



## Estimation of Fetal Weight by Measuring Umbilical Cord Diameter Using Ultrasonography

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### ABSTRACT

**Background and Objectives:** Fetal weight assessment is a significant component in obstetric practices. The present study aims to estimate the fetal weight (EFW) by measuring the diameter of the umbilical cord.

**Materials and Methods:** The cross-sectional study included 153 pregnant women in third trimester. The sonographic evaluation was performed using mindary and Futus Fujifilm, for the examination. Data were collected by the researcher by measuring the umbilical cord diameter. The data were analyzed using Microsoft Excel and SPSS version 16.

**Results and Discussion:** The current study closely aligned with findings reported by Benjamin et al. (2020) and Sarwar et al. (2018). Both studies highlighted significant positive correlations between UCD and fetal weight, reinforcing the idea that UCD is an important metric for assessing fetal growth and development. These studies emphasized using UCD as a reliable indicator, linking it effectively to fetal growth patterns, paralleling the findings of the current study in terms of correlations with fetal weight.

**Conclusion:** The ultrasonographic measurement of fetal weight using the umbilical cord diameter helps predict and estimate fetal birth weight and help in obstetric management. The current study provides valuable insights by demonstrating that umbilical cord diameter is significantly correlated with fetal weight.

**KEY WORDS:** Estimation Fetal weight (EFW), Umbilical Cord Diameter (UCD), Ultrasonography

### 1.INTRODUCTION

Umbilical cord is to begin with visualized by ultrasound at 8weeks, when the length of the line is roughly rise to the crown-rump length; it as a rule remains at the same length as the hatchling all through pregnancy. Distance across of the umbilical rope is ordinarily 2 cm. It as a rule contains two arteries and one vein; early in improvement, there are two umbilical veins, but the right vein decays and the left vein continue. Nearness of two umbilical arteries can be confirmed on a short axis view or by visualizing vessels on each side, sidelong to the fetal bladder (1). The ultrasonographic assessment of fetal weight assists in accurately predicting fetal birth weight and can affect obstetric management choices about delivery timing and method, thereby minimizing perinatal morbidity and mortality (2). The estimation of fetal weight in utero has been an important aspect of obstetrical practices since the introduction of ultrasonography by Dr. Ian Donald in 1958 (3). Estimating fetal weight is crucial in various obstetric choices related to monitoring intrauterine growth, delivery, and identifying high-risk pregnancies (4, 5). Fetal weight is regarded as an independent risk factor for elevated perinatal morbidity and mortality. Complications during labor and delivery can arise for both the mother and child due to both low and high fetal weight at birth (2, 4, 6). Errors in estimating fetal weight can heighten risks in management and during delivery, particularly in cases of suspected macrosomia (7).

Ultrasound is an effective technique for determining the duration of pregnancy, thereby enhancing obstetric care. The multiple parameters approach for evaluating gestational age is applicable when the gestational age estimates from different ultrasound parameters are consistent. If the estimates of gestational age from one or more parameters differ by more than 2 weeks from those of other parameters, either the abnormal ultrasound parameters need to be disregarded or an alternative method for estimating gestational age should be employed. When different ultrasound parameters indicate varying gestational ages, the fetus needs to be assessed further to understand these discrepancies. For instance, a significantly small FL measurement could indicate short-limb anomalies, a large BPD might be a result of hydrocephalus, and an unusually small or large AC measurement may point towards asymmetric intrauterine growth restriction or macrosomia, respectively (8).

## 2. MATERIALS AND METHODS

A cross-sectional study includes 153 pregnant women with confirmed pregnancy were included. All women with Suspected fetuses of having congenital abnormalities were excluded. The sonographic evaluation was performed using mindary (figure 1), and Fujifilm machines (figure2). A linear array probe was preferably used for the examination. Data were collected by the researcher by measuring the umbilical cord diameter.

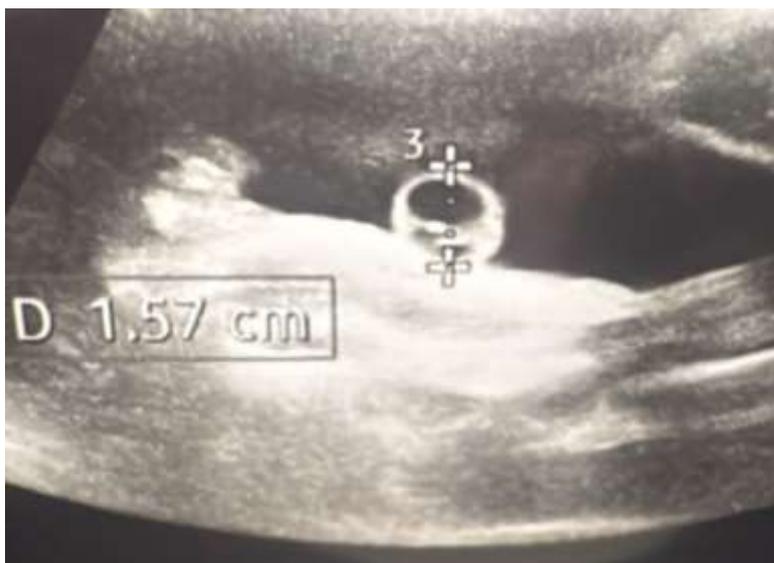


Figure (1): Demonstrates measurement of the umbilical cord diameter 1.57 cm using Mindary ultrasound machine for the fetus of 28 years old pregnant woman.



Figure (2): Demonstrates measurement of the umbilical cord diameter 1.80 cm using Fujifilm ultrasound machine for the fetus of 25 years old pregnant woman.



3.RESULTS AND DISCUSSION:

**Table (1): Shows Correlations Between umbilical Cord & Estimated Fetal Weight( EFW )**

		CORD	EFW
CORD	Pearson Correlation	1	.345**
	Sig. (2-tailed)		.000
	N	153	153
EFW	Pearson Correlation	.345**	1
	Sig. (2-tailed)	.000	
	N	153	153

\*\* . Correlation is significant at the 0.01 level (2 tailed).

There is a significant positive correlation between fetal weights and umbilical cord diameter, with a correlation coefficient of (0.345) at a significant level, indicating a strong statistical significance (sig 0.000), this results is shown in table (1).

**Table (2) simple regression analysis for evaluating fetal weight in relation to increased umbilical cord diameter**

Model	R	R Square	Adjusted Square	R	Std. Error of the Estimate
1	.345 <sup>a</sup>	.119	.113		.240278328000000

a. Predictors: (Constant), EFW G

- .113 = Adjusted R Square: Corrected Value Accounting for the Number of Variables and Sample Size.
- .240278328000000 =Std. Error: Standard Error of the Model Estimate

Table (2) illustrates the results of simple regression analysis for evaluating fetal weight in relation to increased umbilical cord diameter. The results have shown the significance of this effect, with a value of (119= R2), which indicating that fetal weight explains (119) approximately (11.9%) of the variance in the dependent variable (umbilical cord diameter) that can be accounted for by umbilical cord diameter at a value of (0.119).

Among the previous studies, Benjamin et al. (2020)(9) and Sarwar et al. (2018)(10) reported findings closely aligned with the current study. Both studies highlighted significant positive correlations between UCD and fetal weight, reinforcing the idea that UCD is an important metric for assessing fetal growth and development. These studies emphasized using UCD as a reliable indicator, linking it effectively to fetal growth patterns, paralleling the findings of the current study in terms of correlations with fetal weight.

However, differences arose when comparing the current findings with studies such as those by Afzali & Noferesti (2015)(11) revealed a significant correlation between umbilical cord area and fetal weight only during the second trimester, pointing to a temporal limitation not observed in the current study.

In conclusion, the current study provides valuable insights by demonstrating that umbilical cord diameter is significantly correlated with fetal weight.

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