

## LOCATIONS OF THE PLACENTA IN OBSTETRIC SONOGRAPHY AS SEEN IN THE UNIVERSITY OF BENIN TEACHING HOSPITAL, NIGERIA. SIMPLY A DESCRIPTIVE OR ROUTINE ASSESSMENT?

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**Objective:** The objective of the study was to investigate possible role of the different sites of placentation in relation to fetal lie and presentation.

**Method:** This was a retrospective antenatal sonographic study of 702 pregnant women attending the obstetric clinic of University of Benin Teaching Hospital in Benin City, Nigeria. The women had routine indications for antenatal ultrasound examination as assessed by the referring obstetrician. Bio-data was also recorded.

**Results:** The study showed age range of 18 – 42 years with a mean age of  $27.1 \pm 5.2$  years. The antenatal obstetric sonographic examinations carried out showed that the placenta was anteriorly sited in 45.7%, posteriorly in 30.2% fundus-anteriorly in 4.3% and fundus-posteriorly in 8.1%. Fetal presentation was cephalic in relation to anteriorly sited placenta in 37.3%, posteriorly in 17.8% and fundally in 1.6%. Fetal presentation was breech in relation to anteriorly sited placenta in 7.1%, posteriorly in 11.5% and fundally in 0.4%.

**Conclusion:** The study has reported placenta location as seen in UBTH which may assist in improving the antenatal maternal and fetal management.

**KEY WORDS:** placenta location, antenatal care, obstetric sonography, fetal presentation

### Introduction

Obstetric sonography which is a safe, point-of-care and non-invasive procedure has become a quick and important investigative tool in routine antenatal care and patient safety. The placenta can be demonstrated reliably and accurately by ultrasound during an obstetric ultrasound examination.<sup>1,2</sup> It enhances evaluation of the fetal well-being and viability therefore improving obstetric care.<sup>3,4</sup> During ultrasound examination of the fetus, increasing prominence is accorded biophysical profile (amniotic fluid index and more recently, umbilical cord Doppler velocimetry), structural and chromosomal anomalies screening.<sup>5,6,7</sup> It should be noted that biophysical parameters such as fetal biometry (biparietal diameter, femoral length, abdominal

circumference) respiratory rate, fetal movement, amniotic fluid index and umbilical cord Doppler velocimetry have numerical values.<sup>8,9</sup> However, description of the location of the placenta is often limited to mere notional remark without recourse to implications on progress of the pregnancy and ultimately the mode of delivery.<sup>10</sup> The placenta is therefore given detailed comments only for the evaluation for placenta previa or abruption.<sup>11</sup> Specifically, the World Federation for Ultrasound in Medicine and Biology,<sup>12</sup> American Institute of Ultrasound in Medicine<sup>13</sup> and the American College of Obstetricians and Gynecologists<sup>14</sup> have recommended that standard obstetric sonogram carried out during the second and or the third trimester should include the assessment of placental position and morphology, the amniotic fluid index and umbilical cord velocimetry. The exact position of the placenta can be determined relative to the fetus and internal os of the uterine cervix from 14 weeks gestational age onwards. Placenta location (PL) is classified as fundal, fundus-posterior, fundus-anterior, posterior upper,

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anterior upper, posterior, lower, anterior lower, right lateral wall, left lateral wall, partial placenta previa and complete previa.<sup>12,13,14</sup>

Research<sup>7</sup> has reported the potential relationship between the diameter of the umbilical cord, the fetal crown rump length and nuchal translucency in chromosomally normal fetuses using an Australian study population. Rogers<sup>6</sup> studied the use of ultrasound to assess the predictive value of umbilical cord morphology such as the thickness of Wharton's jelly, umbilical cord index (UCI) and cord entanglement to the incidence of intrapartum fetal distress. However, Prasad<sup>14</sup> in India has reported that on the most common location of the placenta in the study population and its association with fetal presentation. While Gizzo et al<sup>9</sup> documented the role that sonographic assessment of placenta location plays in influencing the incidence of maternal-fetal conditions such as gestational diabetes, pre-eclampsia, threat of pre-term birth and mode of delivery in Italy. Measurement of placenta thickness and its relationship with growth parameters in apparently normal six hundred and sixty-six pregnant Nigerian women as a marker for evaluation for intrauterine fetal growth retardation has been documented by Ohagwu et al.<sup>16</sup> There is relative dearth of data and literature regarding placenta location in particular and its relationship if any with fetal lie or presentation, complications during pregnancy (gestational diabetes, hypertension/eclampsia, abruptio placentae), fetal birth weight and mode of delivery in Benin City, Nigeria. The aim of this study is to primarily investigate the most common frequency of placenta locations in this locality.

### MATERIALS AND METHODS

This retrospective study was carried out over the period January 2016 to November 2017, to review ultrasound scan reports of 702 pregnant women. The patients were either direct referrals from other peripheral hospitals or as referrals from patients attending the ante-natal clinic of the Department of Obstetrics and Gynecology of the University of Benin Teaching Hospital (UBTH), Benin City for routine second and third trimester

scans. The request forms and reports were retrieved from the Records Unit of the Department of Radiology. Inclusion criteria in the study included singleton pregnancies which had complete clinical and grossly normal obstetric sonographic records of antenatal visits. All scans which showed evidence of fetal biophysical profile and placental location were selected and documented. The clinical indications included routine obstetric scan and patients with incomplete sonographic records were excluded from the study.

Bio-statistics, clinical information and ultrasonographic data regarding maternal age and parity, gestational age, placental location, fetal lie and presentation were collected and inputted into a Microsoft Excel spread sheet. Data analysis was performed using the Statistical Package for Social Science (SPSS) version 16 (Chicago IL, USA). Statistical software and the summary data expressed in descriptive statistics such as frequency tables, percentages, and averages were generated. The type and pattern of fetal congenital anomalies seen during this period was analyzed. Test of significance was done with student T-test, analysis of variance (ANOVA) and Pearson correlation test. Confidence interval of 95% was used. P value less than or equal to 0.05 was considered statistically significant.

### RESULTS

Between January 2016 and November 2017 sonographic reports of 702 pregnant women were retrospectively evaluated in the University of Benin Teaching Hospital at in this study population. The age range of patients was 18 - 46 years with a mean age of  $27.2 \pm 5.2$  years, median age of 27 years as documented in Table I. The gestational age (GA) of the fetuses in this study ranged from 14 – 42 weeks with a mean GA of  $27.9 \pm 9.0$  weeks. The frequency distribution of location of the placenta is as shown in Table II and the most common location recorded as anteriorly sited, contributing 327 cases or 46.6% of the study population. The data collected from the study regarding the correlation between placenta

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**Table I:** Age distribution of patients in this study.

AGE GROUP (Years)	FREQUENCY (n)	PERCENTAGE (%)
16-20	68	9.7
21-26	275	39.2
27-31	223	31.8
32-36	108	15.4
37-41	17	2.4
42-46	11	1.6
TOTAL	702	100.0

### DISCUSSION

**Table II:** Placenta location demonstrated in this study.

PLACENTA LOCATION	FREQUENCY (n)	PERCENTAGE (%)
ANTERIOR	321	45.7
POSTERIOR	212	30.2
FUNDO-ANTERIOR	30	4.3
FUNDO-POSTERIOR	57	8.1
FUNDAL	16	2.3
ANTERIOR PREVIA MINOR	12	1.7
ANTERIOR PREVIA MAJOR	12	1.7
POSTERIOR PREVIA MINOR	36	5.1
POSTERIOR PREVIA MAJOR	6	0.9
TOTAL	702	100.0

location and fetal presentation is recorded in table III. Fetal presentation was cephalic in relation to anteriorly sited placenta in 37.3%, posteriorly in 17.8% and fundal in 1.6%, while presentation was breech in relation to anteriorly sited placenta in 7.1%, posteriorly in 11.5% and fundal in 0.4% of cases. The fetuses were mainly cephalic presenting (n=503, 71.6%), breech presenting (n= 168, 24.0%) and transverse lie (n= 31, 4.4%) as reported in this study and presented in Figure I.

Ultrasound is a safe and useful investigative tool in antenatal diagnosis and management of the in-utero fetus throughout the stages of gestation, and thus aids the obstetrician in planning a safe mode of delivery.<sup>4</sup> This is more expedient in present day maternal healthcare which aims at reducing the primary cesarean delivery rate worldwide, and therefore maternal mortality and morbidity.<sup>17,18</sup> In the time interval considered, the study measured data of 702 patients with

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**Table III:** Relationship between placenta location and fetal presentation demonstrated in this study.

PLACENTA LOCATION (n)	CEPHALIC PRESENTATION (n, %)	BREECH PRESENTATION (n, %)	TRANSVERSE LIE (n, %)
ANTERIOR (321)	262 (37.3)	50 (7.1)	9 (1.3)
POSTERIOR (212)	125 (17.8)	81 (11.5)	6 (0.9)
FUNDO-ANTERIOR (30)	28 (4.0)	2 (0.3)	-
FUNDO-POSTERIOR (57)	48 (6.8)	7 (1.0)	2 (0.3)
FUNDAL (16)	11 (1.6)	3 (0.4)	2 (0.3)
ANTERIOR PREVIA MINOR (12)	10 (1.4)	2 (0.3)	-
ANTERIOR PREVIA MAJOR (12)	9 (1.3)	3 (0.4)	-
POSTERIOR PREVIA MINOR (36)	26 (3.7)	10 (1.4)	-
POSTERIOR PREVIA MAJOR (6)	4 (0.6)	2 (0.3)	-
<b>TOTAL</b>	<b>523 (74.5)</b>	<b>160 (22.7)</b>	<b>19 (2.8)</b>

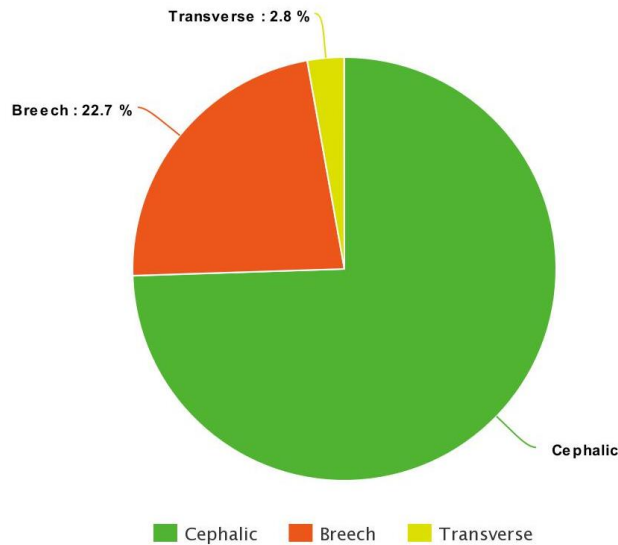
maternal age ranging between 18 - 46 years with a mean age of  $27.2 \pm 5.2$  years, median age of 27 years as documented in Table I. The age distribution reported that 27-31 age group contributed the highest frequency of 223 patients or 31.8% to the study.

The placenta which has various sites of attachment to the uterine wall establishes the vascular supply between the mother and the fetus through the umbilical cord, and therefore can be used to assess fetal well-being, viability and mode of delivery. This brings to fore the need for a focused investigation of placenta location during routine antenatal sonographic examination of the fetus. Researchers<sup>5,6,19</sup> have studied the diameter of the umbilical cord and the flow velocity as it relates with fetal development, but this study has documented the location of the placenta. In this study, the highest placenta

location frequency was anterior (45.7%), posterior (30.2%) and fundo-posterior 9.1%) locations followed respectively as shown in table II. The finding was in agreement with study done by Gizzoet al<sup>10</sup> which documented anterior (54.8%), followed by posterior (30.9%) and fundal (7.7%) locations, while Prasad<sup>15</sup> which documented anterior lower (41.8%), followed by posterior upper (22.8%) and fundo-posterior (13.8%) locations.

Although placenta has been routinely and systematically included in standard ultrasound reports in the University of Benin Teaching Hospital, unfortunately no research has been conducted to investigate the impact of placenta location on pregnancy outcome. This study probably for the first time documented the

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**Figure 1:** Percentage contribution of the fetal presentations commonly seen in the study (n=702).

relationship between placenta location and fetal presentation as reported in table III, and showed that 74.5% were cephalic presenting, 22.7% breech presenting and 2.8% in transverse lie. The highest frequency of anterior concordant with cephalic presentation documented in this study corroborates with studies<sup>8,15</sup> done with a larger sample size. Although the exact mechanisms involved in facilitating fetal rotation to favor cephalic presentation is not precisely understood, the authors speculated that this finding may be due intrauterine factors such as gravity, maternal posture, fetal neurological development which resulted in fetal kicking and body movements which ultimately influenced fetal body axis posture in favor of cephalic presentation.<sup>20,21,22,23,24</sup>

In conclusion, this study has documented the relationship between placenta location and fetal presentation in a hospital-based study population in Benin City, reporting that anterior location and cephalic presentation are the most common findings. A more detailed research of placenta location, fetal presentation and pregnancy

outcome with a larger sample size is therefore recommended.

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