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Research Article

**PROSPECTIVE ANALYTICAL COMPARISON IN  
SONOGRAPHIC MEASUREMENTS ON ABW WITH STUDY  
TO FWA**<sup>1</sup>Dr Hafiza Aqsa Faiz, <sup>1</sup>Dr. Maryam Khan, <sup>2</sup>Dr Ayesha Iftikhar<sup>1</sup>Dera Ghazi Khan Medical College<sup>2</sup>Govt Allama Iqbal Memorial Teaching Hospital Sialkot**Article Received:** May 2020**Accepted:** June 2020**Published:** July 2020**Abstract:**

**Aim:** To determine the accurateness of fetal weight that has been derived from the six modules of sonographic cases, to estimate the birth of actual of the babies or neonates in Pakistan. The purpose of the study is to determine either results taken from the sonographic technique are similar to the actual weight of the babies after delivery.

**Technique:** The cross-divitional analytical study was conducted by using the data of 245 women which were having singleton pregnancies at Multan hospital, Pakistan from September 2017 to February 2020. To determine Estimated Fetal Weight, the fetal parameters were obtained by obstetric ultrasound scan from which each woman who has participated was included into sonographic modules. Scan Delivery Interval as well as Actual Birth Weight were obtained from the birth. Percentage error, sensitivity test, ROC curve analysis, and proportion of EFW with ABW were used to determine the accuracy of sonographic modules.

**Results:** The Hadlock Biparietal Diameter per Abdominal Circumference per Femur Length as well as Hadlock BPD/AC modules have the slightest systematic error (-0.5% and -0.7%) as compared to other modules, and advanced proportions of precise estimated fetal weight in 10% of actual birth weights. For new-born in the normal weight class, Hadlock BPD/AC module best found the ABW ( $p=0.006$ , ROC curve area=0.737).

**Conclusion:** The Hadlock BPD/AC method constantly determined elevated correctness for assessment of fetal weight. It is analogous with Hadlock BPD/AC/FL module but it has a benefit of finding less fetal parameters

**Keywords:** Estimated Fetal Weight, coronavirus, sonographic modules, ROC curve analysis, Actual Birth Weight

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**INTRODUCTION:**

Correct amount of fetal weight is critical and effect on the administration of the fetus in different clinical situations. It is necessary for the finding of fetal enlargement in women with high risk pregnancies because it gives the information which helps obstetricians make a decision on the time, mode as well as the place of delivery for the majority pregnancies; and finds the want for detailed interventions (1). Mortality rates are more aware to birth weight than gestational age, thus making fetal weight a determinant of pregnancy outcomes as well as neonatal mortality

Different clinical as well as imaging techniques are usually engaged in the assessment of fetal weight along with studies differ in their opinions on the precision of one method over the other (2). Presently, two-dimensional ultrasonography is a extensively satisfactory imaging method usually used for the estimation of foetal weight. It is apparent as having high-quality clinical strength as well as accuracy due to it's impartiality, and use of standardised as well as reproducible fetal measurements (3). The frequent fetal measurements include: the HC, BPD, FL, and AC that are then insert singly or in diverse combinations into regression modules, to obtain estimations of weight (4). Current modules included three or four foetal parameters, in an attempt to get better their accurateness as well as analytical value (5).

**METHODOLOGY:**

This was a , cross-sectional, probable analytical study of 245 consecutive, accepting , suitable pregnant women who were getting care at the antenatal clinic of Multan, Pakistan, from September 2017 to February 2020. The study was accepted by the Health Research Ethics Committee. All women participated in the study with singleton,

term pregnancies of 37 to 41 weeks of the gestational age were appropriate for the study.

The exclusive criteria selected for the women during study was pregnant women dealing with various chronic mental illness, chronic hypertension, HIV infection, pulmonary tuberculosis, pre-eclampsia, diabetes mellitus and antepartum haemorrhage. The women who were not certain of their last menstrual cycle, as well as had no ultrasound scan dating of pregnancy in the first trimester and with antenatal analysis of congenital fetal anomalies were not included in the study. Each chosen mother-fetus pair serve as their own control because fetal weight for each fetus was predictable as well as then compared with their definite birth weight. The sample size was found by use of standard deviation of weight of neonatal of 0.64 kg.

Consequently, a sample of about 245 women was sufficient for the study depends on an understood standardised consequence size of 0.3, study power of 90% at 95% self-assurance level, and abrasion rate of 5%.

Every foetal parameter was calculated three times as well as the average of two actions at close choice, recorded for every parameter. After the delivery of child, the birth weight of babies was calculated in grams by the midwife on responsibility within 30 minutes of delivery, by use of a standardised neonatal weighing balance. The actual birth weight of every child, the sex as well as number of days from the ultrasound scan (SDI) were standard in the data sheet participants. Parameters for every foetus were divided into the six chosen formulae for weight modules, to get the value of EFW.

**Association between EFW of sonographic modules and ABW.**

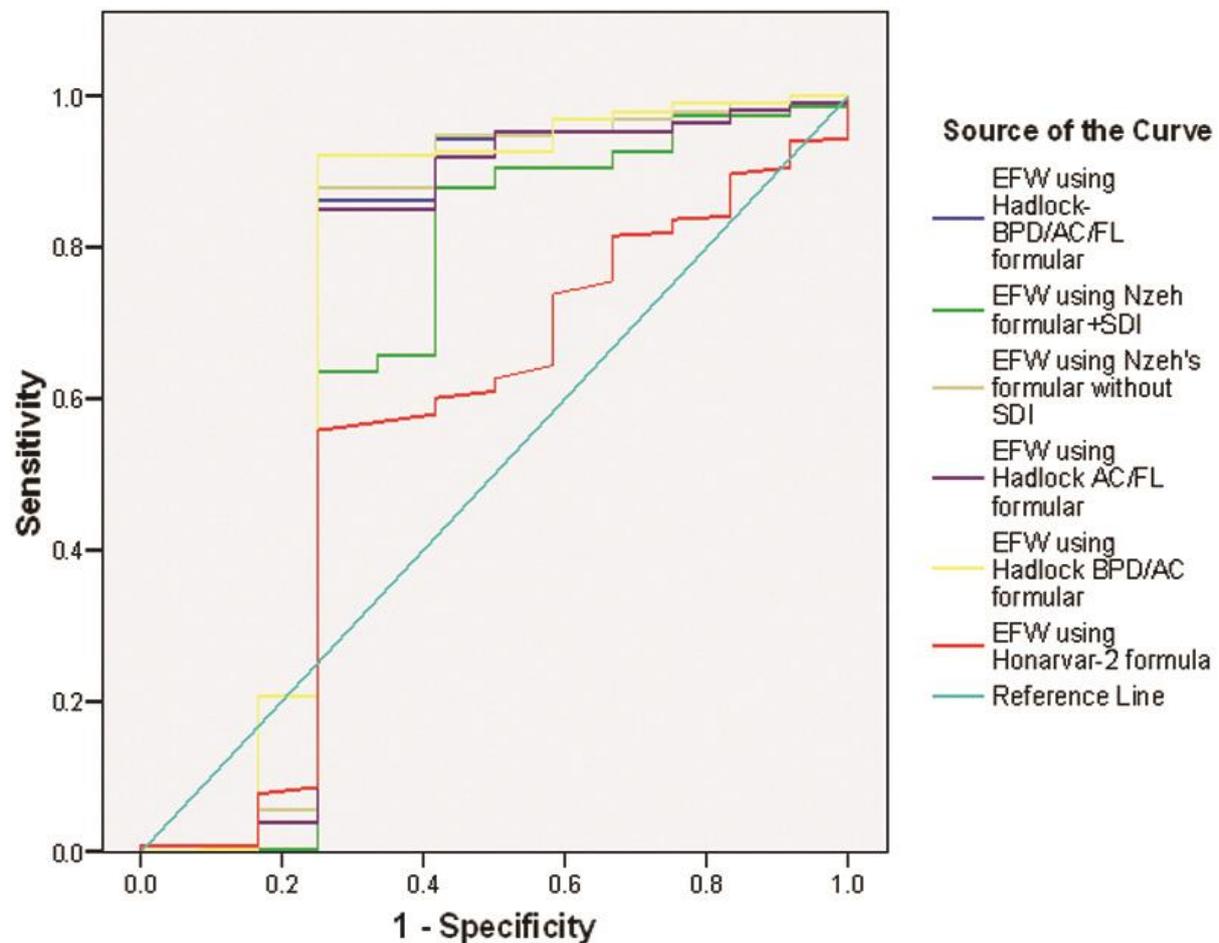
Sonographic modules	EFW range (grams)	Comparison of means		Correlation analysis <sup>†</sup>	
		Mean EFW±SD (grams)	p-value*	r	p-value*
Nzeh BPD/AC/FL	2496-4185	3404.2±276.14	0.040	0.723	<0.001
Hadlock BPD/AC/FL	2240-4321	3332.4±336.76	0.068	0.722	<0.001
Nzeh BPD/AC/FL+SDI	2374-4460	3544.8±355.36	<0.001	0.707	<0.001
Hadlock AC/FL	2355-4448	3396.1±352.72	0.151	0.700	<0.001
Hadlock BPD/AC	2228-4346	3324.0±327.31	0.022	0.692	<0.001
Honarvar FL	2521-4751	3392.5±328.89	0.348	0.427	<0.001

**RESULTS:**

A total amount of 252 women who were pregnant were selected for the study from which 245 women completed their study by following all variables. The follow-up plan was not followed by 7 patients; therefore, it has been showed that 2.8% were not followed the study. The results showed that the mean age of the patients was about  $30.7 \pm 4.47$  which ranges from 15-41 years. It has been found that 241 out of 245 which means 98.4% women were of Igbo tribe, 241 out of 245 were married and 196 out of 245 were having tertiary education. The results determined that ABW of the newborns was  $3371.4 \pm 413.64$  that was ranges from 2100-5000. The rate of male to female was 2:1 which means 131 out of 245 babies were female and 114

babies were male. Low birth weight of the neonates was 1.2%, for normal birth weight was 95.1% and macrosomia was about 3.7%.

The mean Actual Body Weight was alike to the mean EFW from Hadlock BPD/AC/FL, Hadlock AC/FL and Honarvar FL modules ( $>0.05$ ) but altered considerably from those of Hadlock BPD/AC), Nzeh BPD/AC/FL/SDI, and Nzeh BPD/AC/FL without SDI modules. Though, the EFW from each module determined a positive association with ABW ( $p < 0.001$ ). the particulars of the relationship between the actual birth weights as well as estimated foetal weights from all modules are determined in the table.

**ROC Curve****DISCUSSION:**

The study was conducted to find the accuracy and sensitivity of four equations of ultrasound for the estimation of fetal birth weight. The objective of the study was to find the most accurate method used for the estimation of fetal birth weight. Four types of equations of ultrasound such as hadlock's formula, shepard's formula, shinozuka's formula

and warsof's formula were used for the study. From the study it was concluded that the most accurate method for birth weight estimation is hadlock's formula. It was considered as most sensitive method for the birth weight estimation. It was also found that few formulae have been produced for assessing fetal load in the late second and the third trimester. These formulae include an

assortment of sonographically acquired biometric estimations. The sonographic estimation which depends on estimation of different fetal measurements, especially BPD, HC, Air conditioning and FL has been better than clinical estimation yet at the same time needs instruments and very much prepared physicians. The most noteworthy positive relationship between the ABW and the EFW was found in the Hadlock's IV ( $r = 0.836$ ). As indicated by the zone under the bend for every ROC bend Hadlock's IV condition has the most noteworthy (0.849).

The results were similar to a study conducted by Waseem Akhtar et al. This study was conducted in Pakistan and the accuracy of sonographic method found in this study. Four methods were compared in this study in which it was found that handling equation is more sensitive to the people of Pakistan. This technique is mostly used in different hospitals and is giving better results. Before 4 days of delivery, ultrasound scans were performed. The prediction of birth weight was done with all the equations. All formulae showed better results with a small error, but Hadlock's formula was considered as superior method. The study was also similar to a study conducted by J. Siemer et al. at the Perinatal center Germany. 11 different formulae were studied to estimate the fetal weight in order to find which one method is more suitable and which one is less suitable. There was also another purpose of the study that was estimation of function of sonographers for accurate measurement of fetal weight. 1941 fetuses were selected and examined by ultrasound with all biometric parameters that were recorded seven days before the delivery. Both experienced and inexperienced sonographers carried out the scans of fetuses. It was concluded from the results that the two formulae of Hadlocks regression (such as AC-FL-BPD and AC-FL-BPD-HC) showed most accurate results

### CONCLUSION:

It has been concluded from the study that there is variation present in the actual body weight of the neonates as well as the weight estimated by the ultrasound scan. Hadlock is the best method that can be used to determine the actual baby weight before delivery because the results showed that the variation in this method was less as compared to the other methods used in the study. Less parameters as well as less time is used in the Hadlock method while determining the baby weight. Therefore, the routinely used method for the determining of the baby weight is Hadlock and is being practiced in various hospitals in Pakistan.

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