Chapter One

1-1-Introduction

Nutritional interventions during prenatal care aimed at achieving adequate maternal weight gain have been shown to be effective . However, debate remains concerning ideal gestational weight gain (GWG), and how to monitor it over the trimesters to reduce maternal and fetal complications. This debate has extended over at least seven decades. The difficulty in establishing recommendations is to strike a balance between a weight gain that is not so reduced as to cause low birth weight, restricted intrauterine growth and prematurity, yet which is not so high as to increase the chances of macrosomia, preeclampsia, cesarean section and gestational diabetes. The recommendations must be analyzed within the context of a world that is in the midst of an obesity epidemic, with a resultant higher percentage of women beginning their pregnancies while overweight, and major future risk of obesity for both the pregnant women and their offspring (Charlotte et al , Aug 2013).

1-2-Study problem:

To show the normal weight of mother and fetus; and whether there is abnormal weight affect both of them.

1-3-objectivesof the study:

1-3-1general objectives:

To see the association between mother's weight and fetal weight in third trimester using ultrasound.

1-3-2 Specific objectives:

To correlate between mother age and fetal weight

To find out the correlation between mother's and fetal weight, and the rule of ultrasound in the assessment of fetal weight.

1-4 Significant of the study:

The early knowledge of fatal weight helps in safety of mother and fetus and detects the method of delivery.

1-5 **over view of the study:**

This study consist of five chapter

Chapter one introductions, objectives, and study problem

Chapter two literature review and previous studies

Chapter three materials and methods

Chapter four results

Chapter five discussions, conclusion and recommendations

Chapter Two

Literature review and Previous Study

Literature Review

2_1-Growth of the fetus during third trimester

The third trimester of pregnancy brings about rapid development of the unborn baby. The beginning of the seventh month also marks the third trimester. The seventh month of pregnancy typically begins at week 27. Most pregnancies typically last 40 weeks, but babies can be safely born, if the mother goes into active labor, at around 38 weeks. While some babies are born a couple of weeks early, they can also be a couple of weeks late . The actual due date is just an estimation that is based on the last menstrual period, or LMP(Dudley NJ.A , 2005) At the beginning of the third trimester, the baby will weigh approximately 2 to 2 1/2 pounds. His weight will almost double in the eighth month of pregnancy to approximately 5 pounds. In the final month of pregnancy, the baby will gain around 1/2 pound per week, according to the American Congress of Obstetricians and Gynecologists. By the time his weight can range from 6 to 9 pounds (Dudley NJ.A et al , 2005).

2_1_1-Third trimester development

27 weeks : The fetus weighs in third trimester just over 2 pounds and is about 14 inches long. The baby's eyes begin to open around this time.
28 weeks : The fetus has his own regular intervals for sleeping and being awake. It also opens and closes its eyes and may suck a thumb (Bernstein I M et al , 1992)

29 weeks : The baby now weighs about 2 1/2 pounds and is about 15 inches long from head to heel. His muscles and lungs are continuing to mature, and his head is growing bigger to accommodate his brain, which is busy developing billions of neurons. Baby hears things better from the vibrations all around, and can now distinguish real sounds and voices (Dudley NJ.A , 2005).

30 weeks : For several months, the umbilical cord has been the baby's lifeline to the mother. Nourishment is transferred from the mom's blood, through the placenta, and into the umbilical cord to the fetus. The fetus now weighs about 3 pounds (Dudley NJ.A et al , 2005).

31 weeks : Now it is time for the baby's lungs and digestive tract to be very near of being mature. Baby's weight gain will exceed its growth in length from now on.

32 weeks : During this time the baby sleeps most of the day. The baby will now weigh about 4 pounds. The uterus getting to be too small for the baby to move so you may have notice a decrease in your baby's movements. The baby is still trying to move frequently but it just doesn't have enough room. The baby can also now turn its head from side-to-side. The baby's organs are continuing to mature. thumb (Dudley NJ.A et al , 2005).

33 weeks : The fetus is now about 18 inches long and weighs 4 1/4 pounds. The baby is using it's lungs to practice breathing by inhaling amniotic fluid. The baby's hair is also growing.

34 weeks : The baby now weighs about 5 pounds and is approximately 19 inches long. It has probably already take the head-down position by this time. The skull bones are still pretty flexible and not completely joined to help to ease exit out of the narrow birth canal. The baby's skin is also becoming less wrinkled and red. thumb (Dudley NJ.A et al , 2005)..

35 weeks : The baby is now about 19.5 inches long and weighs over 5.5 pounds. The baby's hearing is now mature. The baby's body is growing round because of developing fat layers.

36-37 weeks : The baby's weight is now about 6 pounds and and the height is about 20 inches. The mother may now notice that it sometimes may feel like the baby is gradually dropping. This is called lightening. The feeling comes from increased pressure in the lower abdomen. thumb (Bernstein I M et al , 1992)

38-40 weeks : The pregnancy is considered full term now (anytime between 38-42 weeks is full-term). Most of the baby's skin downy coating has now disappeared. At the time of birth, most babies weigh about 7.5 pounds, and are 18-20 inches long, but it can vary with each baby, and there is no cause for concern. At birth the placenta will detach from the side of the uterus and the umbilical cord will stop working when the child takes his first breaths of air outside of uterus. The child's breathing will trigger changes in the heart that will force all blood to go through the lungs (Dudley NJ.A et al , 2005).

Week 41 and **Week 42** : mother considered full-term [overdue]. The ninth month is the last month of pregnancy and is the end of the third trimester. thumb (Bernstein I M et al , 1992)

2_2-Assessment of fetal blood flow:

Ultrasound and Doppler flow measurements provide means to visualize the umbilical cord and to evaluate the fetal blood flow. Figure 1-1 shows an example of an ultrasound color image of umbilical cord arteries and vein. By measuring the amount of forward blood flow through the umbilical artery during both fetal systole and diastole, an overall measure of fetal health can be obtained. In general, the more forward blood flow from the fetus to the placenta through the umbilical artery, the healthier the fetus.. The mean absolute vein blood flow is about 443 ±

92 ml/min in normal umbilical cord between 24 and 29 weeks of gestation, and reduced absolute vein blood flow is associated with low fetal birthweight . herefore, an assessment of fetal blood flow through the umbilical cord by ultrasound color Doppler sonography has proven to be a valuable noninvasive procedure for assessing fetal well-being during pregnancy (Elbehery MM , et al 2009).

Figure-1 : Ultrasound color imaging of umbilical cord arteries and vein. Red: umbilical cord vein; and blue: umbilical cord arteries. (from http://www.medical.siemens.com). Image courtesy of Siemens Healthcare (Elbehery MM , et al 2009).

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2-3-Variation in growth

There is much variation in the growth of the fetus. When fetal size is less than expected, that condition is known as intrauterine growth restriction (IUGR) also called fetal growth restriction (FGR); factors affecting fetal growth can be maternal, placental, or fetal (kurmanavicius J et al , 2009).

Fetal growth is often classified as follows: small for gestational age (SGA), appropriate for gestational age (AGA), and large for gestational age (LGA). SGA can result in low birth weight, although premature birth can also result in low birth weight. Low birth weight increases risk for perinatal mortality (death shortly after birth), asphyxia, hypothermia, polycythemia, hypocalcemia, immune dysfunction, neurologic abnormalities, and other long-term health problems. SGA may be associated with growth delay, or it may instead be associated with absolute stunting of growth (kurmanavicius J et al , 2009).

2-4-Ultrasound of Fetal Biometrics

2-4-1 Fetal Biometry

Fetal biometry with the help of ultrasound scanning provides the most reliable and important information about the fetal growth and wellbeing. A wealth of important and relevant factors is gathered covering the fetal anatomy, physiology and fatal behavior. A good scanning ultrasound machine and an experienced hand are essential for obtaining maximum advantage (Chang TC et al , 1993).

Fetal biometry is a methodology devoted to the measurement of the several parts of fetal anatomy and their growth. Fetal growth is defined as the time dependent changes in body dimensions that occur throughout the pregnancy.The growth rate of various parameters is rapid especially in the 1st and 2nd trimesters; they change significantly with the advancement of pregnancy and must be evaluated against normal value at that age (Chang TC et al , 1993).

Fetal biometry can be carried out by two different kinds of studies *viz*: cross-sectional or longitudinal. For *cross-sectional* study, fetuses are examined only once during gestation. This type of study can be performed in a small period of time and the data is easier to collect and analyze statistically. The power of statistics that can be performed on cross-sectional data is suboptimal; they are

susceptible to inclusion of fetuses with abnormal growth pattern and/or poorly established gestational age and may not give the desired information . A *longitudinal study*, on the other hand, is one in which a small number of fetuses are investigated serially, at least thrice during the course of pregnancy. In this type of study, fetal age is established in early pregnancy, abnormal growth curves are easily diagnosed; and the statistics provide more relevant and stronger information. These studies necessitate that same fetuses be scanned during the whole gestation, which considerably increases the time to collect the data and calls for a high motivation on the part of both the mother and investigator (Chang TC et al , 1993).

Professor Ian Donald in Glasgow first used ultrasound scanning for obstetrical purpose in late 1950s. Later in 1960s, fetal cephalometery was employed for fetal biometry. diagnostic ultrasound, has changed the face of obstetrics and gynecology in the middle of the twentieth century more than any others did. Hardly any area in medicine has experienced such dramatic technical advances during the past four decades as diagnostic ultrasound. The development of high-resolution two-dimensional probes and improvements in color Doppler ultrasound have been critical milestones in the recent history of sonographic diagnosis. Especially in prenatal diagnosis and gynecology, ultrasound has become an indispensable, noninvasive diagnostic tool (Peter W Callen , 2013).

With the recent advent and evolution of three-dimensional (3D) ultrasound technology during the past 10 years, we now stand at a new threshold in non-invasive diagnosis. Donald was born in Cornwall on 27 December 1910. He went to school in England but when he was 14 years of age his family moved to South Africa because of his father's ill health. His early education was in Edinburgh, and then in South Africa where he graduated in Arts in Cape Town. His father and grandfather had been doctors.With the recent advent and evolution of three-

dimensional (3D) ultrasound technology during the past 10 years, we now stand at a new threshold in non-invasive diagnosis (Peter W Callen , 2013).

2-5-Fetal weight categories

Fetal weight may be characterized as falling into 1 of 3 categories:

Reference range (generally defined as between 10th and 90th percentile for gestational age) , Small for gestational age (<10th percentile) , Large for gestational age (>90th percentile). As shown in table 1 (Peter W Callen , 2013).

Until a fetus is delivered, only those methods that can evaluate fetal size in utero are of any value in assessing into which of these 3 categories it will fall. Depending on the precise nature of the patient population used for establishing the birth weight percentile ranks, these standards may be misleading if applied to other sets of gravidas. For instance, if standard birth weight curves for Caucasian women are applied inappropriately to black gravidas, a higher proportion of black women would appear to have birth weights below the 10th percentile than for a matched group of Caucasians (Bernstein IM et al , 1992)

2-6-**Factors Influencing Fetal Growth**

The principal determinants of fetal growth are fetal genotype and in utero environment. Environmental factors include maternal and paternal genetics, maternal size, and the capacity of the placenta to provide nutrients to the fetus. These environmental factors interact with the intrinsic growth pattern of the fetus, yielding a particular rate and composition of fetal growth. Most of the variation in fetal growth in a population is due to variations in environmental factors, not the fetal genome, although a genetically abnormal fetus clearly might not grow as well as a normal fetus if affected genes include those that are important for growth (Bernstein IM et al , 1992).

2-6-1-**Maternal Nutrition**

Normal variations in maternal nutrition have relatively little effect on fetal growth because they do not markedly alter maternal plasma concentrations of nutrient substrates or the rate of uterine blood flow, the principal determinants of nutrient substrate delivery to and transport by the placenta. Human epidemiologic data from conditions of prolonged starvation as well as nutrition deprivation in experimental animals indicate that even severe restrictions in maternal nutrition only limit fetal growth by 10% to 20% . Calorie and protein intakes must be reduced to less than 50% of normal for a considerable portion of gestation before marked restrictions in fetal growth are observed , Such severe conditions often result in fetal loss before late gestation fetal growth rate and fetal size at birth are affected. Similarly, fetal macrosomia is only common in pregnancies complicated by gestational diabetes mellitus in which maternal plasma hyperglycemia and hypertriglyceridemia combine with fetal hyperinsulinemia to produce excessive fetal adiposity (Ounsted M et al , 1973).

2-7-Gestational Diabetes (Diabetes During Pregnancy)

2-7-1-Definition of Diabetes During Pregnancy:

Gestational diabetes is a type of diabetes that starts during pregnancy. When the pregnant woman has diabetes, her body is not able to consume the sugar (glucose) in her blood as well as it should. So the level of glucose in the blood becomes above normal. Gestational diabetes occurs in 4% of pregnant women. It is usually diagnosed in the fifth or sixth month of pregnancy (Between the 24th and 28th weeks). Generally, Females are cured from gestational diabetes after delivery (Ounsted M et al , 1973).

2-7-2-Risk factors for Diabetes During Pregnancy:

Being overweight prior to becoming pregnant , having glucose in the urine , impaired glucose tolerance or impaired fasting glucose (blood-glucose glucose levels are high, but not high enough to be diabetic.) , family history of diabetes. (If the parents or siblings have diabetes) ,previously giving birth to a baby over 9 pounds , previously giving birth to a stillborn baby, having gestational diabetes with a previous pregnancy , ncreased Amniotic fluid Volume (A condition called polyhydramnios) (Ounsted M et al , 1973).

2-7-3-Complications of Diabetes During Pregnancy in third trimester:

Most women with gestational diabetes go on to have normal pregnancies with healthy babies.The risk of complications is reduced if gestational diabetes is diagnosed and managed properly throughout your pregnancy (Lumey LH , et al 1992) .

This involves monitoring and controlling the level of glucose in mothere's blood during pregnancy . If gestational diabetes is not managed properly, or goes undetected, it could cause a range of serious complications for both you and your baby, including:

The baby being large for its gestational age – i.e. weighing more than 4kg (8.8lbs) (macrosomia**)** – this increases the need for induced labour or a caesarean birth, and may lead to birth problems such as shoulder dystocia . (Lumey LH , et al 1992) .

Premature birth **(**your baby being born before week 37 of the pregnancy) – which can lead to complications such as newborn jaundice or respiratory distress syndrome , Your baby having health problems shortly after birth that require

hospital care – such as low blood sugar , Miscarriage – the loss of a pregnancy during the first 23 weeks Stillbirth – the death of your baby around the time of the birth (Lumey LH , et al 1992).

2-7-4-Shoulder dystocia

Macrosomia can lead to a condition called shoulder dystocia. This is when the baby's head passes through the vagina, but the baby's shoulder gets stuck behind the pelvic bone (the ring of bone that supports your upper body – also called the hip bones) , Shoulder dystocia can be dangerous, as your baby may not be able to breathe while they are stuck. It's estimated to affect 1 in 200 births. For more information (Peter W Callen , 2013).

2-8 Fetal Growth Abnormalities:

2-8-1-The Large Fetus:

The large-for-gestational-age (LGA) neonate (or fetus) is defined as one whose weight is above the 90th percentile for gestational age. Macrosomia, a related entity, is most often defined on the basis of a weight above 4000 g; other weight cutoffs (4100 g, 4500 g) are sometimes used. These growth disturbances occur with different frequencies and are associated with different morbidities and mortalities in diabetic mothers than in the general population. Therefore these two patient populations are considered separately.(17)

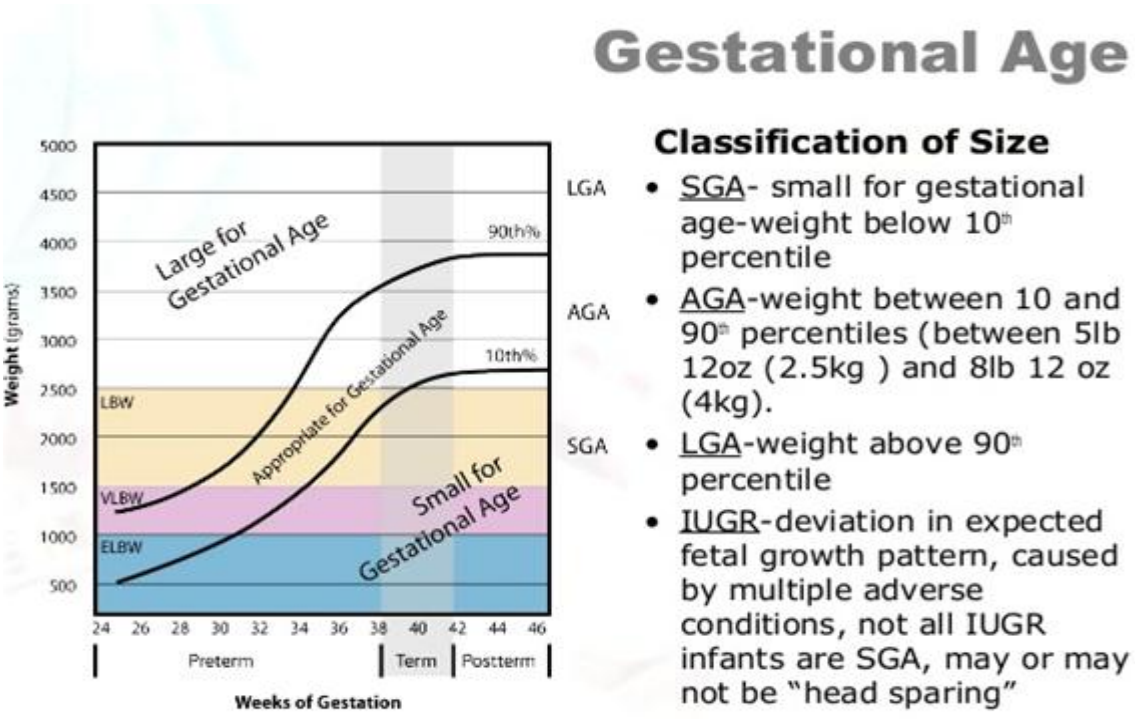


Figure2: Classification of the fetal size

If only one fetal measurement for the detection of macrosomia were to be required, then the most reliable would be the AC. The correct representation has a deciding influence (Schnieder J A et al , 2005).

on the measurement, and therefore an axial crosssectional view must be obtained. The kidneys should not be visible, and only one pair of ribs and the three ossification points of the vertebrae should be visible. Furthermore, according to Campbell and Wilkin the correct transverse section includes the stomach, and Hansmann stated that the umbilical vein should be visualised at the level of the portal sinus and not be present at any stage (Schnieder J A et al , 2005).

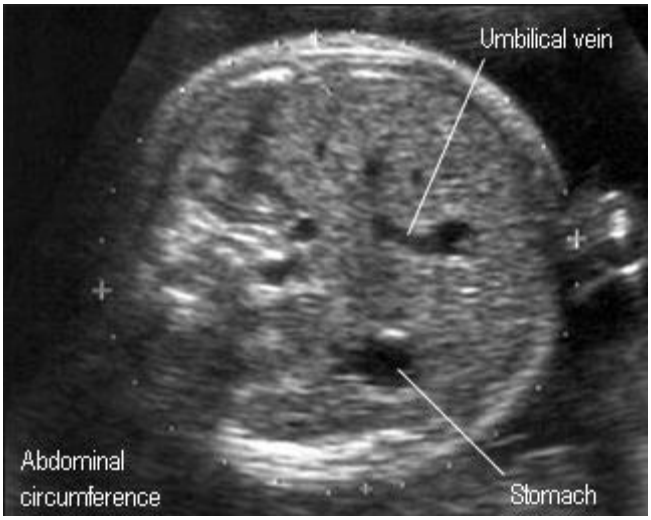


Figure-3: Correct transverse ultrasound section for measurement of the AC

Sonographers should keep in mind that fetal AC has the greatest impact on weight estimation. There are several publications assessing the AC for detecting fetal macrosomia (Schnieder J A et al , 2005)..

Fetal ultrasound provides a collection of biometric data, such as the biparietal diameter (BPD), the head circumference (HC), and the femur length (FL) which are also used to estimate the fetal weight. The most widely used formulae are the Shepard et al. and Hadlock et al. formulae, which are preinstalled in most ultrasound machines. Finally, various factors limit the accuracy of ultrasound for the detection of antenatal fetal macrosomia , including: suboptimal views with oligohydramnios, maternal obesity, multiple pregnancies or unfavourable fetal lie; a lack of experienced examiners; outdated ultrasound machines, and fetal anomalies such as gastroschisis, omphalocoele, and hydrocephalus that lead to changes in biometric measurements (J A Schnieder et al , 2005).

The error in sonographic estimation of fetal weight is dependent on the actual birth weight, and even with xperienced examiners can be up to 25% . Accuracy is also compromised by large intra- and inter-observer variabilities, and therefore measurement techniques should be standardised during ultrasound training. To

reduce the variability in estimated fetal weight formulae such as averaging of multiple measurements, improvements in image quality, uniform calibration of equipment, and regular auditing of measurements are required (Schnieder J A et al , 2005).

In conclusion, there is still a lack of precision of antenatal diagnosis of macrosomia using ultrasonographic estimates of fetal weight. In this era of modern obstetrics, it is important, from a practice-oriented clinical perspective, not only to correctly diagnose fetal macrosomia but also to predict the associated complications such as shoulder dystocia and palsy. The best way to manage fetal overgrowth is to prevent it (J A Schnieder et al , 2005).

As in the general population, the most straightforward approach to diagnosing LGA and macrosomia in the fetuses of diabetic mothers is by means of the sonographically estimated fetal weight. A fetus whose estimated weight falls above the 90th percentile for gestational age has a 74% likelihood of being LGA, versus 19% if the estimated weight lies below the 90th percentile. A weight estimate above 4000 g is associated with a 77% chance of macrosomia, and one above 4500 g with an 86% chance. The chance of macrosomia is only 16% when the weight estimate is less than 4000 g. It follows that if vaginal delivery is believed to be contraindicated for the macrosomic fetuses of diabetic mothers, the estimated fetal weight should be considered when selecting the route of delivery. Prenatally diagnosed syndromes associated with macrosomia include Beckwith-Wiedemann, Marshall-Smith, Ruvalcaba-Myhre, Sotos', and Weaver's syndromes (J A Schnieder et al , 2005).

2-9-**Previos studies :**

2-9-1-**Study 1**

Michele Drehmer et al studied the association of second and third trimester weight gain in pregnancy with maternal and fetal outcomes , Gestational weight gain was evaluated in 2,244 pregnant women of the Brazilian Study of Gestational Diabetes (Estudo Brasileiro do Diabetes Gestacional – EBDG). Outcomes were cesarean delivery, preterm birth and small or large for gestational age birth (SGA, LGA). Associations between inadequate weight gain and outcomes were estimated using robust Poisson regression adjusting for pre-pregnancy body mass index, trimester-specific weight gain, age, height, skin color, parity, education, smoking, alcohol consumption, gestational diabetes and hypertensive disorders in pregnancy.(19)

In fully adjusted models, in the second trimester, insufficient weight gain was associated with SGA (relative risk [RR] 1.72, 95% confidence interval [CI] 1.26–2.33), and excessive weight gain with LGA (RR 1.64, 95% CI 1.16–2.31); in third trimester, excessive weight gain with preterm birth (RR 1.70, 95% CI 1.08–2.70) and cesarean delivery (RR 1.21, 95% CI 1.03–1.44). Women with less than recommended gestational weight gain in the 2nd trimester had a lesser risk of cesarean deliveries (RR 0.82, 95% CI 0.71–0.96) than women with adequate gestational weight gain in this trimester.

They found that the motherśmean (SD) age at enrollment was 27.9 (5.3) years and mean BMI 26.0 (3.9) kg/m2. Among the 2,244 women analyzed, 631 (28.1%) had insufficient and 975 (43.4%) excessive weight gain in the 2nd trimester, and 874 (38.9%) had insufficient and 877 (39.1%) excessive weight gain during the 3rd trimester. In relation to total weight gain during pregnancy, 750 (33.4%) women presented insufficient and 738 (32.9%) excessive weight gain. Gestational diabetes was diagnosed in 164 (7.7%; 95% CI 6.5–8.8).

As shown in 48% of nulliparous women had excessive weight gain in the 2nd trimester and 46% in the 3rdtrimester. Women with a higher level of education had a greater frequency of excessive weight gain in both the nd(56%) and 3rd trimesters (54%). A greater percentage of women with low pre-pregnancy weight had insufficient weight gains in the 2nd (42%) and 3rd (65%) trimesters while a greater percentage of women who were overweight (63%, 55% in the 2nd and 3rd trimesters, respectively) and obese (50%, 60% in the 2nd and 3rdtrimesters, respectively) prior to conception had excessive weight gains. (33.4%) women presented insufficient and 738 (32.9%) excessive weight gain. Gestational diabetes was diagnosed in 164 (7.7%; 95% CI 6.5–8.8).

As shown in 48% of nulliparous women had excessive weight gain in the 2^{nd} trimester and 46% in the 3^{rd}trimester. Women with a higher level of education had a greater frequency of excessive weight gain in both the 2^{nd}(56%) and 3^{rd} trimesters (54%). A greater percentage of women with low pre-pregnancy weight had insufficient weight gains in the 2^{nd} (42%) and 3^{rd} (65%) trimesters while a greater percentage of women who were overweight (63%, 55% in the 2^{nd} and 3^{rd} trimesters, respectively) and obese (50%, 60% in the 2^{nd} and 3^{rd}trimesters, respectively) prior to conception had excessive weight gainsat the end they though insufficient weight gain in the 3^{rd} trimester was not associated with adverse outcomes, other deviations from recommended weight gain during second and third trimester were associated with adverse pregnancy outcomes. These findings support, in part, the 2009 IOM/NRC recommendations for nutritional monitoring during pregnancy.

2-7-2-**Study 2**:

Effect of maternal dietary intake on the weight of the newborn in Aligarh city, India

This study aimed (1) To record the nutrient intake of the respondents and compare the same with the available recommended dietary allowances (RDA). (2) To assess the correlation between maternal dietary intake and the weight of newborn. Two hundred and ninety two pregnant women. Study Area: Five hospitals of Aligarh city, Uttar Pradesh. Study Tool and Data Collection: Interview schedule was administered to record information regarding dietary intake and weight of newborn. The data collection was initiated in April 2009 and was completed in March' 2010. Data Analysis: Statistical analysis was done by using version SPSS 17. Frequency distributions were calculated for all variables. Univariate and multivariate analysis were performed to determine the influence of the dietary intake on the birth weight of newborn.

Results revealed that the nutrient intake in all trimesters of pregnancy was lower as compared to RDA. There were significant correlations between the nutrient intake of the mothers and the weight of newborn in all trimesters of pregnancy (P=0.01). It was found that the dietary intake during all trimesters of pregnancy were significantly associated with the birth weight.

Chapter Three

Materials and Methods

A total of 50 patients were examined in a period of one year from October 2014 to October 2015 using standard of protocol of examinations in all cases according to the international scanning guidelines and all patients were examined in supine transverse and longitudinal or saggital scan.

All patients were examined in ultrasound department of Shaam Hospital in Ras Al Khaima in United Arab Emirates .

3_1- Materials:

3-1-1 Instrumentation :

Study conducted by LOGIQ P6 _GE,serial No :ae1235USO4 GE , manufactured on june 2012 ultrasound machine equiped with doppler facilities and attached image enhancer screen and a Sony Video graphic printer .

Each patient was examined according to the international ultrasound scanning guidelines and protocols using various techniques and manipulation to client proper patient examination to obtain best possible clear view pictures in the normal cases.

3-1-2 Patients:

Target population of 50 pregnant women ,the mothers were normal and diabetics , data collected between 28 –full term gestation, .

3-2 Methods:

3-2-1 Ultrasound technique:

Transabdominal technique .

3_3-Importance of study :

To findout the relation between mother's weight and fetal weight in third trimester by using ultrasound .

3_5_1- Area of study :

Radiology department of Shaam Hospital in Ras Al Khaima in United Arab Emirates .

3_5_2- Duration of study :

One Year (October2014 –October2015)

3_5_4- Data Analysis :

Data collection sheet designhned to meet the purpose of the study , using SPSS (Statistical Package for the Social Sciances) .

3_5_5- Ethical considerations :

Information on the study was given to the participants who voluntarily decided whether or not to enroll on the study, after the approval by hospital Research and Ethics Committee. Informed consent was obtained from all participants before the study.

Chapter Four

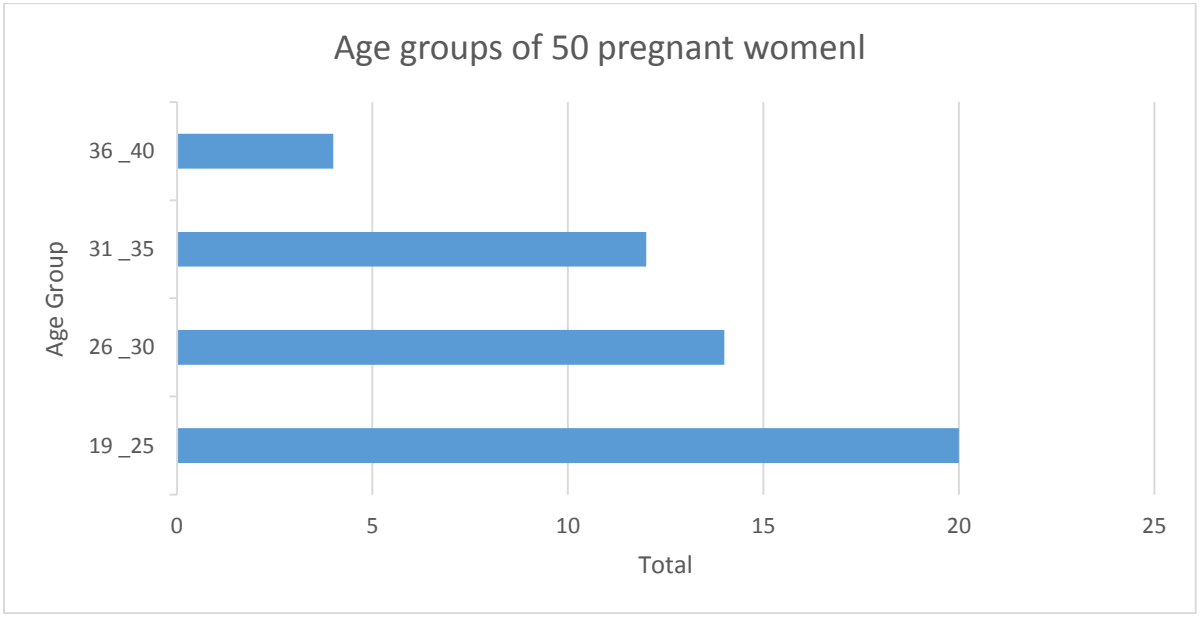
RESULTS

A total of 50 patients were examined in a period of one year ,from October 2014 to October 2015 . using standard of protocol of examinations in all cases according to the international scanning guidelines and all patients were examined in supine transverse and longitudinal or saggital scan.

4-2 Tables and Graphs

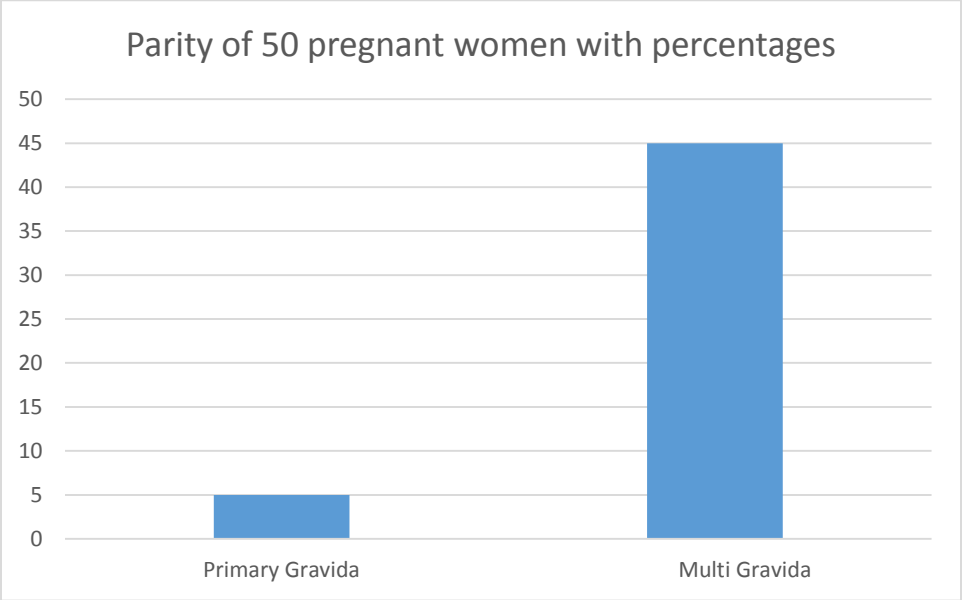
1 _Age groups of 50 pregnant women with percentages :

Age groups	Total	Percentages
19 _25	20	40%
26 _30	14	28%
31 _35	12	24%
36 _40	4	8%



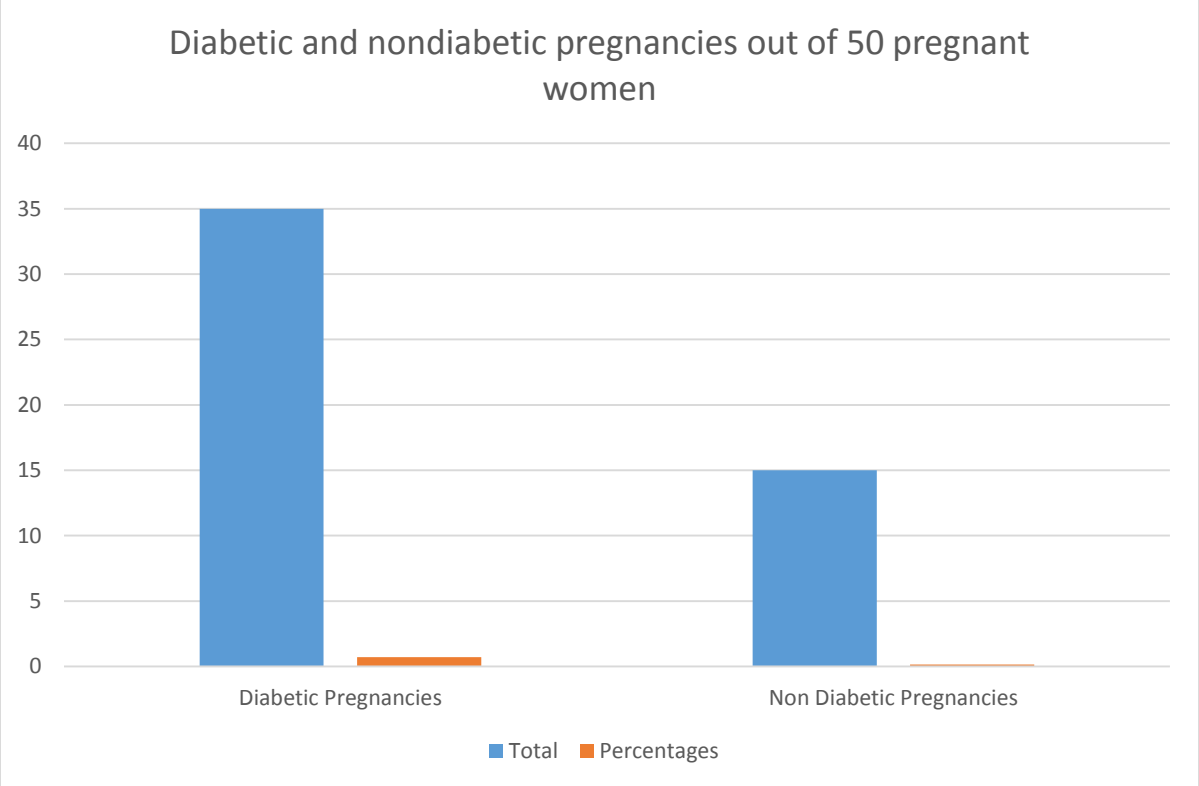
2 _Parity of 50 pregnant women with percentages :`

Parity	Total	Percentages
Primary Gravida	5	10%
Multi Gravida	45	90%



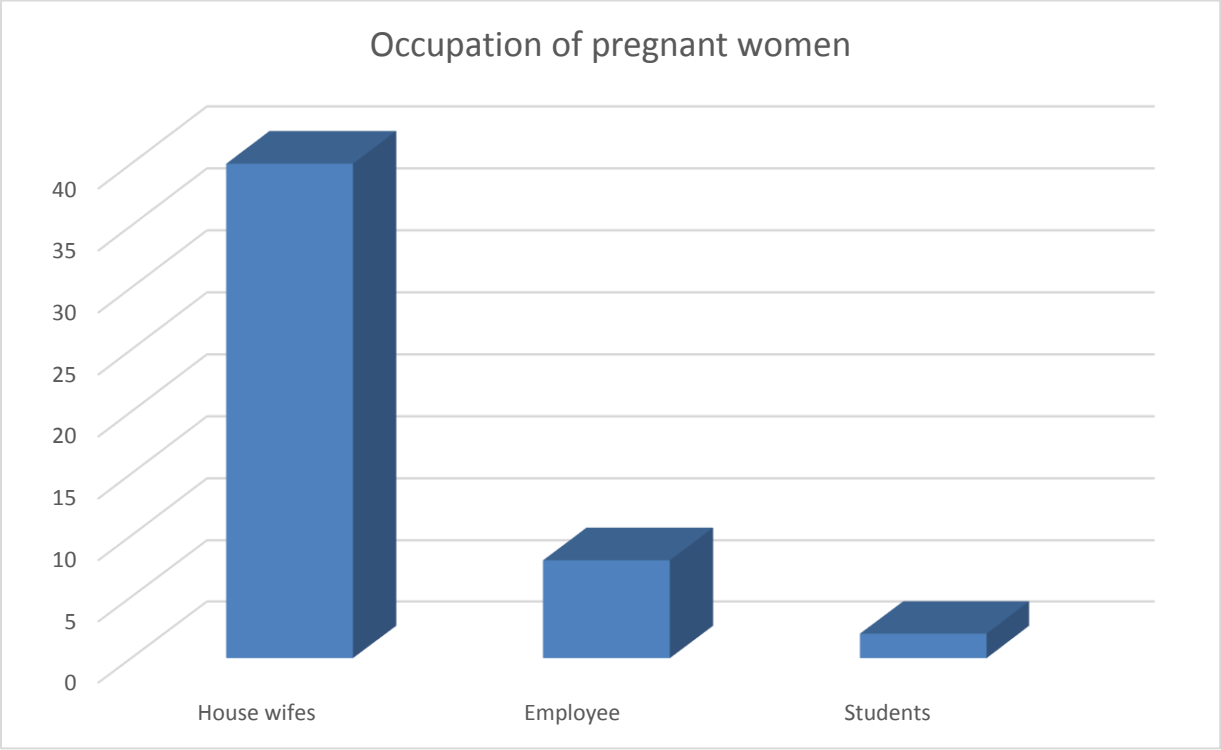
3 _Number of diabetic pregnancies out of 50 pregnant women :

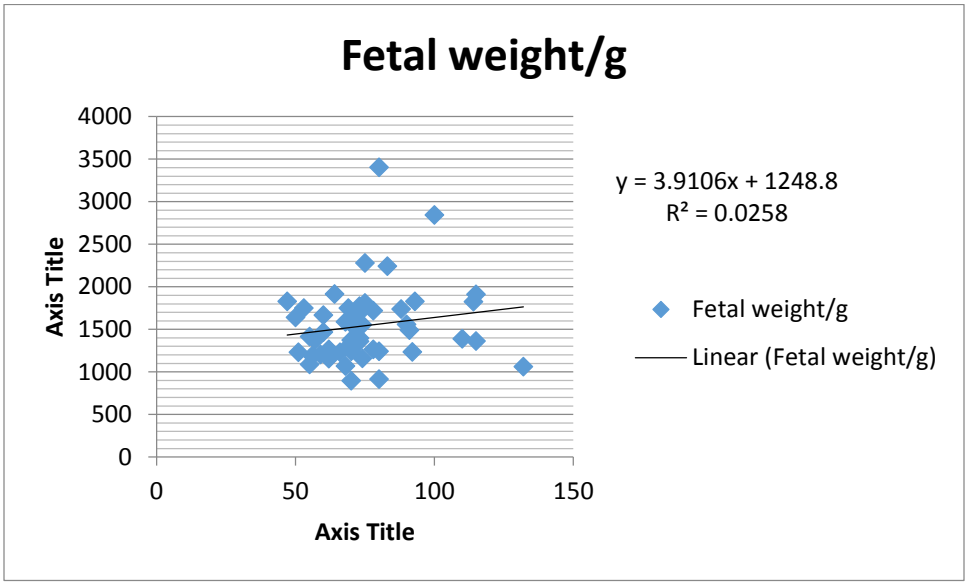
Diabetic or non diabetic	Total	Percentages
Diabetic Pregnancies	35	70%
Non Diabetic Pregnancies	15	15%



4 _Occupation of 50 pregnant women with percentage：

Occupation	Total	Percentages
House wives	40	80%
Employee	8	16%
Students	2	4%





Relation between mother's weight and fetal weight according to equation

Y=3.9106+1248.8

R^z =0.0258

Chapter Five

5-1 Discussions:

Accurate prediction of fetal weight has been of great interest in obstetrics. As fetal weight cannot be measured directly, it must be estimated from fetal and maternal anatomical characteristics. Of the various methods, the most commonly used is ultrasonographic method as in this study**.**

The study showed that ultrasound examinations done in the third trimester to predict fetal weight performed accurately. Normal fetuses are expected not to cross the growth curve percentiles**.**

Identification of SGA fetuses at an earlier gestational week might give the chance of close monitoring and planning of delivery to reduce perinatal risks. Ultrasound at an earlier gestational age also allows timely identification of placental localization problems. The study found that the ability of early third trimester ultrasonography enough to predict LGA babies of diabetic mothers.

We presented the results of serial ultrasonographies performed by one clinician and two sonographers. Amniotic fluid volume may affect the accuracy of the measurements by affecting the image quality and by distorting the abdominal circumference .

There was no difference in the prediction of the fetal weight between nullipara and multipara. The above findings have important implication for developing countries like ours where there is paucity of technologically advanced ultrasound machines capable of doing sophisticated functions such as fetal weight but have experienced clinicians who could perform this function equally well.

5-2 Conclusions:

The study revealed that ultrasonographic fetal weight could be affected by mother's weight . It is very clear from the research that the effectiveness of the ultrasound depends greatly on the quality of the equipment used and the skill of the technician using it. There are very clearly more "false positives" and "false negatives" from ultrasound technicians who have not received special training in the use of ultrasonographic, or from those who are using a less-powerful machine. In general, ultrasounds are more accurate when done on more powerful machines and by people who are highly trained and very experienced in their use.

To improve the accuracy of fetal weight estimation , sonographic models that are based on 3or 4fetal biometric indices should be preferred . recognizing the accuracy and the tendency for underestimation or overestimation , especially at the extremes of fetal weight .

5-3 Recommendations

- All sonographers performing fetal scans should be appropriately trained and their results subjected to rigorous audit .
- . Further work to improve the universal validity and accuracy of fetal weight estimation
- Additional studies using different volume measurement of the fetus are necessary.

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Appedices

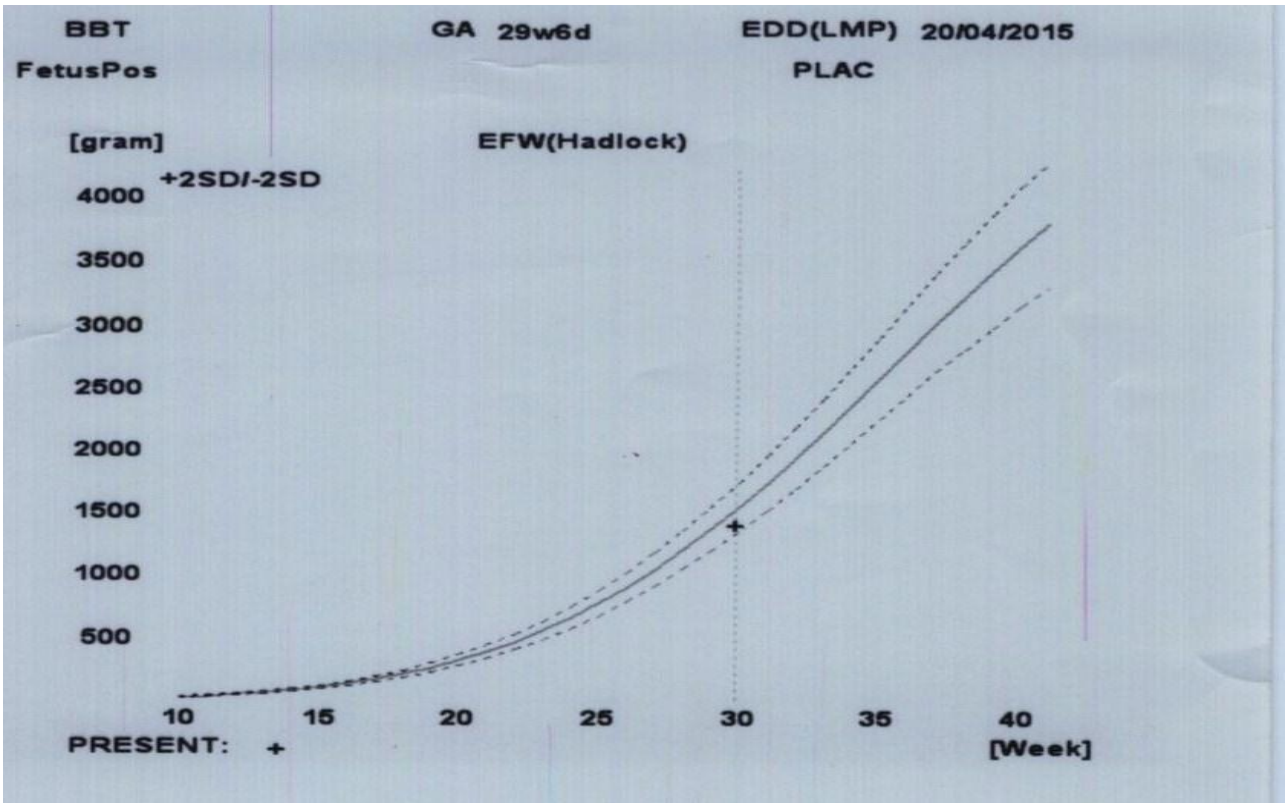
Table 1: Fetal weight percentiles throughout pregnancy

GA Menstru-al weeks	Smoothed percentile		
	10% ile	50%	90%
23	370	550	990
24	420	640	1080
25	490	740	1180
26	570	860	1320
27	660	990	1470
28	770	1150	1660
29	890	1310	1890
30	1030	1460	2100
31	1180	1630	2290
32	1310	1810	2500
33	1480	2010	2690
34	1670	2220	2880
35	1870	2430	3090
36	2190	2650	3290
37	2310	2870	3470
38	2510	3030	3610
39	2680	3170	3750
40	2750	3280	3870
41	2800	3360	3980
42	2830	3410	4060

Case No 1

Fetal biometry

BPD	7.60 cm	30w3d
FL	5.92 cm	30w6d
HC	26.96 cm	29w3d
AC	24.76 cm	28w6d
EFW	1414 gm	

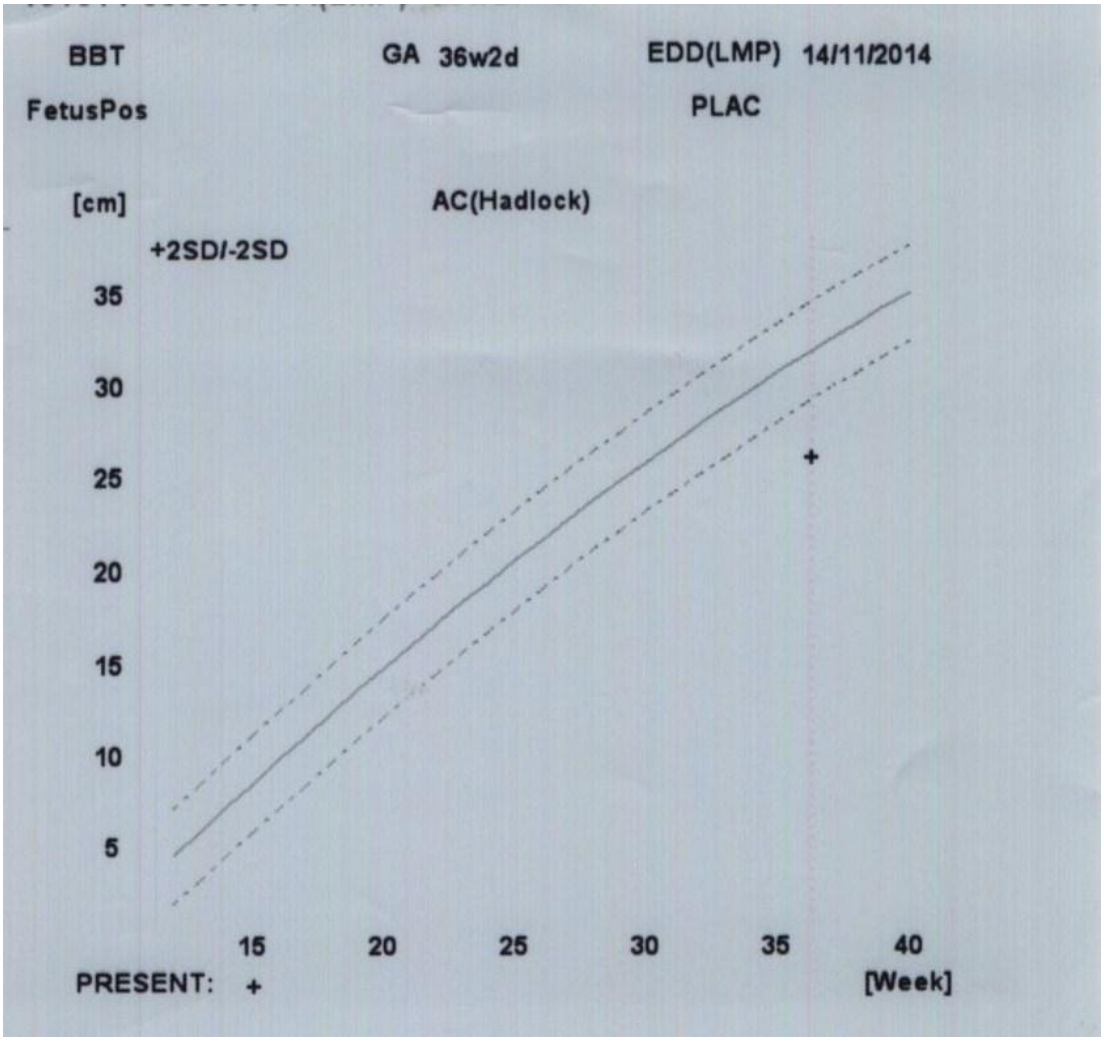


Age: 33Years _ Multigravida

Case No 2

Fetal biometry

BPD	8.88 cm	35w6d
FL	6.29 cm	32w4d
HC	29.70 cm	32w6d
AC	26.30 cm	30w3d
EFW	1748 gm	

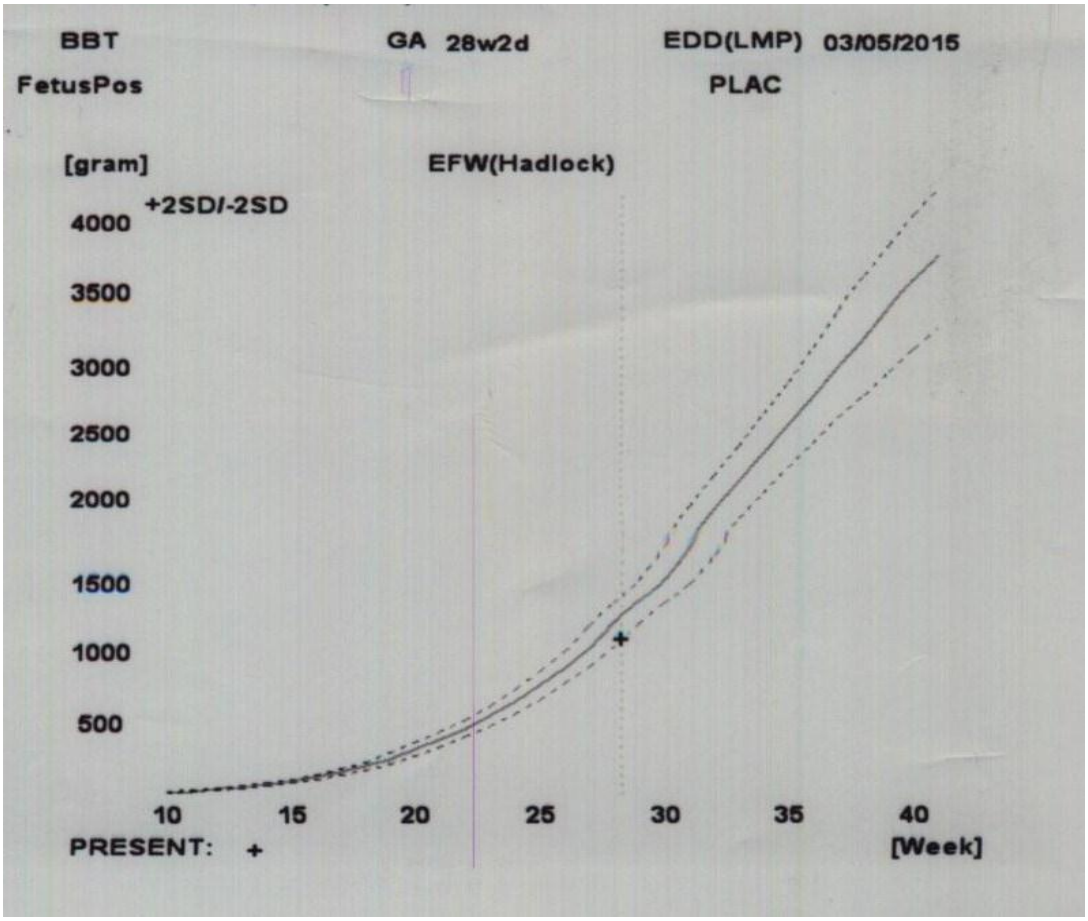


Age:25 Years _multigravida

Case no 3

Fetal biometry

BPD	6.67 cm	26w6d
FL	5.3 cm	28w1d
HC	25.4 cm	27w4d
AC	23.05 cm	27w3d
EFW	1112 gm	

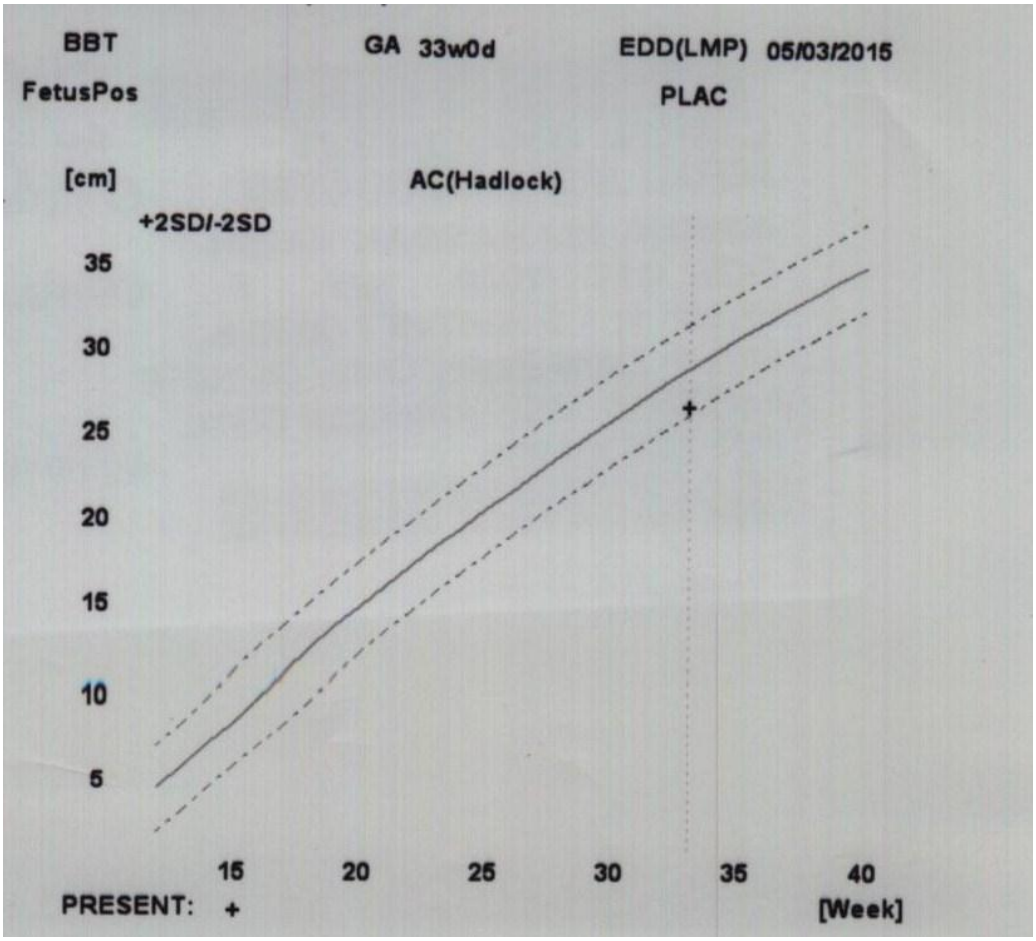


Age :33 years _multigravida

Case No 4

Fetal biometry

BPD	7.7 cm	30w6d
FL	6.3 cm	33w0d
HC	27.30 cm	29w6d
AC	26.79 cm	30w6d
EFW	1737 gm	

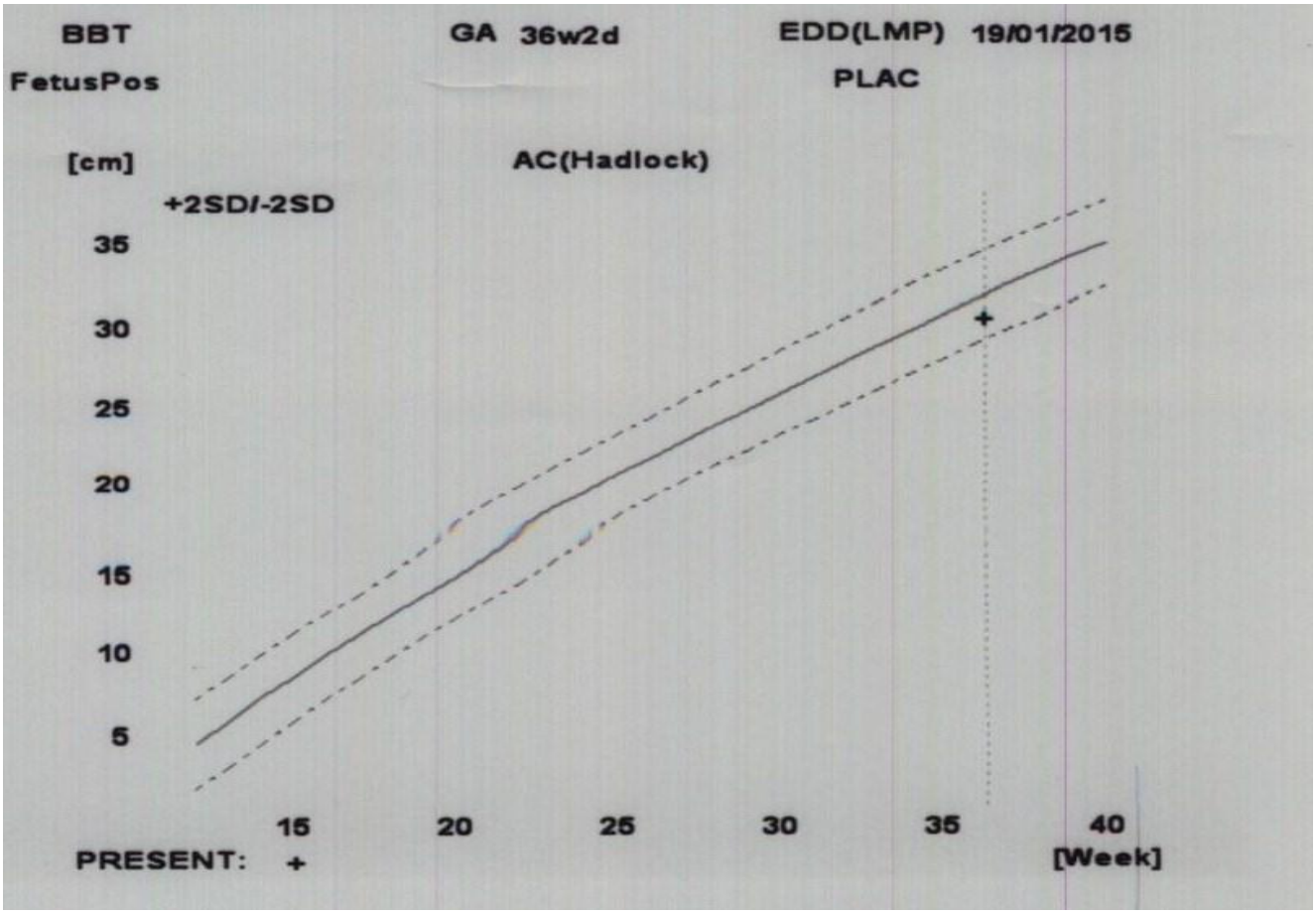


Age :32 years _multigravida

Case No 5

Fetal biometry

BPD	**8.83 cm**	**35w5d**
FL	6.46 cm	33w2d
HC	31.60 cm	35w3d
AC	30.69 cm	34w4d
EFW	2369 gm	



Age :23 years _primigravida