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A CROSS-SECTIONAL RESEARCH TO DETERMINE THE ULTRASONOGRAPHIC ACCURACY FOR THE ESTIMATION OF DELIVERY DATE

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Abstract:

Objective: *This study focused on determining the correctness of the ultrasonography process to find the date of delivery within pregnancy during the First Trimester. This was a cross-sectional study held at the Mayo Hospital, Lahore from February to September 2018.*

Results: *observations made in the first trimester showed the deliveries accuracy rate as 109 (86%) predictable by ultrasound. In Group 1 (18 – 35 years) there were 106 (84%) patients with a frequency rate 88 (83%) and Group 2 was having age range (36 – 50 years), and there were 22 (16.5%) and with the accuracy rate 100%. In the initial group of gestational age, there were 78 (61.4%) patients with an accuracy rate 73 (94%) and within the second group of gestational age, 49 (38.89%) patients were included with an accuracy rate 37 (74%).*

Conclusion: *For the detection of the date of delivery, ultrasound-based EDD approximation is better during the 1st trimesters.*

Keywords: *Ultrasound, Gestational Age, Last Menstrual Period, Estimated / Expected Date of Delivery*

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INTRODUCTION:

It is very important to know the date of delivery as it has personally, medically and socially many important implications for the woman in pregnancy and the doctor has responsibility for the safe delivery of her patient as well. Proper assessment of gestational age is vital in the process of obstetric care [1]. The need for an accurate appraisal of gestational age is mandatory for making suitable management. Right detection of pregnancy date can help obstetricians for providing proper counselling to the women which are at risk of delivering a fetus prior to 37 weeks (preterm delivery). It is also important in assessing fetal development and in detecting intrauterine development limitation [1, 2]. Roundabout seventy percent of women in the USA get through ultrasound tests during pregnancy for determining the date of delivery [3]. The precise information relevant to the gestational age is mandatory to monitor fetal growth during gravidity and for providing the best relevant arrangements for the fetus in accordance with the delivery date [4]. Information about the delivery time is very important to the health of the fetus and categorizing delivery as pre-term, term or post-term 42 weeks later. So, accuracy has great importance [5]. During pregnancy, women can predict well-recognized fetal parameters on the basis of ultrasound scanning measurement [6]. The delivery process has many effects on women in pregnancy. There are limitations in ultrasound assessment because it presents bias having its base on fetal growth and it can display incorrect lower gestational age approximations for the fetus as well as the infant's born rate as post-term is 1.1% and 7.9% as pre-term [2]. In underdeveloped countries like Pakistan where there is a lack of education and resources, the mothers rely on USG to determine fetus gestational age. The approximate magnitude of USG's accuracy within the first trimester during gravidity in assessing the date of delivery is significant. High accuracy effects newborn's and maternal obstetri1cal care and in the future, it can be used for assessing delivery date. In this study, the delivery was taken positive if it befalls on the date estimated through USG during pregnancy's first trimester and term defines the occurrence of delivery between thirty-seven completed weeks and forty-one weeks + six days [6, 7].

METHODS:

This was a cross-sectional study held at the Mayo Hospital, Lahore from February to September 2018. The participants were primigravida, having Singleton pregnancies and the age range 18 to 45 years. The participants with Multiple gestations, nonviable pregnancy, fetal malformation crown-rump length less than 15 mm (below 8 weeks), and women who are intended for elective cesarean were excluded from the study. Our study had hospital-based limitations and it included the patients only came for antenatal care and the patients with multiple pregnancies were excluded as well as those who had complications in their pregnancies. Patients fulfilling the inclusion criteria were briefly explained the constraints of the study procedure, and informed consent was taken. Necessary permissions were taken from the ethical committee. Experienced sinologists completed first-trimester USG and obtained the estimated delivery date. When the date of delivery matched USG estimated date of delivery (in the first trimester) then accuracy was taken positively. Statistics were noted on the Performa. At the time of registration, information was entered in the first part of Performa in Annexure-1, and at the time of thirty-seven to forty-one weeks + six days or on delivery time, information was entered into the second part of Performa. Data analysis was done through software SPSS version 10. Quantitative variables (age of the woman and gestational date) were assessed by USG through percentages and Frequencies. Chi-square test was used and distribution of groups was made using the random technique to decrease the effects of a confounder, classification of the age and other variable was performed and the significance level ≤ 0.05 was significant.

RESULTS:

All data were analyzed through SPSS Version17. Patients average age was (26.50 ± 3.85) and fetal average gestational age was (10.16 ± 0.85) weeks. In the first trimester, all patients had gone through ultrasonography for the expected delivery date. The accuracy rate for deliveries was 108 (85.8%) assessed in the first trimester by the ultrasound. Two groups were made after stratification of age as Group 1 and Group 2. Group 1 comprised over patients with age range18 years to 30 years whereas, Group 2 comprised over patients having the age range 31 years to 45 years. Group 1 had 105 (83.33%) patients and the accuracy rate was 88 (83%) and within Group 2 had 21 (16.17%) patients displayed accuracy rate 100%. Stratification according to age as well as two groups were made. The patients in the first group and in the second group were having gestational age 9 to10 weeks and 11 to 12 weeks respectively. There were 77 (61%) patients in group 1 gestational age group with the accuracy 73 (94%) and 49 (38.90%) patients in group 2 with accuracy 36 (74%).

Table – I: Ultrasonographic Accuracy in First Trimester

Ultrasonographic Accuracy in First Trimester	Percentage
Yes	86
No	14

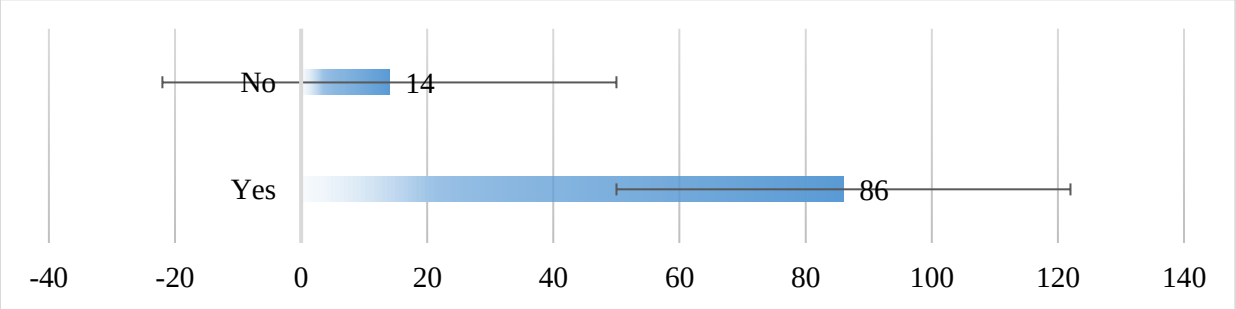


Table – II: Age Wise Accuracy

Accuracy	Yes		No		Total		P-Value
	No	%	No	%	No	%	
Group - A (18 - 30) Years	87	82.9	18	17.1	105	83.33	0.029
Group - B (31 - 45) Years	21	100	0	0	21	16.17	
Total	108	85.7	18	14.3	126	100	

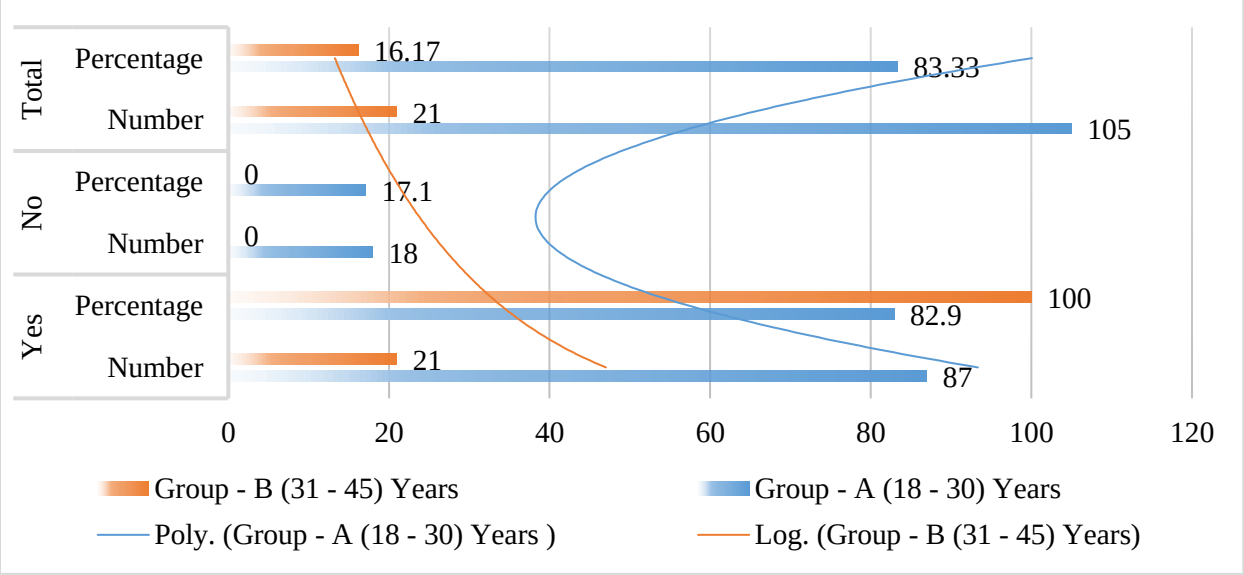
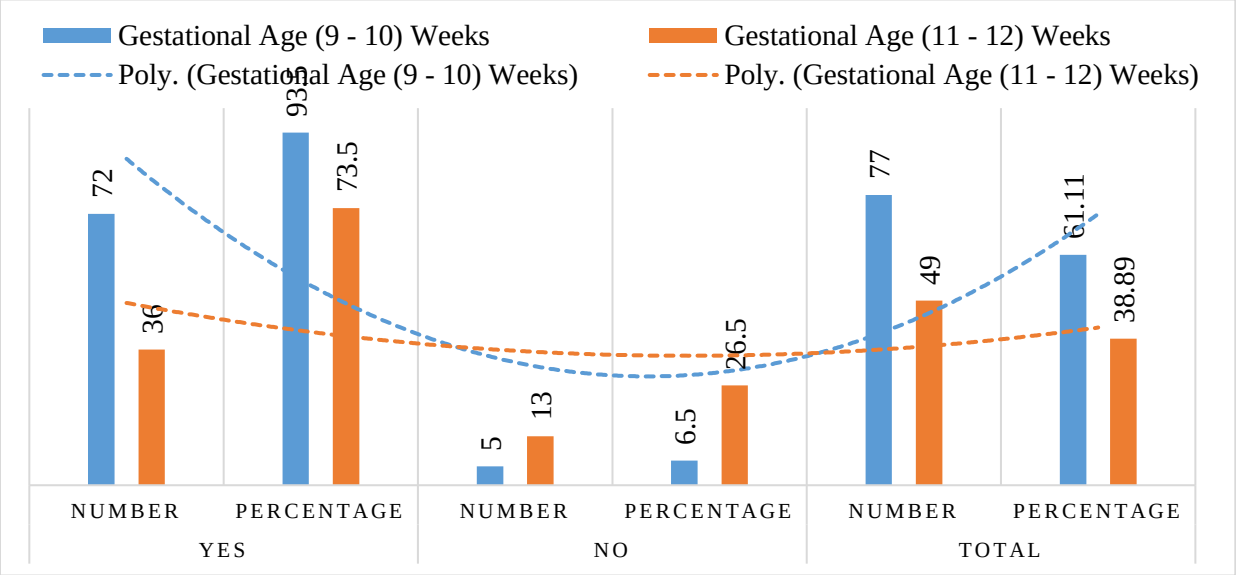


Table – III: Gestational Age Accuracy

Accuracy	Yes		No		Total		P-Value
	No	%	No	%	No	%	
Gestational Age (9 - 10) Weeks	72	93.5	5	6.5	77	61.11	0.002
Gestational Age (11 - 12) Weeks	36	73.5	13	26.5	49	38.89	
Total	108	85.7	18	14.3	126	100	



DISCUSSION:

The estimated date of delivery has enormous importance for pregnant patients as it gives pleasure with physical and psychological preparation to welcome a new life. In obstetric care, the rightly expected date of delivery should be calculated at the start of the trimester and should be noted in the antenatal file. In our study, EDD accuracy rate based on ultrasound (in the first trimester) was 86% which can be compared with the accuracy rate 91% presented in a study by Dietz PM et al [2]. The gestational age dating based on ultrasound in the 1st-trimester was once held in reserve for a patient with unidentified LMP dates. In the the use of ultrasound for the estimation of the date of delivery is increasingly becoming common day by day. During pregnancy, a large number of women go through obstetric ultrasound once in their pregnancy duration [8]. On the other hand, researchers have become fail in demonstrating the benefits of obstetric ultrasound within low-risk populations [9, 10]. Doctors often review an estimated date, in case the ultrasound-based estimates and LMP have a difference of more than seven days up to gestation of twenty weeks, more than fourteen days from twenty to thirty weeks' gestation, and more than twenty-one days at thirty weeks' gestation or more than it [11]. The basis of gestational age approximation through ultrasonography, doctors take many fetal measurements in accordance with the woman's described LMP dates [12]. Within the 1st trimester, length of crown-rump measured for estimating gestational age through ultrasounds process, through its development and lined relation with gestation age in duration [13]. Approximately, at the completion of 8weeks gestation, the crown-rump landmarks become observable [8]. During the second as well as third trimesters many biparietal diameter combinations, head circumference, femur (diaphysis) and abdominal circumference length are observed [14]. The measurements of the fetus are matched with age-specific references with the help of standard formulae. It is important to know that techniques are calculating two dissimilar entities during matching menstrual histories with ultrasound (for detecting

pregnancy dating). One is measuring length duration of pregnancy, while the second is measuring fetal size. Many studies have made a comparison with the help of using menstrual vs the date based on ultrasound for assessing gestational age, and majority reported that an early (second trimester) ultrasound based date is better as compared with the date grounded on LMP for prediction of actual delivery date, even amongst the women with certain dates of LMP [8, 15, 16]. In our study, ultrasonic accuracy of the estimated date of delivery approximation within the first trimester was found improved (almost 100%) in the women of middle to late reproductive ages that is thirty-one to forty-five years. Although its better in early to middle ages 18years to 30 years, where it is 83%. As it is well recognized and presented in the literature that the estimated date of delivery through ultrasound has good results within the early trimester as compared to later trimesters and is found even better within the early weeks as compared to the late weeks of the 1st trimester. In this study, 9 to 10 weeks of gestation age have more accurate 93.5% EDD as compared to 11 to12 weeks which have shown 73.5% accurate EDD. At the initial stage, more work was focused on comparing the date of the ultrasound technique using biparietal diameter (fetal head measurements) with LMP to estimate gestational age [17]. The work of studies was performed in 2nd or 3rd trimesters of gestation with respect to LMPs. Limitations remained because some of the patients were serious and unreliable, therefore, the estimated date as per techniques based on ultrasound was found superior as compared to LMP based date, especially with regarding forecasting the actual date of delivery [18]. In a study presented by Mongelli and colleagues [19] concluded that amongst all the estimated delivery dates for singleton pregnancies with the consistent menstrual date in accordance with methods as ultrasound only, LMP only, and three distinct groupings of ultrasound and LMP, it was seen that the estimated date of delivery through independently ultrasound was seen as more accurate. When only dates of menstruation cycle were utilized the occurrence of delivery happened within ten days (with respect to estimated date) within 65%women and when only ultrasonography was utilized then the percentage was seen in 70.3% women. On the other hand, the delivery on the foretold date was noticed only in 4.3%women and 3.7% women as the estimated date was based on ultrasound and LMP respectively.

CONCLUSIONS:

The Ultrasound Accuracy based estimated date of delivery approximation is noticed as superior in 1st trimesters for finding the delivery date.

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