



Original Article



Characterization of Placenta Using Ultrasound

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ABSTRACT

The placenta is an organ which grows in the uterus when one is pregnant. It aids in the transport of nutrients, oxygen, and eliminates waste products. The placenta is attached to the uterus wall, and the baby's umbilical cord will grow out of it. Usually, it is attached to the top, side, front or back of the uterus. **Objectives:** To determine placenta, placental thickness, and echotexture and correlate them with gestational age using ultrasonography. **Methods:** The research was conducted at the Radiology Department, the private sector, Tehsil Kharian, District Gujrat, Pakistan. The mixed-method sampling approach was applied to collect the data between December 2023 and March 2023. The data were collected on a sample size of 107 patients. The data were taken with the informed consent of the patients in adherence to the ethical norms. SPSS-20.0 was utilized as the data were entered and analyzed. **Results:** This study shows 37.4% of female with an anterior, 32.7% of female with a posterior, 7.5% with a left lateral placental location, and 22.4% with a fundal placenta. The study shows a weak positive relationship between placental thickness and gestational age. **Conclusions:** It was concluded that ultrasonography is reliable for the accurate determination of placental location, thickness, and its correlation with gestational age.

INTRODUCTION

The placenta is one of the organs that develops in the uterus; it grows. It allows it to eliminate carbon dioxide and other products of metabolism and obtain oxygen and nutrients in the blood of the mother [1, 2]. The placenta starts to develop at around week 5 of the pregnancy as the chorionic villi start growing around the area of implantation [3]. By the ninth or tenth week, the placenta appears to have a diffuse granular echo texture on sonography [4]. The uterus has a placenta, which is replaced by the fetus, and the placenta by the umbilical cord [5]. The placenta may be described as mostly anterior, posterior, fundal, right or left lateral [6]. Some placental abnormalities could include placenta previa, percreta, or vasa previa, which have serious consequences on the mother and fetus [7]. One of the studies focused on the correlation between the age of the fetus and the placenta thickness among Sudanese mothers and concluded that the placenta

thickness grows along with the age of the fetus. Researchers aimed at finding out the mean placental thickness in millimeters as sonographically calculated at the second-trimester scan (18 weeks to 22 weeks 6 days). They determined that gestational age and possibly placental location must be taken into account when calculating placental thickness was being calculated. The anterior placentas are about 7 mm thicker than the posterior or fundal placentas [8, 9]. Anterior placentas over 33 mm and posterior placentas over 40 mm should be considered as a possibility [10]. Marwa SA (2018). The Statistical Package for Social Science (SPSS) was applied by US scholars to establish a correlation between fetal weight estimates of Sudanese women and the placenta thickness of these women. Fetal movement influences the estimation of fetal age based on biparietal diameter (BPD), femur length (FL), head circumference (HC), and abdominal



circumference (AC), in the third trimester. The current research is an effort to determine the age of a fetus based on the features of the placenta that are used in a normal birth. The study's major goal is to use ultrasound to describe the placenta, determine echo texture, calculate the placenta's thickness, to relate fetal weight, gestational age, and placenta thickness, to compare the placental thickness and femur length to correlate the accuracy of age assessment, abdominal circumference, menstrual cycle, and biparietal diameter.

This study aims to determine the nourishment of the placenta and fetus through the echo texture of the placenta. Through the early diagnosis of placental anomalies, this research helps to improve patient circumstances. Also, to treat placental abnormalities using ultrasonography.

METHODS

A retrospective study was conducted in the private sector in Kharian, Pakistan. Data were collected from existing patient records between December 2022 and March 2023. The sample size of 107 was considered as per convenience. The data were collected using a mixed-method scanning method after informed consent and following the ethical guidelines described by the research committee of the university. Formal permission to access and utilize the anonymized patient records was obtained from the management of the healthcare facility before data collection. No direct patient interaction occurred, and all identifying information was kept confidential to maintain privacy and adhere to ethical standards. The obstetric scans that were done in the study were at the second and third trimesters, (between 17 to 38 weeks of gestation). Pregnant women having a previous history of intrauterine growth retardation, uterine or adnexal masses, diabetes mellitus or hypertension were not to participate. The obstetric sonography was performed using a MINDRAY® DC7 ultrasound scanner (3.8 5.0 MHz convex transducer

and Doppler function; Shenzhen Mindray Biomedical Electronics, Nanshan and Shenzhen, China). Every patient was scanned in a supine position with a moderately distended urinary bladder. The abdominopelvic area was well exposed, and an acoustic gel was used. Several longitudinal and transverse sections were done to show the placenta in its entirety. The thickness of the placenta was determined in a representative area at right angles to the chorionic plate at the cord insertion level. They measured three fetal biometric parameters, and these are BPD, AC, and FL. The measurements of placental thickness were taken at the place of cord insertion and correlated with the fetal biometric parameters.

RESULTS

Results illustrate the frequency distribution of placental location, liquor status, placental outline, and placental echogenicity. They reveal that 37.4% of females have an anterior placenta, 32.7% have a posterior placenta, 7.5% have a left lateral placental location, and 22.4% have a fundal placenta (Table 1).

Table 1: Frequency Distribution of Placental Location

Placenta Location		Frequency (%)
Valid	Anterior	40 (37.4%)
	Posterior	35 (32.7%)
	Left Lateral	8 (7.5%)
	Fundal	24 (22.4%)
	Total	107 (100.0%)

In our study, there are 93.5% of females have normal liquor status while 6.5% of female have abnormal liquor status. The placental outline of the patient is normal in 93.5% and abnormal in 6.5% of female. The homogeneous pattern of the placenta is seen in 85% of females, while 15% of female have a heterogeneous echo-pattern (Table 2).

Table 2: Frequency Distribution of Liquor Status, Placental Outline, and Placental Echogenicity

Liquor Status	Frequency (%)	Placental Outline	Frequency (%)	Placental Echogenicity	Frequency (%)
Normal	100 (93.5%)	Regular	100 (93.5%)	Homogeneous	91 (85%)
Abnormal	7 (6.5%)	Irregular	7 (6.5%)	Heterogeneous	16 (15%)
Total	107 (100%)	Total	107 (100%)	Total	107 (100%)

Maternal age included in the study were analyzed (Figure 1).

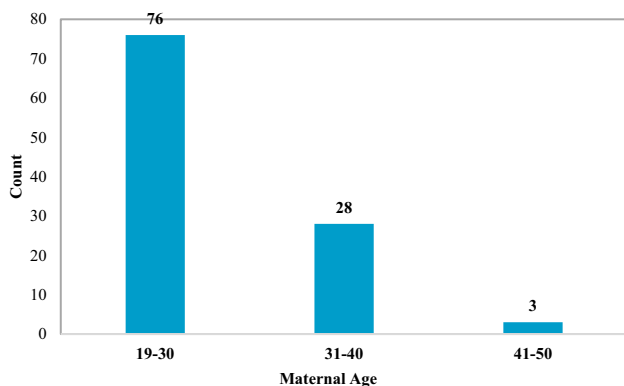


Figure 1: The Count of Maternal Ages Included in the Study
The Count of Maternal Status Included in the Study Is Calculated (Figure 2).

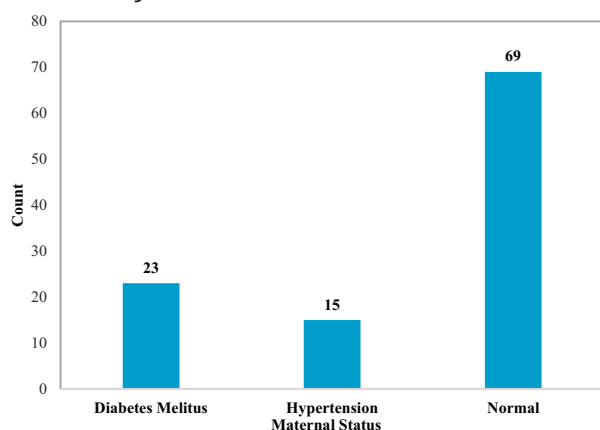


Figure 2: The Count of Maternal Status Included in the Study
The correlation above is done on the age of gestation and the placental thickness. The correlation calculated is 0.923 that gestational age and placental thickness have a weak positive relationship. Positive correlation has been documented earlier, although the correlation between the placenta thickness and the gestational age was not found to be significant in the current study. This suggests that further research with larger samples and more controlled variables is needed to better understand this relationship (Table 3).

Table 3: Correlation Between Placental Thickness and Gestational Age

Correlations		Placenta Thickness	Gestational Age
Placenta Thickness (cm)	Pearson Correlation	1	-0.010
	Sig. (2-tailed)	—	0.923
	N	107	107
Gestational Age (Weeks)	Pearson Correlation	0.010	1
	Sig. (2-tailed)	-0.923	—
	N	107	107

DISCUSSION

The placenta is a special organ that grows in the uterus when one is pregnant. It is extremely important in the exchange of nutrition, oxygen and waste products between

the mother and the unborn fetus [12]. The placenta is not a nerve organ [13]. The organ is usually attached at the top, side, front or back of the uterus. In normal pregnancy, the correlation between placental thickness and gestational age is linear, and in most of the studies, the correlation between thickness (in millimeters) and gestational age (in weeks) exists. A total of 107 pregnant women in their 2nd and 3rd trimesters the aged between 17-38 weeks of gestation, were included in the current research. In this study, it is evident that the placental position is more often anterior in the majority of the pregnancies. A research report found that the most frequent placental position was anterior and posterior [14]. The given study proves that there is a weak positive correlation between the placental thickness and the gestational age. The study of the subject, released by Angus Sunday Azagidi, concluded: The close relation and significant correlation with GA (in weeks) at all trimesters, most of them during the 2nd trimester [15]. Another study has similar results, that there is an association between gestational age and placental thickness [16]. This indicates that as gestational age grows, the placenta also grows in its thickness, thus accurately determining gestational age. Another research study reveals the same results that placental thickness has a correlation with the age of gestation [17, 18]. Placental thickness is an important additional factor that can be utilized along with other factors to estimate gestational age [19, 20]. All these studies show that there is a high likelihood (92.3%) that this weak correlation occurred by random chance.

CONCLUSIONS

It was concluded that ultrasonography is a very strong and sensitive indicator towards accurate measurement of the placental location, thickness and its relationship with the gestational age. In the current study carried out in Kharian, Pakistan, it has been revealed that there is a weak positive correlation between placental thickness and gestational age.

Authors Contribution

Conceptualization: AN
Methodology: AN, SI, NA
Formal analysis: NA
Writing review and editing: SM, NA

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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