the Addis Ababa University at College of Health Sciences, School of Public Health. The thesis is deposited in the Addis Ababa University Digital Library and is made available to local, national and international scientific community. I solemnly declare that this thesis has not been submitted to any other institution anywhere for the award of any academic degree, diploma or certificate.

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ACRONYMS

AC: Abdominal Circumstance

ACOG: American college of Obstetrics and Gynecology

BMI: Body Mass Index

BPD: Bi-Parietal Diameter

BRHP: Butajira Rural Health Project

CRL: Crown Rump Length

DSS: Demographic Surveillance Site

EDD: Estimated Date of Delivery

GA: Gestational Age

HC: Head Circumstance

LMIC: Low and Middle Income Countries

LMP: Last Menstrual Period

SFH: Symphysis-Fundal Height

US: Ultrasound

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ABSTRACT

***Introduction**:* Accurate knowledge of gestational age is important for optimal prenatal, delivery, and postnatal care. Early ultrasound during first trimester can provide accurate gestational age but its use is limited in resource poor setting. Last menstrual period can predict gestational age well if cycle characteristics and the date of onset of the last menstrual bleed can be clearly established, yet this has proven difficult in many low income countries settings as pregnant women in such setting seldom remember their last menstrual period. The use of symphysis fundal height in determining gestational age is not widely studied in low and middle income countries including Ethiopia.

***Objective**:* This study was aimed to evaluate the validity of symphysis-fundal height measurement in dating gestational age during second half of pregnancy among pregnant women in Butajira demographic and surveillance site.

Methods: A community based prospective cross sectional study linked with health facility was conducted in Butajira on 186 pregnant women who were enrolled consecutively. Symphysis fundal height measurement was taken by selected data collectors blinded of ultrasound result after women undergoes obstetric ultrasound scan. The difference in mean gestational age at birth between symphysis fundal height and ultrasound was tested by using paired t-test. Bland and Altman plot were used to assess the agreement between the methods in gestational age estimation. Sensitivity, specificity, positive predictive value, negative predictive value and Kappa coefficient were calculated for the rate of preterm and post term birth classification. All analysis was performed by using SPSS 25 software. Ethical clearance from Addis Ababa University school of Public health and verbal informed consent from the study participant was obtained.

Results: A total of 172 pregnant women with gestational age less than 24 weeks at enrollment were included in the analysis. The mean gestational age at enrollment was 16.76(SD=4.28) weeks and the median age of pregnant women was 28 (IQR=5) years. The median gestational age at delivery was 40.28(IQR=2.68) weeks by ultrasound, 38.28(IQR=3.14) weeks by symphysis fundal height. There was a statistically significant difference in mean gestational age between symphysis fundal height and ultrasound (T=7.51, p value <0.001). At delivery, about 52% of gestational ages estimated by symphysis fundal height were within 2 weeks and

about 71% were within 3 weeks of gestational age estimated by ultrasound. Moreover, using ultrasound as a reference symphysis fundal height correctly classified 76%, 75% and 35.5% of preterm, term and post term birth, respectively (weighed kappa = 0.37).

Conclusion: In conclusion the accuracy of a single symphysis fundal height measurement in centimeter corresponding to gestational age in weeks during second half of pregnancy was poor and improving ultrasound facilities and skills together with early attendance in rural health facilities are essential for accurate pregnancy dating.

Key words**:** ***s****ymphysis fundal height, gestational age dating, Butajira rural health project*

1. INTRODUCTION

1.1 Background

Gestational age (GA) is the age of unborn baby. It is the duration of pregnancy that begins with conception. Accurate determination of gestational age has always been issue of concern for obstetricians because it greatly affects management of antenatal patients.

Different techniques have been used to estimate gestational age. Although not limited to these one; LMP, symphysis fundal height measurement and Ultrasound are the common methods to estimate gestational age antenatally. Because the typical menstrual cycle lasts 28 days with ovulation presumed to occur around day 14, the first day of the last menstrual period (LMP) has been used as the primary method for dating pregnancy for more than 200 years with the assumption that human gestation lasts 280 days from the first day of last menstrual period. This simple calculation to determine the Estimated Date of Delivery (EDD) by adding 7 days to the first day of the LMP and then subtracting 3 months is called Naegele's rule (1).

For the past 40 years the use of ultrasound in determining gestational age has been widely advocated in both developed and developing countries. Ultrasound machine uses sound waves to generate images and gestational age estimation is based on fetal biometry, anthropometric measurement of fetal growth. Ultrasound can provide additional benefit than dating pregnancy like detection of fetal anomaly antenatally, identification of multiple pregnancy and other additional benefits(2). Ultrasound produced Fetal crown-rump length (CRL) between 7+0 and13+6 weeks gestation is the recommended method for precise dating pregnancy conceived spontaneously (3). Beyond 14 weeks, ultrasound up to 24 weeks is the upper recommended limit for accurate gestational age estimation using other fetal biometry measurements including head circumference (HC) and bi-parietal diameter (BPD)(4) as the effects of growth restriction and the biologic variations in fetal size are small. The accuracy is less if the scan is performed during the third trimester(5).

In many high-resource countries, the first trimester US scan and the second scan between 18 and 22 weeks are essential parts of obstetric practice because they determine gestational age along with screening for fetal anomalies(6). American College of Obstetrics and gynecology (ACOG) (7) further recommends 18 to 20 weeks gestation as the optimal time to obtain a single ultrasound in pregnancy. This time frame allows for fairly accurate dating and the added benefit of a fetal survey, a factor that some authors have found significantly reduces woman's anxiety about the overall health of their baby(8, 9). Current guidelines reports indicate a consistent 8% margin of error even well into the third trimester (10).

Symphysis fundal height, measurement of the distance from uterine fundus to symphysis pubis is inexpensive and simple method of estimating gestational age. For fetuses after 12 weeks' gestation, the measurement is made by identifying the uterine fundus and the upper border of the symphysis pubis and measuring the distance in between with a tape meter(11). Traditionally this measurement in centimeter is applied to gestational age by simple rule of thumb. This method appears more accurate than other non-ultrasound based methods, and predicts gestational age at delivery best when sequential measurements are used(12). It was originally meant to identify small for gestation fetuses rather than to estimate gestational age. It is commonly practiced method of pregnancy dating in developing countries including Ethiopia. This method is reported to perform better than LMP in dating pregnancy and is often the method of choice to estimate gestational age in setting where access to ultrasound machines and trained ultra-sonographers is limited.

1.2. Statement of the problem

Preterm birth is the leading cause of death of children less than five years of age, responsible for over 800,000 deaths per year (14% of total)(13). Unfortunately the risk of premature birth is much higher in low income setting. In 2014, an estimated 10.6% of the total live birth were preterm globally and Asian and sub-Saharan African countries accounted for 78·9% of live births and 81·1% of total preterm births. Ethiopia is among top ten countries with large number of preterm birth with 376,700 births per year in 2014(14). Accurate determination of gestational age is necessary to improve detection of such problems.

Apart from determination of preterm birth, accurate knowledge of gestational age is important for optimal prenatal, delivery, and postnatal care. The expected date delivery, identification of preterm or post-term labor, and differentiation between premature birth and intrauterine growth restriction depends on the estimated GA. And also, prenatal counseling and interventions for poor fetal growth as well as the avoidance of unnecessary hospitalization, testing, and interventions such as induction of labor and tocolytic treatment(6, 15) are determined by gestational age. Furthermore, a close estimation of GA informs research toward improving maternal and neonatal outcomes. And for women and their families, this estimated date of delivery (EDD) represents the long-awaited birth day of their child and is a time frame around which many economic and social activities are planned(8).

Ultrasound, when performed in early pregnancy gives the better estimate of gestational age and the predicted delivery date. However, as the duration of pregnancy increases the accuracy of ultrasound in dating pregnancy decreases(7). In many high resource countries where most women attend health centers early in pregnancy (<13weeks), a first-trimester US scan and a second scan between 18 and 22 weeks are essential parts of obstetric practice because they establish GA and screen for fetal anomalies (3). However, Ultrasound equipment is often unavailable in low-resource countries, especially in rural and peri-urban areas. And where available, the equipment is expensive to use, often of poor quality, and operated by undertrained technicians(8, 15). Last menstrual period (LMP) can predict gestational age well if cycle characteristics and the date of onset of the last menstrual bleed can be clearly established, yet this has proven difficult in many LMIC settings including Ethiopia. In

addition, a great proportion of women still attend late for antenatal care, often after 24 gestational weeks, which further limits gestational age estimation even with the use of ultrasound(16).

The SFH may be used after 12 weeks of gestation but its accuracy may be diminished by a multiple pregnancy, maternal size, intrauterine growth restriction, fetal position, and other maternal or fetal characteristics. This method is reported to perform better than LMP in dating pregnancy but there is a lack of evidence on whether it can be relied up on as reliable gestational dating method or not particularly in our local setting. This study will provide the accuracy of symphysis fundal height measurement during the second half of pregnancy in estimating gestational age using ultrasound as the gold standard.

1.3. Significance of the study

Studies in developed countries shows that SFH measurement can provide the most accurate dating of gestational age than LMP but there is evidence of difference in fundal height with difference in population characteristics for which, many country specific fundal height chart has been developed. Therefore there is a need to further assess the performance of the method in women with different socio-demographic and biologic characteristics. This study aimed to answer a question of whether SFH can be still relied up on as a reliable method of pregnancy dating in area with no ultrasound facility and women doesn't recall her LMP.

The result of this study will be used to inform health care providers in resource poor setting on the accuracy of gestational age determined using SFH and bias associated with it. It will also informs the pregnant mothers and families in poor setting, the estimated date at which she will give birth so that they make proper preparedness at time of birth. Additionally it will be used to improve identification of preterm and SGA baby for delivering appropriate care to minimize complication associated with them. Finally, it will helps researcher in area of maternal and child health as a tool for proper determination of gestational age.

2. LITERATURE REVIEWS

2.1. Dating gestational age

The issue of pregnancy dating goes back to 18th century when first explained by Herman Boerhaave who developed the formula to calculate delivery rate from last menses which some historian believes Boerhaave loosely based on observation found in the bible that human gestation last 10 lunar months (280 days)(17). Although there are various ways of determining GA; last normal menstrual period, Ultrasound and measuring of symphysis fundal height are widely used methods. The accuracy and factors limiting the use of these methods are a focus of this literature reviews.

Although there are no recent studies which examined length of human gestation, previous sources have reported data that suggest human gestation lasts up to 7 days longer than the presumed 280 days(18, 19). Nakling et al. (20) found substantial biologic error between the onset of the menstrual period, the timing of ovulation, and the actual start of pregnancy, concluding that fertilization could potentially occur any time in the menstrual cycle even in the presence of a seemingly normal 28-day menstrual cycle.

With advance in technology Ultrasound is currently the gold standard technique of determining gestational age. CRL measured during first trimester of pregnancy provide the most accurate dating of gestational age with minimal error. There is also evidence that an ultrasound performed before 24 weeks' gestation establishes a more accurate EDD than relying solely on the LMP (21-23). However as the pregnancy increases, error associated with US also increases. Later in third trimester the use of ultrasound in GA dating has minimal accuracy. Current ACOG (7) guidelines recommend changing the EDD when a first-trimester ultrasound differs more than 7 days from the LMP date or more than 10 days between 12 and 20 weeks' gestation. Interestingly, Hadlock's (24) data indicate that 8% margin of error in the first trimester would represent plus or minus 5 days difference and plus or minus 11.2 days difference at 20 weeks' gestation.

Dating the last menstrual period (LMP) and measuring the symphysis-fundal height (SFH) are alternate means of assessing GA antenatally in area with no access to Ultrasound, but each has limitations. Dating the LMP may be difficult because of poor recollection, irregular menstrual cycles of varying duration, lactational amenorrhea, bleeding in early pregnancy, or hormonal contraceptive use prior to conception(9, 18, 25) In addition due to the low literacy level, only small proportions of pregnant women in developing countries remember their LNMP. For example, in Thai-Myanmar border, more than two-thirds of pregnant women don't recall their LMP(26). Although no study which reported this percentage in our countries, many women in rural area are illiterate and do not recall their LMP.

SFH may be used after 12 weeks of gestation but its accuracy may be diminished by a multiple pregnancy, maternal size, intrauterine growth restriction, fetal position, and other maternal or fetal characteristics(27, 28). Moreover, due to the observed variations in SFH across populations(29, 30), there is a need to reevaluate the accuracy of this method in gestational age dating in our local setting.

2.2. The technique of symphysis fundal height measurement

The technique of SFH measurement was first described by Spiegelberg in the German literature in 1891 (31). It was originally meant to detect the growth-restricted fetus rather than to estimate the GA. Its performance in detecting small for age fetuses is still controversial with some studies reporting that it is a good predictor for abnormal fetal growth, whereas others fail to find much benefit (32, 33). This variation in the accuracy of SFH can be explained by the fact that the fundal height can vary depending on maternal factors like ethnicity, parity, maternal BMI and also sex of the fetuses.

The use of abdominal reference like umbilicus and xiphoid process in measuring fundal height was reported to be unreliable. In one UK-based study, an obstetrician blinded to the LMP overestimated gestation by six weeks when assuming SFH at the umbilicus was equivalent to 20 weeks(34). SFH has been used as a proxy for gestational age in Africa (35) and racial differences in SFH growth rates have also been documented(36, 37). Traditionally this measurement was from the top of symphysis pubis to the top of uterine fundus. This is

done by first identifying the top of the women symphysis pubis and elongating a non-elastic tape meter from this point to the top of the fundus as described by Belizan et al(28).

Recently the technique has been hugely studied by different researchers who are doing in the improvement of maternal and child health. Perinatal Institute is one of them which suggested the technique of measurement used in the past were wrong and developed a new standard of SFH measurement. Perinatal Institute suggested SFH is measurement from the variable fundus to the fixed symphysis pubis opposite to the traditional measurement from symphysis pubis to the fundus after positioning mother in semi recumbent position and empty bladder by using non elastic tape meter as recommended by Westin (38).

2.3. Accuracy of symphysis fundal height measurement in pregnancy dating

Although LMP is widely used in area where there is no first trimester ultrasound, SFH measurement were reported to be more accurate than LMP recall. Unger et al. 2019 (39), a prospective malaria cohort study in four sub-Saharan African countries using ultrasound measurement before 24 weeks as the gold standard found that the mean gestational age at delivery by SFH was significantly different from mean GA by US (38.7 weeks by US and 38.3 by SFH) and the limits of agreement between this methods were considerable (−4.9 to 5.8weeks) and varied from country to countries. In this study, the sensitivity of a single SFH measurement in detecting preterm birth was 80% and performed better than LMP and Ballard score. Specificity, PPV and NPV of SFH in this study were 74%, 35% and 96% respectively. The authors suggested that SFH as the best alternative to US measurement in routine care in area with no US facility. The difference among countries in this study could be due to the fact that SFH variation with difference in socio demographic and biological characteristics. In addition, this study is a secondary analysis of women with p. falciparum which can cause early fetal growth restriction and can't be generalized to women in non-malaria endemic area.

Similar finding is observed in a community based prospective study in urban Pakistan(40) by Jehana et al. (2010). In this study, using ultrasound measurement between 20 to 26 weeks of gestation as a gold standard found that SFH agreed more with US than LMP in dating gestational age and in detecting preterm birth. The study found that about 75% of estimated gestational age by SFH is within 7 days and almost 91% are within 14 days of estimation by

US. Also SFH sensitivity in detecting preterm baby was 68%. In this study all pregnant women were recruited during second trimester between 20 to 26 weeks of gestation and US measured during this period was used as a gold standard in Gestational age dating although CRL is the current gold standard for dating pregnancy. Therefore, it cannot fully explain the bias associated with SFH measurement when used in estimating gestational age during second half of pregnancy.

On the other hand, a retrospective analysis of clinic records over 1990's in Thai-Myanmar border(41) by Moore et al. (published in 2015) found that the sensitivity of SFH in identifying premature infant to be only 21% and there was poor agreement in preterm classification by the SFH formula in reference to CRL biometry (Kappa =0.31). In this study HC and BPD measured before 25gestation weeks achieved moderate agreement with CRL biometry (Kappa =0.80and 0.75respectively), and very high specificity (99%) but average sensitivity (HC: 77%; BPD 67%).When measured after 25weeks gestation, HC biometry vastly overestimated preterm prevalence (22%) and agreement for preterm classification was poor (Kappa =0.41).BPD biometry measured after 25weeks gestation also achieved poor agreement for preterm classification (Kappa =0.52). In this study, symphysis-fundal height formula performed well in term newborns, but overestimated gestational age of preterm by 2.57weeks.

Although not widely studied, the use of serial SFH measurement over a single SFH in dating pregnancy has shown to improve the accuracy of the methods. A prospective study by white et al. (2012) in Thai-Burmese border found that a SFH formula which included six or more measurement estimated gestational age within +- 2weeks of gestational age estimated by Ultrasound in first trimester and early second trimester(12). In this study, sensitivity of serial SFH measurement in detecting prematurity was low sensitivity 50% but was highly specific 97%.

Similarly the recent prospective study in United States by Pugh et al. (2018) reported that the model with serial SFH measurement predicted prematurity with 75% sensitivity and 97% specificity(42). In this study the method estimated gestational age within 14.9 days of the GA estimated using ultrasound and suggested the use of Serial SFH measurement in low resource setting as the best alternative to ultrasound. The accuracy of ultrasound is limited to the

timing of scan with higher accuracy if performed in early pregnancy. However, SFH allows more flexibility and it can be used as the proxy of gestational age estimate in poor setting. But, since SFH measurement is reported to vary across different ethnicity and can vary by country(29), the performance of model developed in these specific country is yet to be seen in other low income countries. In addition, this technique alone cannot do anything in area with low ANC service and many low income setting are still based on a single measurement when a woman doesn't recall her LMP.

2.4 Research Hypothesis

Null hypothesis (H0): There is no significant difference in gestational age estimated by symphysis fundal height and Ultrasound.

Alternative hypothesis (HA): There is a significance difference in gestational age estimated by symphysis fundal height and Ultrasound.

3. OBJECTIVES

3.1. General Objective

The general objective of this study was to assess the validity of symphysis fundal height measurement in dating gestational age during second half of pregnancy among pregnant women in Butajira DSS. `

3.2. Specific objectives

1. To evaluate the validity of symphysis-fundal height measurement during second half of pregnancy in estimating gestational age

2. To assess the validity of symphysis-fundal height measurement during second half of pregnancy in detecting preterm birth.

4. MATERIALS AND METHODS

4.1. Study design and setting

A community based prospective cross sectional study linked with facility was conducted in Butajira Rural Health Program (BRHP) site to evaluate fundal height measurement from February to July 2019. BRHP is a Demographic and Health Surveillance Site (DHSS) for Addis Ababa University and is located 130 km to the south of the capital, Addis Ababa in Meskan and Merako districts of Gurage zone, Southern Nation, nationalities and Peoples (SNNP) regional state of Ethiopia. The total population of the area is estimated to be 80,369 in 2015 of which almost half (39,717) are females and 18,429 are women of reproductive age group. There are a total of 10 kebeles in the DSS with 1 of which is urban and the rest are rural kebeles.

This study was conducted on participants sampled for the ongoing follow up study aimed to evaluate the effect of economic, psychological and quality aspects of food and nutrition on pregnancy outcomes, child growth and development being undertaken among pregnant women and their children living in ten villages in the Butajira Health and Demographic Surveillance Site (DHSS) which is underway starting from 2017.

4.2. Study Population

4.2.1. Source population

The source populations were all pregnant women in Butajira DSS, southern Ethiopia.

4.2.2. Study subjects

The study subjects were all women in Butajira DSS who were pregnant during the study period and were on follow up in an ongoing pregnancy cohort.

Inclusion and exclusion criteria

Inclusion criteria: All women with singleton pregnancy were eligible to participate in the study.

Exclusion criteria: pregnant women having fetuses with known congenital anomalies and those lacking early ultrasound (taken before 24 weeks) and those with known chronic illness

like DM and those with blood pressure measurement above 140/90 mmHg were excluded from the study.

4.2.3. Sample size

Sample size was calculated using G*power software using the following assumptions.

Power = 90%, alpha (α) = 0.05

Mean gestational age at delivery and standard deviation by SFH of 39.58(1.53)

Mean gestational age at delivery and standard deviation by US of 39.88(1.41) (43)

Assuming correlation between the methods of 0.6, the calculated sample size is 167. After adjusting for 10% loss to follow up the final sample size becomes 186.

4.2.4. Sampling procedure

Only those Pregnant women in the DSS who have follow up ultrasound were included because gestational age based on the result of ultrasound taken in early pregnancy was used as a gold standard for evaluating performance of SFH in estimating gestational age. Once the women were selected to be in the study, data collector assigned to each kebeles rotate house to house to collect socio-demographic characteristics along with obstetric history data. For this study, study participants were consecutively enrolled until the final sample is reached and followed until delivery to ascertain the delivery date.

4.3. Data collection and analysis

4.3.1 Variables and definitions

Term birth: a birth between 37–41 weeks (259-293 days) of gestation.

Post term: any birth which occur after 42 0/7 weeks (>293 days) of gestation and beyond

Hypertension: defined as systolic blood pressure reading greater or equal to140 mmHg and/ diastolic blood pressure above or equal to 90 mmHg.

4.3.2 Data collection tools

Non-elastic tape meter was used for measuring Symphysis fundal height. Obstetric ultrasound was undertaken to estimate gestational age. The data on socio-demographic characteristics were collected by using semi structured questionnaire through interviewing. Digital sphygmomanometer was used to measure blood pressure of the participants. Maternal weight and height were taken at enrollment using UNICEF weighing scale (Seca-product) and portable stadiometer.

4.3.3. Data collection procedures and measurements

Women socio-demographic characteristics and chronic morbidity data were taken at the time of recruitment for the main study by using semi-structured questionnaire through interviewing by trained data collectors. Blood pressure was measured using sphygmomanometer after mother is rested for stabilization. With mother sitting, BP was measured from right hand of the mother twice and the average was recorded. A calibrated UNICEF weighing scale (Seca product) was placed on flat ground and with women wearing light clothes and no shoes, maternal weight was measured to the nearest 100gm. Height were measured with women standing upright and her head, back and buttock held against the wall of the stadiometer. The measured height was recorded to the nearest 1mm.

At enrollment, trans-abdominal ultrasound examination was performed with portable Sonosite M-Turbo diagnostic imaging, and full color flow mapping ultrasound system according to the standard procedure by two emergency obstetric professionals with thorough training to determine gestational age either by CRL if less than 14 weeks or BPD and HC above 14 weeks but less than 24 weeks of gestation. The study participants were then appointed in the second trimester at 26 weeks of gestation and the third trimester at 30 and 36 weeks of gestation.

Symphysis fundal height was then measured from the same women by independent person blinded of ultrasound examination. With woman in a semi-recumbent position, having emptied her bladder, using non-elastic metric tape and identifying the position of uterine fundus through palpation, the tape was positioned with one hand over the upper border of the

symphysis pubis bone. Then the tape was placed in a straight line over the pubic symphysis until loss of resistance was felt when reaching the symphysis pubis. With the cubital edge of the hand used to sustain the tape in place at the point of the fundus, the tape was turned so that the numbers were visible to record the value to the nearest centimeter. Measurement was repeated and the average value was used for comparing the accuracy of SFH in dating pregnancy against US. The number of centimeter was taken to correspond to gestational age in weeks. After delivery, the sex of the newborn and date of delivery were recorded. Gestational age at the time of birth is calculated for both methods by adding the number of days between the date at which the data is taken and the delivery date for each study participants.

4.3.4. Data quality management

Before actual data collection, the method was pretested on 10 pregnant women in Ginchi HC to know whether data collector can correctly apply the measurement. The data on socio-demographic characteristics was collected by trained data collectors. Ultrasound examination was performed by experienced health professional with Ultrasound skill. Symphysis-fundal height measurement was performed by trained health officer professional twice and the average was recorded. The data was checked for completeness during data collection by data collectors themselves before leaving the respondents. Completeness and consistency of data were also checked by principal investigator.

4.3.5. Data processing and analysis

Data were entered by using Epi-info software and then exported to SPSS (version 25) for statistical analysis. Data was cleaned, coded and checked for missing value before starting analysis. Univariate description of the study participants was presented by proportion for qualitative variables and mean (SD) or median (IQR) for quantitative variables. Paired t-test was used to assess the statistical significance difference in mean gestational age at delivery between SFH and Ultrasound. Bland Altman plot were used to assess the agreement between the methods in gestational age estimation. Finally, sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV) and Kappa coefficient of Symphysis fundal

height were calculated for the rate of preterm detection using ultrasound done before 24 weeks of gestation as a gold standard.

4.4. Ethical consideration

The Ethical clearance for this study was taken from Addis Ababa University, School of Public health. The participants were enrolled only when they were volunteered to participate in the study after informing them the benefit and risk of the study by the language they understand. Confidentiality was assured through avoiding personal information, coding of questionnaires and keeping the information in secret.

5. RESULTS

5.1 socio-demographic characteristics of the study participants

From a total of 186 pregnant women having GA estimated by US for whom SFH measurement was done from February to April 2019, 92.5 % has completed the follow up and their complete information was collected giving the total study participants of 172 for final analysis. There was no significant difference in maternal characteristics between the included and excluded study participants.

Table 1 shows socio-demographic characteristics of the study participants. 19.2% of the participants are from urban and 80.8% are from rural kebeles. The median age of the study participants was 28(IQR=5). Majority (64.5%) of the respondents were between age group 25-34. Almost half of the study participants (45.3%) have attended primary school and almost all (99.4%) were married. Regarding the religion of the study participants, majority (81.4%) were Muslims. Majority (73.8%) of the study participants were house wives.

Table 1: Socio-demographic characteristics of sampled pregnant women who lived in BRHP, Gurage zone, SNNP Region, Ethiopia, 2019

Variables	Frequency (n)	Percent (%)
Residence		
Rural	139	80.8%
Urban	33	19.2%
Age	28(IQR=5)	
15-24	41	23.8 %
25-34	111	64.5%
35 and above	20	11.6%
Religion		
Orthodox Christian	21	12.2%
Islam	140	81.4%
Protestant	11	6.4%
Educational status		
No formal education	78	45.3%
Primary level	78	45.3%

Secondary level and above	16	9.3%
Marital status		
Married	171	99.4%
Separated	1	0.5%
Occupation		
Housewife	127	73.8%
merchants	18	10.5%
Farmer and housewife	23	13.4%
Others *	4	2.3%

*Includes (maid servant, daily laborer)

5.2 Maternal and pregnancy related characteristics of the study participants

Table 2 shows maternal and pregnancy characteristics of the study participants. About half of the study participants (48.2%) were multiparous. The median weight of the study participants at enrollment was 52.5(IQR=12.25) kg and the mean maternal height at enrollment was 157.42(5.98) centimeters. Majority of the study participant (73.8%) had normal BMI at booking.

The mean gestational age of the study participants was 16.76(4.28) weeks by Ultrasound at enrollment and about 73.6% of pregnant women were at gestational age less than 20 weeks. Symphysis fundal height measurement was performed for every pregnant woman between 20 to 40 weeks and the median gestational age was 28.42(IQR-8) weeks with about 43.4% of the participants were in the second trimester.

Table 2: Maternal and pregnancy related characteristics of sampled pregnant women who lived in BRHP, Gurage zone, SNNPR, Ethiopia, 2019

Variables	**Frequency (n)or mean ± SD**	**Percent (%)**
Parity	Median 1(IQR=3)	
Null parity	52	30.2%
Para I	37	21.5%
Multipara	83	48.2%
Maternal weight (Kg)	52.5(IQR=12.25)	
Maternal height (cm)	157.42(5.98)	

BMI (kg/m2)	21.17(IQR=4.36)	
Underweight (<18.5)	28	16.7%
Normal BMI(18.5-24.9)	124	73.8%
Overweight (25.0-29.9)	16	9.5%
Obese (>30)	0	0
Gestational age at first visit in weeks	Mean 16.76(4.28) 73.6% <20weeks	
Gestational age at time of SFH measurement	Median 28.42(IQR=8) Range (19-40)	
Second trimester	43.4%	
Third trimester	56.6	
Neonatal characteristics		
Sex of the neonate		
Male	95	55.2
Female	77	44.8

5.3. Validity of symphysis fundal height measurement in estimating gestational age

The median gestational age at birth by US was 40.28(IQR=2.68) weeks and the median GA by SFH was 38.28(IQR=3.14)

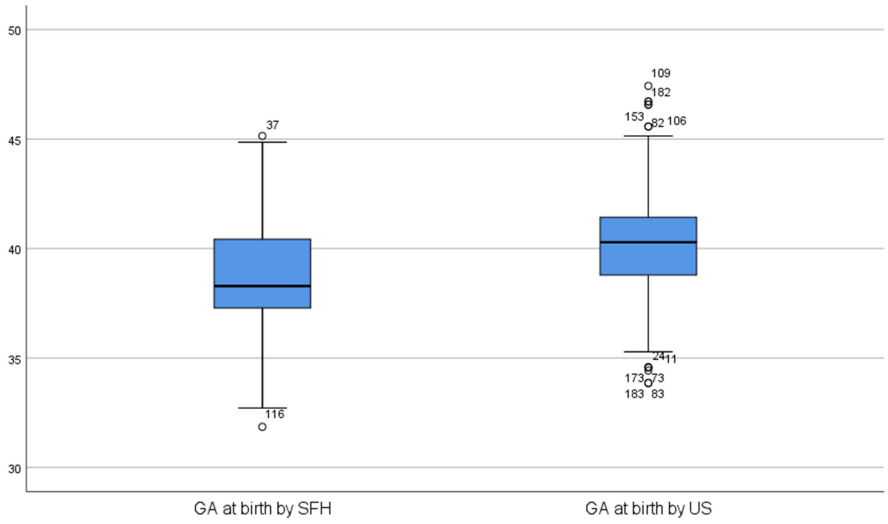

Figure 1: Box plots showing the distribution of the data by SFH and Ultrasound

The mean difference between GA at birth by Ultrasound and SFH was statistically significant (T=7.51, p value <0.001).

Table 3: Paired t-test result of SFH compared to US estimated gestational age at birth

	Paired Differences					T	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
GA at birth by US GA at birth by SFH	1.47508	2.57587	.19641	1.08739	1.86278	7.51	171	.000

Only 52.3% of gestational age estimated using SFH were within 2 weeks of gestational age estimated using US done in early pregnancy and about 71.5% of GA estimated using SFH were within 3 weeks of US estimated gestational age.

Table 4: The classification of GA by SFH using US as a reference

SFH accuracy	Frequency	Percent	Cumulative Percent
0-7 days	45	26.2	26.2
8-14 days	43	26.2	52.3
15-21 days	32	19.2	71.5
>21 days	52	28.5	100.0
Total	172	100.0	

Bland and Altman plot is plotted to further investigate the agreement between gestational age estimated by SFH and ultrasound. The 95% confidence interval ranged from -3.57 to 6.52. Inspecting the plot visually, the limit of agreement is wide to be clinically useful suggesting poor agreement between the two methods.

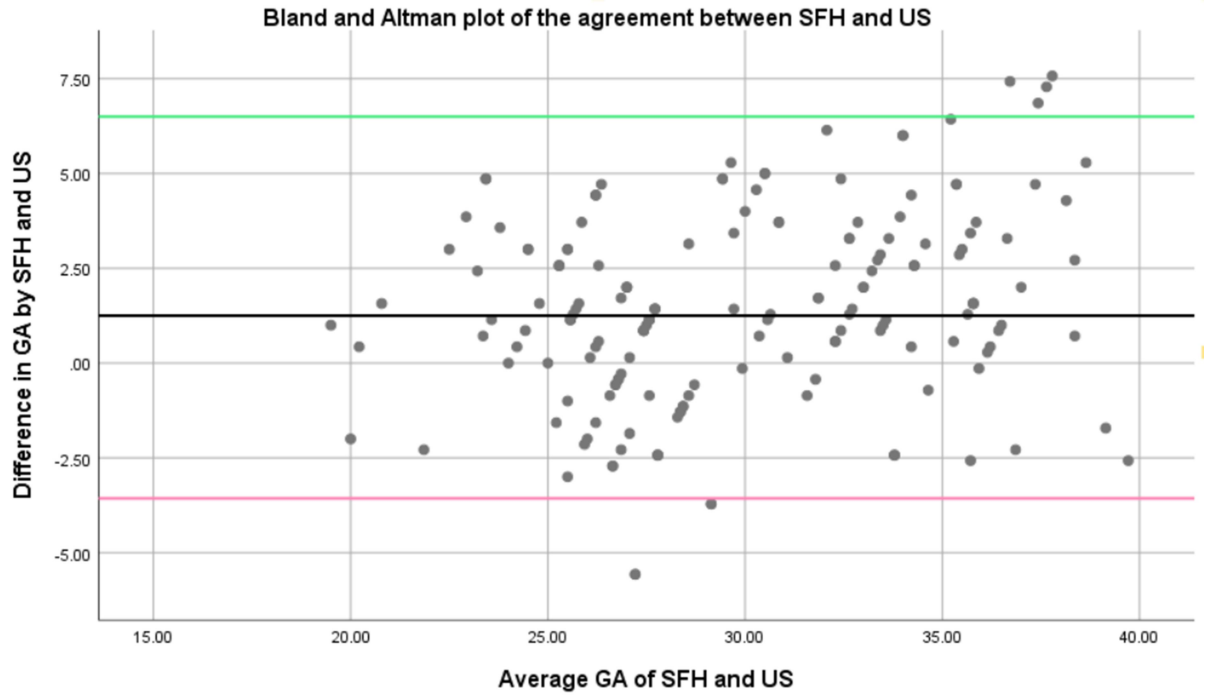

Figure 2: Bland and Altman plot of the gestational age estimated by US compared to gestational age by symphysis fundal height measurement.

There was no proportional bias because the linear regression analysis of the difference and the mean of measurement were not statistically significant (T=-1.813, p value=0.72) and the difference plotted against the average of the measurement similarly distributed throughout the length of gestation.

5.4. Validity of Symphysis fundal height in preterm detection

Table 5 presents the estimated GAs at delivery classified as preterm, term and post-term by the methods.

Using Ultrasound done before 24 weeks of gestation as a reference, 124 mothers delivered term babies and 17 delivered preterm (less than 37 weeks of gestation) compared to 117 and 32 by SFH method, respectively.

Table 5: Classification of preterm, term and post-term by the methods

Methods	***Preterm***	***Term***	***Post term***
US	17(9.8%)	124(72.1%)	31(18%)
SFH	32(18.6%)	117(68%)	23(13.4%)

Figure 2 shows performance of the method in classification of preterm, term and post term infants. Of 17 deliveries classified as preterm by US, 4 (23.5%) deliveries were classified as term by SFH and of 124 deliveries classified as term by US, 19 (15.3%) deliveries were classified as preterm by SFH.

SFH correctly classified 76%, 75% and 35.5% of preterm, term and post term birth as that of early Ultrasound respectively. Specificity, Predictive value Positive and negative predictive value of SFH in detecting preterm birth were 0.877(0.815, 0.925), 0.406(0.237, 0.594) and 0.971(0.928, 0. 992) respectively. The weighed kappa coefficient of the agreement between SFH and US was 0.37(95% CI: 0.247, 0.507).

Table 6: Classification of deliveries by Symphysis fundal height against Ultrasound

US Method	**Symphysis fundal Height**		
	Preterm	Non preterm	**Total**
Preterm	13	4	17
Non preterm	19	136	155
Total	32	140	172

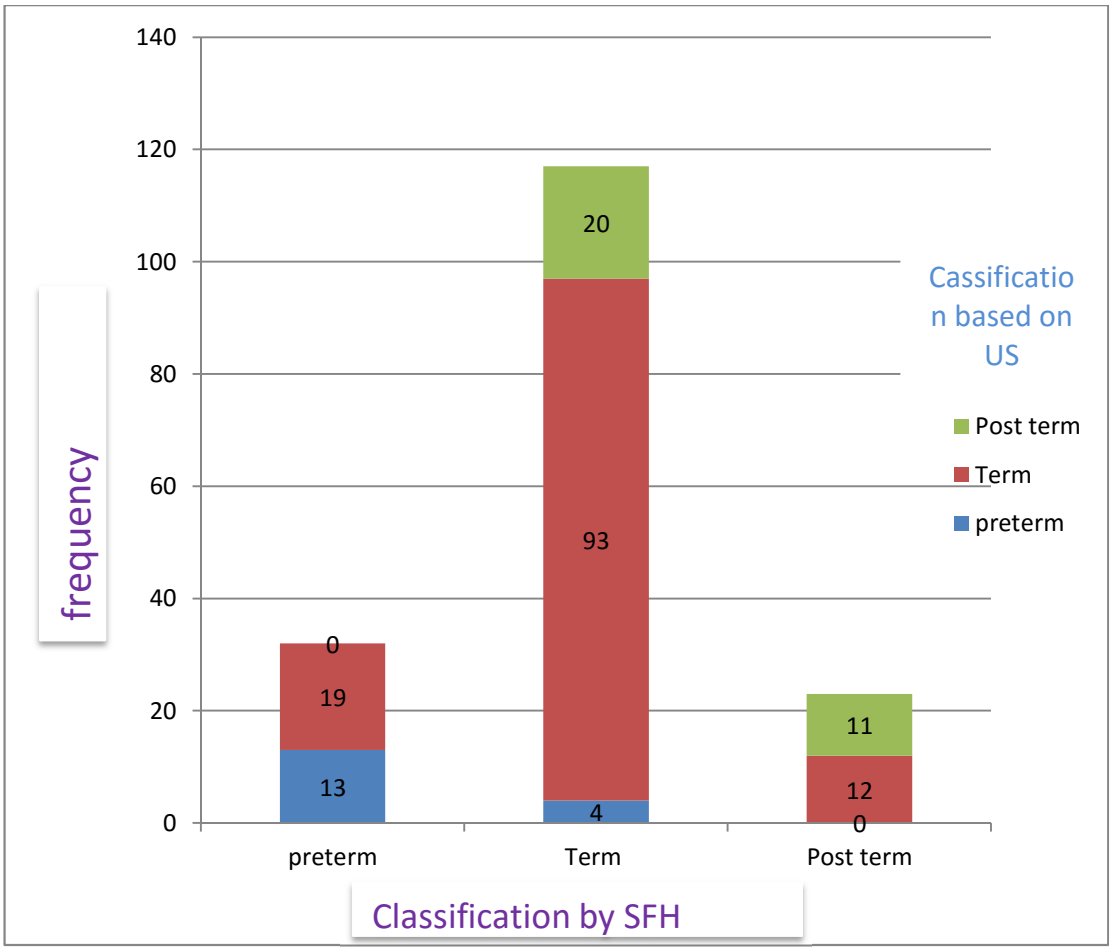

Figure 3: Bar chart showing classification of deliveries by SFH against US classification

6. DISCUSSIONS

This community based follow up study linked with health facility was conducted to assess the accuracy of symphysis fundal height measurement in estimating gestational age during second half of pregnancy using ultrasound before 24 weeks of gestation as a reference and found that symphysis fundal height perform well in detecting preterm birth.

SFH methods produced smaller mean and median GA values, and a wider range of values, than the US methods. This finding is similar with the study conducted in four sub-Saharan Africa(39) and the study in Nigeria(43) where the GA at birth was smaller by SFH than by ultrasound but opposite to the study conducted in Pakistan which found larger GA at birth by SFH than by US(40). This can be due to the use of US done after 20 weeks as the reference in the later study whereas early US before 20 weeks of gestation was used as the gold standard in the former studies. This variation may also be due to the difference in maternal characteristics between study participants among different studies.

This study found that statistically significant difference in mean gestational age at birth between SFH and ultrasound both in early and late trimester of pregnancy. This indicates that the use of number of centimeters obtained by symphysis fundal height to correspond gestational age in weeks may not be the reliable methods as it may vary by different maternal characteristics. The study by Mongelli and Gardosi in UK (27) suggested SFH can vary not only with GA but also with other maternal characteristics like maternal weight, parity and sex of the fetus.

Surprisingly, in this study the correct classification of gestational age by SFH method was found to be lower than other studies in different parts of the world. Only 51% of gestational age estimated by SFH was within 2 weeks of gestational age estimated by Ultrasound before 24 weeks. This shows that if a women gestational age is estimated by SFH alone the probability that her estimated GA is within two weeks accuracy is 0.51 and there is about 50% chance that her estimated GA may not be within two weeks of accuracy.

This finding is lower than the study in Pakistan(40) which found that about 91% of GA estimated by SFH to be within two weeks of that of Ultrasound. This difference can be explained by the error associated with US itself as they used US done between 20-26 weeks

of gestation. Also we did not know the proportion of women who could develop intrauterine growth restriction of the fetus which could result in huge variation of the SFH measured in second half of pregnancy and ultrasound done in early pregnancy. The small sample size in this study may also contribute to the difference in classification accuracy.

In this study 95% limits of agreement (LOA) for SFH were wide and it ranged from -3.57 to 6.5 which indicate poor agreement between SFH and US done before 24 weeks of pregnancy. Inspecting the plot visually, the limit of agreement is wide to be clinically useful. No systematic distribution of the data across the mean was observed and the test for proportional bias was insignificant. This poor agreement of SFH with US in our study is in line with the study by Unger et al (39) which found that the 95% limits of agreement for SFH ranged from -4.9 to 55.8.

The sensitivity of SFH in detecting preterm baby was 76% in this study. This indicates that about quarter of actual preterm babies may be missed when SFH alone is used as the method of gestational age estimation. This finding agrees with the finding of Jehan et al (40) and Unger Et al(39) which reported that SFH correctly classified 68% and 63% of preterm birth by ultrasound as preterm, respectively. In this study the specificity of SFH in preterm birth detection was found to be 0.87, which can be interpreted as of those who are classified as non-preterm by SFH, about 87% are actually non-preterm but there is 13% chance that the method wrongly classifies non preterm as preterm (false positive). This is higher than the finding of study by Unger et al which reported the specificity of SFH in classification of preterm deliveries to be 0.72(95%CI, 0.66–0.76).

In this study predictive value positive and negative predictive values were 0.406(0.237, 0.594) and 0.971(0.928, 0. 992) respectively. The finding of this study is in line with the study from four sub Saharan countries which found that PPV and NPV of SFH to be 35% and 96%. This means that of the total pregnancies classified as preterm by SFH the probability of that pregnancy to be preterm is only 0.4. This indicates that SFH in centimeter correspond to GA can't be used as the diagnostic tools of preterm but it can be used as screening methods in area where there is no US facility and a women doesn't recall her LMP. For instance if a women present with rupture of membrane and women doesn't recall her LMP and there is no obstetric US to assess the viability of the fetus and SFH classifies as non-preterm, there is a

high probability that the women is actually not preterm and delivery and neonatal care can be managed at the same facility. However, if SFH measurement in centimeters corresponds to GA classifies as preterm, referral of the newborn for further investigation may be considered although the chance of the newborn to be actually preterm is low.

7. STRENGTHS AND LIMITATIONS OF THE STUDY

7.1. Strengths

The study was conducted in demographic and surveillance site with population characteristics that can represent population in other parts of the region. Additionally there was proper contact with the women throughout the study period from enrollment until the time of delivery which allowed us to collect the required data properly.

7.2. Limitations

The current recommendation is that US conducted before 13 weeks provide the accurate GA assessment. In this study GA based on CRL is done only for 24% of pregnant women as it is difficult to find women in their early stage of pregnancy. However ACOG recommends that US done before 24 weeks can still be used to estimate GA with allowable accuracy. Additionally, small sample size in this study resulted in wider confidence interval for sensitivity and PPV. Although there are studies suggesting serial SFH for GA estimation, Only Single SFH was measured due to the lack of resource to appoint the women for repeated measurements. However, as the women in most low income country setting present late in pregnancy, serial SFH may not be suitable in such setting.

8. CONCLUSION AND RECOMMENDATIONS

8.1. Conclusion

This study found that the accuracy of a single SFH measurement in centimeter corresponding to gestational age in weeks during second half of pregnancy was poor and can't be relied up on as a tool for accurate gestational age estimation but may be utilized as the screening tools for preterm in area where late presentation and unreliable LMP history are common.

8.2. Recommendations

Based on the study finding, the following recommendations were drawn

The Federal Ministry of Health (FMOH) should give emphasis on the need for accurate gestational age dating and improving ultrasound facilities and skills together with early attendance in rural health facilities is needed.

Health professional in poor setting shouldn't rely on a single SFH measurement corresponding to gestational age as the accurate tool for pregnancy dating and should consider the error associated with the tool. SFH may be utilized as a screening tool for preterm in areas where there is no US facility and no LMP record if women present in late pregnancy.

Researcher may need to further evaluate the validity of SFH measurement preferably serial measurement in gestational age dating in developing countries on large and generalizable sample.

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10. ANNEXES

Annex –I: Informed Consent form in English

Greeting! First, thank you for your interest to talk with me.

I am_____ and coming here to collect data for Mr. Diriba Kumara Abdisa who is MPH student at Addis Ababa University. He is conducting study on the title entitled "symphysis fundal height measurement in dating gestational age during second half of pregnancy". He got permission to conduct the research from SPH, AAU and BRHP coordinator. The main purpose of this study is to evaluate the accuracy of symphysis fundal height measurement in estimating gestational age during second half of pregnancy. I am inviting all pregnant women who are eligible for the study. We will only perform fundal height measurement using tape meter. The procedure is simple and doesn't induce any harm to you or your fetus. To perform the procedure it will only take a maximum of five to ten minutes. Your name will not be recorded. All information you give will be kept strictly with care and you have the right to refuse if you don't want to be part of the study.

Based on the information given you above, do you want to participate in the study?

A. Yes---------- say Thank you and continue

B. No---------- Go to the next respondent

Name and signature of the data collector certifying that the informed consent has been given verbally by respondents

Name: ---------- Date: ----------

Principal Investigator Name and address

Name: Diriba Kumara

Telephone: 0963449972

Email address: dkumar45210@gmail.com

Annex –II: English Version Questionnaire

1. General information and socio-economic characteristics

I would like to ask you a few questions about you

No.	Question	Responses
	Date of interview (dd/mm/yyyy)	☐☐/☐☐/☐☐☐☐
	Respondent ID	
	Kebele name	……
101.	In what month and year were you born?	Month…… Don't know month ..... 9999 Year..... Don't know year..... 99
102.	How old are you now?	_____years
103.	What is the highest level of school you attended?	Primary (1-8)..... 1 Secondary(9-12)..... 2 College/university..... 3 Read and write ..... 4 Illiterate 5
104.	What is your religion?	Orthodox Christian..... 1 Islam ..... 2 Protestant ..... 3 Catholic..... 4 Other (specify) ……99
105.	To which ethnic group do you belong?	Oromo ..... 1 Amara ..... 2 Gurage ..... 3 Tigray..... 4 Afar ..... 5 Silte 6

		Other (specify……99
106.	What is your occupation?	Farmer and housewife..... 1 Housewife ..... 2 employee/private ..... 3 Student ..... 4 Merchant ..... 5 Local drink seller ..... 6 Commercial sex worker ..... 7 Maid servant..... 8 Daily laborer ..... 9 Unemployed……..10 Farmer and merchant ……11Other (specify) …….99
107	What is your marital status?	Currently married ..... 1 Separated ..... 2 Divorced..... 3 Widowed..... 4 Never married ……99

2.	**Maternal medical disorders and current pregnancy information**		
201	Known Cardiac disease?	Yes . . . . . ……..1 No . . . . . …….0 Don't know 99	
202	Known diabetes disease?	Yes . . . . . ……..1 No . . . . . …….0 Don't know 99	
203	Other known disease?	Yes . . . .1 No . . . .0 Don't know 99	
204	During your life how many times have you given live birth? *[I mean, to a child who ever breathed or cried or showed other signs of life – even if he or she lived only a few minutes or*	[_____] times Don't Know…….99	
205	During your life how many times have you had abortion/pregnancy terminated before 28 weeks of gestation?	[_____] times Don't Know…….99	

3. Women's anthropometry and other measurements

	Date of examination	……dd/….mm/……yy
	Measurements	**Results**
301	Maternal Weight at enrollment	Kg
302	Height at enrollment	cm
303	Blood pressure(systolic)	mmHg
304	Blood pressure(diastolic)	mmHg

4. Ultrasound measurement result

	Measurements	**Results**
	Early US Date of examination	…..dd/….mm/….yy
401	Gestational age by early ultrasound	Weeks+ days
402	Estimated date of delivery by Ultrasound	…..dd/….mm/….yy

5. Fundal height measurement

	Date of measurement	……dd/… ….mm/…… yy
501	Symphysis-fundal height	☐☐.☐ cm

6. Neonatal characteristics

	Questions	**Result**
601	Date of delivery	……dd/…….mm/……yy
602	Sex of the newborn	1. Male 2. Female

Annex-III: Informed Consent form in Amharic

እኔ _____ እባላለዉ፡፡ እዚህ የመጣሁት በአድስ አበባ ዩንቨርሲቲ የህብረተሰብ ጤና በሁለተኛ ድግሪ ለሆኑት ድርባ ኩማራ መረጃ ለመሰብሰብ ነዉ፡፡አቶ ድርባ ‹‹ በሁለተኛ አጋማሽ የእርግዝና ክፍለ ጊዜ የሲምፊስስ ፌንዳል ሄይት ልኬት የእርግዝና ጊዜን ለማወቅ›› በምል ሪፅስ ጥናት እያካሄድኩ ነዉ፡፡ ጥናቱን ለማካሄድ ከአዲስ አበባ ዩኒቨርሲቲ፣ ጤና ሳይንስ ኮሌጅ፣ የህብረሰብ ጤና ትምህርት ቤት እና የቡታጅራ የገጠር ጤና ፕሮግራም አስተባባሪ ፍቃድ ተሰቷቸዋል፡፡የጥናቱ ዋና አላማ በሁለተኛ አጋማሽ የእርግዝና ክፍለ ጊዜ የሲምፊስስ ፌንዳል ሄይት ልኬት በማድረግ የእርግዝና ጊዜን ለማወቅ ማጥናት ነዉ፡፡

የምንሰራዉ ስምፍስስ ፋንዳል ረዝመት በሜትር መለካት ብቻ ነዉ፡፡ እሱም ቀላልና ምንም ጉዳት እርሶዎም ሆነ ልጆት ላይ አያደርስም፡፡ ለማከናወል ብበዛ ከአምስት እስከ ኣስር ደቂቃ ይፈጃል፡፡ ካንች የምንወስደዉ መረጃ በጥንቃቄ የምያዝ ነዉ፣ የጥናቱን አካል መሆን ካልፈለግሽ እምብ ለማለት መብት ኣለሽ፡፡

ስለ ጥናቱ ጥያቄ አለዎት?

ተጨማሪ መረጃ ከፈለጉ ዋና አጥኚዉን ከታች ባለዉ አድራሻ ተጠቅመዉ መግኘት ይችላሉ፡ :

አጥኚ፡ ድርባ ኩማራ **ስልክ፡** 0963449972

ከላይ በተደረገልዎት ገለ.. መሰረት በ ጥናቱ ለመሳተፍ ፈቃደኛ ነዎት?

ሀ. ኣዎ ..... **አመስግንና ቀጥል**

ለ. ኤይደለሁም..... **ወደ ቀጣዩ ሂድ**

Annex –IV: Amharic Version Questionnaire

ቀን፡ |__|__| |__|__| |__|__|

የቀበሌ መለያ ቁጥር፡ |__|__||__|__|

የቤት መለያ ቁጥር፡ |__|__| |__|__|

ተ.ቁ	መጠይቆችና መለያዎች	የመልስ ኮድ	ይለፍ
የመኖሪያ ቤት ሁኔታ ስለዕርስዎና ቤትዎ ጥቂት ጥያቄዎችን በመጠየቅ እጀምራለሁ፡፡			
101	**የተወለዱት በየትኛው ወርና ዓመተ ምህረት ነው**?	**ወር** [_____] **ወሩን አላውቀውም**. ..... 9 **ዓመተ ምሕረት** [_____] **ዓመተ ምሕረቱን አላውቀወም**. 99	
102	**እድሜዎት ስንት ነዉ**? **በማነፃፀር የማይጣጣም ከሆነ/ስህተት ካለው ይታረም**	.....**አመት**	
103	**የተማሩት ከፍተኛው የትምህርት ደረጃ የትኛው ነው**?	**አንደኛ ደረጃ** .....1 **ሁለተኛ ደረጃ**.....2 **ኮሌጅ/ዩኒቨርስቲ**. ....3 **ማንበብና መፃፍ** 4	

		ያልተማረ..... 5	
104	ሐይማኖትዎ ምንድነው?	ኦርቶዶክስ ክርስቲያን.....1 እስልምና. .....2 ፕሮቴስታንት.....3 ካቶሊክ.....4 ሌላ ካለ ይገለፅ_____	
105	የየትኛው ብሔረሰብ አባል ነዎት?	ኦሮሞ..... .....1 አማራ.....2 ጉራጌ.....3 ትግረ.....4 አፋር.....5 ስልጤ.....6 ሌላ ካለ ይገለፅ_____	
106	የሥራ ዓይነት	ኦርሶ አደር እና የቤት እመቤት.....1 የቤት እመቤት.....2 የመንግስት/የግል ተቀጣሪ.....3 ተማሪ.....4 ነጋዴ..... .....5 አረቄ፣ ጠላ የመሳሰሉትን መሸጥ.....6 ሴትኛ አዳሪ.....7	

		የቤት ሰራተኛ.....8 የቀን ሰራተኛ.....9 ሥራ ፈላጊ/ሥራ የሌለው. .....10 ሌላ ካለ ይገለፅ_____	
107	የጋብቻ ሁኔታ	በአሁኑ ሰዓት በትዳር ላይ ያሉ.....1 የተለያዩ.....2 የተፋቱ.....3 ባለቤታቸው የሞቱባቸው.....4 በጭራሽአግብተው የማያውቁ/ያላገቡ.....5	

2. **የእናት ጠና ችግሮች እና የአሁኑ እርግዝና ሁኔታ**			
201	**የታወቀ የልብ በሽታ አለዎት**	**አዎ** ……1 **የለም** ……2 **አላውቅም**…….99	
202	**የታወቀ የሱካር በሽታ አለዎት**	**አዎ** ……1 **የለም** ……2 **አላውቅም**……99	
203	**ለላ የታወቀ በሽታ አለዎት**	**አዎ** ……1 **የለም** ……2 **አላውቅም**…….99	
204	**እስካሁን ድረስ ስንት ጊዜ ልጅ ወልደዋል/ማለቴ ሲወለድ የተነፈሰ ወይም ያለቀሰ ወይም በህይወት መሆኑን የሚያሳይ ምልክት ያሳየ፤ እንዳውም ለተወሰነ ደቂቃ በህይወት የቆየ**	**( ) ግዘ** **አላውቅም** ……99	
205	**እስካሁን ድረስ ምንያህል ጊዜ ውርጃ አጋጥሞሻል/ከ28 ሳምንታት በፊት የተቋረጠ እርግዝና/**	**( ) ግዘ** **አላውቅም** ……99	