بسم الله الرحمن الرحيم

Sudan University for Sciences and Technology

College of Graduate Studies

Characterization of Placenta Using Ultrasonography

توصيف المشيمة بإستخدام التصويربالموجات فوق الصوتية

A thesis Submitted for Partial Fulfillment for the Requirement of M.Sc. Degree in Medical Diagnostic Ultrasound

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الآيـة

بسم الله الرحمن الرحيم

قال الله تعالي :

(إِنَّ اللَّهَ عِندَهُ عِلْمُ السَّاعَةِ وَيُنَزِّلُ الْغَيْثَ وَيَعْلَمُ مَا فِي الْأَرْحَامِ ۖ وَمَا تَدْرِي نَفْسٌ مَّاذَا تَكْسِبُ غَدًا ۖ وَمَا تَدْرِي نَفْسٌ بِأَيِّ أَرْضٍ تَمُوتُ ۚ إِنَّ اللَّهَ عَلِيمٌ خَبِيرٌ).

صدق الله العظيم

سورة لقمان الاية (٣٤)

Dedication

This thesis dedicated to : -

-The soul of my parents(Salah, Manahel).

- My dearest Husband (mohammed).

- My sweet daughter(nehal) and my sons(ahmed ,reem)

- My aunt (bthoon).

- My all family.

- All people who help me.

- My teachers and collogues.

- My friends.

Acknowledgment

I am deeply indebted my supervisor Dr. Babeker AbdElwahab for her support , guidance and valuable idea helped me to complete this work.

I also appreciated the help and support provided to me by my colleagues in ultrasound department at Hagalsafy Hospital Bahry and Al Hagyosif Hospital.

I like to thanks my friends those who supported me to accomplish this work.

I wish to thanks my teathers those who are cause of my success.

Abstract

This was cross sectional study done in normal pregnant women in second and third trimester , to estimate the placenta thickness ,fetal weight and gestational age .

The aim of this study was to assess characterization of placenta and estimate the correlation between placenta thickness (PT),fetal weight(FW) and gestational age(GA) using Ultrasound.

The sample size was consisted of 55 normal pregnant women in second and third trimester the data was collected by master data sheets in the period from April 2019 to june 2019.

This study was carried out in Ultrasound departments of; Haj Elsafi Hospital, Elhaj Uosef hospital in Khartoum state.

Data were analyzed by using SPSS (statically package for the social sciences) program and the results were presented in form of graphs and tables.

The mean maternal age\year was 29.53 (minimum 13 and maximum40) ,mean maternal weight\kg 63.53 (minimum 46 maximum 85) , the mean placenta thickness \cm 2.88 (minimum 1.8 maximum4.4) , the mean gestational age \week 28.50 (minimum 17.29 maximum 39.14)and mean fetal weight\g 2405 (minimum 1650 maximum 3490).

The study found there was the strong significant correlation between gestational age, fetal weight and placental thickness ($P< 0.01$) the placenta grade strongly correlated to fetal weight and gestational age ($P< 0.01$) , but no significant correlation between placenta thickness and maternal clinical history, also no significant correlation between maternal status and placenta location ($p>0.05$).

The study found the placenta thickness has direct relationship with gestational age it increase with the increase of gestational age ($R^2= 0.366$) and found linear relationship between placenta thickness and fetal weight ($R^2= 0.328$).

The study approved there was significant positive correlation between the placental thickness ,fetal weight ,gestational age in non DM, non HT normal pregnant women.

Further studies should be carried aut in this field on many aspect such as increasing the number of patients, to show the relation between placental thickness and gestational age fetal weight **,** is recommended estimate the fetal age by using placental thickness

for different nationalities or with abnormal pregnancies (DM.HT).

المستخلص

كانت هذه الدراسة مقطعية عرضية للنساء ذوات الحمل الطبيعي في الثلث الثاني والثالث من الحمل لقياس سمك المشيمة ،وزن الجنين وعمر الجنين.

الهدف من هذه الدراسة وصف المشيمة و تقييم العلاقة بين سمك المشيمة و وزن و عمر الجنين بإستخدام الموجات فوق الصوتية.

كان حجم العينة يتضمن ٥٥ من النساء ذوات الحمل الطبيعي وهن في الثلث الثاني والآخير من الحمل ،هذه العينات جمعت بإستخدام صحائف البيانات في الفترة من ابريل ٢٠١٩ حتى يونيو ٢٠١٩.

اجريت الدراسة في اقسام الموجات فوق الصوتية في مستشفى حاج الصافي و مستشفى الحاج يوسف بولاية الخرطوم.

حللت البيانات بإستخدام برنامج الحزم الإحصائية للعلوم الانسانية في التحليل الإحصائي واخرجت النتائج في شكل رسوم بيانية و جدوال إحصائية.

كان متوسط عمر النساء الحوامل ٢٩.٥٣ سنة (اصغرهم ١٣ واكبرهم ٤٠) ٦٣.٥٣،متوسط وزنهم بالكيلوجرام (اصغرهم ٤٦ واكبرهم ٨٥)، متوسط سمك المشيمة بالسم ٢.٨٨(اصغرهم١.٨ واكبرهم ٤.٤) متوسط عمر الجنين بالاسبوع ٢٨.٥٠ (اصغرهم ١٧.٢٩ واكبرهم ٣٩.١٤) و متوسط وزن الجنين بالجرام ٢٤٠٥ (اصغرهم ١٦٥٠ واكبرهم ٣٤٩٠) .

وجدت الدراسة علاقة ارتباط قوية بين عمر الجنين و وزن الجنين و سمك المشيمة ($P< 0.01$) و وجدت ايضا ان هنالك علاقة ارتباط مهمة بين درجات تصنيف المشيمة و عمر الجنين ووزنه. ووجدت انه ليس هنالك علاقة ارتباط بين سمك المشيمة والحالة السريرية للحوامل وايضا لا علقة ارتباط بين حالة الحامل و موقع المشيمة ($P> 0.05$).

وجدت الدراسة ان سمك المشيمة له علاقة مباشرة مع عمر الجنين كلما ذاد عمره $R^2= 0.366$ وايضا وجدت هنالك علاقة خطية بين سمك المشيمة ووزن الجنين $R^2= 0.328$.

اثبتت الدراسة ان هناك علاقة ارتباط موجبة مهمة بين سمك المشيمة ووزن الجنين وعمره للحوامل الطبيعية ليس لديهم سكري ولا ضغط.

للحصول على نتائج افضل في البحوث المستقبلية يجب زيادة عدد العينات لنرى العلاقة بين سمك المشيمة وعمر الجنين ووزنه ،وايضاً اوصي بتقييم عمر الجنين بإستخدام سمك الحوامل على مجموعة من الحوامل من جنسيات مختلفة او حوامل لديهم مشاكل الحمل مثل السكري والضغط.

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List of Abbreviations

APH	Antepartun Hemorrhage
AC	Abdominal circumference
BPD	bi-parietal diameter
CD	Color Doppler
cm	Centimeter
DM	Diabetes mellitus
EVS	Endo Vaginal Scan
FL	Fetal length
FMC	Focal Myometrial Contraction
FW	Fetal weight
g	Gram
GA	Gestational age
HC	Head circumferences
HCG	Human Chorionic Gonadotropin
HCS	Human Chorionic Somatomammotropin
HT	Hypertention
IUGR	Intrauterine growth retardation
Kg	Kilogram
M/HZ	mega hertz
PT	Placenta thickness
SCH	Sonographaic Characteristics
SPSS	Statistical Package for Social Sciences
TAS	Trans Abdominal Scan
TPS	Trans Perineal Scan
US	Ultrasound

Chapter One

Introduction

1.1 Introduction:

The placenta is an organ that develops in the uterus during pregnancy. It is a unique characteristic of the higher mammals. In humans it is a thick mass about 7 in (18cm) diameter, liberally supplied with blood vessels. It usually weighs about 1 to 2 pounds (about 1/6 of the weight of the baby). The placenta is attached to the uterus, and the fetus is connected to the placenta by the umbilical cord (http// Wikipedia.com).

The placenta develops from the chorionic villi at the implantation site at about the fifth weeks of gestation and by the ninth or tenth week of diffuse granular echo texture of the placenta is clearly apparent at sonography Placental location is described with respect to its relative position on the uterine wall and its relationship to the internal OS. The placenta may be described as predominantly anterior, posterior, fundal, right or left lateral. A placenta that is distant from the internal os may be described as being in a normal location, central, or non previa. A low-lying placenta describes a placenta which appears to extend into the lower uterine segment and is within 1-2 cm of the internal os. A placenta previa describes a placenta which appears to partly or completely cover the internal os. Documentation should include an image showing placental location and the relationship to the internal os (Devin D 2015).

The placenta is a vascular structure by which an unborn child is attached to its mother's uterine wall and through which respiratory gas and metabolic exchange occurs. The placenta is formed in part from maternal tissue and in part from chorionfrondosum, whereas the maternal portion is composed of the area of the uterine wall called the decidua basalis, into which the chorionic villi penetrate. Blood does not flow directly between these two portions, but because their membranes are in close proximity, certain substances diffuse readily. When fully formed, the placenta is a reddish brown oval disc with a diameter of

15 to 20 cm and a thickness of 2.5 cm, It weighs between 500 and 600 g, about one sixth as much as the fetus. (Graaff 2011).

As a result of the continuous growth of the fetus and expansion of the uterus, the placenta also enlarges . its increase in surface area roughly parallels that of the expanding uterus and throughout pregnancy it cover s approximately 15 to 30% of the internal surface of the uterus. the increase in thickness of the placenta results from arborization of existing villi and is not caused by further penetration into maternal tissues. so placental thickness is closely related to fetal wellbeing and may be a key factor in perinatal out come

The use of ultrasound to evaluate the placenta is routine among the majority of pregnant women. A wide range of pregnancy complications result from abnormal placental . A development, including preeclampsia, intrauterine growth retardation (IUGR) and abruption . Other placental abnormalities, such as placenta previa, percreta or vasa previa, may cause major maternal and fetal complications.Timely recognition and delivery.Thus , careful examinations of the placenta by ultrasound can contribute directly to enhance patient care and improve outcomes. (Rumack et al 2011).

Before the availability of the ultrasound , manual examination of the maternal abdomen was the only approach that could used to estimate fetal size . the physical examination , however, provides only a general approximation of fetal weight because the palpated dimensions of the uterus are affected by several factors other than fetal size, including amniotic fluid volume, placental bulk, presence of fibroids and maternal obesity . Sonographic measurements of the fetus provide information about fetal age and growth. These data are used to assign gestational age, estimated fetal weight and diagnose growth disturbance . the measurements of fetal body parts provide a direct way of assessing fetal size .numerous formulas have been published for estimating fetal weight from one or

of these fetal body measurements : head (bi-parietal diameter BPD or head circumference HC), abdomen (abdominal diameter AD or abdomen circumference, AC), and femur length (FL). Estimation of fetal weight, on its own and in relation to the gestational age, can influence obstetric management decisions concerning to the gestational age, can influence obstetric management decisions concerning the timing and route of delivery may benefit a fetus that is small for dates. Such a fetus may be inadequately supplied by its placenta with oxygen and nutrients and therefore may do better in the care of neonatologist in uterus. When the fetus is large, cesarean section may be the preferred route of delivery, particularly in pregnancies complicated by maternal diabetes . In view of these considerations, fetal measurements should be a component of every complete obstetric sonogram. (Rumack et.al 2011).

1.2 Problem of the Study:

One of the most important issues was the miss determination of fetal weight using the placenta thickness, therefore formulation of new method for estimation of fetal weight by placenta thickness.

1.3 Objectives of the Study:

1.3.1 General objective:

To characterize of the placenta using ultrasound.

1.3.2 Specific objectives:

- To determine echo texture

- To determine the placenta grade

- To measure placenta thickness.

-To correlates placenta thickness , gestational age and fetal weight.

1.4 Overview of the Study:

This study is concerning to the characteristic of placenta in pregnant ladies accordingly it falls into five chapters : chapter one includes introduction , problem, objectives as well as the over view of study. chapter two includes literature review and previous studies related to the same . Chapter three deals with material and methods by which we conduct the study. chapter four represents the results . chapter five includes discussion , conclusion, recommendation, followed by the references and appendices.

Chapter Two

Literature Review and previous studies

Literature Review

2.1 Placenta anatomy:

2.1.1 Development:

The early developing embryo is surrounded by amnion and chorion. Villi cover the entire surface of the chorion up to about 8 weeks of gestation). The villi, which are the basic structures of the placenta, initially form by 4 or 5 weeks' gestation. The villi next to the decidua capsularis degenerate, forming the chorion laeve. The villi contiguous with the decidua basalis. (Moore 2016).

become the chorion frondosum and later the placenta. The fetal side of the placenta consists of the chorionic plate and chorionic villi. The maternal side consists of the decidua basalis, which open up into large cisterns, the intervillous spaces. The fetal villi are immersed in maternal blood located in the intervillous spaces. Anchoring villi develop from the chorionic plate.1 These attach to the decidua basalis, holding the placenta in place. By the end of pregnancy, the villi have a surface area of 12 to 14 square meters.(Rumack 2011).

After the blastocyst attaches to the endometrial surface, it begins the process of implantation. In the early stages of implantation, the trophoblast begins to differentiate into two cell layers the outer syncytiontrophoblast the inner cytotrophoblast. As the trophoblast invade the decidua, its breaks down decidual blood vessels and creates a network of blood _filled spaces known as lacunae,the lacunar network evolves into the intervillous spaces of the mature placenta. (Moore 2016).

It is inserting to note that in the trophoblasts invasion of the decidua it normally penetrates just so far and then stops, probably as a result of limits imposed by the deciduas rather than by the trophoblast it self (in a tubal pregnancy, trophoblast is not under any local control and invades freely all the tissue layers of the tube (mucosa, musle, serosa). As the syncytiotrophoblast becames

embedded in the decidua , the inner cytotrophoblast proliferate forming a complicated system of tiny projections that put into the syncytiotrophoblast and the lacunae. The cytotrophoblast projections, called the primary chorionic villi, eventually became branched and vascularized by fetal blood vassels originating branched and vascularized by fetal blood vassels originating from the arteries in the umbilical cord. Initially, the entire surface of the developing gestational sac is covered with chorionic villi. As the chorionic sac grows, the villi underneath the decidua scapsularis are compressed and their blood supply reduced, subsequently.

These villi degenerate,resulting in an avillous portion of chorionic sac known as the smooth chorion or chorion leave . Meanwhile, the chorionic villi associated With the deeper decidua basalis proliferate, branch profusely and hypertrophy to Chorion frondosum (future placenta).(Moore 2016).

2.1.2 structure of the placenta:

Initially form by 4 or 5 weeks gestation. The villi next to the decidua capsularis degenerate, forming the chorion leave. the villi contiguous with the deciduas basalis became the chorion frondosum and later the placenta. the fetal side of the placenta consists of chorionic plate and chorionic villi, the maternal side consists of the deciua basalis which open up into large cisterns, the intervillous space. The fetal villi are immersed in maternal blood located the intervillous spaces, Anchoring villi develop from chorionic plate. these attach to the decidua basalis , holding the placenta in place. By the end of pregnancy , the villi have asurface area 12 to 14 square meters.(Rumack.2011).

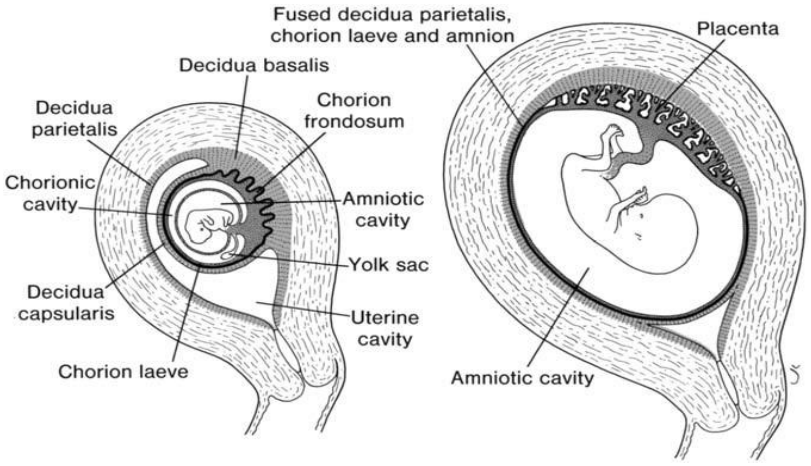

Fig 2.1 Relation of fetal membranes to wall of the uterus.

(Steven.M,Penny.2011).

2.1.3 Placental Maternal_Fetal Circulation:

Maternal circulation via the basal veins .Oxegenated and nutrient_rich fetal blood passes from the fetal capillary bed in the villi to an enlarging system of veins that eventually converge to form a single umbilical cord.In the fetal abdomen, the umbilical vein courses cranially towards the liver where it joins.

The portal sinus(umbilical portion of the left portal vein) to supply the liver . Most of the fetal blood bypasses the liver via the duct us venous which originates at the portal sinus and terminates in the inferior vena cava or left hepatic vein.

Deoxygenated blood returns from the fetus to the placenta via two umbilical arteries which originate at the right and left internal iliac arteries in the fetal pelvis. The two umbilical arteries divide into numerous radiating branches as the cord inserts in the placenta. Fetal and maternal bloods do not normally come into direct contact . CD,PO are helpful technologies to demonstrate the normal and deranged anatomic vascular relationships of the maternal and fetal circulations.(Moore 2016).

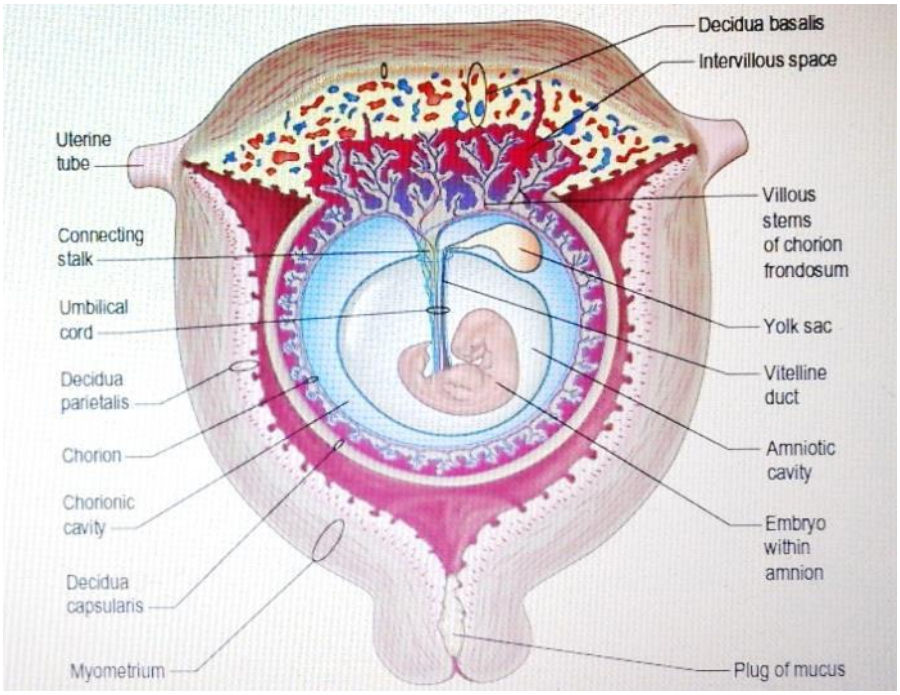

Fig 2.2 The gravid uterus in the second month|(Moore.2016)

2.1.3 Location :

Placental location is described with respect to its relative position on the uterine wall and its relationship to the internal os. The may be described as predominantly anterior, posterior, fundal, right or left lateral. A placenta that is distant from the internal os may be described as being in a normal location, central, or non previa. A low_lying placenta describes a placenta which appears to extend into the lower uterine segment and is within 1_2 cm of the internal os. A placenta previa describes a placenta which appears to partly or completely cover the internal os .Documentation should include an image showing placental location and the relationship to the internal os.(Devin 2015).

Fig 2.3.a Sagittal view of the uterus reveals a posterior fundal placenta.

Fig 2.3.b Transverse view of the uterus demonstrates a right side wall placenta that extends along the anterior wall of the uterus. (Devin 2015).

2.1.4 Cord insertion:

The placenta cord insertion site should be sought and documented. According to the literature, the placenta cord inserted site may be visualized with real time ultrasound between 50_60% of pregnancies in routine clinical practice and over 95% of cases with color Doppler. Not surprisingly, the placental cord inserted site is most difficult to assess when the placenta is posterior and in the presence of oligohydramnios. The umbilical cord normally inserted near the center of placenta. A cord which appears to inserted near the edge of the placenta is called a marginal insertion or battledore placenta and is generally thought to be of no concern. A cord which fails to reach the placenta and inserted in the membranes is known as a velamentous inserted and may complicate the pregnancy especially if the intramumbranous umbilical vessels are close to or cross the internal os (a condition known as vasa previa). (Devin D 2015).

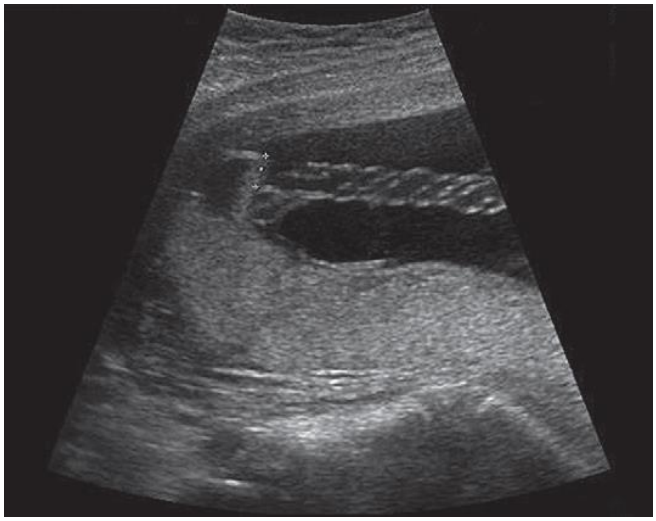

Fig 2.4 This sagittal transabdominal image reveals a marginal cord insertion 7.6mm from the edge of the placenta (arrow). (Sandra 2012)

2.2 Physiology:

The placenta has many important functions but there are three main function:

i. Metabolism .
ii. Secretion of hormones.
iii. Transport of nutrient.

The placenta play an important role particularly during early pregnancy in the synthesis of glycogen, cholesterol , fatty acid, hormones and metabolizes a number of substances and can release metabolic products into maternal and fetal circulation to increase metabolic demands of the developing fetus through gestation.(http.wikipediew.placenta).

The placenta must be able to metabolize raw materials from the maternal blood Pumped into the intervillous spaces. The metabolism of proteinin, the placenta is Largely governed by the demands of the fetal and placenta growth. No other organ carries out the synthesis of such a diverse group of proteins for such a wide rang of purposes. The vast quantities of structural proteins that will be incorporated into proliferative fetal and placental tissues must be derived from maternal source.(Moore 2016).

Little of the raw material in the massive flow from the mother, however, is in the Precise form required for the different stage of fetal and placental development. Hence, in addition to the placenta prefabrication of specific proteins for its own Purposes it must sort through the available supply, matching the quality and Quantity of material available to the current fetal demand. (Moore 2016).

The production of hormones to regulate the activities of pregnancy is one of the most interesting special functions of the placenta. It is the placenta that bears this responsibility and not the mother or the fetus. From the first days after fertilization, the cell of the trophoblast and their successors in the placenta

manufacture a large variety of hormones. The first to be manufactured in appreciable amounts is human chorionic gonadotropin (hCG) . As pregnancy proceeds, large amount of progesterone are synthesized in the placenta. In addition to sustaining the necessary decidual reaction of pregnancy, this hormone serves as a raw material for the production of placental estrogen which in turn act on many organs and tissues of both mother and fetus. (Moore 2016).

Large amount of progesterone are produced during the first months of pregnancy by the corpus luteum but the placenta takes over this activity after the third month of pregnancy. The processes influenced by estrogen and progesterone include the synthesis of protein and the metabolism of cholesterol, the functioning of specific organs such as the maternal uterus and breast and the regulation of many aspects of fetal development. Another hormone produced by the placenta is human chorionicsomatomammotropin (Hcs) or human placental lactogen. HCS can be detected in maternal serum as early as the sixth week of pregnancy. It rises steadily during the first functional representation of the placenta featuring fetal and maternal circulation. (Moore 2016).

In the second trimesters with little variation, Hcs has several important Physiologic effects on the mother and is referred to as the "growth hormone" of the Second half of pregnancy because it promotes good fetal growth by ensuring a good supply of energy to the mother. Maternal HCS serum measurements have been used as a test to measure placental function however it lacks sensitivity and specificity to be of clinical value (Devin D 2015).

Among the physiological processes in pregnancy that call for particular precise coordination are those concerned with protecting the embryo from immunological rejection by maternal tissue .One of the many mechanisms that seem to play a part in this task is the non-specific suppression of lymphocytes,

the cells that would normally mediate the rejection a foreign tissue to the host tissue. Another highly specific immunological function of the placenta is to supply the fetus at the end of pregnancy with maternal antibodies of the type known as immunoglobulins. These antibodies summarize the mothers experience of and resistance to various infections and provide the newborn infant with a ready –made prophylaxis against infection until its own immune system can begin to function. (Devin D 2015).

2.3 Pathology:

2.3.1 Placental Size and Growth:

There is less emphasis nowadays in measurements of the placenta largely because The information is of limited diagnostic value. Thus, the placenta is not routinely measured . The most popular measurement is placental thickness(data on placental area , volume, and weight estimate have all been studied and reported in the literature).As a guideline, placental thickness should be measured if the placenta appears to be either thick or thin. Placental thickness measurements should be made near the mid portion or center of the placenta with one caliper place at the amnichorionic surface (chorionic plate) and the second caliper place at the basal surface perpendicular to the amnichorionic surface. The measurements should exclude retroplacental veins. Myometrium, fibroids, and contraction of the uterus that might incorrectly increase the measurement. In a normal pregnancy, placental thickness increase with gestational age . As a rule of thumb, the mean thickness of the placenta in millimeters is roughly equal to the gestational age in weeks (e .g. 20 weeks, mean placental thickness is 20mm. 28 weeks ,mean placental thickness is 28 mm.(Shaheen 2013)

False thickening of the placenta may be seen with placental abruption if the retroplacental hematoma has the same echogenicity (isoechoic) as the normal placental tissue . Color Doppler may be helpful in distinguishing true placental thickening from pseudothickening . With true placental thickening, the normal

intraplacental vascular net work should seen from the chorionic to basal surface, with abruption and a retroplacental hematoma, colossr will be seen in the placental tissue and be lacking in the hematoma.(Shaheen F 2013).

A placenta thickness greater than 4 cm is considered abnormal at any gestational age. Less than 2.5 cm at or greater than 35 weeks is considered too thin. The four conditions most commonly associated with placental thickening are:

i. Diabetes mellitus, especially gestational diabetes.
ii. Immune and no immune fetal hydrops.
iii. Fetal infection (e.g. cytomegalovirus).
iv. Chromosomal abnormalities, especially triploidy.

Small or thin placentas are most commonly associated with maternal hypertensive Disease, severe IUGR, and severe diabetes mellitus. Rarely, a thin placenta may be due to a membranous placenta (placenta membranacea or diffusa) which with a thin, poorly functional placenta that cover the entire surface of the chorionic sac .

The placenta may also appear unusually thin with severe polyhydramnios as it is stretched over a large surface area of the uterine wall. (Shaheen .2013).

2.3.2 Placental Tumours：

All primary and secondary tumours of the placenta are rare. The most common tumour of the placenta by far is chorioangioma. Other primary tumours of the placenta include teratoma and choriocarcinoma. Choriocarcinoma is most likely to develop secondary to hydatidiform mole. Melanoma is reported to be the most common tumour to metastasize to the placenta. (Devin 2015).

2.3.3 Placental Infarcts:

Small placenta infarcts are common and of no clinical significance. Large infarcts (e. g. greater than 10% of the placental volume) are most commonly associated With maternal hypertensive disease and may cause IUGR, fetal hypoxia and fetal demise. Fresh placental infarcts appear as non-specific anechoic spaces in the placental and undistinguishable from other anechoic placental lesions. Aging or healing infarcts appear as hyperechioc lesions (more echogenic than the surrounding placental tissue) and may become calcified. (Shaheen F 2013).

Fig 2.5 Placental infarctions in patient with severe preeclampsia. (Sandra 2012).

2.3.4 Abnormal Placental Attachment:

The normal placenta should attach to decidua basalis and not invade the Underlying myometrium. Abnormal placenta attachment to the myometrium is a Significant maternal risk. This condition varies in severity depending on the degree Of invasiveness in the myometrium. Three grades are described based on the depth Of penetration of placental tissue:

i. placenta accreta: villi invade decidua but not the myometrium.

ii. placenta increta: villi invade myometrium but not the serosa.

iii. placenta percreta: villi invade myometrium and the serosa and can also invade local tissue like the bladder wall.

The true incidence of this condition is unknown difficult to ascertain. The average incidence is reported to be about 1 in 7,ooo pregnancies, with placenta accreta accounting for approximately 60%of cases. Most cases in the ultrasound literature are based on placenta accreta with very few cases describing the sonograghic findings associated with placenta increta or percreta. Our discussion with therefore focus on the clinical and sonograghic features of placenta accrete.(Devin.D 2015).

The most important predisposing risk factor for placenta accrete is previous uterine surgery resulting in focal damage to the endometrium and uterine scarring. Other significant risk factors include advanced maternal age, increasing parity, previous endometritis or history of Asherman's syndrome, and submucousmymas. Patients are either asymptomatic or may present with antepartum bleeding . In one published series, 5 of 11 patients (45%) had elevated maternal serum alpha-fetoprotein. Placenta accreta is usually discovered at the time of delivery and may be associated with lack of normal progress during labor.(Devin D 2015).

Fig 2.6.a Placenta percreta. Transvaginal sonogram of a third-trimester placenta shows loss of the hypoechoic border between the placenta and the myometrium, with protrusion of the placenta (long arrow) into the maternal bladder (arrowhead); short arrow, placental lake.(Devin D 2015)

Fig 2.6.b First-trimester placenta accreta**.** The umbilical cord insertion is low in the uterus; arrowheads indicate multiple small placental lakes(Devin D 2015).

2.3.5:Placenta Previa:

Placenta previa describes a placenta that partially or completely covers the internal os. Three degrees of placenta previa are generally described:

2.3.5.1 Complete or Total Previa:

The internal os is completely covered by the placenta. Complete placenta previa my be either symmetric or asymmetric. Asymmetric placenta previa is indicated when the central portion of the placenta is over the os and equal portions of the placenta appears to be attached to the anterior and posterior walls of the lower uterine segment. With asymmetric, complete placenta previa, the placenta is predominantly anterior or posterior in relation to the internal os.(Devin D 2015).

2.3.5.2 Marginal Previa:

The internal os is only partially covered by placenta.

2.3.5.3 Low-Lying Placenta:

The placenta is close to the edge of the internal os but does not extend over it.Lowlying placentas generally convert to higher positions by 34 weeks gestation.

The incidence of placenta previa at the time of delivery is reported to be about 1%.Three factors which increase the relative risk of placenta previa are advanced maternal age, parity, and smoking. Multiparous women are twice as likely to haveplacenta previa as women delivering for the first time. A possible reason for this association is endometrial scarring which occurs with increasing age or repeated pregnancies. The scarring is thought to cause inadequate placental blood supply, for which the placenta compensates by becoming

thinner and occupying a greater surface area of the endometrium. A consequence of greater placental surface area attachment is an increased chance for encroachment over the internal os. The majority of patients with placenta previa present with painless vaginal bleeding near the end of the second trimester or early in the third trimester (antepartum hemorrhaging or APH) however placenta previa may remain asymptomatic until the onset of labour. (Devin 2015).

The clinical course and management of placenta previa depends on several factors including the onset and severity of APH, the maturity of the fetus, and the degree of placenta previa.

2.3.6 Developmental Variation:

Variations in the configuration of the placenta is very uncommon however the Sonographer should be aware of the most common variants and understand their Clinical significance. Only the most commonly encountered forms will be considered in detail. Other less frequent forms include placenta annularis, placenta membranacea, fenestrate placenta, and placenta spuria. (Devin 2015).

2.3.6.1 Succenturiate Lobe:

A succenturiate lobe or succenturiate placenta is define as one or more accessory Lobes connected to the main body of the placenta by velamentous connection of the umbilical vessels . The pathogenesis of the succenturiate lobe is uncertain but it is likely due to a failure of the normal chorionic villi associated with part of the deciduas capsularis to atrophy. Succenturiate placenta has a reported incidence of about 2.5 per 1,000 deliveries. Potential associated symptoms and complications include antepartum hemorrhage (if the velamentous vessels rupture before delivery), vasa previa (velamentous vessels cross the internal os), postpartum hemorrhage and infection(due to retention of

the accessory lobe), and perinatal morbidity and mortality (fetal anemia and shock due to rupture of velamentous vessels) .(Devin D 2015).

A succenturiate lobe appear as a smaller mass of placental tissue at variable distance from the main placental body . The diagnosis can by made accurately when the connecting velamentous vessels are seen between the two islands of placental tissue . Colour Doppler is very helpful to localize the connecting vessels which will show typical fetal umbilical flow . Focal myometrial contraction (FMC) and subchorionic hematomas (SCH) have sonographic characteristics that may mimic a succenturiate placenta with SCH being more challenging to distinguish SCH will lack connecting vessels and changes appearance over the course of Serial studies. A FMC is a transient event which change appearance Placenta membranacea. Colour Doppler should demonstrate normal intraplacental flow in the succenturiate lobe (colour flow similar to the main placental body) whereas SCH will lack normal colour flow signals(Devin 2015).

Fig 2.7 Succenturiate lobe. Transabdominal sonogram of a third-trimester pregnancy shows a portion of placenta (arrow) separate from the main placental disc (Rumak 2011).

2.3.6.2 Placenta Membranacea:

Also known as placenta diffusa. Classically, this term describes a thin membranous Placenta covering the entire or greater part of the chorioamniotic membrane. The essential feure of the anomaly is that all or most of the chorioamniotic membranes are cover on their outer (endometrial) aspect by functioning chorionic villi. Exceptionally, there may be a focal thickening to form a placental disc, but more Commonly the gestational sac is diffusely covered villous tissue, albeit of varying thickness (Devin 2015).

In nearly all instances there is recurrent vaginal bleeding in the late first and second trimesters the consequence of which is either spontaneous abortion or premature labor. The bleeding is due to the fact that the placenta mumbranacea must also, of necessity, be placenta previa. Fetal survival is usually hampered by prematurity and IUGR. Antenatel diagnosis of this condition is exceedingly rare but the routine and extensive use of ultrasound obstetrics will undoubtedly result in more cases being diagnosed prenatally. A review of the ultrasound literature reveals reported cases since 1976. The diagnosis is established by noting placenta surrounding the entire gestational sac or uterine cavity.

2.3.6.3 Placenta Annularis:

Defines a ring-shaped placenta which surrounds the gestational sac. This type of placenta is considered by some investigators to be a variant of placenta membranacea. It is associated with an increasing risk of ante- and postpartum bleeding and IUGR. Placenta extrachorialis extrachorialplacenta is a placenta in which the membranes and deciduas have an abnormal relationship to the amniochorionic surface of the placenta.(Devin 2015).

2.3.6.4 Fenestrate Placenta :

This is an exceptionally rare variant of placental development in which the central Portion of a discoidal placenta fails to develop creating a large gap. Does not Appearance to be of significance.

2.3.6.5 Placenta circumvallate:

results in significant raising and folding of the membranes at the edge of the placenta forming a raised ring of tissue. Placenta circumvallate is usually asymptomatichowever it may be associated with antepartum hemorrhage (APH) and premature labour. Placenta circumvallate appears as a placenta with a peripheral echogenic Fenestrate Placentaband of tissue near the amniochorionic surface of the placenta representing the abnormally raised and folded amniochorionic membrane. (Devin 2015).

Fig 2.8 Circumvallate placenta. Transabdominal sonogram in the early third trimester shows rolled edges of the placenta (arrows). (Sandra 2012)

2.4 Ultrasound:

Ultrasound is the imaging modality of choice for the prenatal diagnosis of placenta previa however the sonographer must be aware of technical limitations and common interpretation pitfalls leading to false positive and false negative diagnosis. The false negative rate for the detection of placenta previa is very low (ultrasound misses the diagnosis of placenta previa), and makes ultrasound a good screening tool to rule out the diagnosis. The most significant factors contributing to a relatively high false positive rate (ultrasound falsely indicates the diagnosis of placenta previa) include distortion of the lower segment by an overdistended bladder and focal myometrial contractions (Devin D 2015). Bladder distention pushes the anterior wall of the uterus posteriorly towards theposterior wall with the net effect of bringing an anterior lower segment placenta artificially closer to the cervix and also compressing the anterior and posterior lower segment walls together and masking the true location of the internal os. For these reasons, when evaluating a placenta that reaches the lower segment of the uterus and appears to be low-lying or previa, the sonographer should re-evaluate the patient after she has voided (postvoid scans). In the majority of cases, the postvoid study will resolve the situation, with most placentas changing in23 appearance from previa or lowlying to normal (cases that remain suspicious should be evaluated with endovaginal (EVS) or transperineal (TPS) techniques).(Devin D 2015).

2.4.1 Placental migration or placental retraction:

The placenta does not truely migrate; the apparent upward movement of the placenta is due to the development of the lower uterine segment. At 16 weeks gestation, the placenta occupies approximately one-half of the internal surface area of the uterus; however, because the placenta grows more slowly than the

uterus, at term it occupies only one quarter to one third of the uterine surface area.

The majority of apparent placenta previa and low-lying placentas diagnosed with ultrasound in the first and second trimester will resolve. Are their reliable sonographic criteriathat will reliably predict those placenta previa that will persist and those that will resolve ? Some authors showed that a placenta which overlapped the internal os by 15 mm or more(evaluated with EVS at 18-23 weeks' gestation) was more likely to remain previa at term. The placenta that overlapped the internal os by 25 mm or more at 20-23 weeks' gestation was incompatible with a vagin delivery. (Carne et.al, 2012).

They initially performed TAS and followed with EVS if the diagnosis was uncertain. They observed that using EVS at 20-23 weeks' gestation to predict persistence of placenta previa to term has a low false-positive rate compared to using it at earlier stages of pregnancy. It show that the incidence of major complications is higher in women with a thick placental. He defined a "thin" placental edge as measuring less than 1 cm in thickness and or presenting an angle of less than 45 degrees. The thin-edge group had a significantly higher vaginal delivery rate, while the thick-edge group required more frequently emergency delivery by C-section, peripartum hemorrhage, placenta accreta, and preterm delivery. The rate of placental migration was a factor in predicting outcome. (CieminskiA 2015). In his study, EVS was performed at 4-week intervals in women who had been noted at 26 weeks' gestation to have a placenta lying within 3 cm of the internal cervical os, and the rate of placental migration was assessed. 25 They showed that the mean rate of placental migration in women who were to later require a C-section for related complications (bleeding and malpresentation) was 0.3 mm/wee, while the mean rate of migration in women who had a vaginal delivery or C-sectionfor other

indications was 5.4 mm/week. They also made two other important observations:-

1. when the placental edge was initially 20 mm or more from the internal os, migration occurred in all cases, and no C-sections were necessary for placenta previa.

2.when the placenta overlapped the internal os by 20 mm or more at 26 weeks, all the women required C-section. Further studies are required to verify these reports however it may be possible in the future to predict in the second trimester whichplacentas will be previa at term and which will not. It may be possible to determine in the second trimester who will need a further sonogram and who will not. (CieminskiA 2015).

Complete placenta previa is generally not difficult to diagnose in the second or third trimester with conventional TAS. Partial placenta previas or low-lying placentas are sometimes difficult to diagnose with TAS, especially in the third trimester, largelybecause the fetus interferes with visualization of the posterior 26 placenta and the internal os region. When TAS evaluation is non diagnostic, EVS or TPS should be performed. The use of EVS has not been shown to lead to an increase in vaginal bleeding however many investigators prefer the less invasive TPS approach. The EVS probe should always be carefully and gently introduced in the vagina with the sonographer observing the insertion on the screen with realtime; the tip of the probe should be placed 3 to 4 cm from the external os. The general sentiment is that an EV study does not pose the same threat as a blinded digital examination which results in direct palpation and manipulation of the cervix. In this circumstance, EVS should be done by a qualified physician in a hospital setting. It is much easier to evaluate a low-lying anterior placenta extending down into the lower uterine segment than a posterior or lateral placenta which may be masked by fetal parts. A posterior placenta will displace the fetal head or buttocks anteriorly and may interfere with descent. In this situation, if the cervical margin of the placenta cannot be

adequately visualized with TAS, EVS or TPS should be performed especially if the patient presents with antepartum bleeding.(Devin D 2015).

Ultrasound Evaluation of the placenta should be a routine part of every second and thirdtrimester ultrasound study as indicated in the American Institute of Ultrasound in Medicine Antepartum Obstetrical Ultrasound Examination Guidelines ("The placentallocation, appearance, and its relationship to the internal cervical os should be recorded").(Carne 2011).

2.4.2 Technique:

In general, there are no special equipment or transducer considerations (the equipment and transducer deemed most appropriate for the obstetrical ultrasound study may be used). If the system has electronic beam focusing, the focal zone should be adjusted to optimally visualize the placenta.(Carne JM2011).

27 A posterior placenta is more difficult to visualize in its entirety due to attenuation and shadowing from the overlying fetus. If indicated, positioning the patient in a left or right posterior oblique position may be helpful in better visualizing a posterior placenta. (Carne 2011).

For the standard transabdominal study (TAS), the bladder should be adequately distended to optimize visualization of the cervix and lower uterine segment and to show the relationship of the placenta to the internal os. Overdistention of the bladder distorts the appearance of the cervix and lower uterine segment and may lead to the false positive diagnosis of placenta previa. Endovaginal (EVS) or transperineal (TPS) techniques should be performed whenever TAS does not adequately show the relationship of the placenta to the internal os (e.g. due to attenuation by fetal parts or the patient presents with an empty bladder) and there isa high index of suspicion of placenta previa (e.g. patient presents with third trimester bleeding). Routine evaluation of the placenta with colour Doppler is now favoured to rapidly find the placental cord insertion site and to

detect vascular abnormalities in the placenta and the retroplacental uterine wall. This is especially important if the placenta is anterior and appears to be low-lying or previa since the risk of placenta acreta is highest in this situation. An important view is the median lower segment and cervix image which may identify vasa previa associated with velamentous insertion of the cord or succenturiate lobe. Pulsed Doppler spectral waveform analysis of the placenta may be helpful to characterize flow in masses or abnormal appearing vessels. (Devin D 2015).

2.4.3 Echo Texture:

The normal placenta appears as a sonographically uniform structure with mid amplitude echoes (in contrast, the adjacent uterine wall (decidua and myometrium) appear less echogenic or hypoechoic). In the third trimester, the placenta generally appears less homogeneous and may have small anechoic or hypoechoic areas of 28 different pathological etiologies. Calcium deposits are seen in the majority of placentas in the third trimester and appear as high amplitude (white) linear echoes. The fetal or amniochorionic surface of the placenta (generally referred to by authors as the chorionic plate) forms a strong interface with the amniotic fluid. This surface is very angle dependent (specular reflector) and appears as a bright (white) echo when the sound beam strikes at normal incidence (perpendicular to the interface).(Devin 2015).

2.4.4 Retroplacental Uterine Wall:

The retroplacental uterine wall consists of the richly vascular myometrium and decidua basalis. These tissues are distinctly hypoechoic in comparison to the placenta. After 18 weeks gestation, the normal anterior retroplacental uterine wall (sometimes referred to as the subplacental
complex or the retroplacental space) has an average thickness of 9.5 mm. The sonographic diagnosis of placental acreta depends on this normal hypoechoic zone being invaded by more echogenic villi andappearing thinner or not seen.

The endometrial veins in the decidua basalis may be quite dilated and appear as irregular, tubular spaces especially when the placenta is posterior (probably due to diminished venous drainage when the patient 29 is supine and the weight of the uterus on the posterior uterine wall impedes venousflow). Other retroplacental abnormalities include hematomas associated with abruption of the placenta and fibroids which must be distinguished from focal myometrial contractions. (Devin 2015).

Fig 2.10 Normal Retroplacental Flow TAS CD evaluation of the placenta shows normal retroplacental vascularity in the basal area of the placenta and uterine wall.(Devin 2015)

2.4.5 Placental Grading:

Calcium deposition in the placenta is a normal process of placental aging or maturation which occurs at different rates in normal pregnancies. Sonographically, macroscopic areas of placental calcifications appear as hyper echoic (white) echo densities in different areas of the placenta, with larger areas of calcification exhibiting shadowing. Calcium is deposited primarily along the basal surface and placental septa. Macroscopic and sonographic evidence of

placental calcification is not evident until the third trimester. More than 50% of placentas show somesono graphic evidence of calcification after 33 weeks' gestation however about 20% of normal term placentas have no macroscopic or sonographic evidence of calcification. Previously, investigators found it useful to assign placentas a numerical grade (0 to 3) based on the degree of calcification however such grading 30Schemes have proven to be of limited value in clinical practice in predicting fetal maturity, fetal wellbeing, or perinatal outcome. Although of limited clinical value, I recommend you learn the basic facts about placental grade, especially the features of a grade 3 placenta and the significance of early or premature appearance. These placentas show an irregular amniochorionic surface (chorionic plate) with calcification extending along the cotyledenal division from the chorionic plate to the basal surface. The grade 3 placenta may also have larger areas of calcification that produce shadowing and the placental parenchyma may contain hypoechoic or anechoic areas. Grade 3 placentas are the most heavily calcified and are not seen before weeks gestation in normal pregnancies. Only about 15% of normal term pregnancies are grade 336 placentas. A greater percentage of Grade 3 placentas are seen with increasing gestational age in pregnancies >36 weeks however a grade 3 placenta does not predict fetal lung maturity. The appearance of a Grade 3 placenta before 36 weeks gestation should raise concern for later development of IUGR, maternal hypertension and fetal distress (these conditions have been associated with premature placental senescence characterized by heavy placental calcification). (Devin 2015).

Anechoic and Hypoechoic Placental Lesions Small, anechoic and hypoechoic lesions are commonly seen in the placenta, especially in the 3rd trimester. These anechoic and hypoechoic placental lesions have been referred to by different authors as "sonolucencies", "lucencies", and "holes". Although sonographically alike, these lesions represent different pathologies including subchorionic fibrin deposits, intervillous thrombosis, perivillous fibrin deposition, fresh infarcts,

subchorionic maternal venous lakes, and septal cysts. These lesions may be round, ovoid, or linear and are typically less than 2 cm in diameter. Occasionally, sludge-like blood flow can be seen in some lesions (e.g. subchorionic venous lakes) on real-time imaging and Doppler. The only significant fact pertaining to these placental lesions is that they may be associated with 31 elevated maternal serum alpha-fetoprotein values and an otherwise normal fetus. If the fetus appears structurally normal, the placenta should be evaluated carefully for evidence of placental bleeding, masses and these lesions. . (Devin D 2015).

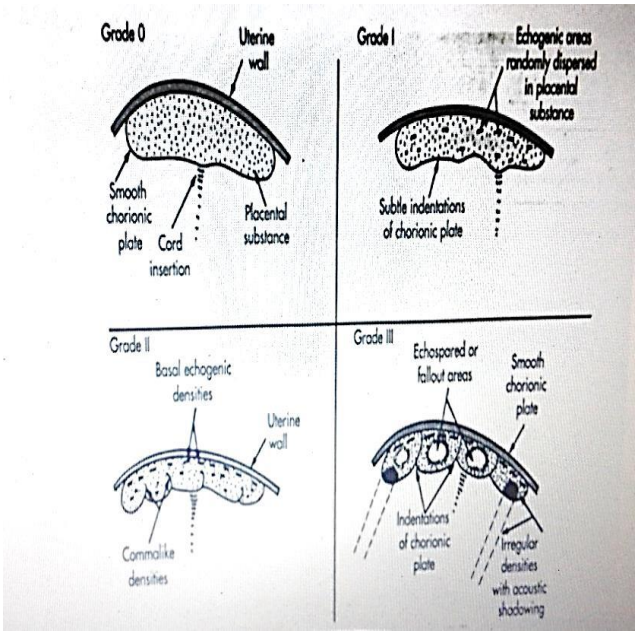

Fig 2.11 General demonstrate how the placenta ades.(Devin D 2015)

2.5 Previous studies:

*Anna J, Lee, Michael Bethune , Hiscock . Richard J MBBS Franzcog, Franzco, COGU. They sought to determine the normal sonographically measured placental thickness in millimeters at the second-trimester scan (18 weeks to 22 weeks 6 days) and determine whether the measurement should be adjusted for

gestational age and the placental site. They conducted a cross-sectional observational pilot study involving 114 consecutive patients with singleton pregnancies presenting for routine second-trimester sonography between 18 weeks and 22 weeks 6 days. And the result is the unadjusted overall mean placental thickness was 24.6 (SD, 7.29) mm. The placental thickness was normally distributed. On multivariable analysis, the predicted mean thickness was 6.6 mm (95% confidence interval, 4.4 to 8.8 mm; P< .001) less in anterior compared to posterior or fundal placentas and increased by 0.6 mm (95% confidence interval, −0.5 to 1.7 mm; P = .27) for each week increase in gestation after 18 weeks .They conclusions The placental position and possibly gestational age need to be considered when determining placental thickness. Anterior placentas are approximately 7 mm thinner than posterior or fundal placentas. Anterior placentas of greater than 33 mm and posterior placentas of greater than 40 mm should be considered abnormally thick. (J Clin Ultrasound. 2014).

*El amin M Y A,(2012) Studied the relationshipbetweenplacental thickness and fetal age in Sudanese women,she found that the placental thickness increase with gestational age . She also found that there is significant positive correlation between placental thickness and LMP, biparietal diameter (BPD), femur length (FL). Her study showed linear regression between placental thickness and LMB, biparietal diameter (BPD),abdominal circumference(AC) and femur length(FL). (Sudan University of Science and Technology- Khartoum.)

*CC Ohagwu. Po Abu. BE Udoh. The study is aimed to investigate placental thickness as a parameter for estimating gestational age in normal singleton pregnancies in Nigerian women. 730 Nigerian women with normal singleton pregnancies who were attending antenatal clinic at Federal Medical Centre, Makurdi, Nigeria were studied by transabdominal ultrasound between February, 2007 and January, 2008. Sonography was carried out using Sonoscape SSI 600 ultrasound machine with 3.5MHz transducer. Gestational age was stimated by

crown-rump length (CRL), biparietal diameter (BPD), femur length (FL) and abdominal circumference (AC) and the composite average recorded while placental thickness was measured at the point of insertion of the umbilical cord. Mean placental thickness with standard deviation was calculated for each gestational age. Correlation analysis was used to determine the relationship between placental thickness and gestational age while regression analysis yielded mathematical relationships between placental thickness and gestation age. The maximum mean placental thickness of 45.1 ± 6.4mm was recorded at 39 weeks gestation. There was a fairly linear increase in mean placental thickness with gestation age. There was significant and strong positive correlation between placental thickness and gestational age. Placental thickness appears promising as an accurate indicator of gestational age in singleton pregnancies in Nigerian women. (African Journal Online,2009).

*Marwa SA (2018) Studies the correlation placenta thickness and estimation fetal weight in Sudanese woman by US The data analyzed by using Statistical Package of Social Science (SPSS). Results of the study showed that there was strong positive correlation between placenta thickness and estimated fetal weight (r = 0.78) and (p=0.01) and both are firmly increased with fetal age. (Sudan University of Science and Technology- Khartoum).

Chapter Three

Materials & Methods

3.1 Materials :

3.1.1 Machine:

The ultrasound is SonoScope A6 with ultrasound probe 3.5 MHz, with three major probes, and Mindary DP-10, with full ultrasound departmental facilities, and coupling gel.

3.1.2 Patient :

3.1.2.1 Sample size:

This study was consist of 55 pregnant ladies in second and third trimester with age range 1 to 40 years.

3.1.2.2 Included criteria:

The patient were scanned in second and third trimester at differe gestaional ages which include 17 till 38 weeks.

3.1.2.3 Excluded criteria:

The period below 17 weeks or above 38 weeks.

Pregnant which has history of intrauterine growth retardation.

Pregnant which has history of fetal mass or anomaly.

Pregnant which has history of placental mass or anomaly.

Pregnant which has history of uterine or adenexal mass.

3.2 Methods:

3.2.1 Technique:

Patient position and preparation: The patient is usually comfortable on her back (supine). Should be has a full, but not over – distended bladder, a 3.5MH convex probe used. Multiple longitudinal and transverse scans will be necessary to demonstrate the placenta completely. Placental thickness measured in a representative portion perpendicular to the chorionic plate at the level of the cord insertion. (Manual of diagnostic scanned while lying ultrasound. Edited by (P .E .S. Palmer) and then measurement were compared with growth parameter.

3.2.2 Study design:

This was a descriptive analytical study used to characterization of placenta

3.2.3 Data collection:

The data of this study was collected by using special data collection sheet consisting of ten variables which were the age, weight, number of pregnancy, gestational age, fetal weight, liquor , placental location, placental thickness and placental grade.

3.2.4 Data analysis:

The data of this thesis was analyzed by using SPSS system.

Chapter four

Results

Results

Table (4.1) frequency distribution of maternal age \years

Age \years	Frequency	Percent	Valid Percent	Cumulative Percent
13-19	5	9.1	9.1	9.1
20-26	12	21.8	21.8	30.9
27-33	20	36.4	36.4	67.3
34-40	18	32.7	32.7	100.0
Total	55	100.0	100.0	

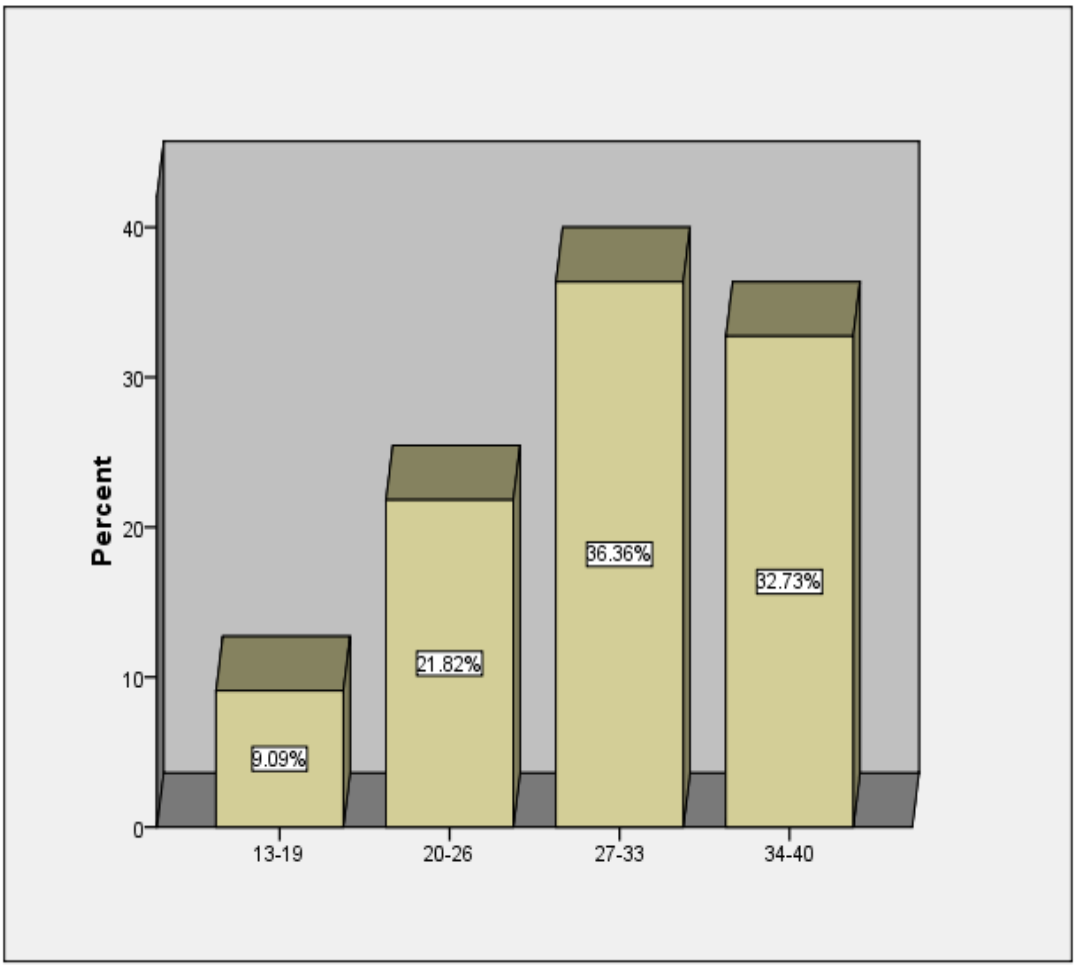

Figure (4.1) frequency distribution of maternal age \years.

Table (4.2) frequency distribution of maternal weight\ kg

Weight \kg	Frequency	Percent	Valid Percent	Cumulative Percent
46-55	14	25.5	25.5	25.5
56-65	20	36.4	36.4	61.8
66-75	16	29.1	29.1	90.9
76-85	5	9.1	9.1	100.0
Total	55	100.0	100.0	

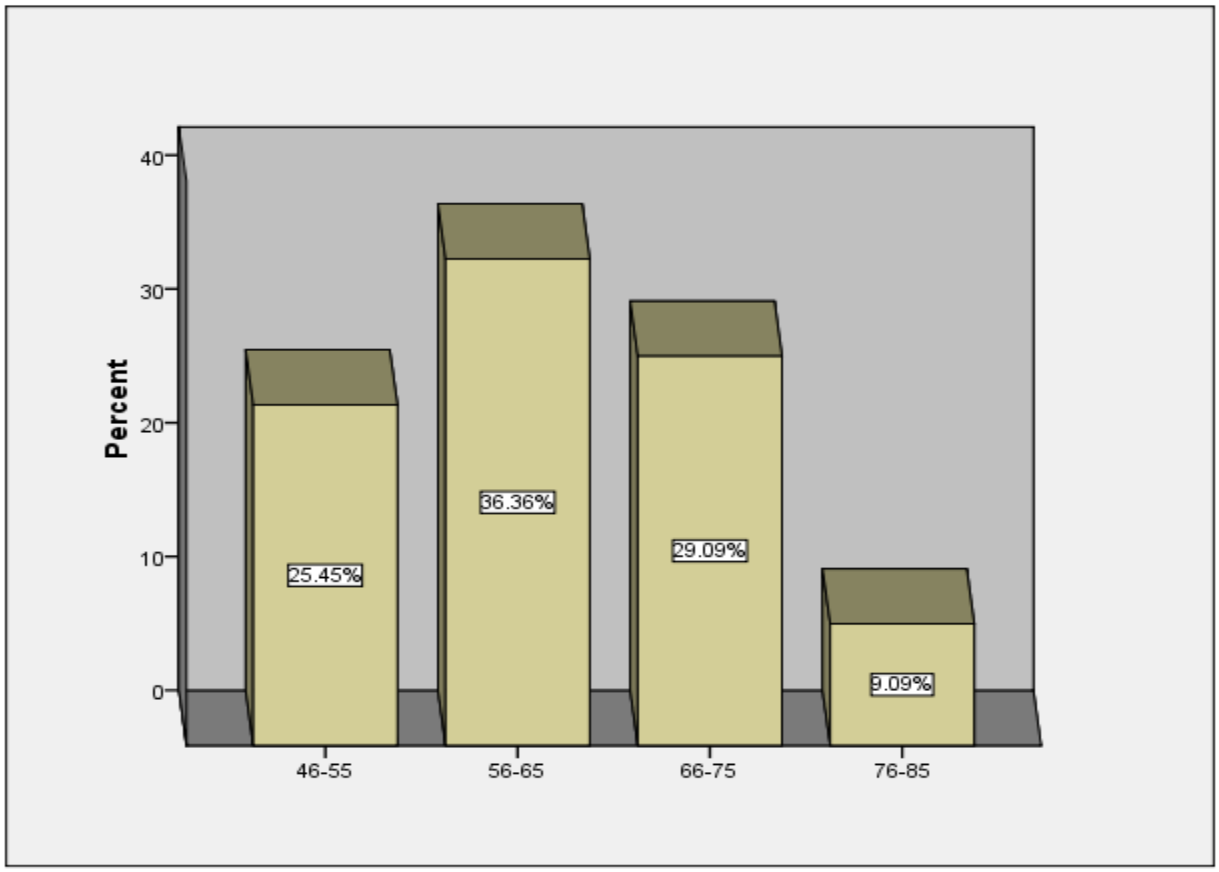

Figure (4.2) frequency distribution of maternal weight\ kg

Table (4.3) frequency distribution of gravida

Gravida	Frequency	Percent	Valid Percent	Cumulative Percent
1	10	18.2	18.2	18.2
2	13	23.6	23.6	41.8
3	14	25.5	25.5	67.3
4	5	9.1	9.1	76.4
5	7	12.7	12.7	89.1
6	2	3.6	3.6	92.7
7	2	3.6	3.6	96.4
8	2	3.6	3.6	100.0
Total	55	100.0	100.0	

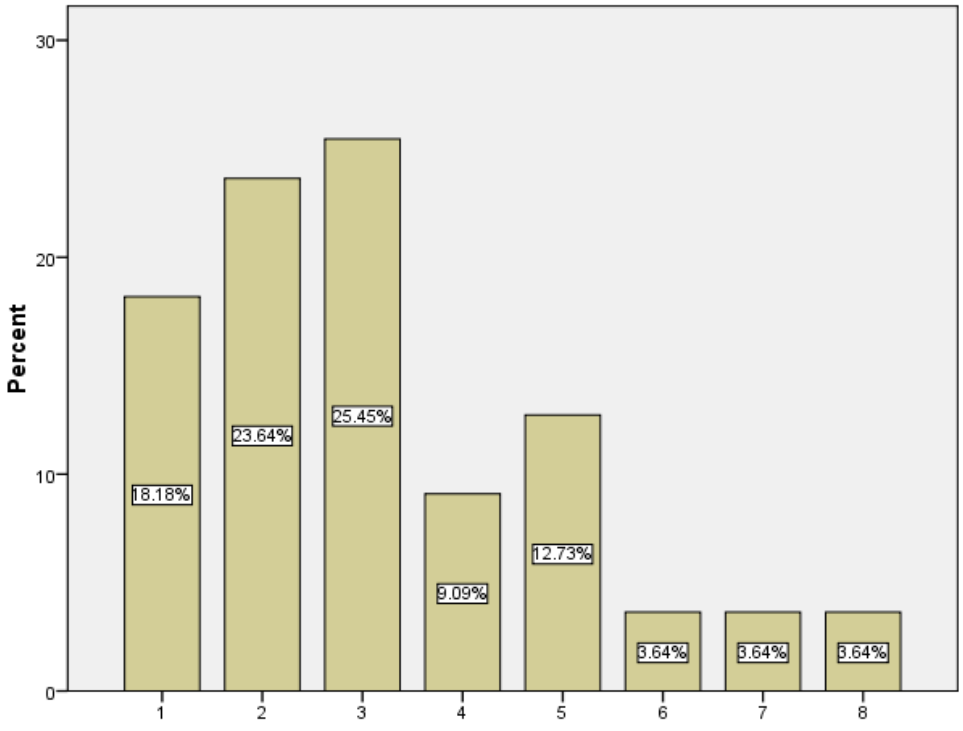

Figure (4.3) frequency distribution of gravida

Table (4.4) frequency distribution of maternal status.

Status	Frequency	Percent	Valid Percent	Cumulative Percent
DM	4	7.3	7.3	7.3
HT	2	3.6	3.6	10.9
Normal	49	89.1	89.1	100.0
Total	55	100.0	100.0	

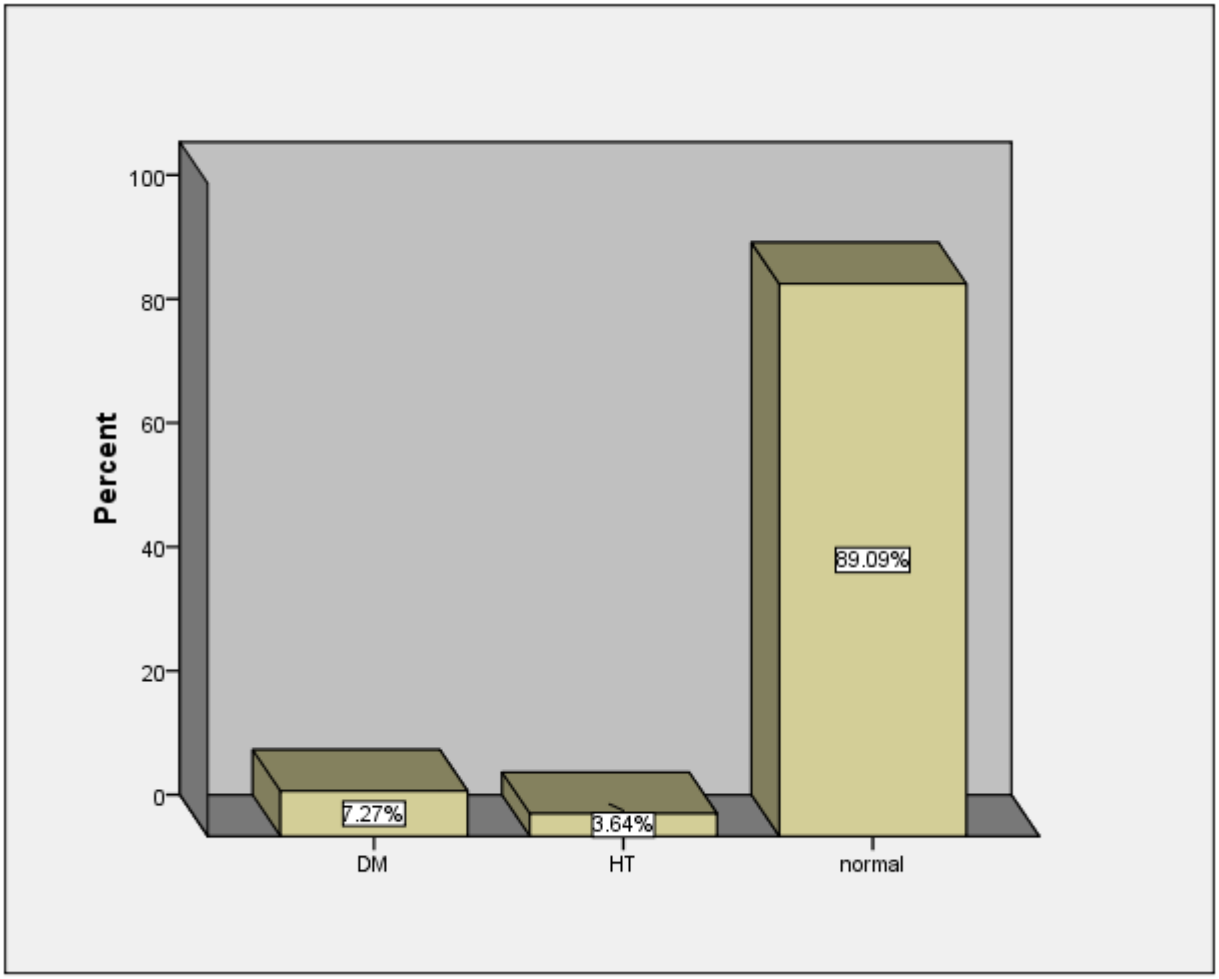

Figure (4.4) frequency distribution of maternal status

Table (4.5) descriptive statistic for age ,weight, gravida , placenta thickness , GA \weeks and fetal weight.

Variables	N	Minimum	Maximum	Mean	Std. Deviation
Patient Age\years	55	13	40	29.53	6.506
Patient weight\kg	55	46	85	63.53	9.428
Gravida	55	1	8	3.18	1.847
Placenta thickness"cm"	55	1.8	4.4	2.880	.5327
GA\ weeks	55	17.29	39.14	28.5065	6.26438
Weight	55	1650	3490	2405.09	456.820
Valid N (listwise)	55				

Table (4.6) frequency distribution of liquor status.

Liquor status	Frequency	Percent	Valid Percent	Cumulative Percent
Abnormal	11	20.0	20.0	20.0
Normal	44	80.0	80.0	100.0
Total	55	100.0	100.0	

Table (4.7) frequency distribution of placenta location.

Location	Frequency	Percent	Valid Percent	Cumulative Percent
Anterior	31	56.4	56.4	56.4
Posterior	14	25.5	25.5	81.8
Fundal	8	14.5	14.5	96.4
Previa	2	3.6	3.6	100.0
Total	55	100.0	100.0	

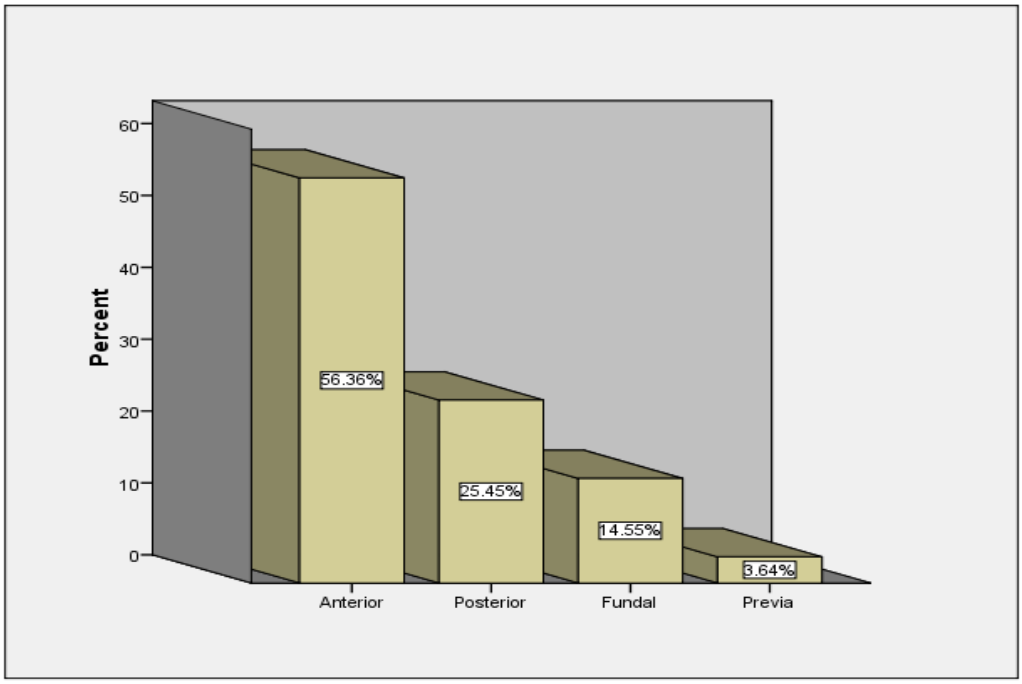

Figure (4.5) frequency distribution of placenta location.

Table (4.8) frequency distribution of placenta grade.

Grade	Frequency	Percent	Valid Percent	Cumulative Percent
0	36	65.5	65.5	65.5
1	15	27.3	27.3	92.7
2	4	7.3	7.3	100.0
Total	55	100.0	100.0	

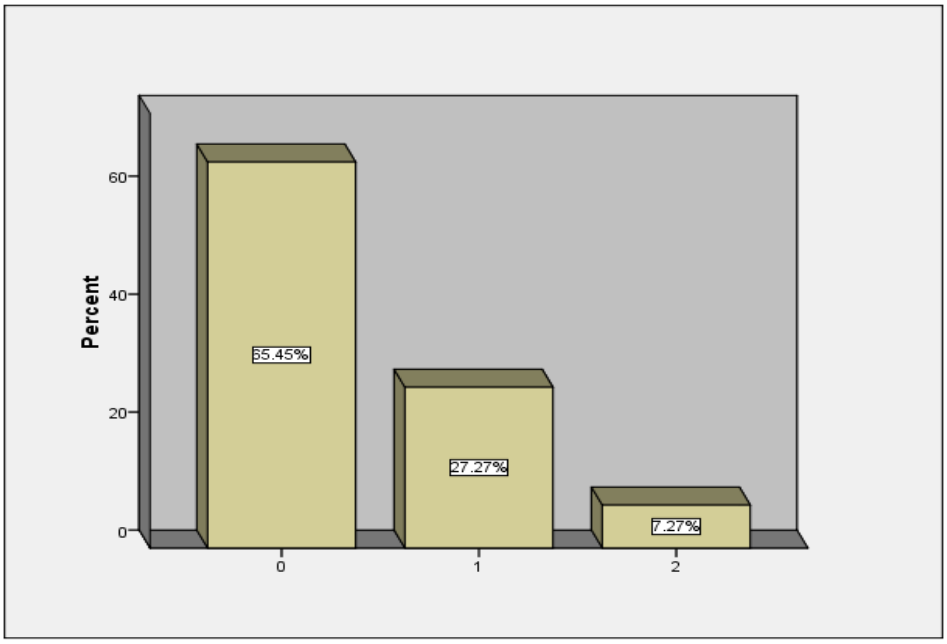

Figure (4.6) frequency distribution of placenta grade.

Table (4.9) frequency distribution of placenta outline

Outline	Frequency	Percent	Valid Percent	Cumulative Percent
Irregular	11	20.0	20.0	20.0
Regular	44	80.0	80.0	100.0
Total	55	100.0	100.0	

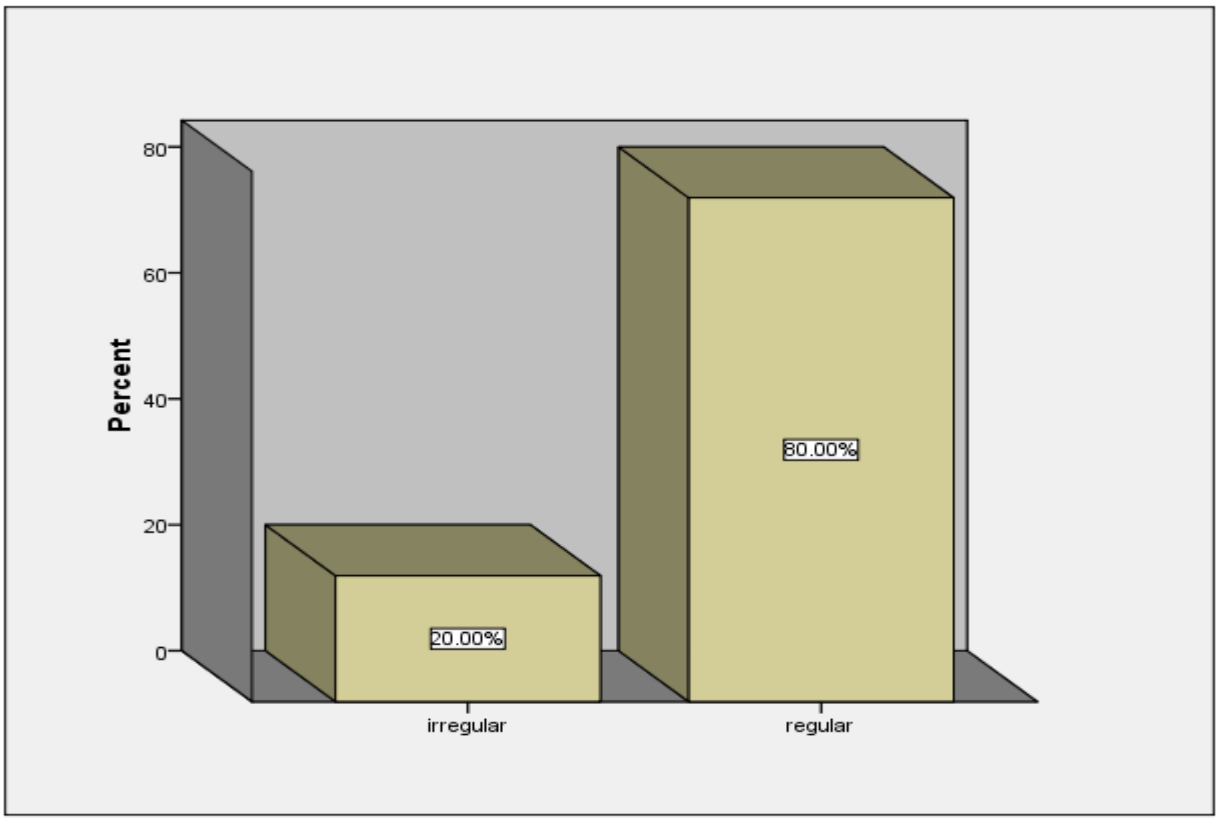

Figure (4.7) frequency distribution of placenta outline.

Table (4.10) frequency distribution of placenta echogenicity.

Echogenicity	Frequency	Percent	Valid Percent	Cumulative Percent
Heterogeneous	19	34.5	34.5	34.5
Homogeneous	36	65.5	65.5	100.0
Total	55	100.0	100.0	

Table (4.11) correlation between gravida , placenta thickness , GA \weeks and fetal weight

		Placenta thickness"cm"	GA	Placenta grade	Weight
Placenta thickness"cm"	Pearson Correlation	1	.605**	.236	.573**
	Sig. (2-tailed)		.000	.083	.000
	N	55	55	55	55
GA\weeks	Pearson Correlation	.605**	1	.609**	.808**
	Sig. (2-tailed)	.000		.000	.000
	N	55	55	55	55
Placenta grade	Pearson Correlation	.236	.609**	1	.682**
	Sig. (2-tailed)	.083	.000		.000
	N	55	55	55	55
Weight\kg	Pearson Correlation	.573**	.808**	.682**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	55	55	55	55
**. Correlation is significant at the 0.01 level (2-tailed).					

Table (4.12) compare mean weight placenta thickness, GA \weeks and fetal weight with maternal status.

Status		Placenta thickness"cm"	weight	GA
DM	Mean	2.522	2032.50	22.9643
	N	4	4	4
	Std. Deviation	.5825	280.877	5.03643
HT	Mean	3.050	2705.00	32.1429
	N	2	2	2
	Std. Deviation	.2121	431.335	.20203
Normal	Mean	2.902	2423.27	28.8105
	N	49	49	49
	Std. Deviation	.5337	458.596	6.27349
Total	Mean	2.880	2405.09	28.5065
	N	55	55	55
	Std. Deviation	.5327	456.820	6.26438
P VALUE		0.359	0.166	0.144

Table (4.13) cross tabulation placentalocation with maternal status.

Status	Placenta location				Total
	anterior	posterior	Fundal	Previa	
DM	1	1	2	0	4
HT	1	1	0	0	2
Normal	29	12	6	2	49
Total	31	14	8	2	55
P value 0.488 e. > 0.05					

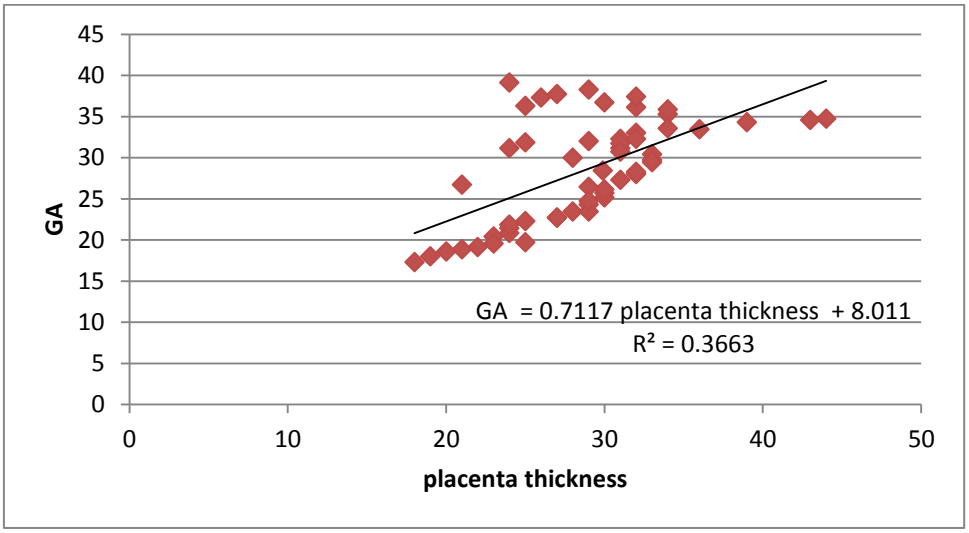

Figure (4.8) scatterplot shows linear relationship between placenta thickness and GA (R^2= 0.366)

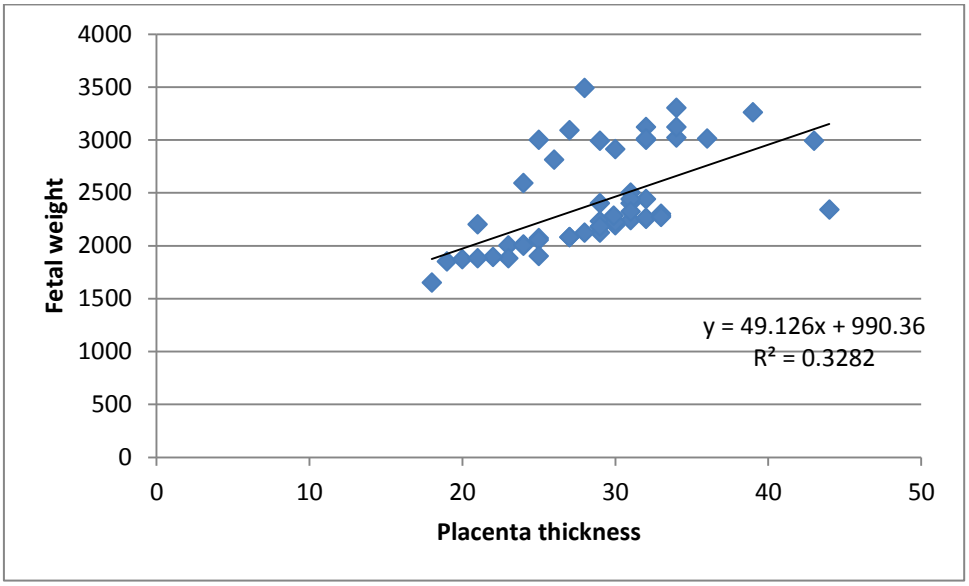

Figure (4.9) scatterplot shows linear relationship between placenta thickness and fetal weight (R^2= 0.3282Table (4.14)correlation between grade of placenta , placenta thickness , GA \weeks and fetal weight in normal (none DM or HT)

		Placenta thickness"cm"	GA	Placenta grade	weig ht
Placenta thickness"cm "	Pearson Correlation	1	.566**	.226	.537**
	Sig. (2-tailed)		.000	.118	.000
	N	49	49	49	49
GA	Pearson Correlation	.566**	1	.613**	.797**
	Sig. (2-tailed)	.000		.000	.000
	N	49	49	49	49
Placenta grade	Pearson Correlation	.226	.613**	1	.716**
	Sig. (2-tailed)	.118	.000		.000
	N	49	49	49	49
Weight	Pearson Correlation	.537**	.797**	.716**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	49	49	49	49
**. Correlation is significant at the 0.01 level (2-tailed).					

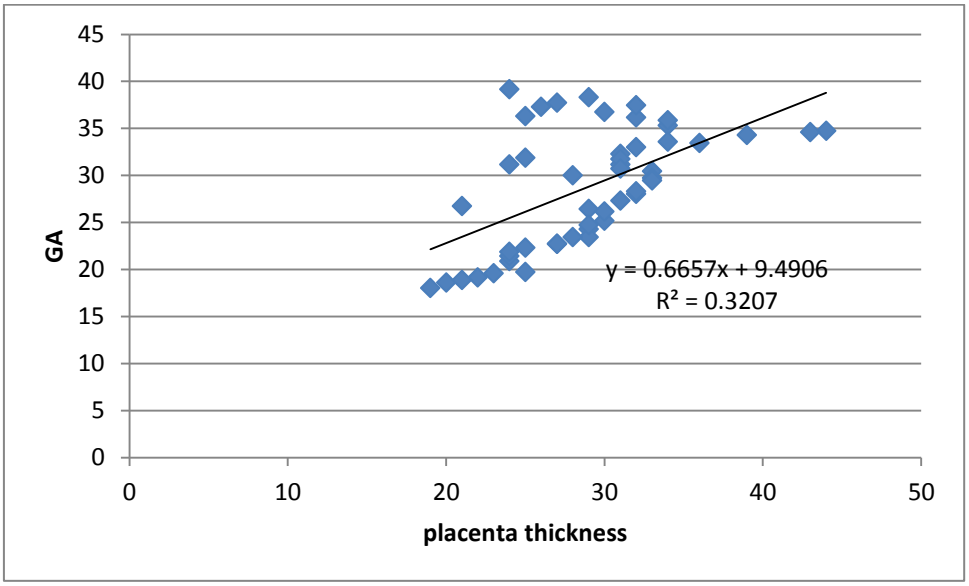

Figure (4.10) scatterplot shows linear relationship between placenta thickness and GA normal cases (R^2= 0.3207)

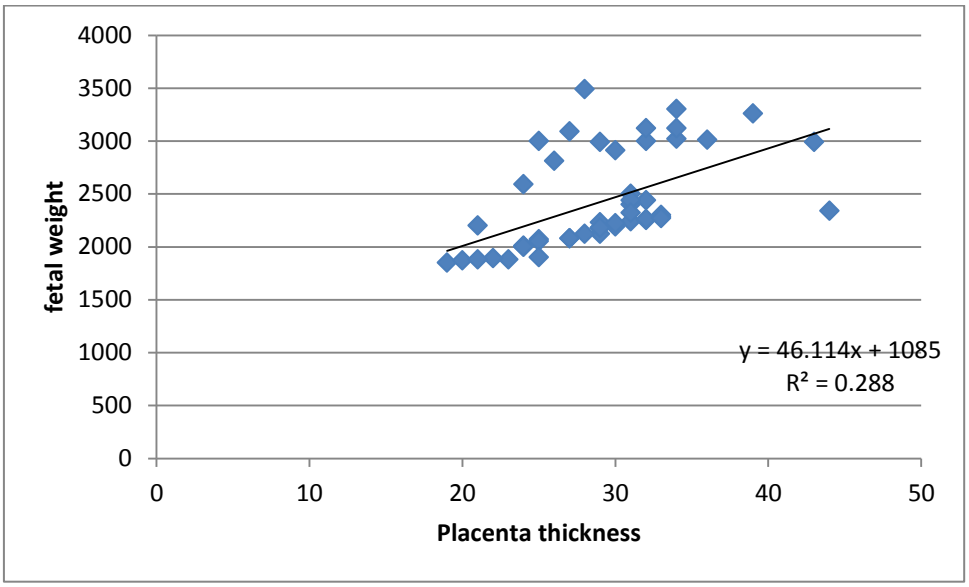

Figure (4.11) scatterplot shows linear relationship between placenta thickness and fetal weight in normal cases (R^2= 0.288).

Chapter Five

Discussion, Conclusion and Recommendations

5.1 Discussion :

study was to characterize of the placenta using ultrasound in order to assess the relationship between placenta thickness ,gestational age and fetal weight .55 pregnant woman in second and third trimester scanned using trans abdominal scanning .Most of the pregnant comes to fallow up there distributed between different age groups with peek distribution in age group (27-33)years which is 36.4% (table 4-1)figure (4-1).the frequency distribution of maternal weight is 46-85kg the high distributed in 56-65kg table (4-2)figure (4-2). Most of them were in gravida 1-3 (74%) table (4.3) . 89% had no clinical history (table 4-4) , 7.3% DM and 3.6% HT.

the mean age was 29.53(minimum 13 and maximum 40) , mean weight\kg 63.53 (minimum 46 maximum 85) , ranged 1 - 8 .the mean placenta thickness \cm 2.88 (minimum 1.8 maximum 4.4) , the mean gestational age\week 28.50(minimum 17.29 maximum39.14) and mean fetal weight \g 2405 (minimum 1650 maximum 3490.) table 4-5

Concerning liquor volume normal is most status 80% abnormal is 20% abnormal, The placenta mostly located anterior 56.4 and previa 3.6% table(4-6, 4-7) figure (4-5).

The placenta mostly in grade (0) 65.5%,regular outline and homogeneous echogenicity (80%) because most of pregnant in this sample in second trimester and normal status table(4-8),(4-9) and (4-10).

The study found that there was strong significant correlation between GA , fetal weight and placenta thickness ($p< 0.01$) ($r= 0.605,0.573$ respectively) this results agree with El amin M Y A,(2012) and Anna J, Lee, Michael Bethune , Hiscock . Richard J MBBS Franzcog, Franzco, COGU (2014), placenta grade strongly correlated to fetal weight and GA ($p<0.01$), but no significant correlation with thickness ($p>0.05$).Table (4-11) , no significant correlation between thickness and maternal clinical history ($p>0.05$) , this may be due to smaller sampling and the cases of DM and HT .table (4-12). Also no significant correlation between maternal status and placenta location ($p>0.05$).

The result of this study showed that the placenta thickness has direct relationship with gestational age it increase with the increase of gestation age (R^2=0.366) figure (4-8).The results showed that the linear relationship between placenta thickness and fetal weight (R^2=0.3282) figure (4-9), these results agree with Marwa SA (2018)

There was significant positive correlation between the placental thickness, fetal weight gestational age in non DM , non HT normal pregnant women ($p < 0.01$) table (4-14).

5.2 Conclusion:

The study found that, there is positive significant correlation between Placenta Thickness (PT) and gestational age (GA)). Also the study found that, there is positive correlation between Placenta Thickness (PT) and Fetal Weight (FW) and both are increased with increase gestational age, So gestational age and fetal weight can be followed by measuring placenta thickness.

placenta grade strongly correlated to fetal weight and gestational age but no significant correlation with placenta thickness .

no significant correlation between placenta thickness and maternal clinical history.

5.3 Recommendations:

Estimate the gestational age by using placenta thickness with abnormal pregnancies (DM-HT) is recommended for further studies.

Placenta thickness should be used in to estimation of fetal age in second and third trimesters of pregnancies .

Further studies should be carried aut in this field on many aspect such as increasing the number of patients, to show the relation between placental thickness and gestational age, comparing between the role of U/S scanning and other diagnostic tools, using color Doppler ultrasonagraphy.

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Appendix1

Data Collection Sheet

Date:

Patient data:

- Patient number( )

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……

- Age:

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……

- Weight:

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……

- Pregnancy numbers ( )

- Diabetes mellitus:
  Yes ( ) No ( )
- Hypertension:
  Yes ( ) No ( )

Fetal Data :

- Gestational age:

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……..

-Fetal weight :

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……

- liquor :

Normal ( ) Abnormal ( )

Placenta Finding:

- thickness:

……

……

-Location :

……..

……..

-grade:

……

……

-Outline:

Regular ( ) Irregular ( )

- Echogenicity:

Homogeneous ( ) heterogeneous ( )

-Separate :

Yes ( ) No ( )

- Retro placental fluid collection :

Yes ( ) No ( )

Other

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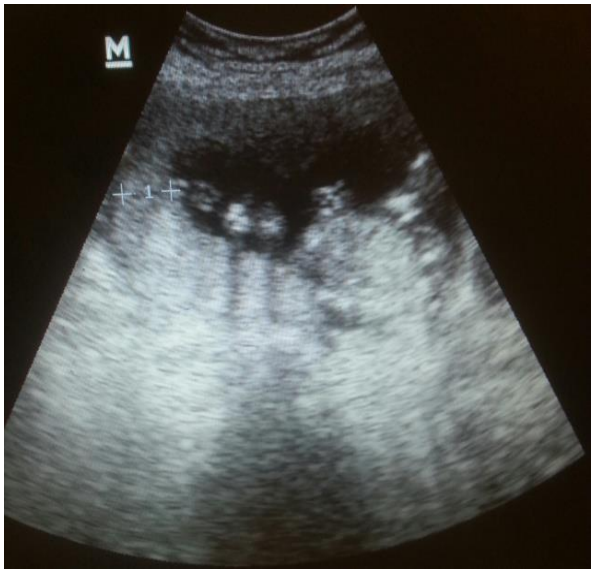
Appendix 2

Image

Transabdominal ultrasound image for 20years pregnant women, gestational age=21weeks, Measurement of placenta thickness 20mm.



Transabdominal ultrasound image for 22years pregnant women shows, placenta thickness measures 17mm and EFW 158g, gestational age= 17weeks+5days.

Transabdominal ultrasound image for 29years pregnant women, gestational age= 35 weeks + 3days, placenta thickness measures 35mm and EFW 2428g.

Transabdominal ultrasound image for 25 years pregnant women, gestational age= 29 weeks + 3days, placenta thickness measures 33mm and EFW 2270g.