ACCURACY OF ESTIMATION OF GESTATIONAL AGE FROM 18-38 WEEKS BY MEAN FETAL RENAL LENGTH”

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ABBREVIATIONS

FRL	-	Fetal renal length
BPD	-	Biparital diameter
HC	-	Head circumference
AC	-	Abdominal circumference
FL	-	Femur length
KL	-	Kidney length
GA	-	Gestational age
LMP	-	Last Menstrual Period
EDD	-	Expected date of delivery
POG	-	Period of gestation
CRL	-	Crown Rump Length
MSD	-	Mean sac diameter
MKL	-	Mean kidney length
FKL	-	Fetal kidney length
FGR	-	Fetal Growth Restriction
UTD	-	Urinary tract dilation
GS	-	Gestational sac
YS	-	Yolk sac
AP	-	Anterio-posterior
CI	-	Cephalic index

SGA	-	Small for Gestational Age
AGA	-	Appropriate for Gestational Age
EFW	-	Estimated Fetal Weight
OFD	-	Occipito-frontal diameter
TCD	-	Transcerebellar diameter
MSAFP	-	Maternal serum alpha- fetoprotein
USG	-	Ultrasonography
OPD	-	Outpatient department
MAPE	-	Mean absolute percentage error
SFH	-	Symphysio – fundal height
DM	-	Diabetes Mellitus
GDM	-	Gestational diabetes mellitus
UK	-	United Kingdom
SONAR	-	Sound Navigation and ranging
MHz	-	Mega Hertz
TVS	-	Transvaginal scan
TAS	-	Transabdominal scan
BMUS	-	British Medical Ultrasound society
ACOG	-	American College of Obstetricians and Gynecologists
B/L	-	Bilateral
Sl.No.	-	Serial Number

KLE’s	-	Karnataka Lingayat Educational Society
KAHER	-	KLE Academy of Higher Education and Research center
JNMC	-	Jawaharlal Nehru Medical College
SD	-	Standard Deviation
CI	-	Confidence interval
ANOVA	-	Analysis of variance
SE	-	Standard error

ABSTRACT

Background- Gestational age (GA) plays a pivotal role in efficient obstetric care and practice**.** Accurate assessment of gestational age is of utmost importance and the mainstay for management of pregnancies. Various ultrasonographic biometric parameters like crown- rump length(CRL) and head circumference(HC), biparietal diameter (BPD), femur length (FL), and abdominal circumference (AC) are used to calculate GA .As the reliability of these parameters decline with advancing gestational age, there continues a search for other parameters in determining GA. Various studies have shown the application of fetal renal length as a parameter in estimating GA with great accuracy when the women presents in late 2^{nd} or 3^{rd} trimester without a dating scan. This study has hence been taken up to evaluate the accuracy of mean fetal renal length measurement in establishing the GA over the conventional biometric parameters that are used.

Methods – The present study included 230, singleton uncomplicated antenatal cases from 18- 38 weeks of gestation who were subjected to ultrasonography , to measure mean fetal renal length and routine biometry (ie, BPD,HC, AC, FL). GA was derived from Renal length, individual biometric parameters and Hadlock's formula which were then compared with the GA derived from ACOG guidelines taken as a Standard. Correlation and predictive values of Mean Fetal Renal Length in comparison to other conventional parameters was obtained by Karl Pearson's correlation co-efficient, Linear regression and Multiple regression analysis. Microsoft 2010 excel Sheet was used to tabulate data which was analysed using rates and percentages using R software version 3.6.1. The predictive accuracy is calculated using the Mean absolute percentage error (MAPE).

Results – 230 subjects were included in the analysis.Karl Pearson's correlation suggested that between 18 – 38 weeks, all the parameters have nearly equal p values that is <0.001, which is statistically significant, with best correlation observed with FL (r=0.9663) followed by FRL (r=9615), AC (r=0.9599), HC (r=0.9498) and last by BPD (0.9441).According to regression analysis, Mean fetal renal length has a standard error of estimate of ±8.47days which is 2nd best individual parameter for assessing GA after FL (SEE of ±7.93days).

Conclusion – There is a significant correlation between fetal renal length and Gestational age. Hence it can be used as a reliable single parameter to assess GA in late 2nd and 3rd trimester in women who are unable to recall their LMP accurately. Also it can be used with great precision as an important tool for assessment of gestational age in certain situations where the other conventional parameters cannot be relied upon.

Key words – Mean Fetal Renal Length, Gestational age (GA),Ultrasonography, Biparietal Diameter (BPD), Head Circumference (HC), Abdominal Circumference (AC),Femur Length (FL).

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INTRODUCTION

Research Background

Gestational Age (GA) plays an important role in efficient obstetric care & practice. It is defined as "the chronological age of a fetus which is measured in weeks beginning from the 1st day of the last menstrual period (LMP) till the time of current assessment".[1]The accurate assessment of GA and estimated date of delivery (EDD), plays a fundamental role in providing routine obstetric care and in managing high risk patients. Failure to do so will lead to iatrogenic pre- or post-maturity, both of which are causes of higher incidence of morbidity and mortality in the perinatal period[2, 3, 4]

Accurate determination of GA is very essential in the following ways : 1) to time procedures such as "chorionic villus sampling" and "genetic amniocentesis" and in interpreting tests such as "MSAFP" screening.[1,3] ; 2) to assess fetal growth ; 3) for induction of labour and for timing of a caesarean section in certain conditions like severe preeclampsia, severe fetal growth restriction (FGR) , oligohydramnios etc. ; 4) management of a pregnancy diagnosed with fetal anomaly.[5,6]

From time immemorial, before the emergence of USG, the pregnancies were dated based on various other methods among which most commonly used was 1st day of LMP in women with regular menstrual cycles. Although, certain studies show that 30% of pregnant ladies attending antenatal clinics are unsure of LMP. The other methods that were used in estimation of GA were size of uterus estimated through bimanual examination in first trimester, symphysio- fundal height measurement and X-ray estimation of gestation age ossification center development and dental development. However, these methods also have their own pitfalls and

therefore, the fallacies of physical examination & history restrict their practicality in GA estimation.

The last 2 decades have observed an enormous development in utilization of 'USG' as diagnostic modality revolutionizing management towards better care. There is no reported risk of ionizing radiations as in X-rays, or any other known biological or embryo toxic effect.[7]The reason for its wider acceptability is because of its non-invasive and non-ionizing nature besides its cost effectiveness. 'USG' is secure for mother, fetus and personelperfoming the procedure.[8,9,10,11]

Various 'USG' parameters are utilised to estimate GA. In 1st trimester dating, the sonographic assessment of GA can be done within the first 13 weeks and 6 days by measuring the crown rump length (CRL) whichhas accuracy of ± 5-7 days and this method has been considered to be the most accurate.[12] In 2nd& 3rd, composite fetal biometric parameters like Biparietal diameter (BPD), Head Circumference (HC), Abdominal circumference (AC), and Femur Length (FL) measurements are used. However, estimation of GA by the combination of the above parameters in 2nd trimester varies by +/- 14 days and in3rd trimester by +/- 21 days.[12]

Other indices, such as TCD, humerus length, OFD, clavicular length, scapular length, diameter of orbit, binocular distance, fetal heel ossification, chest circumference & length of foot, were utilised. However these biometric parameters become increasingly unreliable as GA progresses due to variations in biological scale with respect to age.[13] Therefore in women who seek late for antenatal care and are unsure of their LMP, precise dating of pregnancies in late 2nd or 3rd trimester remains a problem.

Therefore there is need to scrutinize means of assigning the gestational age that is quick & easily reproducible particularly in 2nd& 3rd trimester. In the present

day, better instrumentation along with increased diagnostic capability have paved the way for identification of fetal anatomy more precisely and utilizing measurement of many more growth parameters for estimation of GA.

The fetal kidneys are readily recognisable & can be measured. Many studies conducted in the west, Middle East & Asia have shown strong correlation between Fetal kidney length(FKL) and GA .[1,3,14,15,16]

Rule of Thumb states that "**Renal length in millimetres approximates GA in weeks".**This study is undertaken to explicitly determine the accuracy of estimation of GA by mean fetal kidney length(FKL) measurement as supplementary structural measurement in 2^{nd} and 3^{rd} as compared with other growth parameters i.e, BPD, HC, AC and FL

AIMS AND OBJECTIVES

- **Primary Objective**

To assess accuracy of mean fetal renal length(FRL) measurement in estimation of GA from 18-38 weeks of pregnancy

- **Secondary Objectives**

To evaluate the usefulness of FRL against the conventional parameters like BPD ,AC, FL &HC and a combination of all four parameters ie, the Hadlock's formula for estimating the GA

REVIEW OF LITERATURE

Precise estimation of GA is essential in managing high risk pregnancies especially in conditions where termination of pregnancy has to be decided as soon as the fetus has reached maturity for example severe pre-eclampsia, fetal growth restriction, oligoamnios, diabetes mellitus etc.[1]

Various methods have been used for the estimation of gestational age. The universally used is the Naegele's rule wherePOG is estimated by adding 280 days / 40 weeks or by addition of 9months and 7days to the 1st day of LMP. This method in not completely reliable due to various reasons which are as follows

i. When the woman has irregular cycles.

ii. If patient is unable to remember her LMP/ reports incorrectly.

iii. Fertilisation in the period of lactational amenorrhoea.

iv. Early pregnancy bleeding

v. LMP might be unreliable due to oligomenorrhea, abnormal bleeding, utilization of oral contraceptives

vi. Premature ovulation (<11th day) or ovulating exceptionally late (>21st) in the menstrual cycle.[13,17,18,19]

A bimanual pelvic examination can precisely estimate uterine size which corresponds with the period of amenorrhoea and this is more accurate during early pregnancy particularly prior to 12 weeks. However, there exists a discrepancy of ± 2 weeks by the above method and ultrasonic measurement by crown rump length is more reliable.[20]

Other commonly used methods are the symphysio – fundal height (SFH) measurement and the abdominal girth measurement. In pregnancy with single fetus in vertical lie, the SFH measured in centimetres and the abdominal girth measured in

inches at the level of umbilicus correlates to the GA in terms of weeks from 24-36wks. Another method used is the Mc Donald's rule where in

Period of gestation (in lunar months) = fundal height in cm x 2/7
Period of gestation (in weeks) = fundal height in cm x 8/9

However these methods have their own limitations and are variable in circumstances like higher maternal BMI , twin/triplet pregnancy, fetal growth retardation, diabetes mellitus, full bladder, fibroid and is also affected by inter & intra observer measurement variation.[21]

The date of Quickening which is the perception of the first fetal movement during pregnancy can also be used to calculate the expected date of delivery by adding to it , 20 weeks in case of primigravida and 22 weeks in a multigravida. Quickening is around 19 - 21 weeks in primigravida and 17 – 19 weeks in multigravida.[22]As this a subjective method, it is not of great use in estimation of GA.[23]

Postnatally , the original impetus for GA assessment came from the classical work of the french school under Andre Thomas and subsequently Madam Saint Anne Dalgasises.[24] They used tone and neonatal primitive reflexes like Morro's suck and grasp to assess gestational age. In recent days, GA postnatally is assessed by using Dubowtiz model, New Ballard Score. Dubowtiz model is considered as a historical standard method to determine the postnatal age based on 34 physical and neurologic assessments.[25]

SONOGRAPHIC METHODS FOR DETERMINING GESTATIONAL AGE

The 'USG' is a "sound wave beyond the audible range of frequency higher than 2MegaHertz(cycles/sec)". The epoch of present day ultrasound emerged from invention of the quartz sandwich transducer in 1917 by Prof.Langevin from

underwater sound transmission in submarine detection and named it as SONAR which is the acronym for "Sound Navigation and ranging."[26]

The credit of development of contact scanning and application of 'USG' in obstetrics and gynecology goes to Sir Professor Ian Donald of Glasgow who is rightly called "The father of Modern USG". His work was followed by MacVicar and Brown who proposed the method of assessment of fetal GA by ultrasonography in nineteen fifties.[27,28,29] Donald and Brown first demonstrated thefetal BPD on ultrasonography in 1961.[27]

Stuart Campbell in 1968 introduced the A scan and B scan techniques. The fetal biometric parameters on ultrasound was introduced when Willocks & colleagues published, their 1st paper on cephalometery of fetus in 1964.[30] Further in 1968, in routine biometric scans of fetus, fetal cephalometery was incorporated.[27,28,29]Extensive studies in the domain of 'USG' aided assessment of GA has been done by Hadlock et al which has become a vital part of obstetric care.[21]

Estimation of GA is one of the major application of diagnostic 'USG' in obstetrics. The past 20yrs have observed an enormous advancement in the implementation of 'USG' as a diagnostic method transforming the management towards improved supervision.[3,31,32]

Ultrasound is generated by vibration of synthetic piezoelectric Crystals in response to swiftly varying electrical potential sited in transducer of USG machine. Electrical energy is converted to mechanical & conversely by. 3-5MHz transducer for transabdominal scans & 5-7MHz transducers for transvaginal scans are frequently used in obstetrics.As frequency amplifies, resolution of the image increases but deeper structures are not fairly visualized due to rapid wave attenuation.

3 main types of USG evaluation in the field of obstetrics are (i) Transabdominal scan(TAS) (ii) Transvaginal scan(TVS) & (iii) Doppler studies.

TAS forms the foundation for most obstetrical evaluations. The fetus, uterus and adnexal areas are clearly delineated by this technique.

The resolution of image is better in case of Trans-vaginal sonography as the area of concern is closer to the probe and as mentioned earlier, they utilize higher frequencies as compared to trans-abdominal sonography.

Doppler scans are mainly used for evaluation of pattern of blood flow in foetus, placenta &uterus.

EMBRYOLOGY OF THE KIDNEY

The growth of kidney progresses through sequence of sequential phases, each manifesting as evolution of a more advanced kidney: the “pronephros”, “mesonephros” & “metanephros” (Fig. 1).

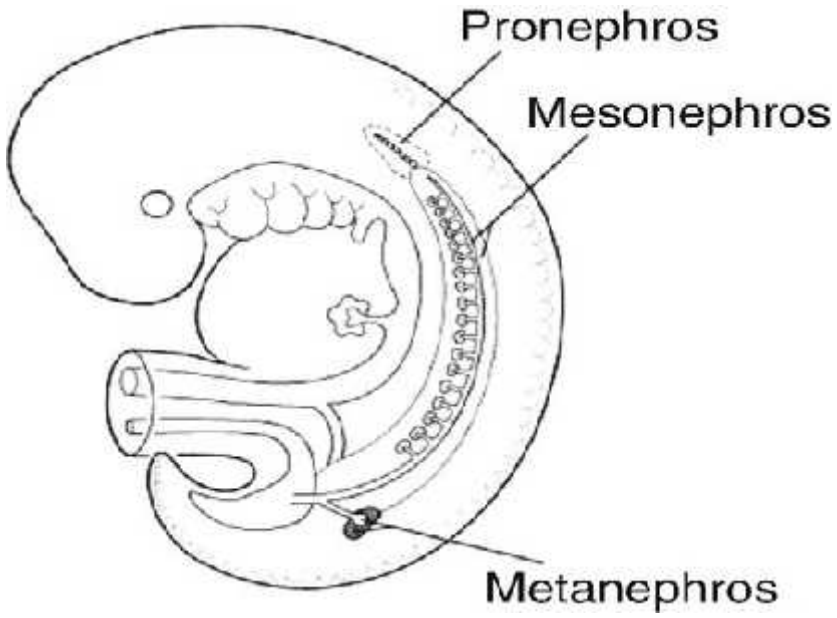


FIGURE 1: The 3 sets of excretory systems in an embryo during the 5th week; Lateral view

By end of 3rd week, pronephros develops in the cervical region as solid groups of cells. From pronephros, tubules drain into excretory duct which ends in cloaca which form the vestigial excretory units. The pronephros involutes and then regresses by the end of 4 weeks.[33, 34]

Mesonephros, replaces pronephros, which includes most of its ducts. Once, pronephric system starts regressing, by 4th week of growth, the 1st excretory tubules of the mesonephric system appear which lengthen to form an "S shaped loop", at one end of which, tuft of capillaries develop forming the glomerulus. Then, Bowman's capsule is formed around glomerulus by tubules. On each side of the midline, a large ovoid organ is formed by the mesonephros during the mid second month. These tubules drain into a structure known as "Wolffian" or "mesonephric duct" of the same side medially. As tubules form from the foetal body's lumbar region, the ones in thoracic region regress & disappear by end of the 2nd month, forming kidneys which are situated lower down in abdomen.

The "metanephros" or adult kidney, arises caudal to the mesonephros during 5th week.[33,34] A diverticulum from "Wolffian" duct forms the ureter, which later invades metanephros, & moulded over its caudal end as cap.[33] Ureteric bud gives rise to collecting ducts metanephros(adult kidney). The metanephrogenic blastema gives rise to glomerulus, proximal & distal tubules under the influence of specialised mesoderm.[33]Ureteric bud then dilates, forming the ureter and primitive renal pelvis. Major calyx & minor calyx are produced when ureteric bud splits &approximately 1-3million collecting tubules that offer a channel for urine passage in definitive kidney.[33,34]

ASCENT OF THE KIDNEY

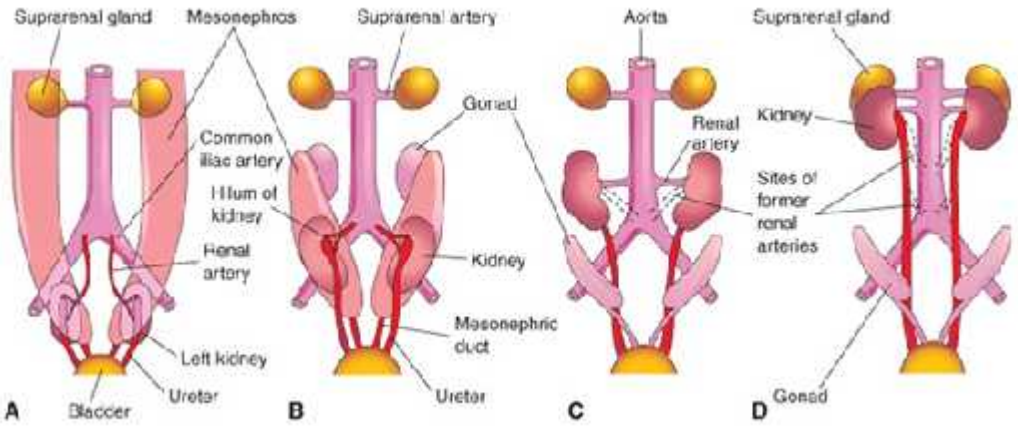


FIGURE 2: Illustration of ascent of kidneys from pelvis to retroperitoneum

In the process of kidney development in fetus, it ascends from its primary site in lower abdomen next to bladder to its final position behind the peritoneum below diaphragm.[33] During the process of ascent, kidneys rotate round their vertical & horizontal axis due to which the final position of renal pelvis is medial & the parenchyma is lateral to it which occurs by 9th week.[33, 34]

Table 1: Embryological development of kidneys

7 weeks	Development of kidney occurs in the fetal pelvis
10 weeks	Nephron formation
11 weeks	Ascend into the posterolateral retro-peritoneum.
13-15 weeks	Functioning of the kidney and production of urine

GROSS AND SONOGRAPHIC ANATOMY OF THE FETAL KIDNEYS

The kidneys are located in retroperitoneal region, one on either side of spine. Extent of kidney is from T12- L3.

There are 2surfaces, 2 borders and upper & lower pole

Hilum consists of vein, artery & ureter from anterior to posterior in the respective order.

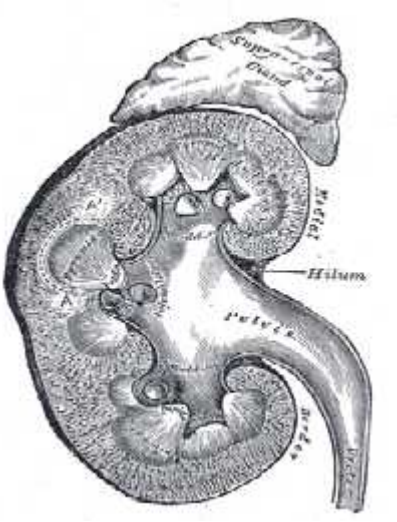


FIGURE 3: Vertical section of kidney.

The kidneys lie in the paraspinal area & have a homogenous appearance comparable to the liver but with a higher echogenecity than adjacent bowel.[36]At this early stage they are readily demonstrated in a posterior transverse scan below the level of the liver.

Upto 15wks of gestation, recognition of kidney is difficult on USG as they are deficient of perirenal fat & because of their small size.[35,36] As pregnancy progresses, the kidneys enlarge, further details of renal architecture appear and they become progressively easier to identify.[36,37] By 18-22 weeks, kidneys are delineated as elliptical structures below adrenal gland & beside the psoas muscles.[36] At 19th week, renal capsule begin to develop as a thin rim.[36] Cortico-medullary junction is

noticeable by twenty eight weeks of gestation, & renal pyramids are well identified.[36] Measurement of kidneys become comparatively easy by 30 weeks, as the perirenal fat increases & accentuating the renal architecture.[16,36-40]

Doppler is used to validate presence of 2 kidneys in cases of uncertainty.[36]

FIGURE 4: Saggital section illustrating Right and Left kidneys (Plane used for Renal length measurement)

It is essential to differentiate normal kidney from that of cystic dysplasia.[36] A central slit-like area is seen containing minimal amount of fluid which represents the renal pelvis.[36,37,41]Apparent dilatation of renal pelvis may be pathological but, minor degrees of pelvic dilatation maybe a normal variant.[36,37]

Renal pelvis is best measured in the AP plane.[36]Renal pelvic dilatation of ≥4mm in second trimester and ≥7mm in third trimester has been set as cut off by

multidisciplinary consensus on the classification of prenatal and postnatal urinary tract dilation (UTD).[42]

FIGURE 5: Coronal sectional illustrating B/L Kidneys on either side of the spines (Plane used for AP diameter and Renal Pelvis measurement)

FETAL BIOMETRY

"Fetal biometry is defined as a means by which various parts of fetus are measured to assess their growth".[43,44] During 1st& 2nd trimester, rate of growth of various fetal structures is rapid, which change considerably as pregnancy progresses & these values are to be plotted against normal range for that gestational age.[44]Various conventional biometric parameters of fetus are used based on trimester to establish gestational age.[44, 45]

FIRST TRIMESTER BIOMETRIC PARAMETERS

GA establishment in the 1st trimester is made by 2 important parameters i.e , gestational mean sac diameter(MSD) &crown-rump length(CRL).[1-5,13,16,46] These parameters are highly accurate in dating a pregnancy from five weeks of gestation until the end of first trimester.[47]

GESTATIONAL SAC (GS):

It is the initial USG finding noted in pregnancy. By 5-6weeks, GS is generally observable on TAS& generally week prior by TVS.[44,48]

GS is seen as circular area in the intrauterine cavity, as echo free region within a reflective ring. GA is derived by Mean sac diameter = (AP + transverse + longitudinal diameter of GS)/3. This is more accurate than measuring the antero-posterior diameter alone.[5]About 1millimeter /day increase in MSD is observed.[49-52]

GA is obtained by adding 30days to Mean sac Diameter.[49-52]

This measurement is very consistent between 2-14mm after which, its accuracy deteriorates.[6]

YOLK SAC (YS):

It is seen inside the GS by 5th /6th week. The yolk sac(YS) is no longer visible, by the end of the first trimester. However, measurement of yolk sac is not used for estimation of GA, although its presence specifies an intra-uterine pregnancy. [18,54]

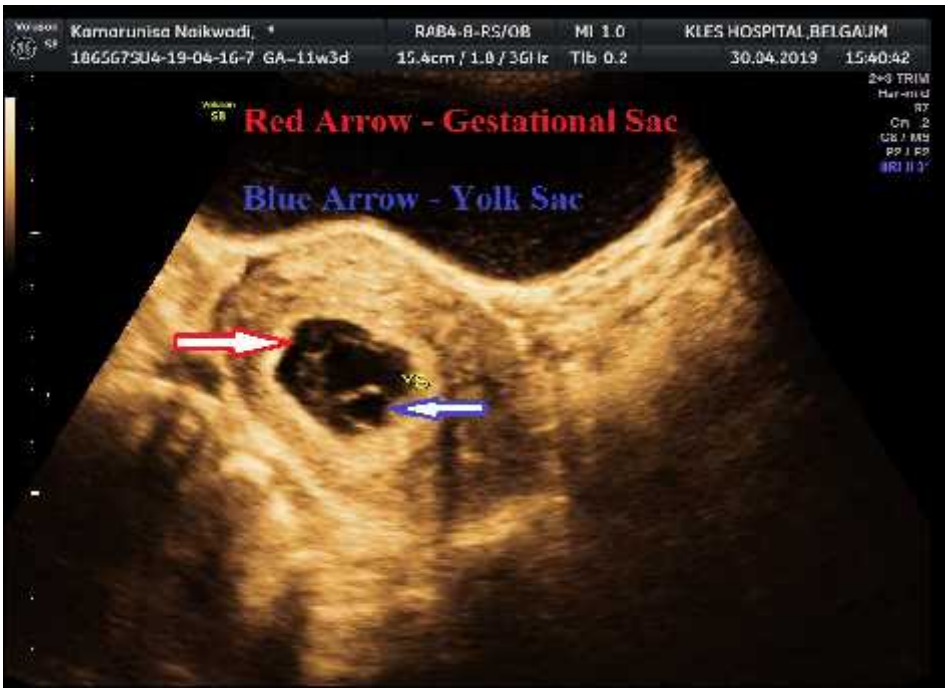


FIGURE 6: Gestational sac & Yolk sac

CROWN RUMP LENGTH (CRL):

Mall in 1967, described CRL which is measurement of choice for determination of GA, once embryo is seen.[6] It is one of the most reliable ultrasonic biometric parameter used in the first trimester.[43,55]

CRL is "length of the embryo or foetus from the top of its cranium to the bottom of its torso(rump)".[47] YS &extremities are not included while measuring CRL.[56] Assessment of fetal position while measuring the CRL is important as fetal

flexion can cause variations of up to 7days.[5] CRL performed between 7th and 11thweek of intrauterine life is utilized for the estimation of GA with an accuracy of 2.7 to 4.7days in 95% of the cases.[57] As CRL is affected by foetal position after 12 weeks of gestation, it becomes less reliable(due to flexion &extension of spine).[47]

GA in weeks = Fetal CRL in cms + 6.5

FIGURE 7: CRL measurement at 7 weeks of gestation

FIGURE 8: CRL measurement at 12 weeks of gestation

SECOND AND THIRD TRIMESTER DATING:

In 2nd&3rd trimester many sonographic parameters are used for assessing GA. The commonly used parameters are

- BPD
- AC
- HC
- FL

The accuracy of dating pregnancy by these are,

- ±7 -10days in 2nd trimester
- ±2 -3wks in 3rd trimester

Renal length can be used for GA estimation along with the above mentioned parameters.

BIPARIETAL DIAMETER:

Special focus was imposed on BPD as a tool for estimation of menstrual age.[58] It is used in the 2nd trimester from twelfth week onwards, having its maximal accuracy between 12 to 20 weeks of gestation.[29] BPD was first measured in 1961. It is measured as the "maximum distance between the two parietal bones taken from the leading edge of the skull in the near field to the leading edge in the far field" i.e, from outer to inner.[44,59,60]

While measuring BPD, the following anatomical landmarks are ensured to improve precision

- Cross sectional view at level of thalami
- Falx cerebri interrupted in between by cavum septum pellucidi and thalamus

- Cerebellum not visualized
- Measurenment taken from outer edge of cranium closer to transuducer to inner edge of cranium farther from transducer.
- Smooth &symmetrical calveria

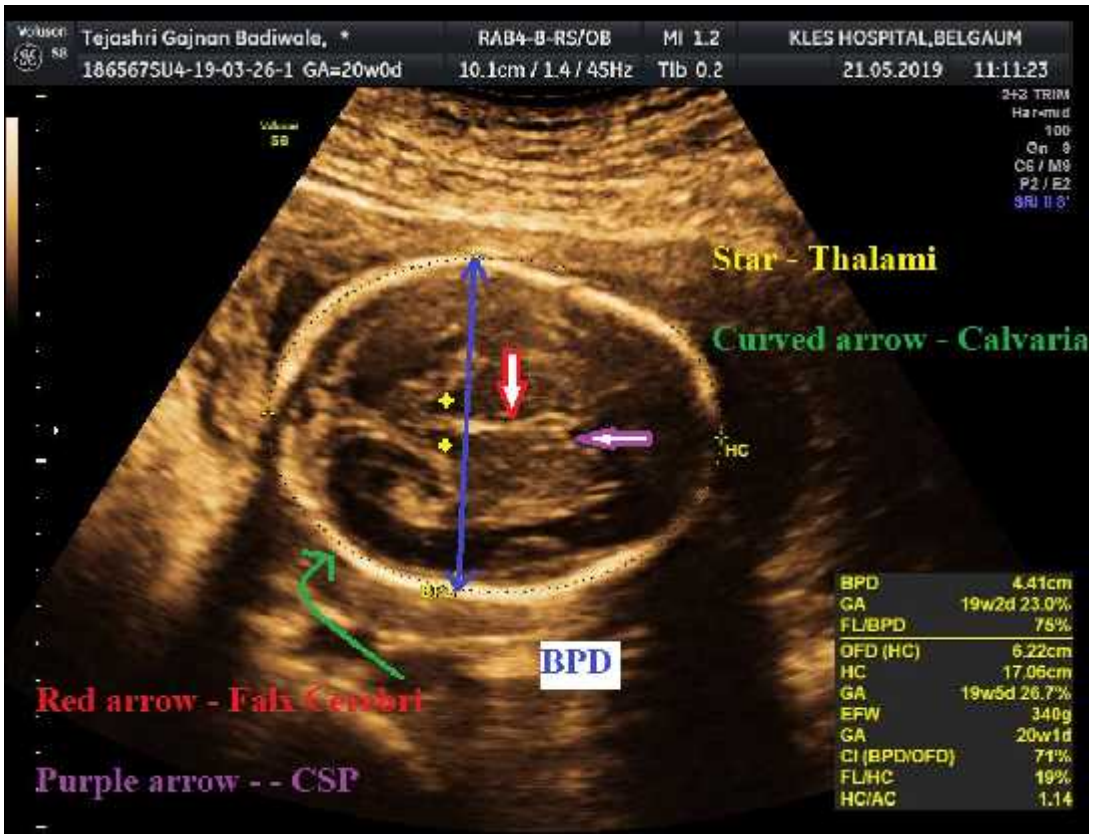


FIGURE 9: Plane for measurement of BPD

Estimating GA from BPD measurements:

BMUS ultrasonic fetal measurements survey recommended that all 'USG'machines should be calibrated at 1540 m/s and the BPD to be measured from outer edge to inner edge.[61]

The occipitofrontal diameter (OFD) is obtained from the same plane as the BPD andis measured from mid skull to mid skull along the long axis of the foetal head.[47]

Corrected BPD: Square root of [(BPD x OFD) / 1.265].[47] The rationale for the corrected BPD is that it represents the BPD of the standard – shaped head (one with an OFD / BPD ratio of 1.265) of the same cross sectional area.[47]

The measurement of BPD from 14-26 weeks predicts the correct duration of gestation to the extent of ±9 days in 95% of cases.[27] Hadlock et al demonstrated the variability to be ± 1 week (2 SD).[62] Similar results have been reported by Persson & Weldner and Rossavik & Fishburne in patients who could recall their LMP accurately.[20,63] Also a similar variability was demonstrated by De crespigny &Speirs in pregnant women whose POG were established by CRL during 1st trimester.[64] Campbell &Colleagues & Waldenstorm &Coworkers in separate studies added on to the above information, stating that , BPD measured from 14-20 weeks is a superior interpreter of EDD as compared to an optimal LMP.[65,66]

Prediction of GA by BPD deteriorates to approximately ±22 days as pregnancy progresses. BPD becomes unreliable for the estimation of GA when measured in the third trimester due to the difference in shape of the head.[14,16] Hence, cephalic index(CI) is used if, shape of head is brachy/dolicocephalic. Cephalic index quantifies the relationship between the width and length of the head

Cephalic Index = $\frac{\text{BPD}}{\text{Occipito-frontal diameter}} \times 100$

(Normal range = 79 ± 8 % for the mean cephalic index throughout pregnancy).[16]

Cephalic index greater than ±1 SD above or below the mean (less than 75 greater than 85) may be associated with significant alteration in BPD measurement expected

for a given menstrual age and the HC can be used effectively as alternative means of establishing age in such cases.

Also, BPD is unreliable in certain conditions like ruptured membranes, breech presentations and multiple gestation.[67] Wolfon and associates have shown that in fetuses that have premature rupture of membranes, the BPD was not very reliable in assessing gestational age.[68] O' Keefee and colleagues have suggested the use of head perimeter and femur measurement in such cases.[69]

In late pregnancy, fetus in vertex presentation are often engaged, rendering measurements difficult to obtain.[70] P.Chudleigh and J.M.Pearce in 1992 emphasised that when the fetus is in breech or transverse lie, measurement of the BPD may lead to underestimation of GA and the values are unreliable as the fetal head may appear dolichocephalic. The other drawbacks of BPD as outlined byP.Chudleigh and J.M.Pearce are as follows [61]:

- When head is in occipito transverse position, BPD measurement can be done with ease as the landmarks are better delineated as compared to other positions or engaged head.
- If asynclitism angle is not correct, midline ech0 is not positioned in the centre within fetal skull.

Sonographic measurement of the foetal BPD has a variability ranging from ±1.5weeks in the fisrt half of pregnancy to ±3.6 weeks during the last six weeks of pregnancy.[20] Due to fallacies from usage of BPD measurement, the BMUS, Fetal Measurements Working Party was of the view that BPD should not be routinely used in clinical practice for assessment of GA later in pregnancy.[45] The large variability associated with BPD in estimation GA during the third trimester has been confirmed by Benson and Doubilet and suggested that the only other alternative in pregnancy

dating is to utilize a method of averaging the estimates of age based on BPD, HC, AC and FL.[71,72]

HEAD CIRCUMFERENCE:

HC is calculated as outer perimeter of cranium. It is one of the most reliable individual parameters for estimation of GA which is due to its shape independence.[6, 73, 74]

Similar landmarks are used to measure HC which were used in measuring BPD. It is measured by keeping ellipse around the outside edge of skull bone. Also it can be determined with HC and OFD.

"HC=1.57 x [(outer to outer BPD) + (outer to outer OFD)]".[47]

FIGURE 10: Plane for measurement of Head circumference

In 1982, Law and Mac Rae demonstrated that HC was superior to BPD, as a predictor of GA in a series of 594 patients.[74] Similar finding were demonstrated in independent studies of Hadlock et al, Hill & coworkers and Benson & Colleagues.[62, 65 ,75-77]

Prenatal compression of the fetal skull is a common occurrence, in fetal malpresentations, such as breech, or in conditions of intrauterine crowding, such as multiple pregnancies. This can also occur in vertex presentations without any obvious reason or as a result of an associated uterine abnormality such as leiomyoma.[43] BPD is unreliable in estimation of GA when shape of the head is altered. HC is less affected by head compression and therefore can be used as a valuable tool in the assessment of GA ie, when cephalic index is outside the normal range (<70 or >86) (Ugwa et al.,2007). The standard error of estimation of GA from HC ranges from ± 1week before 20 wks of gestation to ± 3.8weeks during last trimester.[78-80]

ABDOMINAL CIRCUMFERENCE:

The foetal AC is calculated as length of outer perimeter of foetal abdomen.[47] Compared to other fetal biometric parameters, the largest reported variability has been demonstrated by AC.[76, 77, 81 ,82] This has been attributed to differences in liver size and width of the subcutaneous tissues.[5,44]

AC is measured at the level of foetal liver which is very sensitive to inadequate nutrition hence, considered as most perceptive parameter to assess FGR &can be used as an important tool for assessing fetal growth and in estimation of fetal weight but is a poor indicator of gestational age.[5,14,44]

In 1975, Campbell and Wilken first described the use of the fetal AC for prediction of fetal weight.[83]

The rule for foetal AC are outlined [6]:

i) The cephalocaudal plane where right &left portal veins are continous with each other. This is the plane at which the transverse diameter of the liver is the greatest. The foetal stomach is at the same level, which is slightly caudad to the fetal heart and cephalad to the kidneys.

ii) Symmetric appearance of the lower ribs.

iii) The shortest length of the umbilical segment of the left portal vein should be depicted.

iv)Vertebra is seen in triangular shape, in a coronal section.

v) The outline should be circular

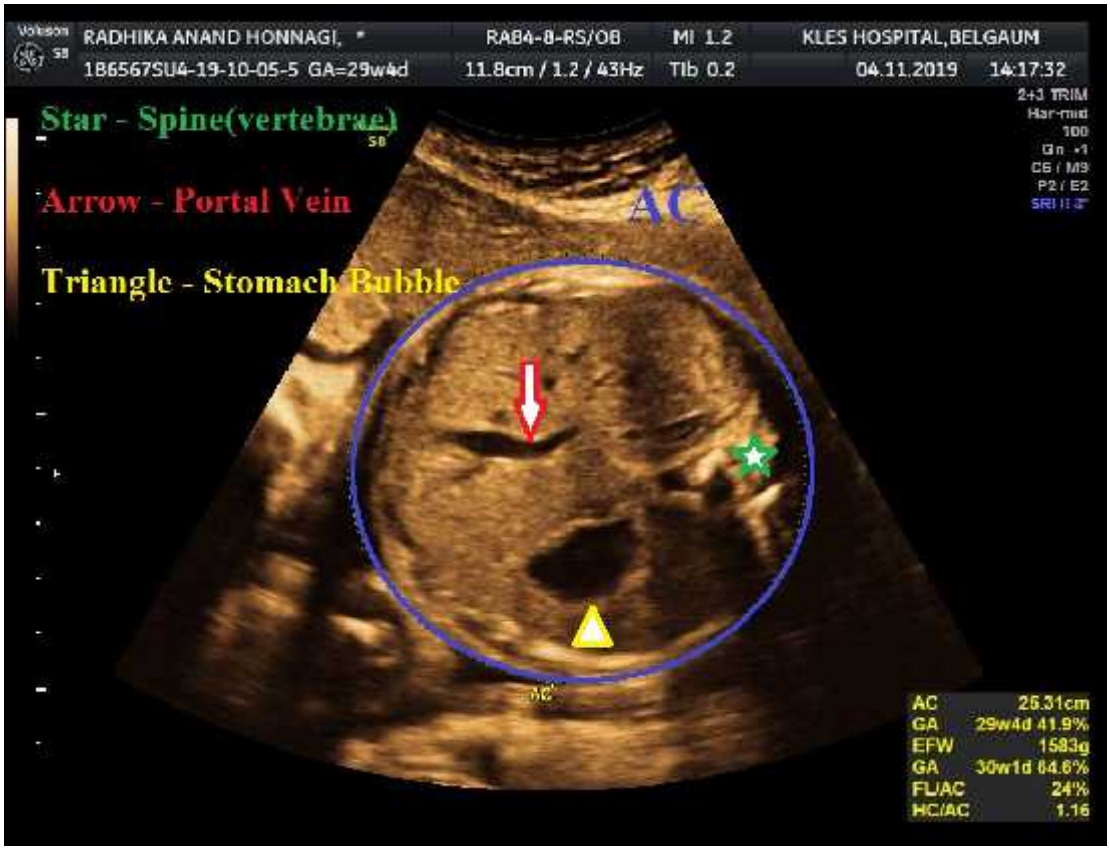


FIGURE 11: Plane for measurement of Abdominal circumference

Alternatively it can be calculated by using the formula (D1 + D2) x 1.57.[6]D1, D2: Transverse and AP diameter of the abdomen measured from skin edge to skin edge respectively.

In early pregnancy, the AC is only slightly less accurate on average than the other basic measurements.[6]But variability of 4.5 weeks is noted in the late third trimester.[77, 78]

FEMUR LENGTH

Limb dwarfism was first detected with the help of FL measurement. Consequently, it was noted that FL was outstanding parameter to estimate foetal GA. O'Brien and Quenan in 1981 described a method by which FL could accurately be measured.[84]Hohler & Quetel in 1982, Hadlock et al., &Jeanty et al. demonstrated that FL can be measured from 10th week of gestation.

When the lie of the fetus makes it difficult to take accurate measurements of the head, femoral length is a particularly useful alternative biometric parameter.[14]

Method

Plane should show both the cartilaginous femoral head and distal condyle. Place the measurement cursors at the junction of the cartilage and bone and the thin bright reflection of the cartilaginous epiphysis should not be included.[6] FL is measured from centre of one end of bone to another. This depicts metaphysical length.[61]

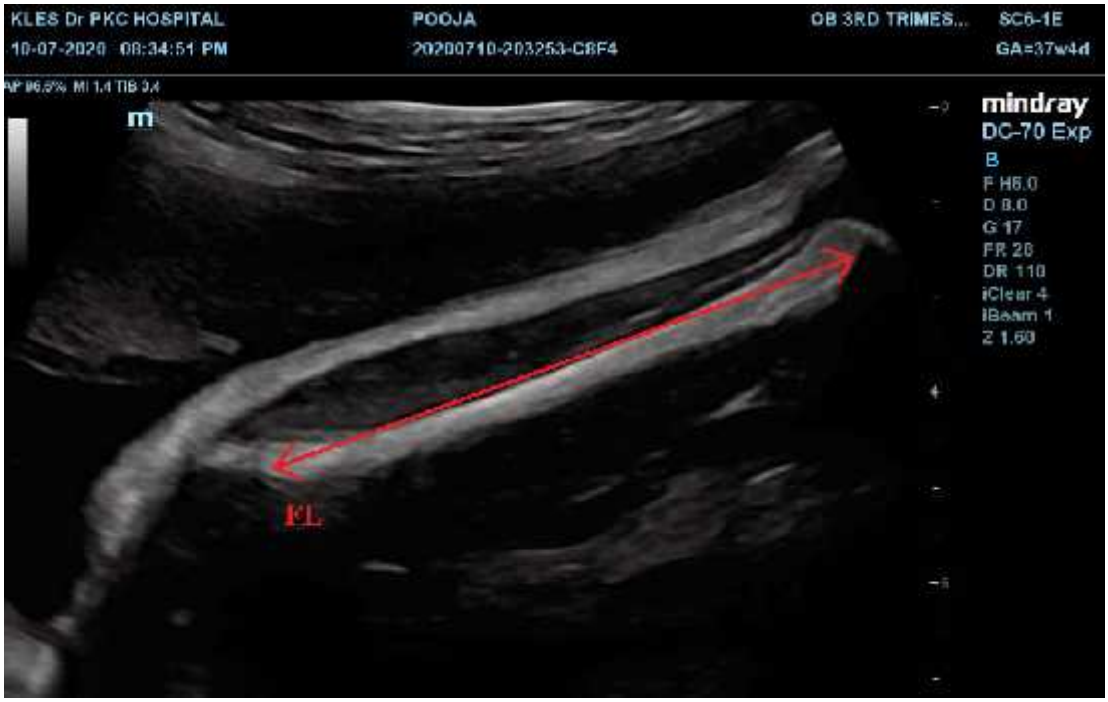


FIGURE 12: Plane for measurement of FL.

FL is an accurate predictor of GA in the early second trimester (2SD: +/- 1week) but as pregnancy advances, the variability increases.[6] Studies done by Hadlock et al and Benson &Doubilit have found that FL is nearly equivalent in precision to the other parameters in estimating menstrual age, with a variability of approximately ±3.5 weeks in late third trimester of pregnancy .[20,77-79,81]

The estimation of GA obtained from measurements of FL should agree with that obtained from the measurement of the BPD. If assessment of FL is lesser as compared to BPD then all the long bones should be carefully measured so that dwarfism is excluded.[61]

Humerus is next chosen long bone ,out of the other long bones, followed bytibia, radius &ulna in that order. However, only in cases of dilemmatic results, these are used.[79]

FETAL RENAL LENGTH

Gonzales J conducted the 1st study that correlated fetal renal parameters with GA in 1981. In the gestational age from 26-41weeks, he examined 390 anatomical specimens. The rate of growth of B/L kidneys in 3 dimensions (i.e, length, width & thickness) during 3rd trimester were assessed. Results showed that the three dimensions and weight of fetal kidneys increase with advancing gestational age. The study was also of the opinion that fetal renal measurements even in cases of a FGR fetus correlated well with GA of the fetus.[85]

Similar study was done by Grannum p et al., which investigated the differences in length of fetal kidney with GA in 89 uncomplicated pregnant women were selected for study. FRL was measured during 2nd& 3rdtrimester and concluded that length of kidney amplifies linearly till term.[86]

In 1981, Lawson &colleauges, did a study on ultrasonographic evaluation of fetal renal anatomy about their regular appearance, frequency of identification, and its growth rate compared to GA. Kidney length was measured in coronal/saggital planes. Sectioning of fourteen still born premature foetuses was done in all 3 planes, to assess the precision of scrutiny, measurements & foetal anatomical relationships were analysed &renal dimensions were measured dirctly from cut sections. Foetal kidneys appeared on USG as a sonolucent halo of tissue surrounding the more echogenic pyelocalyceal sinus. In <50% cases, foetal kidneys were identified in cases that were evaluated between 15-17wks. In 90% of cases between 17-22wks & in 95% of cases beyond 22wks, one or both kidneys were seen. It was concluded from this study that foetal renal length in mm approximates GA in weeks.[87]

In 1982, a growth rate was published by Speigl G. et al. after analysing values of foetal renal length measurement & growth rate was assessed in various patients on scan.[88]

Before the publication by Spiegl G, the fetal kidney growth measurements using USG was studied by Jeanty P. et al.[89]Their study in 1982 demonstrated that from the 20th week of gestation, the fetal kidneys were adequately imaged; and by 27 weeks, the renal capsule and pyramids become apparent.[89]The KL was taken from one pole to another. In foetal horizontal sections, at the height of renal pelvis / at a point where the renal section was perceptibly largest, width & thickness of kidneys were measured.Volume of kidney is given by the following equation – "length x width x thickness x 0.5233".

As the contour of the contralateral kidney was obscured due to the shadow cast by the spine, in most of the cases, the kidney which was closer to transducer was measured. The operator measuring them was unaware of GA. The statistical analysis of the study, concluded that the parameter that correlated well with GA & BPD was the volume of the kidney. These results were similar to studies done by Lawson et al. & Gonzales et al.

In 1983, Bertagnoli et al studied the use of scan in quantitative characterization of the growth of the fetal kidney from 22-40wks gestation in 280 antenatal cases. Cross-sectional & longitudinal studies were done to assess the relation of length & AP diameter of foetal kidney to GA. The study revealed that these parameters increased progressively with advancing gestation and hence came to a conclusion that "measurements of foetal kidneys can be used as an supplementary parameter in regular antepartum fetal surveillance & to R/O renal anomalies identified by changes in size of kidney ".[90]

The changes in foetal kidneys seen on scan during pregnancy was studied by Bowie JD et al. in 1983 in hundred women from 11 to 40 weeks. The kidneys were extremely difficult to identify during the first trimester. From 15 to 26weeks period, kidneys were visualised, but it was difficult to differentiate them from surrounding tissue. In early 3rd trimester, either an acrogenic border or increased echogenecity of the renal sinus was observed. During late 3rd trimester the echogenecity increased due to deposition of fat in para renal area & in sinus of kidney.[91]

Sato A. et al, in 1985, offered a technique wherein foetal kidney size were measured with the help of ultrasound. 241 uncomplicated women & 27 women with FGR were selected for the study which revealed that the cross-sectional area of the kidney increased progressively from 20wks upto term, whereas relative size of kidney to abdomen remained same. It was observed that cross-sectional values in growth restricted fetuses were smaller than normal fetuses but their ratios (kidney measurements: AC) remained in normal range. The study concluded that there was appreciable correlation between growth of the fetal kidney &AC and it could be used as an added parameter for the detection of FGR.[92]

A study on USG measurement of average kidney diameter to the BPD was done by Callen et al. in 1985. The ratio between these two parameters was studied in normal foetuses and those with a known urinary tract pathology. The results by this study showed that ratio remained steady in normal foetus but varied in the other group.[93]

In 1987, Sagi J.et al, compared size of fetal kidney in relation to GA in 660 normal fetuses and made a conclusion that fetal renal length showed a linear correlation with GA and hence can be used as supplementary parameter in

establishing fetal GA. Also, the problem of technique of visualization of the kidney was outlined.[94]

In 1987, a study done by Hughe RJ &co-workers which included study of 240 kidneys in 120 staged human foetuses, concluded that, fetuses with intrauterine growth restriction, oligohydramnios, twin gestation and renal anomalies, maternal complications like preeclampsia have to be excluded while measuring the fetal renal length. An adverse fetal environment can cause increased placental resistance and alters fetal blood flow, associated with decreased fetal kidney volume, hence affecting GA estimation.[95]

A work on allometric study of renal growth in human foetuses was done by Sampaio et al. in 1989, which included 30 staged fetuses between 10-38wks of gestation. Length and weight of kidneys were measured and the data correlated well with GA.At the end of intrauterine life, the left kidney was bigger (21.26%) than right kidney and there was no increase in fetal kidney length after 36 weeks. The conclusion was that in the quantitative estimation of GA &renal anomalies, the growth curves of kidney length and weight have applied benefit.[31]

Fetal kidney screening: growth curves and indices - was a study done by Pruggmayer et al. in 1989 which was a study conducted in 612 foetuses wherein, size of kidney was measured by scan. Values of the length, width, thickness as well as cross sectional areas of the kidney were calculated by statistical means and correlated to gestational age. The study included both large and small for GA fetuses. This study mainly scrutinised the syndromes and didn't give any conclusive result regarding correlation between the kidney measurements &GA.[96]

In 1990, Sampaio FJ.et al., conducted a study on 120 staged human foetuses(240 kidneys) taken from ranging from 10-36 gestational period, which

analysed the growth of FKL during 2^{nd}&3^{rd} trimesters. Length of each kidney was measured & data was correlated to GA by using the allometric method (Y=BXK). Equations and growth curves of right and left kidneys, males, females and the whole sample during the second and the third trimesters were presented. This study had practical utility in the quantitative determination of the renal anomalies & in determination of GA.[97, 98]

In 1991, a prospective 'multiple-operator' study conducted by Cohen et al in New York (USA) which incorporated 397 pregnancies. The FKL was measured once in 2weeks from 18-41 weeks. The results showed that mean lengths were higher & CI were wider than previously reported ie, 22±0.3mm at 18 weeks of gestation which raised to 45 ±0.3mm at 41 weeks They demonstrated a strong correlation; r= 0.82 (p <0.001) between KL & GA determined by BPD, FL &AC, and average 3.[15]
Renal lengths were similar to those reported in premature and full term neonates. No difference was noted between bilateral kidney lengths. Correlation was not observed between weight / height of parents & FRL.[15]

Sampaio FJ in 1992, studied the growth of renal volume during fetal period in 145 fresh human fetuses, from 13 to 36gestational weeks. There was no disparity between volume of both kidneys & renal volume. Volume of Fetal kidney increased with a more intense rhythm in the early fetal period. The study came to a conclusion that the normal parameters of renal volume can be used for practical applications in detection and monitoring of renal anomalies.[99]

In 1995 Rose PG conducted a study in 810 women, in which the external &internal dimensions of fetal kidneys were measured with ultrasonographic scans. This study was done to generate a nomogram, and to correlate them with GA if

possible. Data from Peurperial period was taken from medical records of neonate. There was close relation observed between GA and external renal dimension, enabling accurate growth centile charts to be constructed. There was poor relationship between renal pelvic (internal) dimensions & GA. Conclusion of the study was that was it was likely to estimate the growth and size of foetal kidney according to GA but this was not applicable to the renal pelvis. A renal pelvic dimension of > 5 mm at any GA was unusual.[100]

In 1995, Kim and park conducted a study in which 299 fetuses were evaluated from 20 weeks to term. Fetal renal length & width were measured and reported that, as the pregnancy progressed, fetal kidney length increased. A growth rate of fetal kidney length and width was determined from the study which were 0.87 mm and 0.47 mm per weeks after 20weeks of gestation respectively.[101]

Konje et al in 1997, in the UK conducted a study, to see if there was any differences in size &shape of fetal kidneys in SGA &AGA foetuses at different GA. A study was conducted on219 women from 22-38 weeks of gestation. The FKL, circumference and AP &transverse diameters were measured at each GA and compared between the two groups. All the parameters were greater for normal foetuses than small for GA fetusus, except for kidney length which was similar in both the groups which resulted in sausage shaped kidneys in SGA foetuses.[102]The differences in fetal kidney size with gestation begin to manifest from 26-28wks. Conclusion was made that FKL measurement correlated well with GA in both groups.

Gloor JM et al. in 1997, studied the USG evaluation of fetal renal growth, fetal body weight according to GA. 100 pregnant women, from 18 to 39 weeks of gestation were included, in whom FRL &volume were measured &compared with GA &EFW.

The study result showed that EFW, the RL &renal volume increased as gestation advanced and the renal volume: body weight ratio remained same.[103]

Ansari SM & colleagues in Bangladesh in 1997, conducted a study where 793 pregnant women between 16 &40 weeks with uncomplicated pregnancies were selected & FKL was measured using ultrasound. The study aimed at determining whether the size of various fetal organs varied according to race of the mother. In this study, the average KL at full term was 3.95 cm. A strong correlation was noted between GA, BPD, FL&RL measurements.[104]

A strong correlation between renal length and GA determined by BPD, FL, AC and the average of the three was demonstrated by a study conducted by Mahasset in 1999.[105]

In 2001, Kiran Pandey & co workers,in Kanpur, India, studied relationship between fetal parameters ie, Kidney Length &circumference, BPD, AC, FL, & HC with GA. The study result showed that kidney length and circumference showed a linear correlation with gestational age, with the correlation coefficient of r= 0.84 and 0.86 respectively and predict the GA with a SE of ±1.51wks compared to composite of parameters ie, BPD, HC, FL, AC which predict the GA with SE of ±3wks.[106]

Konje et al in 2002 continued his work & evaluated the application of fetal kidney length as an added biometric parameter for the estimation of GA from 24weeks & its accuracy was compared with that of other biometric indices.[16] 70 antenatal women were included whose FKL&fetal biometry was measured once in 2 weeks from 24-38 weeks. Using these measurements, GA was estimated & was compared with CRL dating. The results showed that the MKL increased from 24.2mm ±1.2 at 24 weeks to 40.1mm ±2.4 by 38 weeks respectively (r= 0.94;

p<0.0001).[16]They concluded that the most accurate individual predictor of GA was the MKL with SE of ±10.29days followed by FL with a SE of ±10.96 days,& AC was least accurate in predicting the GA with a SE of ±14.54 days.[16] Linear regression models concluded that for estimating gestational age, a combination of biometric indices with FKL was most accurate which predicted GA with SE of 9.45 days.[16]

In 2007, a study was conducted in Dhaka, which included 102 pregnant women after 30 weeks of gestation who had a dating scan done at early weeks of pregnancy. The FKL measurement showed a linear correlation(r = 0.990;p .000) with GA. The mean fetal kidney length in mm corresponds to GA in weeks. The result concluded that measurement of fetal kidney length can be used as an additional parameter for the estimation of GA in the third trimester and also as a means for detection of abnormal renal development.[1]

Kansaria & co-workers in 2009 conducted a study in Mumbai, India which included 70 antenatal women with excellent dating. They found the foetal kidneys were only first well appreciated by 24weeks of gestation. Conventional foetal biometric parameters along with MKL were measured once in every 2weeks, from 22 -38 weeks. They concluded that, the MKL grew at a rate of 1.7mm fortnightly and increased from 23.87 ±1.17 at 24 weeks to 36.25 ±1.70 at 38 weeks respectively (r= 0.97; p<0.0001). Also the study demonstrated that the MKL was the most precise single parameter to predict GA from 24-38 weeks of gestation, which estimated GA with SE of ±9.17 days.[3] However, due to racial and socioeconomic differences, the values of the fetal kidney length that were obtained in this study were lower as compared with measurements obtained by works of JC Konje &co-workers.

Three years later, ie, in 2012, Kaul et al in Kashmir, India studied a population of 129 pregnant women and reported that the model generated in their study was more precise than the earlier ones &showed a accuracy of prediction of ±7.41 days.[108] This could be attributed to the larger study population, the selection of the best model in their study was based on the Akaike information criterion, R2 and the standard error of prediction (S_{pred}). Whereas, all the other previous studies had a study population of less than a hundred and they based selection of the best model on only the R2 and the standard error of prediction (S_{pred}). [15]

Around the same time, Abbas et al in Peshawar, Pakistan conducted a study to compare the differences in manual & sonographic measurement of FRL. The study demonstrated that the difference between the measurements of fetal kidneys obtained in utero using ultrasonography and the manual measurements of the kidneys in dissected stillborn foetuses were insignificant. Thus the study concluded that sonographic measurement of fetal kidney length is an accurate tool for in utero assessment of fetal growth and wellbeing.[109]

Adam at al in 2013 conducted a study in sudan which included 100 pregnant women from 28-40 weeks &found that MKL in 3rd trimester was 34.2 mm, 40.9 mm and 44 mm in premature , mature and the full term fetuses respectively. The mean renal thickness was 17.6 mm , 22.2 mm, 24.5 mm in premature, mature and full term fetuses respectively. The mean renal volume of foetal kidneys was 5.6 mm, 9.8 mm, and 10.5 mm in premature, mature, and full term foetuses respectively. The study concluded that there was strong correlation between GA, foetal weight and foetal kidneys volume.[110]

In 2013, a prospective study was conducted by Kumar et al in India which included 199 pregnant women. The FKL were measured once in 2 weeks from 18-38 weeks. The study showed that 18th week was the earliest age by which the fetal kidney could be seen on USG. The MKL at 18wks was 12 ±1.31mm which increased to 40.4 ±1.71mm by the 38th week of gestation ($r= 0.98$; $p<0.0001$).[111] Unlike in the earlier noted studies, the regression models that were developed for the prediction of GA in this study showed that the most accurate single predictor of GA was the FL followed by the MKL with SE of ±3.85 days and ±8.04 days respectively.[111]

The above differences can be explained as their study was more recent, newer USG machines with better resolution& scan was done by only one trained operator. Also, more recent statistical software package was made use of; i.e ,SPSS version 20 Vs versions 16& 17 used in the previous studies.[108]

A study done in 2015, by Nirmalendu Das &colleagues, in the department of Anatomy, RIMS Manipur, consisted of examining of 60 spontaneously aborted &still born human foetuses ,&all dimensions of kidney were measured. The result showed a significant &positive correlation between length, breadth, thickness and weight of the kidneys with the gestational age. All parameters show linear growth from 11- 38 weeks of gestation with growth spurts during 18 –22 weeks and 24 -26 weeks.[112]

An often quoted rule of the thumb is that "renal length in mm and twice the renal anteroposterior diameter approximates the GA in weeks."[113]

OTHER BIOMETRIC PARAMETERS

Certain parameters, that are less frequently used in the discipline of fetal biometry, include :

- Transcerebellar diameter
- Trans coelomic diameter
- Orbit & lens dimensions, Fetal binocular distance
- Clavicle length, Foot length
- Length of long bones
- Fetal liver
- Floating particles in amniotic fluid
- Fetal scapula, sacral length
- Fractional spine length,
- Fetal ear length, fetal nasal bones.

Transcerebellar diameter is the maximum distance between the cerebellar hemispheres on an axial scan. The cerebellar measurement was proposed by Reece and Colleagues.[114] The value of the transverse diameter in millimeters is considered to be equivalent to the GA in weeks, particularly from 14-20weeks of gestation and was not affected by growth retardation.

The normal foetal transverse cerebellar diameter increases with advancing GA and exhibit a more than two fold increase in size during the second half of pregnancy.[115,116]

TCD seemed to be unaffected by alteration in the shape of the foetal skull unlike BPD, hence it was a more reliable parameter in the estimation of GA in cases like dolichocephaly or brachycephaly.[115,117-119]

The foetal TCD / AC ratio is a GA independent method of assessing foetal growth.[119]

The fetal claviclular measurement has also been proposed in estimation of GA. The length of clavicle expressed in millimeters corresponds to GA in weeks. Variability associated with age prediction by clavicle length is 5-6 weeks (±2SD) from 30-42 weeks.[120]

The thoracic diameter& circumference is mainly used in calculation of foetal weight.

Fetal orbit, lens dimensions and fetal binocular distance are used as predictors of gestational age.[121,122] Binocular distance and interorbital diameter, have been used for estimation of GA when fetus is in direct occipito- posterior position and normal data has been published by several authors for the same.The variability (±2 SD) associated with predicting menstrual age using binocular distance is ±14 days between 14 to 27 weeks and ±24 days between 29 to 40 weeks respectively.[122]

Fetal foot length is also used as a parameter for detemining GA and is as accurate as FL.[123]It can be measured from 10 weeks of gestation. The variability (±2SD) in estimation of GA by foot length is 1.2 weeks between 12-18 weeks, increasing to 3-4weeks between 36–42 weeks.

Other fetal long bones like humerus, radius, ulna, femur, tibia and fibula are also used for the assessment of GA but are mainly used for detecting divergence from normalcy e.g. suspected cases of skeletal dysplasias. Measurement of humerus is surely the easiest to obtain and most reproducible. The principles of measurement corresponds to that of the femur. Variability associated with age prediction in third trimester is 3.5 weeks (±2SD) for humerus, tibia and ulna. [124-127]

Fetal liver has also been used for fetal biometry.[128] Parameters such as fetal scapula, sacral length, fractional spine length, foot length, fetal ear length and the fetal

nasal bones are used for dating the fetus at times. Fetal nasal bones are used, in addition, to detect cases of trisomy 21.[123,129-132]

The thickness of the adrenal gland is measured. Fetal adrenal gland measurement in longitudinal axis shows a linear progressive growth between 12 and 17 weeks of gestation.[132]

Spleen volume = longitudinal X transverse diameter X 0.5233.[132]

Bree and parulekar, assessed floating Particles in amniotic fluid as an indicator of fetal maturity, which was however proven to be unreliable.[133,134] Goldenstein &co-workers determined fetal echogenicity and combined it with transverse diameter of the colon to assess intestinal development and found a significant correlation between intestinal development and gestational age. Tabsch and Mahoney et al demonstrated a correlation between the ossification centres and fetal pulmonary maturity.[135]

COMPOSITE GESTATIONAL AGE:

The accuracy of GA estimation increases, as more variables are measured by 'USG'. The reliability of predicting GA from fetal measurements can be improved when two or more measurements are used in combination, was demonstrated by Hadlock et al.[114]This is a widely used method and is termed as composite age.

It was demonstrated by Konje et al that the best predictor for GA is a combination of HC +AC+FL+BPD, with an accuracy of ±9.45 days.[16] Also he concluded that the best model for assessment of GA in late pregnancy was a combination of fetal kidney length, BPD, HC, FL and AC with an accuracy of ±8.48 days. By eliminating AC the accuracy came down to ±8.57 days. When fetal kidney length is combined with HC, BPD &FL, accuracy of dating was superior by two days.

MATERIALS AND METHODS

STUDY SETTING:

The study was conducted in the department of Obstetrics and Gynecology at KLE's Dr.Prabhakar Kore Charitable Hospital and Medical research centre, attached to Jawaharlal Nehru medical college, Belagavi

STUDY DESIGN:

A descriptive cross-sectional study

STUDY DURATION:

The study was conducted for a duration of 1 year 3 months

STUDY PERIOD:

1st January 2019 to 31stMarch 2020.

SOURCE OF DATA:

All the pregnant women seeking antenatal care between 18 to 38 weeks, who met the inclusion criteria and gave written informed consent were enrolled in the study

SELECTION CRITERIA:

Inclusion criteria-

- Singleton pregnancies
- Period of gestation between 18-38weeks.

- All cases who are sure of their LMP and had their first trimester dating scan (done using CRL).

Exclusion criteria-

- Pregnant women with associated risk factors like
  - Pre-eclampsia
  - Diabetes mellitus (overt DM and GDM)
  - Diagnosed cases of early onset FGR
- Anomalous fetus (including renal anomalies)
- Renal pelvic dilatation of ≥4mm in second trimester and ≥7mm in third trimester.[42]
- Multiple gestation
- Oligoamnios
- Polyhydramnios

ETHICAL CLEARANCE:

The study was approved by "Ethical and Research committee, KAHER's Jawaharlal Nehru Medical College" Belagavi, prior to its commencement.

(Annexure-3)

INFORMED CONSENT:

All participants fulfilling the selection criteria were explained regarding the purpose of the study in their own vernacular language and written informed consent was obtained prior to their enrollment in the study.

METHOD OF DATA COLLECTION

- All antenatal cases from 18- 38 weeks of gestation attending the outpatient Department of OBG and admitted in wards and labour room, after obtaining informed consent were subjected to ultrasonography to measure fetal renal length and routine biometry.

- EDD and GA was assigned based on LMP or CRL, according to ACOG guidelines,[12]i.e ,

a) In a scan less than 8weeks 6days – if the difference between EDD obtained from LMP and CRL is >5 days then CRL is taken into consideration. If difference is<5days, LMP is taken.

b) In a scan done from 9weeks to 13weeks 6 days scan – if the difference betweenEDD obtained from LMP and CRL is >7 days, then CRL is taken into consideration. If difference is <7 days, LMP is taken.

- The fetal kidneys appear ultrasonically as a “sonolucent halo of tissues surrounding the more echogenic pyelocalyceal sinus”.

- Kidneys were identifiedbelow the level of AC plane,in transverse section first,&then the probe was rotated longitudinally till full length of kidney was delineated.

- The kidney length was taken as a bipolar measurement carefully excluding adrenal glands. The kidney length was measured from one pole to another.

- Average of 3 measurements in centimeters of the kidney was recorded as final measurement.

- The measurements were performed using gray scale real time ultrasonographic scanner with 3.5-5 MHz curvilinear transducer by 3 trained personnel.

- Voluson S8, PhillipsHD10 and Mindray DC-70 Expert machines were used to measure the various parameters.

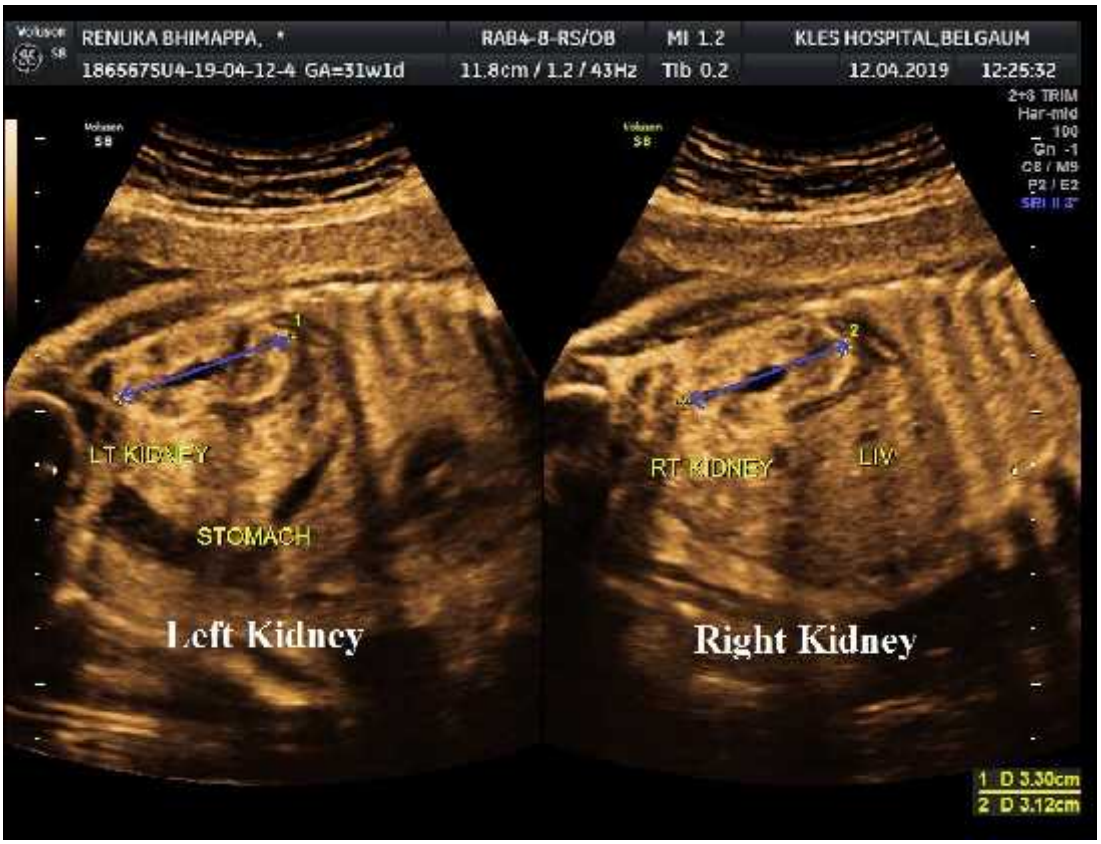


FIGURE 13: Plane for measurement of Fetal Renal Length

FIGURE 14:

Voluson S8 Ultrsound Machine FIGURE 15: Philips HD10 Ultrasound machine

FIGURE 16: Mindray DC-70 Expert Ultrasound Machine

SAMPLE SIZE:

Sample size calculation was based on the correlation coefficient.

$$\mathbf{n = (z_\alpha + z_\beta)^2 / (Z_1 - Z_2)^2}$$

- $Z_1 = \frac{1}{2} \log_e(1+\rho / 1 - \rho)$
- $Z_2 = \frac{1}{2} \log_e(1 + r / 1 - r)$
- ρ – "Population correlation coefficient"
- r –"Sample correlation coefficient"
- z_α is "linked with the level of significance and z_β is linked with the power of the test". "For 5% level of the significance z_α =1.96 and z_β =0.84 for 80% power of the test and by Taking ρ = 0.82 and r =0.611", a figure of 209 is obtained.

STATISTICAL ANALYSIS:

Data was entered in Microsoft 2010 excel Sheet which tabulated and analysed using rates and percentages using R software version 3.6.1.The quantitative data was represented in the form of mean ± SD. Measured variables were displayed using tables and graphs whichever appropriate. Karl Pearson's coefficient of correlation (r) and multiple linear regression was used for analysis.Prediction of gestation period was done by using fetal kidney length and the measurements of the other conventional biometric parameters using the multiple linear regression. Model is constructed using BPD, HC, AC, FL and FRL. "p-value <0.05" was considered as statistical significant at 95% confidence interval. The predictive accuracy is calculated using the Mean absolute percentage error(MAPE).

RESULTS

The present study included 230 antenatal women, attending the outpatient department and those admitted in wards and labour room, between 18-38 weeks of gestation, which were singleton and uncomplicated and had their dating scan done.

TABLE 2: Distribution of participants according to age

Age of patient	Total number of cases	Percentage
<20 years	10	4.35%
20-25years	136	59.13%
26-30 years	60	29.06%
31-35 years	19	8.26%
36- 40years	4	1.73%
>40 years	1	0.43%

The above table shows the distribution of participants according to age group. Among 230 participants, maximum were between the age group of 20-25 years which accounted 59.13%. 10 participants belonged to the age group below 20yrs, accounting to 4.3%. 60 participants belonged to the age group between 26-30years amounting to 29.06%. 19 participants were in the age group of 31-35 years accounting to 8.26% and the remaining ie, 5 participants belonged to the age group above 35years amounting to 2.17%.

FIGURE 17: Distribution of Participants According to Age

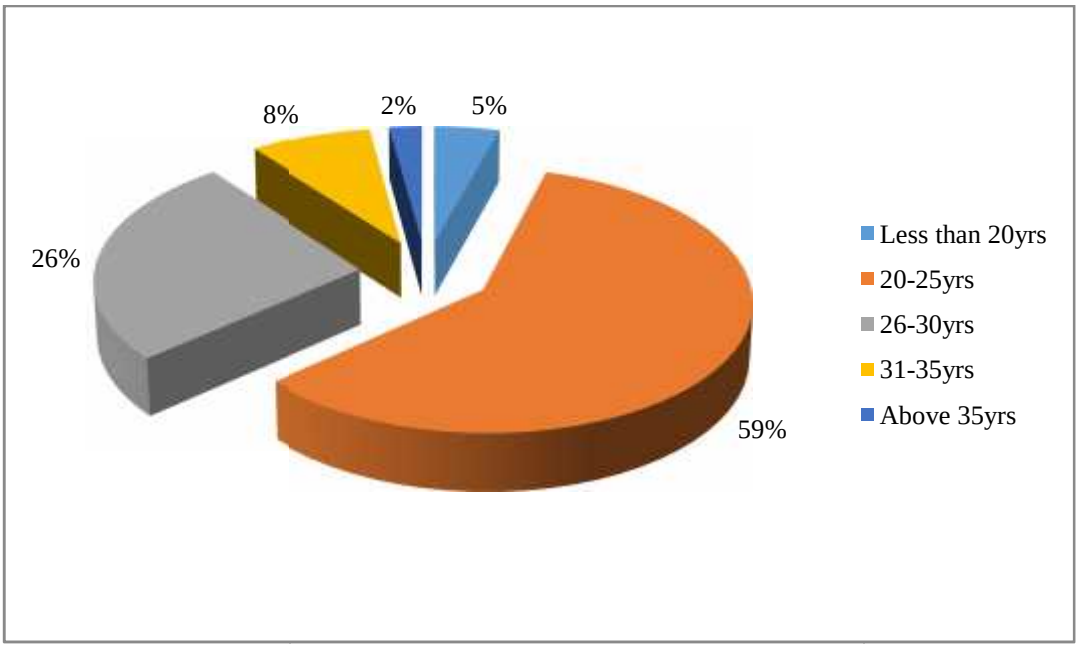


TABLE 3: Analysis of age distribution

Age group	Mean GA	SD	n	p-value
Less than 20	26.34	6.0813	10	**0.57**
20-25	25.0647	5.0055	136	
26-30	24.2683	3.8868	60	
31-35	24.8947	5.4321	19	
36-40	22.375	5.3105	4	
More than 40	27.6	0	1	

From ANOVA, it can be concluded that maternal age had no significant correlation with the renal length in assessment of gestational age. (p = 0.57)

TABLE 4: Distribution of participants according to parity

Parity	Total number	Percentage
Primigravida	100	43.47%
Multigravida	130	56.52%

In our study, about 56% of the participants were multigravida which amounted to 130 participants and 44% were primigravida amounting to 100 participants.

FIGURE 18: Distribution of participants according to parity

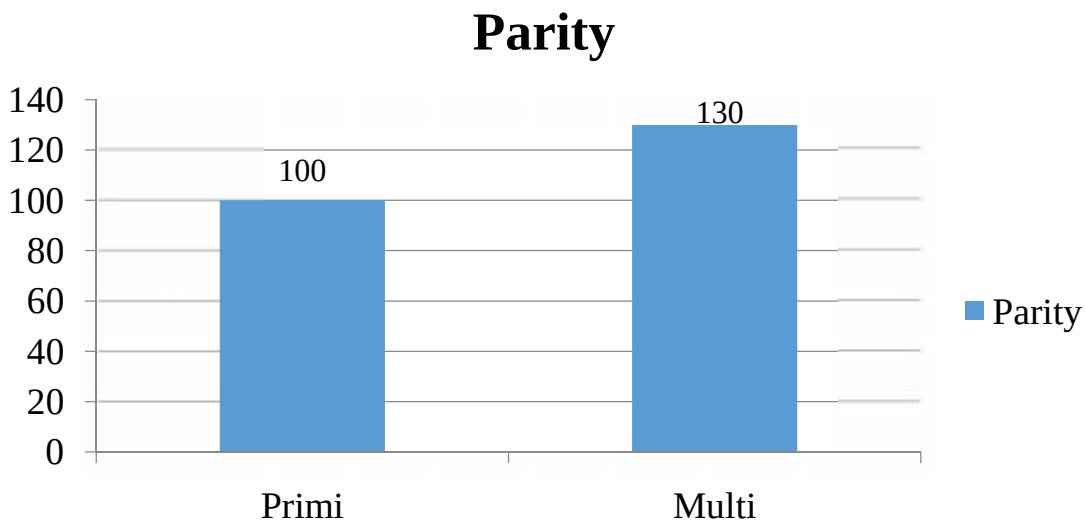


TABLE 5: Analysis of Parity distribution

Parity	Mean	SD	n	p-value
Primi	25.2605	100	5.219609	0.14
Multi	24.5565	130	4.545181	

From the t-test, it can be concluded that parity doesn't have any effect on gestational age and did not alter the kidney length of fetuses belonging to the same gestational age. (p = 0.14)

TABLE 6: Distribution of Participants According to Gestational Age

Gestational age	Total number	Percentage
18wks-19 wk+6 days	19	8.3%
20wks-21 wk+6 days	60	26.1%
22wks-23 wk+6 days	50	21.7%
24wks-25 wk+6 days	34	14.8%
26wks-27 wk+6 days	24	10.4%
28wks-29 wk+6 days	11	4.8%
30wks-31 wk+6 days	14	6.1%
32wks-33 wk+6 days	7	3.0%
34wks-35 wk+6 days	7	3.0%
36wks-38 weeks	4	1.7%

The above table shows the distribution of participants according to gestational age. The distribution was in the range of 2 weeks. Among 230 participants, maximum number of them i.e ,60 participants belonged to the GA between 20 to 21+6weeks amounting upto 26.1%, among the rest, 50 participants belonged to 22 to 23+6 weeks accounting to 21.7%, 34 participants belonged to 24 to 25+6weeks which amounted to 14.8%, 24 participants belonged to 26 to 27+6 days accounting for 10.4%, 19 of them belonged to 28 to 29+6weeks, and the remaining participants ie, among 43 of them, 11 participants belonged to 30 to 32+6weeks accounting for 4.8% ,14 of the participants belonged 33 to 34+6weeks accounting for 6.1%, 7 belonged to 35 to 36+6weeks accounting for 3%, another 7 participants belonged to 34 to 35+6weeks accounting to 3% and the least number was seen between 36 to 38weeks accounting to 4%.

Figure 19: Distribution of Participants According to Gestational Age

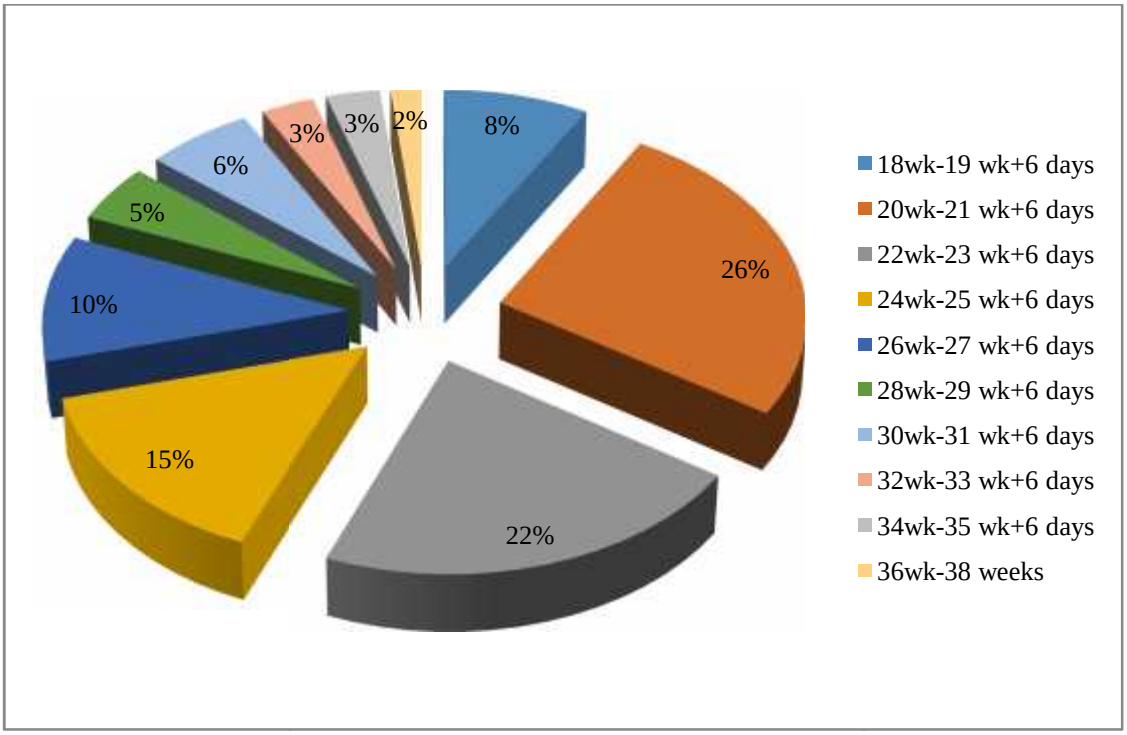

8%
26%
22%
15%
10%
5%
6%
3%
3%
2%
18wk-19 wk+6 days
20wk-21 wk+6 days
22wk-23 wk+6 days
24wk-25 wk+6 days
26wk-27 wk+6 days
28wk-29 wk+6 days
30wk-31 wk+6 days
32wk-33 wk+6 days
34wk-35 wk+6 days
36wk-38 weeks

TABLE 7: Correlation of GA derived by LMP with GA derived by various parameters by Karl Pearson's Correlation Coefficient Method

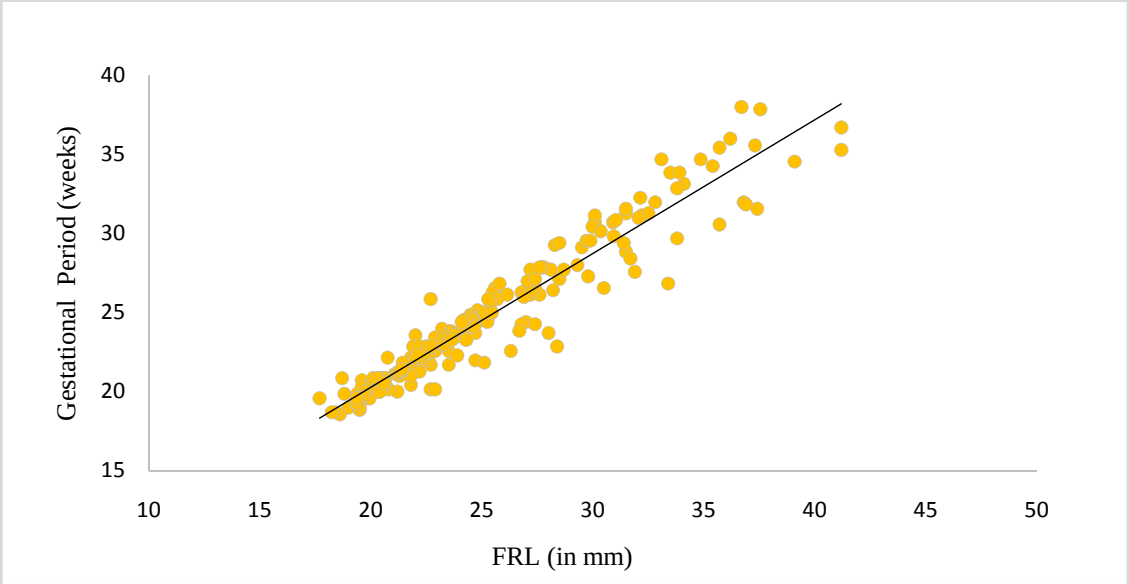
	BPD(mm)	HC(mm)	AC(mm)	FL(mm)	FRL(mm)
Gestational period (in weeks)	0.9442	0.9498	0.9599	0.9663	0.9615
p value	<0.001	<0.001	<0.001	<0.001	<0.001

The above table shows the correlation between GA derived from LMP and GA derived from HC, BPD, FL, AC, and Foetal renal length which was done with the help of "Karl Pearson's correlation coefficient method".

The best correlation with actual GA was observed with FL(r= 0.9663) and second best was by fetal renal length (r= 0.9615). This was followed by AC(r=0.9599) and HC(r=0.9498), and least correlation was seen with BPD (r=0.9442).Nevertheless, all the individual parameters had a strong correlation with LMP derived GA which was suggested by a statistically significant p value of <0.001.

SCATTER PLOT DIAGRAMS SHOWING LINEAR RELATIONSHIP OF VARIOUS PARAMETERS WITH GESTATIONAL AGE

Figure 20: Correlation between gestational age and mean fetal renal length



Regression equation: GA = 3.3511+0.8463*FRL

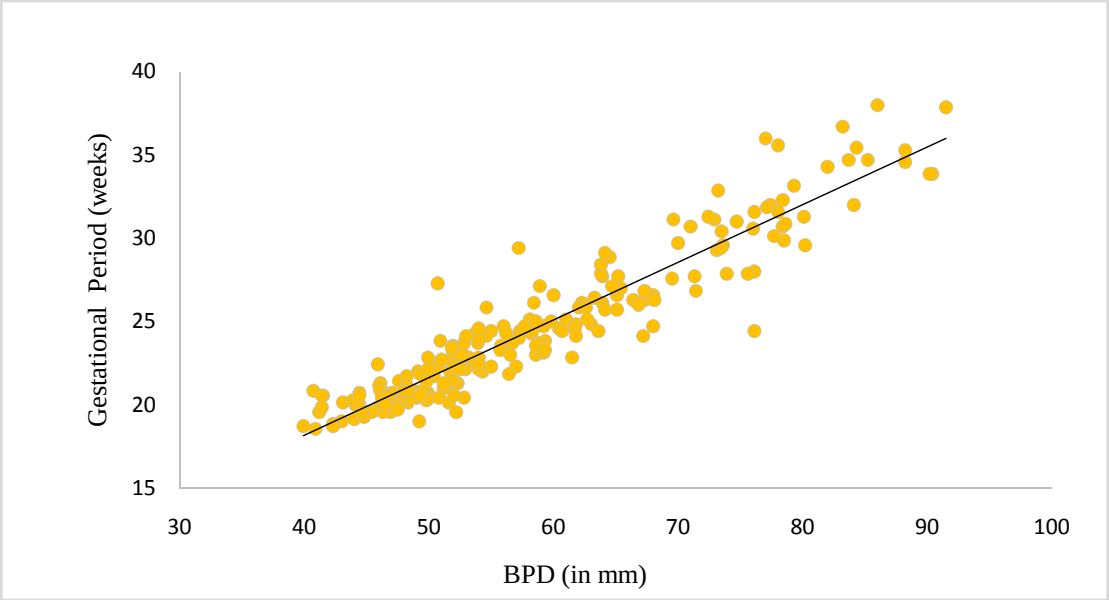
The above scatter plot figure shows a linear correlation of fetal renal length with LMP derived GA.

Fetal renal length has shown to correlate with LMP derived GA by 96.15%

With 95% confidence interval ranging between 0.9501 to 0.9702 and Pearson's correlation coefficient r = 0.9615 and R^2= 0.9245, a regression equation has been formulated with which GA can be calculated with the help of fetal renal length measurements.

It is given by GA = 3.3511+0.8463*FRL, where 3.3511 and 0.846 are constantsp-value is <0.001, suggesting that it is statistically significant.

Figure 21: Correlation between gestational age and Biparietal diameter



Regression equation: GA = 4.3474+0.3459*BPD

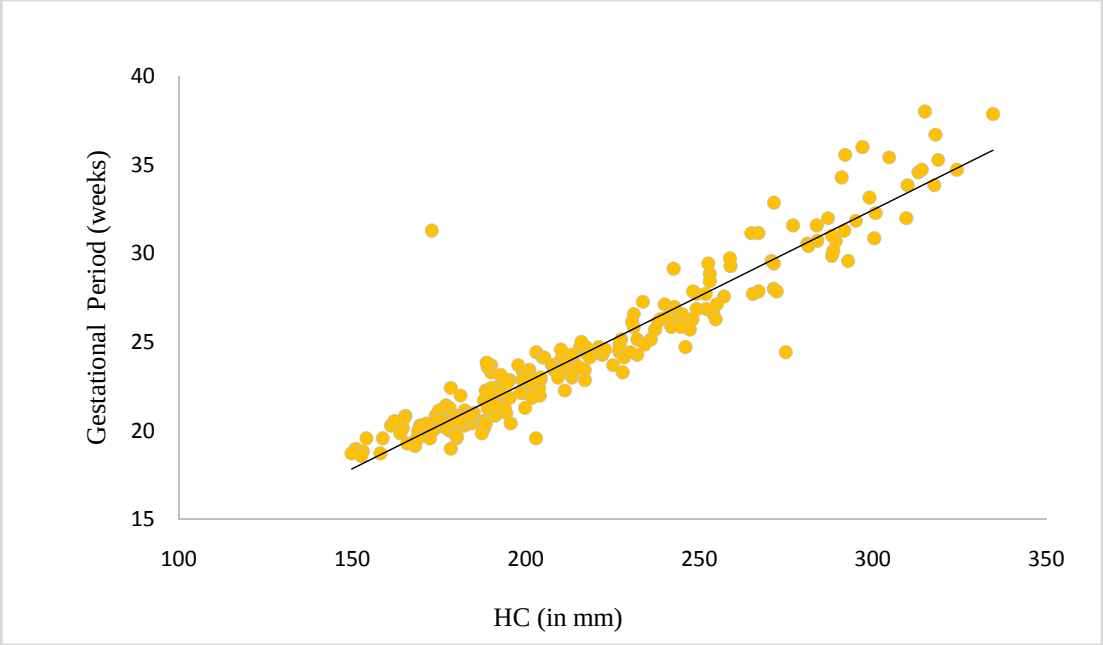
The above scatter plot figure shows a linear correlation of BPD with LMP derived gestational age.

BPD has shown to correlate with LMP derived GA by 94.41%

With 95% confidence interval ranging between 0.9281 to 0.9567 and Pearson's correlation coefficient r = 0.9441 and R^2= 0.8914, a regression equation has been formulated with which GA can be calculated with the help of fetal BPD measurements.

It is given by GA = 4.3474+0.3459*BPD, where 4.3474 and 0.345 are constantsp-value is <0.001, suggesting that it is statistically significant.

Figure 22: Correlation between gestational age and Head circumference



Regression equation: GA = 3.2702+0.0972*HC

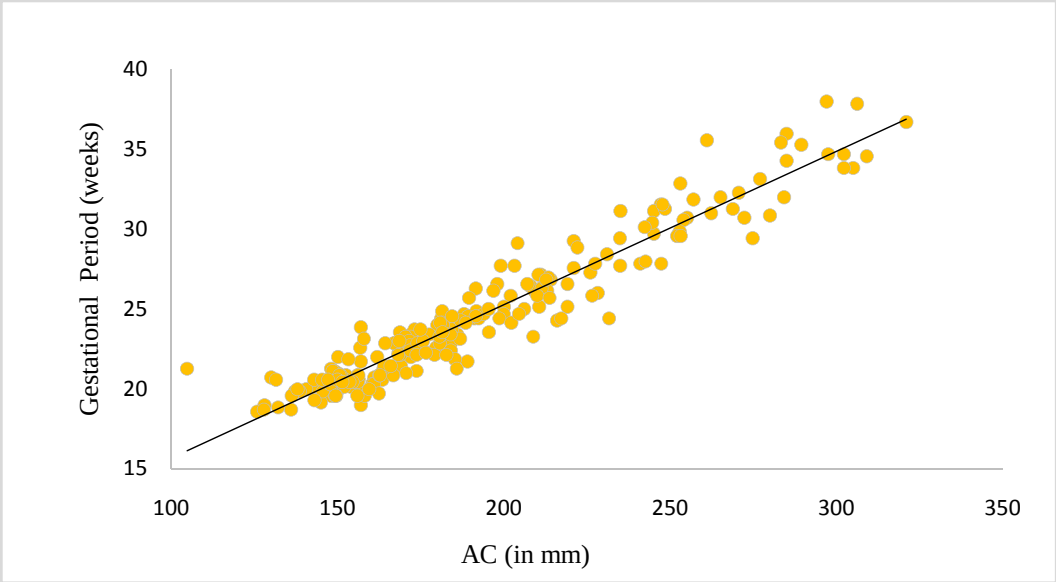
The above scatter plot figure shows a linear correlation of HC with LMP derived gestational age.

HC has shown to correlate with LMP derived GA by 94.98%

With 95% confidence interval ranging between 0.9354 to 0.9611 and Pearson's correlation coefficient r = 0.9498 and R^2= 0.9611, a regression equation has been formulated with which GA can be calculated with the help of HC measurements.

It is given by GA = 3.2702+0.0972*HC, where 3.2702 and 0.097 are constants and p-value is <0.001, suggesting that it is statistically significant.

Figure 23: Correlation between gestational age and Abdominal circumference



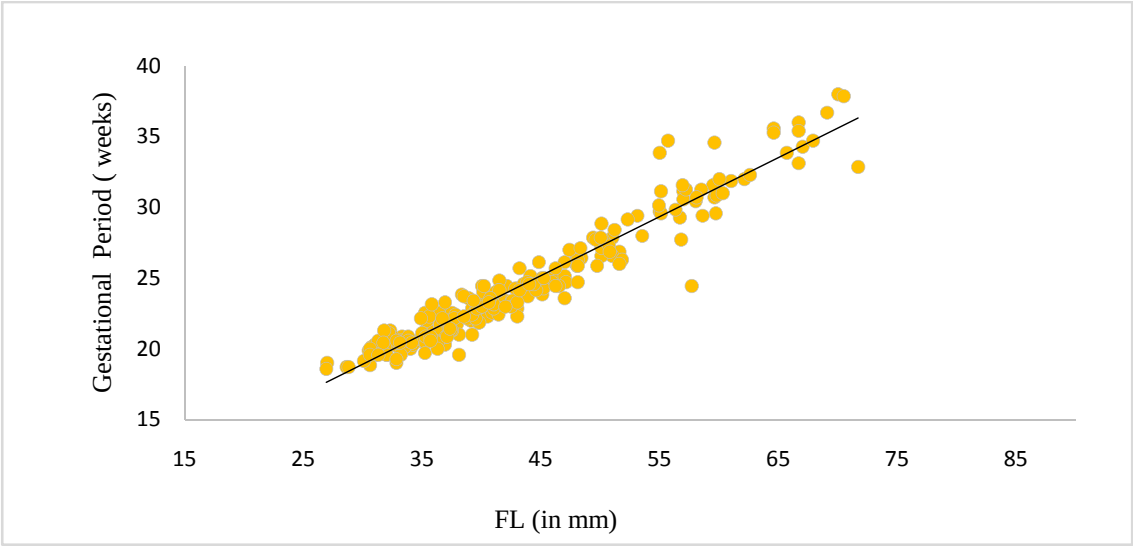
Regression equation: GA =6.0783+0.096*AC

The above scatter plot figure shows a linear correlation of AC with LMP derived gestational age.

AC has shown to correlate with LMP derived GA by 95.99%

With 95% confidence interval ranging between 0.9483 to 0.9689 and Pearson's correlation coefficient r = 0.9599 and R^2= 0.9215, a regression equation has been formulated with which GA can be calculated with the help of AC measurements. It is given by GA =6.0783+0.096*AC**,** where 6.0783 and 0.096 are constants and p-value is <0.001, suggesting that it is statistically significant

Figure 24: Correlation between gestational age and Femur Length



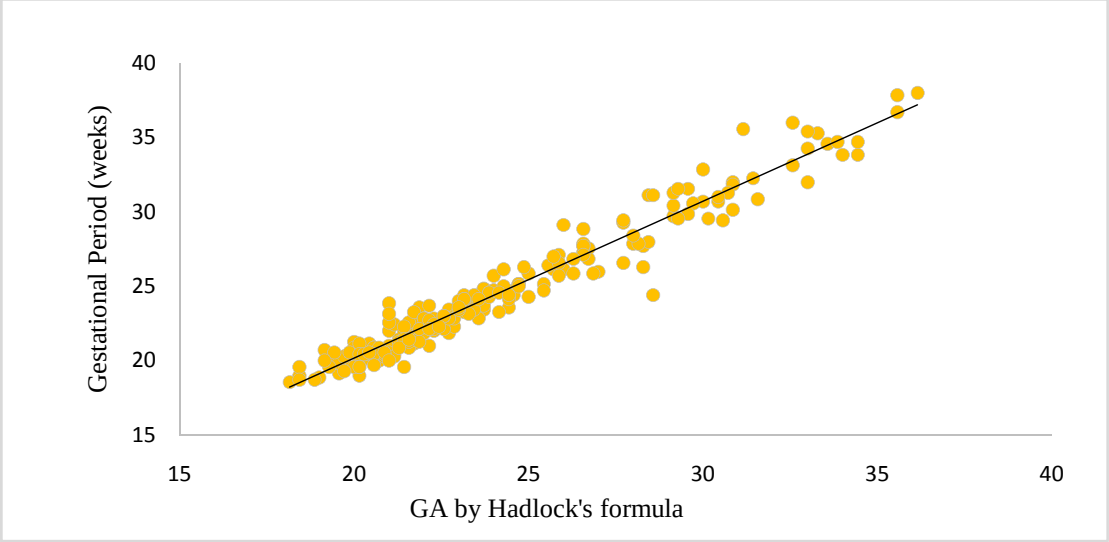
Regression equation: GA =6.4103+0.425*FL

The above scatter plot figure shows a linear correlation of FL with LMP derived gestational age.

Femur length has shown to correlate with LMP derived GA by 94.98%With 95% confidence interval ranging between 0.9565 to 0.9739 and Pearson's correlation coefficient r = 0.9663 and R^2= 0.9337 , a regression equation has been formulated with which GA can be calculated with the help of FL measurements.

It is given by GA =6.4103+0.425*FL, where 3.2702 and 0.097 are constants and p-value is <0.001, suggesting that it is statistically significant

Figure 25: Correlation between GA and Combined biometry (BPD, HC, AC, FL)



Regression equation: GA = - 0.9328+1.05*GA acc. to Combined biometry

The above scatter plot figure shows a linear correlation of combined biometry with LMP derived gestational age.

GA by Hadlock's formula(Combined biometry)ie a combination of BPD, HC, AC and FL has shown to correlate with LMP derived GA by 97.91% (which is the best)With 95% confidence interval ranging between 0.9704 to 0.9823 and Pearson's correlation coefficient r = 0.9771 and R^2= 0.9538, a regression equation has been formulated with which GA can be calculated with the help of GA derived from combined biometry.

It is given by GA = - 0.9328+1.05*GA according to Hadlock's formula where 0.9328 and 1.05 are constants and p-value is <0.001, suggesting that it is statistically significant

TABLE 8: Regression model for estimation of gestational period using various parameters

	Intercept	Intercept Std error	Slope	Slope SE	p-value	R^2	SE(days)	Regression equation
BPD(mm)	4.3474	0.4286	0.3459	0.0072	<0.001**	0.8914	**10.15**	4.3474+0.3459*BPD
HC(mm)	3.2702	0.4702	0.0972	0.0021	<0.001**	0.9022	**9.63**	3.2702+0.0972*HC
AC(mm)	6.0783	0.3640	0.0960	0.0019	<0.001**	0.9215	**8.64**	6.0783+0.096*AC
FL(mm)	6.4103	0.3266	0.425	0.0073	<0.001**	0.9337	**7.93**	6.4103+0.425*FL
FRL(mm)	3.3511	0.4069	0.8463	0.016	<0.001**	0.9245	**8.47**	3.3511+0.8463*FRL
GA acc.to Hadlock's formula	-0.9328	0.371	1.055	0.015	<0.001**	0.9548	**6.54**	-0.9328+1.05*GA acc. to Hadlock's Formula

****Highly significant**

With the help of multiple linear regression, it has been observed that **fetal renal length** can predict GA with a standard error of estimate of **±8.47days**, which is **second best** after FL which can date pregnancy with accuracy of ±7.93days (taking into consideration individual parameters). These are followed by AC(±8.64days), HC(±9.63days) and BPD(±10.15days)

The above table also provides regression equation for the estimation of GA with the help of various fetal biometric parameters.

Another observation made with the aid of this table is that, for every **1mm increase in FRL,** the gestational period will increase by 0.8463 week**(5.92days)** and for every 1mm increase in BPD, HC, AC, and FL, the gestational period will increase by 0.3459week(2.42days),0.09week(0.68days),0.09week(0.67days)and 0.425weeks(2.98days) respectively.

TABLE 9: Regression analysis for predicting various parameters using gestational age

	Intercept	Intercept Std error	Slope*	Slope SE	P-value	R^2	Regression Model
BPD	-4.89	1.4782	2.5767	0.0595	<0.001**	0.89	-4.89+2.5767*GA
HC	-9.0577	5.0207	9.2762	0.2023	<0.001**	0.90	-9.0577+9.2762*GA
AC	-43.3270	4.6052	9.5970	0.1855	<0.001**	0.92	-43.327+9.5970*GA
FL	-11.4878	0.9805	2.2388	0.0395	<0.001**	0.93	-11.487+2.2388*GA
FRL	-1.78	0.5131	1.0924	0.0206	<0.001**	0.92	-1.78+1.0924*GA

***Slope values for gestational age**

The above table shows regression equations with which values of various parameters can be calculated with the help of gestational age.

For every **1 week increase in gestational period,FRL increases by 1.0814mm,** BPD increases by 2.5767mm, HC will increase by 9.2762mm, AC will increase by 9.5970, FL will increase by 2.22.

TABLE 10: Mean fetal renal Length measurements at specific gestational age.

Gestational age in weeks	Total No. of cases (n)	Mean fetal renal length	Standard deviation	Confidence interval
18	4	18.69	0.49	18.21 to 19.17
19	15	19.33	0.51	19.07 to 19.59
20	44	20.46	0.68	20.26 to 20.66
21	16	21.9	1.03	21.4 to 22.4
22	28	22.83	1.45	22.29 to 23.37
23	22	23.87	1.23	23.35 to 24.39
24	24	24.85	0.94	24.47 to 25.23
25	10	25.06	0.82	24.55 to 25.57
26	13	27.56	2.11	26.42 to 28.7
27	11	28.34	1.35	27.54 to 29.14
28	3	30.83	1.09	29.6 to 32.06
29	8	30.26	1.67	29.1 to 31.42
30	6	31.35	1.98	29.76 to 32.94
31	8	33.02	2.48	31.3 to 34.74
32	4	33.89	1.78	32.14 to 35.64
33	3	33.83	0.25	33.55 to 34.11
34	4	35.61	2.19	33.47 to 37.75
35	3	38.07	2.31	35.46 to 40.68
36	2	38.7	2.5	35.24 to 42.16
37	1	37.55	0	37.55 to 37.55
38	1	36.7	0	36.7 to 36.7

The above table shows the mean renal length in millimeteres with standard deviation at various gestational age. Mean renal length was obtained by taking the average value of left and right kidney, each of which was further derived from 3 separate readings. As observed in the table, FRL increases linearly with advancing GA

TABLE 11: Mean and standard deviation of various biometric indices (BPD, HC, AC and FL)at different gestational age

Gestational Age (weeks)	BPD		HC		AC		FL	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
18	41.35	1.01	153.35	3	130.4	3.93	28.73	1.31
19	45.59	2.72	171.31	12.76	146.84	9.04	31.93	2.39
20	47.2	2.77	178	7.85	152.18	7.74	33.68	1.81
21	50.03	2.6	189.1	7.6	161.08	19.65	36.48	2.47
22	52.5	2.69	197.65	7.97	171.7	7.63	38.64	2.27
23	55.28	3	206.38	11.23	177.78	11.22	40.98	2.51
24	59.53	5.3	222.36	14.9	193.1	13.03	44.11	3.6
25	60.86	2.99	234.06	8.91	207.25	10.49	46.27	1.88
26	65.25	3.45	243.87	7.59	209.18	9.25	49.15	2.07
27	65.72	6.68	252.91	11.39	221.32	14.82	50.36	2.27
28	68.13	5.64	259.1	8.63	231.83	8.39	51.6	1.42
29	71.26	7.04	267	16.13	242.18	20.49	55.85	2.37
30	75.87	2.79	287.45	6.62	258	13.81	57.9	1.65
31	75.11	3.18	267.56	37.25	251.38	10.02	58.19	1.86
32	78.28	3.89	292.2	14.46	268.18	11.21	64.1	4.49
33	86.63	5.19	308.87	7.64	294.73	12.59	62.47	5.3
34	84.78	2.28	310.55	12.11	298.43	8.76	62.55	5.1
35	83.5	4.2	305.1	10.91	277.87	12.19	65.3	0.99
36	80.1	3.1	307.5	10.5	303	18	67.9	1.2
37	91.5	0	334.6	0	306.1	0	70.5	0
38	86	0	315	0	297	0	70	0

The above table shows the mean values of various fetal biometric paramaters i.e, BPD, HC AC& FL at specific GA as noted in this study.

Figure 26: Graphical representation of association between with various biometric indices with gestational age.

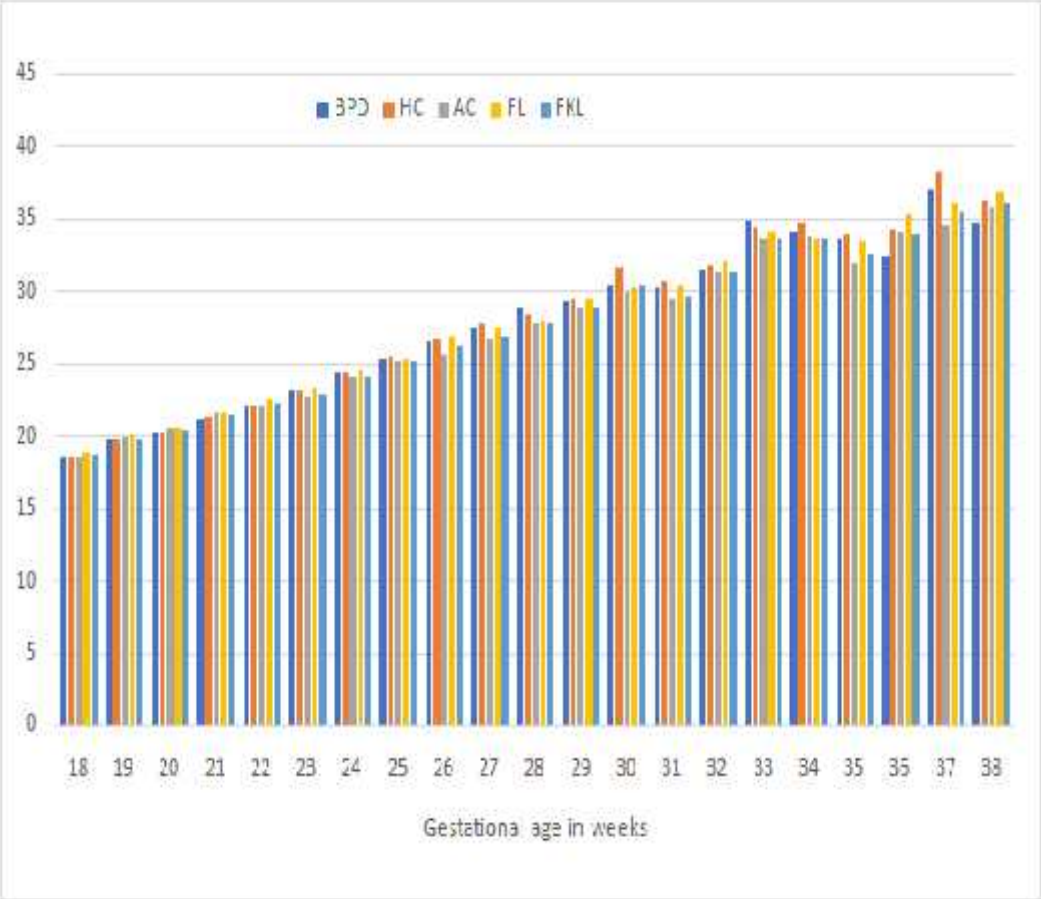


TABLE 12: Predicted values of GA for a given value of Fetal Renal Length

Fetal renal length (mm)	Mean Gestational age (weeks)	95% CI for GA	
		Lower bound	Upper bound
18	18.56	18.53	18.59
19	19.41	19.38	19.44
20	20.26	20.23	20.29
21	21.11	21.08	21.14
22	21.96	21.93	21.99
23	22.81	22.78	22.84
24	23.66	23.63	23.69
25	24.51	24.48	24.54
26	25.36	25.33	25.39
27	26.21	26.18	26.24
28	27.06	27.03	27.09
29	27.91	27.88	27.94
30	28.76	28.73	28.79
31	29.61	29.58	29.64
32	30.46	30.43	30.49
33	31.31	31.28	31.34
34	32.16	32.13	32.19
35	33.01	32.98	33.04
36	33.86	33.83	33.89
37	34.71	34.68	34.74
38	35.56	35.53	35.59
39	36.41	36.38	36.44
41	38.11	38.08	38.14
42	38.96	38.93	38.99

With help of regression analysis, the above table has been constructed which shows the predicted values of GA in weeks with 95% confidence interval for a given value of fetal renal length in millimetres from 18 to 42 mm.

TABLE 13: Comparison of present study with Konje et al 2002

	Study	Intercept estimate	Intercept SE	Slope estimate	Slope SE	p-value	R^2	SE (days)
BPD	Present	4.3474	0.4286	0.3459	0.0072	<0.001**	89	**10.15**
	Konje et al	3.808	0.44	0.38	0.005	<0.005	88	11.6
HC	Present	3.2702	0.4702	0.0972	0.0021	<0.001**	94	**9.63**
	Konje et al	3.013	0.49	0.12	0.002	<0.005	89	11.2
AC	Present	6.0783	0.3640	0.0960	0.0019	<0.001**	90	**8.64**
	Konje et al	5.593	0.45	0.97	0.002	<0.005	81	14.5
FL	Present	6.4103	0.3266	0.425	0.0073	<0.001**	93	**7.93**
	Konje et al	5	0.34	0.449	0.005	<0.005	89	10.9
FKL	Present	3.3511	0.4069	0.8463	0.016	<0.001**	92	**8.47**
	Konje et al	3.821	0.38	0.858	0.012	<0.005	90	10.2

The above table shows a comparison of regression model between the current study and the one done by JC Konje et al in United Kingdom in 2002.

Fetal renal length predicts GA with an accuracy of ±8.47 days in the present study as compared to ±10.2 days in Konje et al.

However, FL is the best predictor followed by renal length and last is BPD according to our study when compared to Konje et al, where fetal renal length is the best predictor followed by FL and last is AC.

These variations can be explained due to racial differences between the two populations.

TABLE 14: Predictive accuracy of GA by Fetal renal length

Gestational age	Accuracy	Days of discrepancy
18wks to 27wk+6days	96.69%	±7.02 days
28wks to 38wks	97.32%	±12.95 days
18 to 38 weeks	96.66%	±8.45 days

TABLE 15: Predictive accuracy of GA by Hadlock's formula

Gestational age	Accuracy	Days of discrepancy
18wks to 27wk+6days	97.60%	±5.70 days
28wks to 38wks	97.23%	±9.35 days
18 to 38 weeks	97.52%	±6.54 days

The above 2 tables shows the predictive accuracy of GA by fetal renal length and by conventional Hadlock's formula (combined biometry)

In 2nd trimester (i.e., from 18-28 weeks), Hadlock's formula predicts GA with an accuracy of ±5.7days, as compared to renal length which predicts by ±7.02 days. Similarly in the 3rd trimester, Hadlock's formula predicts GA with an accuracy of ±9.35days, as compared to renal length which predicts by ±12.95 days. The overall prediction of GA (i.e., from 18-38 weeks) by Hadlock's formula is ±6.54days and by renal length is ±8.45days. Therefore the overall discrepancy between renal length and Hadlock's formula in predicting GA is approximately 2-3days.

Fetal renal length can thus be used as a single parameter similar to combined biometry (Hadlock's formula) in estimation of GA with minimal error. Also, it can be inferred from table 14, that renal length predicts GA better during the 2nd trimester as compared to 3rd trimester.

TABLE 16: Nomogram illustrating the fetal renal length values at various percentiles with specific gestational age

Gestational age(weeks)	Total no. of cases(n)	Percentiles					
		5th	10th	25th	50th	75th	90th
18	4	18.2725	18.295	18.3625	18.5	18.825	19.23
19	15	18.47	18.88	19.35	19.4	19.6	19.74
20	44	19.6225	19.93	20.1875	20.4	20.6	20.755
21	16	21.175	21.225	21.2875	21.45	21.975	23.1
22	28	21.835	21.97	22.1875	22.475	22.65	24.14
23	22	22.915	23.2	23.2625	23.6	23.7875	24.66
24	24	24.1075	24.165	24.3875	24.525	25.1625	26.35
25	10	23.645	24.59	25.15	25.375	25.4	25.475
26	13	25.56	25.64	26.15	27.2	27.6	30.04
27	11	27.125	27.2	27.5	27.8	28.6	29.8
28	3	29.52	29.74	30.4	31.5	31.6	31.66
29	8	28.37	28.44	29.25	29.8	31.0625	32.12
30	6	30.025	30.05	30.1625	30.625	31.0125	33.375
31	8	30.59	31.08	31.5	32.125	33.6	37.05
32	4	32.2475	32.345	32.6375	33.3	34.55	35.9
33	3	33.54	33.58	33.7	33.9	34	34.06
34	4	33.3625	33.625	34.4125	35.125	36.325	37.99
35	3	35.86	36.02	36.5	37.3	39.25	40.42
36	2	36.45	36.7	37.45	38.7	39.95	40.7
37	1	37.55	37.55	37.55	37.55	37.55	37.55
38	1	36.7	36.7	36.7	36.7	36.7	36.7

The above nomogram was constructed based on our study which represents the values of fetal renal length at 5^{th}, 10^{th}, 25^{th}, 50^{th}, 75^{th}, and 90^{th} centiles from 18 to 38 weeks of gestation.

DISCUSSION

Diagnostic ultrasound is the most commonly used in antepartumfoetal surveillance as it is non-invasive, safe, precise & reasonable investigation in pregnancy. With the emergence of high resolution real time 'USG', various inutero organs can be imaged with expertise. Ever since its introduction in the late 1950s by Sir Ian Donald, Diagnostic 'USG' has had a tremendous impact on obstetrical management. One of the major role of diagnostic ultrasound is the precise estimation of GA. Accurate assessment of GA is of utmost importance and the mainstay for management of pregnancies. This plays a major role in scheduling certain clinical tests and interventions, assessing adequacy of intervalgrowth and to plan the timing of delivery for the optimal obstetric outcome.[7]

Studies done by Waldernstorm et al and Kieler et al have shown that GA estimation by LMP is the best method in accurately dating a pregnancy.[66, 136]

But as evidenced in a study by Anderson& workers, in a group of 1000 pregnant patients , only 71% could correctly recall their LMP and studies done by Campbell et al showed that 45% of the women were unsure of their LMP owing to various reasons.[137]

With the advent of diagnostic ultrasound, various conventional parameters are being used in the determination of GA. The routinely used one are CRL in the 1st trimester &HC, BPD, FL,AC and composite of the above in the second and third trimester.[138] As proven by various studies CRL dating is the most consistent ultrasonic biometric parameter used in the first trimester.[43,55] Conventional parameters like AC, HC, BPD, and FL are used during the second and third trimester to establish GA but their reliability reduces with advancing gestational age, owing to their own

shortcomingsHence the major onerous is to date a pregnancy in women who fail to recall their LMP accurately and have not undergone a dating scan and present directly in the late $2^{nd}/3^{rd}$ trimester.

During the early 2^{nd} trimester, kidneys are seen as elliptical structures on either side of lumbar spine in the retroperitoneal region that lacks distinctive borders on real time 'USG'. As pregnancy progresses, the kidneys enlarge and increased echogenicity from increasing perinephric fat , ensures better imaging of renal architecture and become progressively easier to identify.[36,37]

Certain longitudinal studies performed in several countries have shown a linear correlationbetween the fetal kidney length in millimeters and the GA in weeks. Growth variations affect various fetal organs, including fetal kidneys, having its effect predominantly on their anterio-posterior and transverse diameter. Hence length of the kidney is unaffected even in SGA fetuses, This was concluded by Konje et al in 1997.[102]As these measurements are easily reproducible, several studies were taken up to assess the variability in determination of GA by fetal renal length.

The present study, emphasised on the measurement of fetal renal length in the 2^{nd}& 3^{rd}trimester todetermine its predictive accuracy in the estimation of GA as an additional morphological measurement and its efficacywas compared with that of the conventional biometric parameters i.e, BPD, HC, AC and FL and their composite.

A total of 230 singleton uncomplicated antenatal cases attending the outpatient department of Obstetrics and Gynaecology, at KLE'S Dr. Prabhakar Kore charitable hospital attached to KAHER'S JNMC, Belagavi, were included in the present study after meeting the selection criteria.Maternal diseases like Pre-eclampsia, diabetes mellitus, early onset FGR diagnosed in the

course of the study were not included, so as to construct a normogram from the present study showing the percentile values of fetal renal length at respective gestational age.The mean age of the pregnant women in the study was 24.95 ± 4.35 years, with majority of them belonging to the age group of 20-25 years ie, 59.13%.
The present study 56.52% were multigravida which amounted to 130, and 43.48% were primigravida amounting to 100 in number.

We have observed in this study that the maternal age& parity, has nosignificance in renal length measurement, & in assessment of GA.These observations were similar to those noted in the study done by Cohen et al and Yusuf et al.[1, 15]In respect with the gestational age, maximum number of participants belonged to the GA between 20- 24 weeks, amounting to 110 subjects which comprised of 47.8%.The measurements of fetal renal length in our study ranged from 17.7mm to 41.2mm with mean being 24.91mm.

Correlation analyses of conventional parameters with gestational age

In our study, along with fetal renal length, the four conventional parameters ie, HC, AC BPD& FL were also measured and GA was derived from each parameter and from Hadlock's formula which gives the composite GA from the 4 conventional parameters. Further, with the help of Karl Pearson's correlation coefficient, each of the parameters were correlated with GA.

The main objective of the present study was to establish fetal renal length as a supplementary biometric parameter for estimation of gestational age of foetus and also to compare it's efficacy with that of theestablished conventionalbiometric parameters.

Each of the individual biometric parameters i.e , HC, AC, BPD, FL and mean renal length were correlated with GA by correlation analyses, and scatter plots were generated for each of them. All Individual Parameters ie, BPD, HC, AC, FL and mean renal length were statistically significant with a p value of <0.001 and each of them correlated well with GA with a notable "r" value. The results that were obtained are comparable to earlier studies which established the importance of conventional parameters in the estimation of gestational age.[139, 140]

Karl pearson's correlation co-efficient was used in to correlate the obtained values of BPD, HC, AC, FL and mean renal length with GA.

In this study, the R^2 value that was obtained for BPD was 0.8914 which was comparable with other studies like Konje JC et al and JJ Kansaria et al. The value was slightly greater than those obtained by Konje JC et al (R^2= 0.88) and slightly lower as compared to JJ Kansaria et al (R^2 =0.9091).However it showed a good correlation with GA with a statistically significant p value of <0.001.

The values obtained for HC in our study were also statistically significant and correlated well with GA with R^2 value of 0.9022 and its measurement is being considered very important in the assessment intra-uterine brain development which has been proven by various earlier studies.[141,142]

Abdominal circumference is most receptive parameter to assess intrauterine growth disturbances and can be used as an excellent means for assessing of foetal growth and in estimation of fetal weight but is a poor indicator of gestational age.[5,14,44] A study conducted by Chambers *et al*found that a single AC measurement had the highest sensitivity in the prediction of significant growth restriction.[143]The observation of AC in our study revealed statistically significant correlation values(R^2 =0.9215)which was similar to the values obtained by Kansaria and Parulekar(R^2

=0.924) and greater than Konje et al (R^2 =0.81). AC is one of the parameters that has been reported to have maximum variability.[76, 77 ,81]

Limb dwarfism was diagnosed using FL measurement and it was subsequently noted that FL was an excellent tool to estimate GA. Our study observed that FL was correlated to GA the best among all the parameters with R^2 value of 0.9337 which was almost similar to those obtained by Kansaria and parulekar (0.94) and but greater than Konje et al(0.89)

The 1st study to relate foetal renal parameters with GA was done byGonzales J. et al in 1981. Since then various studies have been conducted to establish a linear correlation between renal parameters and gestational age. The present study mainly aimed at assessing the efficacy of fetal renal length in estimation the GA over the conventional parameters like BPD, HC, AC and FL.

In the present study we observed that kidney length linearly increases as the GA advances. The measurements of fetal renal length in our study progressively increased from 18.69 ±0.49mm at 18 weeks to 36.7 ±0.02 mm at 38 weeks. The values of renal length obtained at various GA in our study is almost comparable with Konje et al from 32nd to 36th weeks of gestation, however they were slightly higher as compared to Kansaria and parulekar.

These differences can be explained by various reasons like number of operators, type of study, whether the GA was exact or rounded of to the neasrest single value, quality of 'USG' machine etc. Our study was a cross-sectional type of study, in which 3 skillled operators performed the measurements, estimation of GA was exact and not rounded of and new ultrasonography machines were incorporated.

The results of the current study showed that fetal renal length had a strong association with GA with a statistically significant p value of <0.0001 and correlation

co-efficient (r) of 0.9615. Also, it was the second best individual parameter to correlate strongly with GA after FL (r = 0.9662). This was followed by AC (r=0.9599), HC (r=0.9498) and last by BPD (0.9441).

Similar findings i.e, FL first followed by renal length were reported by Kumar et al and a study conducted in 2007 in Nigeria at Bayero university Kano. However, Kansaria et al and Konje et al in the UK, in their studies, also confirmed a strong correlation between MRL & GA, but the individual parameter to precisely predictGA was MRL. This difference in results could be explained due to variation in sample size of both studies. Konje et al and Kansaria et al each had a study population consisting <100 participants. (50 & 73 respectively).[3, 16] Our study has a sample size of 230 which was almost similar to Kumar et al(n=199).[111]

The first report of the size of normal fetal kidney length sonographically was by Seo Y S et al.[144] This study used the normogram by Cohen et al.[15]Measurements of fetal MKL have been shown to correlate with GA as seen in studies by Seo Y S et al and Cohen et al.[144]

Multiple regression analyses

In our study, regression model was formulated to estimate GA from all the individual parameters.Regression analysis showed that renal length could predict GA with a standard error of prediction of ±8.47 days which is similar to Kumar et al(±8.4days) and lesser as compared to Konje et al(±10.2days), Kansaria et (±9.1days).

The single best parameter to predict GA was FL according to the present study with an accuracy of ±7.93 days which was greater as compared to Kumar et al (±3.95days) and Nigerian study (±3.58days). These values were however less as

compared to Konje et al (±10.2days) and Kansaria et al(±10.9days) but FL predicted the GA better than other parameters according to the latter 2 studies.

With regards to the other parameters, the results of the regression analysis in the present study showed that Biparietal Diameter can estimate GA with a standard error of prediction of ±10.15 days which was low as compared to the results of Kansaria et al (±10.9days) and also that of Konje et al (±11.6days). Head Circumference could date pregnancies with a standard error of estimate of ±9.63 days, which is lower as compared to Konje et al (±11.2days).Abdominal Circumference can date pregnancies within ±8.6 days which was much lower as compared to Kansaria et al(±11.1days) and Konje et al (±14.5days).Hence, to according to regression analysis done in our study, we concluded that pregnancies could be dated best by FL, followed by FRL, AC, HC and last by BPD.

The conventionally established fetal biometric parameters vary with increasing gestational age. Hence there are various limitationsassociated with each of the above mentioned parameter for assessment of GA.

The accuracy of BPD was found to be maximal between 12 and 20 weeks as concluded by various studies (Campbell et al 1971). But there are certain shortcomings associated with its measurement as noted in cases where the head is dolicocephalic or brachycephalic, the measurements are not reliable. Also, during in cases of term gestation in case of primigravidas, when the head has entered the maternal pelvis and is in direct occipito posterior or direct occipito anterior position, technical problems are encountered.

The GA estimation with the help of HC is better as compared to BPDin terms of variablity during the second or third trimester of pregnancy.

The major drawback associated with AC in the estimation of GA is that it is most commonly affected by growth disturbances like FGR and macrosomia. The section that is obtained to measure AC should be as circular as possible for its accuracy to be maintained. Also, during the third trimester, as it is technically difficult to fit the entire outline of the AC on the screen, variations arise in its measurement which may cause under estimation of gestational age. Other problems observed are, a fetal limb can indent the outline and make it non-circular (P. Chudleigh & J.M. Pearce in1992).[61 82]

FL was originally measured to diagnose limb dwarfism. Accurate estimation of GA is observed between 13 and 25 weeks of gestation.

With the help of regression analysis another observation that was made in our study was that, fetal renal length increased by 1.0814mm with weekly progression of gestational age. This finding was similar to those obtained by works of Kansaria & coworkers, JC Konje & colleagues and Kumar et al respectively.[3,16, 111]

The other parameters ie, BPD increases by 2.5767mm, HC increases by 9.2762mm, AC increases by 9.5970 and FL increases by 2.22 with advancement of GA by every 1 week.

Conversely, for every 1mm increase in fetal renal length, the gestational period increases by 0.8463 week (5.92 days).And similarly for the various parameters i.e, BPD, HC, AC and FL, the gestational period increases by 0.3459 weeks (2.42 days), 0.09 week. (0.68 days), 0.09 week. (0.67 days), 0.425 week (2.98 days)respectively.

A normogram was constructed from the present study illustrating the measurements of mean renal length at 5^{th}, 10^{th}, 25^{th} ,50^{th} , 75^{th} and 90^{th} centiles with respective gestational age.

Predictive accuracy of various parameters:

The predictive accuracy of various parameters in estimation of GA in our study was calculated using the Mean absolute percentage error(MAPE).Between the GA of 18-38 weeks, the predictive accuracy of renal length in the present study was found to be 96.66% ± 8.47 days which was second best after FL which was 96.71% ±7.93days, followed by HC (96.41±9.63 days), AC (96.29% ±8.64 days)and least was BPD (95.73% ±10.15days).

In second trimester, ie, from 18-28 weeks, the predictive accuracy of renal length was found to be 97.32%, which suggested that its accuracy is better in the second trimester as compared to third trimester wherein it was 94.88%.

Hence, the present study substantiates the proposalof fact that FKL can be used as an vital sonographic parameter for precise estimation of GA of foetus. In addition to the above stated fact, it also has certain advantages over the conventional parameters. These are, fetal renal length remains unaffected by growth disturbances (which is a major limitation of AC), in cases of skeletal dysplasias, short long bones (where FL is not reliable) and in cases of engaged head,abnormal fetal lie,or congenital anomalies distorting the fetal skull eg: hydrocephalus[145], dolicocephalic or brachycephalic head (whereaccurate estimation of BPD and HC are not possible).

Therefore mean renal length can be utilised to date pregnancies accurately in the above mentioned conditions. Also it can be used as a reliable single parameter in the determination of GA in women who present in the late 2^{nd}& 3^{rd} trimester without a dating scan and who are unable to accurately recall their LMP.

CONCLUSION

The current study demonstrated that there was statistically significant correlation between GA and FRL along with the conventional parameters like HC, AC, BPD and FL.

There was a linear correlation noted between FRL as observed by increase in renal length by 1.08mm weekly with successive advancement of GA and hence can be applied as an important parameter in estimation of GA.

Fetal renal length predicts GA with a standard error of ±8.47days, which is second best after FL which could date pregnancy with a standard error of ±7.93days followed by AC, HC and BPD in that order.

Renal length predicts GA better during the 2ndtrimester (±7.02 days) as compared to 3rdtrimester (±12.95 days).

The overall discrepancy between renal length (96.88 ± 8.45days) and Hadlock's formula (97.29% ± 6.54days) in predicting GA is approximately 2-3days. FRL can thus be used as a single parameter similar to combined biometry (Hadlock's formula) in estimation of GA with minimal error in women who who are unable to recall their LMP accurately, without a dating scan and present directly during the late 2nd and 3rd trimester.

Also fetal renal length can be used as an important tool for assessment of GA in certain situations were the other conventional parameters like BPD, HC, AC and FL are not reliable for assessment of gestational age.

SUMMARY

The current study was a descriptive cross-sectional study that was conducted for a period of 1 year from January 2019 to March 2020 at KLE's Dr Prabhakar Kore Charitable Hospital and Medical Research centre, attached to KAHER's JNMC, Belagavi.

The primary objective of this study was to assess the accuracy of mean fetal renal length measurement in estimation the gestational age from 18-38 weeks of pregnancy against that of the conventional fetal biometric parameters, ie BPD, HC, AC, FL and combined biometry (ie, Hadlock's formula)

A total of 230 singleton, uncomplicated antenatal women whose pregnancies were dated according to ACOG guidelines from 18- 38 weeks period of gestation , attending the OPD, admitted in wards and Labour room , after meeting the selection criteria and obtaining written informed consent were recruited for the study.

Ultrasonography was performed by trained personnel to measure the fetal renal length along with the routine fetal biometric parameters i.e , BPD, HC, AC, FL and GA was determined by each of them and results were tabulated and compared.

The mean age of the pregnant women in our study was 24.95 ± 4.35 years. Among the 230 participants, 56.52% were multigravida and 43.48% were primigravida. Majority of the subjects ie, 60 out of 230, belonged to the GA between 20 to 22 weeks accounting to 26%, followed by 50 subjects accounting to 21.7%, between 22 to 24 weeks. It was observed in this study that the maternal age& parity, has nosignificance in renal length measurement, & in assessment of GA.

There was a strong correlation noted between FRL and GA which was shown by a significant p value of <0.001 and Karl Pearson's correlation coefficient value of r=0.9615. Also, as already proven, there was statistically significant correlation

between GA and other parameters like BPD,HC, FL,AC. However, according to the present study, fetal renal length predicted GA with an accuracy of ±8.47days, which is second best after FL which could date pregnancy with accuracy of ±7.93days.

Renal length linearly increased as GA advanced and for every 1 week increase in gestational period, FRL increased by 1.08mm as observed in this study.

With the help of regression equation, GA could be predicted for a given value of fetal renal length. For every 1mm increase in FRL, the gestational period will increase by 0.8463 week (5.92days)

Normogram was constructed from the present study depicting the values of renal length at various percentiles at specific gestational age.

The renal length in the present study dated pregnancies with a better accuracy of ±7.93days as of compared to those of Konje et al of the United kingdom, in which the renal length dated pregnancies by ±10.2 days. These differences could be due to racial variations.

The predictive accuracy of renal length in the present study was found to be 96.66% ± 8.47 days which was second best after FL which was 96.71% ± 7.93days, followed by HC (96.41±9.63 days), AC (96.29% ± 8.64 days) and least was BPD (95.73% ±10.15days).

Also, renal length predicts GA better during the 2ndtrimester (97.32% ±7.02 days) as compared to 3rdtrimester (94.98% ± 12.95 days).

When compared with predictive accuracy of Hadlock's formula, which is 97.41% ±5.7days during 2nd trimester , 96.75% ±9.35days during 3rd trimester and 97.29% ± 6.54days from 18-38 weeks, the overall discrepancy between renal length and Hadlock's formula in predicting GA is approximately 2-3days. Hence, FRL can be used as a single parameter similar to combined biometry (Hadlock's formula) in

estimation of GA with minimal error in women who present during the late 2nd and 3rd trimester without a dating scan and who are unable to accurately recall their LMP.

Also fetal renal length can be used as an important tool for assessment of GA in conditions like engaged head, dolico / brachycephaly, abnormal fetal lie, fetal growth restriction, skeletal dysplasia etc, were the other conventional parameters like HC, AC, BPD, and FL are not reliable for assessment of gestational age.

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ANNEXUREI

ETHICAL CLEARANCE

K.L.E. ACADEMY OF HIGHER EDUCATION AND RESEARCH
(Deemed – to- be- University)
Accredited 'A' Grade by NAAC (2nd Cycle) Placed in Category 'A' by MHRD (GoI)
JAWAHARLAL NEHRU MEDICAL COLLEGE,
NEHRU NAGAR, BELAGAVI-590010 (KARNATAKA-INDIA)
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Principal: 2471701
Fax No. +91 (0)831 – 2470759

Ref: MDC/DOME/ 74 **Date: 24/11/2018**

To,

REG. NO. BJ0118005

PG student in Obstetrics and Gynecology,
J.N.Medical College,
BELAGAVI.

Sub: Institutional Ethical Clearance for the study.

With reference to the above, we wish to inform you that your proposed research project titled **"ACCURACY OF ESTIMATION OF GESTATIONAL AGE FROM 18-38 WEEKS BY MEAN FETAL RENAL LENGTH",** is ethical and justifiable. The proposed research project has been cleared by the JNMC Institutional Ethics Committee on Human Subjects Research.

(Dr. Arathi Darshan)
Member Secretary
JNMC Institutional Ethics Committee
on Human Subjects Research,
J.N.Medical College, Belagavi.

(Dr. Roopa M Bellad)
Chairman,
JNMC Institutional Ethics Committee
on Human Subjects Research,
J.N.Medical College, Belagavi.

ANNEXURE II

CONSENT FOR PARTICIPATION IN THE RESEARCH STUDY

Mrs. _____ we are requesting you to enroll yourself in study titled **"Accuracy of estimation of gestational age from 18-38 weeks by mean fetal renal length"** conducted by REG. NO. BJ0118005, Post Graduate in M.S. Obstetrics and Gynaecology under the guidance of DR. _____Professor, Department of Obstetrics and Gynaecology, J.N. Medical College, Belgaum under KLE university, Belagavi.

The purpose of research study is to know the accuracy of estimating gestational age from 18-38 weeks by measuring the mean fetal renal length. I will be the investigator for our study. This study is not being funded.I am going to give you information about this research project. Before you decide, you can talk to anyone you feel comfortable with about the research.

Purpose of study:

The purpose of this study is to evaluate the accuracy of mean fetal renal length being used as a tool to estimate the gestational age of antenatal women between 18 weeks to 38 weeks.Gestational age assessment is important as incorrect gestational age can increase the incidence of prematurity, postmaturity and post-datism, thereby increasing maternal and fetal adverse effects. By correctly estimating the period of gestation, we can minimise these adverse effects.

Type of Study

This is a prospective cross sectional study involving ultrasonography of fetal kidney to estimate the period of gestation in antenatal women between 18-38 weeks,

Participant selection

We are inviting all women between 18-38 weeks period of gestation attending the outpatient Department of OBG and admitted in wards and labour room who are sure of their LMP/ have a first trimester dating scan after applying the exclusion criteria.

Voluntary Participation

Your participation in research is voluntary.Your decision whether to participate in the study or not will not change present or future health care services offered to you and will not affect your relationship with J.N. Medical College.

Information on the scan

The fetal kidneys appear ultrasonically as a sonolucent halo of tissues surrounding the somewhat more echogenic pyelocalyceal sinus. Kidneys are identified first in transverse section just below the level of AC measurement, and then the probe has to be rotated longitudinally till full length of kidney is identified. The kidney length has to be taken as a bipolar measurement cautiously excluding the adrenals.The kidney length has to be measured from one outer pole to another. Average of 3 measurements in centimeters of the kidney is recorded as final measurement. The measurements are performed using gray scale real time ultrasonographic scanner with 3.5-5 MHz curvilinear transducer

Procedure Involved:

After selection of patients for the study and obtaining informed consent, patient will be evaluated as per history, general physical examination, routine antenatal investigations and ultrasonography. Fetal renal length will be measured as a part of routine antenatal scan and gestational age will be estimated from it which will be compared with the LMP GA /first trimester GA and the accuracy of estimation of GA by fetal renal length is assessed.

Side effects&Risks

There are no known side effects or risks associated with this study.

Benefits

We want to let you know that there may be no benefits to you at present by participating in this study. By participating you will be helping to ensure that women in future get the best care and outcome.

Your participation being valuable contribution to medical research in the field of estimation of gestational age by ultrasonography

Financial Incentives for participation:

No financial incentives are being offered to enrolled patients. It is purely being done with the idea of research and all the cost of the study will be borne by the investigator.

Privacy and Confidentiality:

The only people who will know that you are the research subject will be the members of the research team. No information about you or information provided by you during the research will be disclosed to others without your written permission except:

1. In emergency to protect your rights and welfare.
2. If required by law.

Authorization to Publish Results:

When the results of the research are published or discussed, in a conference, no information will be displayed that would disclose your identity. Any information that is obtained in connection with this study and that can be identified with you will remain confidential. Results of the study will be used to improve maternal outcome.

Right to refuse or withdraw from study:

You do not have to participate in this research if you do not wish to.You can withdraw at any time from the study. There will be no penalty for withdrawal. Your treatment and care in this hospital will not change irrespective of whether you agree to participate or not. You can be removed from the study if necessary.

Alternative:

You are free to withdraw yourself from this study at any point of time. You will continue to receive the routine care even if you decline to participate in the study. You will be informed about any new information that may affect your decision to participate in the study.

Institutional/sponsor's policy:

In the event of any injury related to the study, treatment will be made available through KLE's Hospital & MRC, Belgaum. There is no compensation or payment for such medical treatment by law. If you are injured you may contact REG. NO. BJ0118005, Post graduate student, Department of Obstetrics and Gynaecology, KLE's Hospital& MRC or by Ph. No: _____.

Contact details:

If you have any questions you may ask now or later. If you wish to ask questions

later, you may contact the responsible doctor attending you at the moment or you may contact,

1. REG. NO. BJ0118005Postgraduate in Department of Obstetrics and Gynaecology, KLE University's Jawaharlal Nehru Medical College, Belagavi

2. Dr. _____,

   Professor in Department of Obstetrics and Gynaecology, KLE University's Jawaharlal Nehru Medical College, Belagavi

If you have any queries about your rights as a study subject, you may callDr.Roopa M Bellad, Professor of Paediatrics as Chairperson of J. N. Medical College Institutional Ethics Committee on Human Subjects Research, Phone No.0831 2473777 at J. N. Medical College, Belagavi.

CONSENT STATEMENT:

I, _____ voluntarily agree for participating in this study. By signing this consent form I am not giving up any of my legal rights, I may withdraw from the study anytime. I am signing the consent form after having read or been read form in my own vernacular language, including the risks and the benefits and having all my questions answered.

Participant Name : _____

Signature of the Left Thumb Print of Participant : _____

Investigators Name: _____ Signature: _____

Witness Name : _____ Signature: _____

Date: _____

ಸಂಶೋಧನಾಅಧ್ಯಯನದಲ್ಲಪಾಲ್ಗೊಳ್ಳಲುಒಪ್ಪಿಗ

ಶ್ರೀಮತಿ. _____ ನಾವುREG. NO. BJ0118005ಎಂಎಸ್ಸಲ್ಲಪೋಸ್ಟ್ಬುಯೀಟಿ.

ನಡಸಲ "ಸರಾಸರಿಭ್ರೂಣದಮೂತ್ರಪಿಂಡದಉದ್ದದಮೂಲಕ 18-38 ವಾರಗಳಗರ್ಭಧಾರಣೆಯವಯಸ್ಸನ್ನುಅಂದಾಜುಮಾಡುವಕುರಿತ"
ಹೆಸರಿನಅಧ್ಯಯನದಲ್ಲಿನಿಮ್ಮನ್ನುಸೇರಿಕೊಳ್ಳಲುಮನವಿಮಾಡುತ್ತಿದ್ದೇವೆ, ಡಾ_____,
ಪ್ರಸೂತಿಮತ್ತುಸ್ತ್ರೀರೋಗಶಾಸ್ತ್ರಇಲಾಖೆಯಮಾರ್ಗದರ್ಶನದಲ್ಲಿಪ್ರಸೂತಿಮತ್ತುಸ್ತ್ರೀರೋಗಶಾಸ್ತ್ರ, ಜವನ್ಮಡಕಲ್ಕಾಲೇಜು,
ಬೆಳಗಾವಿಕೆಎಲ್ಇವಿಶ್ವವಿದ್ಯಾಲಯದಲ್ಲಿಬೆಳಗಾವಿ.
ಸರಾಸರಿಭ್ರೂಣದಮೂತ್ರಪಿಂಡದಉದ್ದವನ್ನುಅಳೆಯುವಮೂಲಕಗರ್ಭಧಾರಣೆಯವಯಸ್ಸನ್ನು 18-38
ವಾರಗಳಿಂದಅಂದಾಜುಮಾಡುವನಿಖರತೆತಿಳಿಯುವುದುಸಂಶೋಧನಾಉದ್ದೇಶವಾಗಿದೆ.
ನಮ್ಮಅಧ್ಯಯನಕ್ಕೆನಾನುಶೋಧಕನಾಗಿರುತ್ತೇನೆ. ಈಅಧ್ಯಯನವುಹಣವನ್ನುನೀಡುತ್ತಲ್ಲ.
ಈಸಂಶೋಧನಾಯೋಜನೆಯಬಗ್ಗೆನಿಮಗಮಾಹಿತಿನೀಡಲುನಾನುಹೋಗುತ್ತೇನ. ನೀವುನಿರ್ಧರಿಸುವಮೊದಲು,
ನೀವುಸಂಶೋಧನೆಯಬಗ್ಗೆಹಾಯಾಗಿರುತ್ತಿದ್ದಯಾರಿಗಾದರೂಮಾತನಾಡಬಹುದು.

ಅಧ್ಯಯನಉದ್ದೇಶ:

18 ವಾರಗಳಿಂದ 38
ವಾರಗಳವರಗಗರ್ಭಧಾರಣೆಯವಯಸ್ಸನ್ನುಗರ್ಭಧಾರಣೆಯವಯಸ್ಸನ್ನುಅಂದಾಜುಮಾಡುವಸಾಧನವಾಗಿಬಳಸಲಾಗುವಸರಾ
ಸರಿಭ್ರೂಣದಮೂತ್ರಪಿಂಡದಉದ್ದದಿಂದಖಚಿತಮೌಲ್ಯಮಾಪನಮಾಡುವುದು.
ತಪ್ಪಾದಗರ್ಭಾವಸ್ಥೆಯವಯಸ್ಸುಪ್ರಾಧಿಸ್ಥತಿಯಪ್ರಿಮಿಣವನ್ನುಹಚ್ಚಸಬಹುದುಎಂದುಗರ್ಭಾವಸ್ಥೆಯವಯಸ್ಸುಅಂದಾಜುಮುಖ್ಯ
ವಾಗಿದ , ಅನನುಭವಮತ್ತುನಂತರದದತ್ತಸಂಚಯ,
ತನ್ಮೂಲಕತಾಯಿಯಮತ್ತುಭ್ರೂಣದಪ್ರತಿಕೂಲಪರಿಣಾಮಗಳನ್ನುಹಚ್ಚಸುತ್ತದ.
ಗರ್ಭಾವಸ್ಥೆಯಅವಧಿಯನ್ನುಸರಿಯಾಗಿಅಂದಾಜುಮಾಡುವಮೂಲಕ,
ನಾವುಈಪ್ರತಿಕೂಲಪರಿಣಾಮಗಳನ್ನುಕಡಿಮೆಮಾಡಬಹುದು.

ಅಧ್ಯಯನಪ್ರಕಾರ

18-38
ವಾರಗಳನಡುವಪ್ರಸವಪೂರ್ವಮಹಿಳೆಯರಲ್ಲಿಗರ್ಭಾವಸ್ಥೆಯಅವಧಿಯನ್ನುಅಂದಾಜುಮಾಡಲುಭ್ರೂಣದಮೂತ್ರಪಿಂಡದಅಲ್ಟ್ರಾ
ಸೊಗ್ರಫಿಯನ್ನುಬಳಸಿಕೊಂಡರುವಭವಿಷ್ಯದಅಡ್ಡವಿಭಾಗೀಯಅಧ್ಯಯನವುಇದು,

ಭಾಗವಹಿಸುವವರುಆಯ್ಕೆ

ಒಬಜಹೂರಗುತ್ತಿಗಇಲಾಖೆಯಲ್ಲಿಭಾಗವಹಿಸುವ 18-38
ವಾರಗಳಗರ್ಭಾವಸ್ಥೆಯಿಎಲ್ಲಾಮಹಿಳೆಯರನ್ನೆನಾವುಆಹ್ವಾನಿಸುತ್ತಿದ್ದೇವೆಮಿತ್ತುವಿರ್ದ್ಗಳುಮತ್ತುಕಾರ್ಮಿಕಕೋಣೆಯಲ್ಲಿಒಬ್ಬಕೂಂ
ಡರಿ, ಅವರಎಲ್ಲಾವಂಚಿಯಿಖಚಿತತಹೂಂದದವರು /
ಹೊರತುಪಡಿಸದಮಾನದಂಡಗಳನ್ನುಅನ್ವಯಿಸದನಂತರಮೊದಲತ್ಯೆಮಾಸಿಕದದತ್ತೀಕರಣವನ್ನುಹೂಂದರುತ್ತಾರ.

ಸ್ವಯಂಪ್ರೇರಿತಭಾಗವಹಿಸುವಿಕ

ಸಂಶೋಧನೆಯಲ್ಲಿನಿಮ್ಮಭಾಗವಹಿಸುವಿಕೆಸ್ವಯಂಪ್ರೇರಿತವಾಗಿರುತ್ತದ.
ಅಧ್ಯಯನದಲ್ಲಿಭಾಗವಹಿಸಲುಅಥವಾಇಲ್ಲವೇಎಂದುನಮ್ಮೆನರ್ಧಾರವುನಮಗಿಪ್ರಸ್ತುತಪಡಿಸದಪ್ರಸ್ತುತಅಥವಾಭವಿಷ್ಯದಆರೋ
ಗ್ಯಸೇವೆಗಳನ್ನುಬದಲಿಸುವುದಿಲ್ಲಮತ್ತುಜವನ್ಮಡಿಕಲ್ಕಾಲೇಜ್ನೊಂದಿಗೆನಮ್ಮೆಸಂಬಂಧದಮೇಲೆಪರಿಣಾಮಬೀರುವುದಿಲ್ಲ.

ಸ್ಕ್ಯಾನ್ಮಾಡುವುದು

ಭ್ರೂಣದಮೂತ್ರಪಿಂಡಗಳುಶ್ರವಣಾತೀತವಾಗಿಸ್ವಲ್ಪಹೆಚ್ಚುಪ್ರತಿಧ್ವನಿಯುಳ್ಳಕ್ಯಾಲಿಸಿಲ್ಯನಸ್ತುತ್ತಲಿನಅಂಗಾಂಶಗಳಸೂಜಿ
ಲೆಸಂಟ್ವಾಲೋಚಿಗಿಕಾಣಿಸುತ್ತವೆ.

ಮೂತ್ರಪಿಂಡಗಳನ್ನುಎಸ್ಅಳತೆಯಿಮಟ್ಟಕ್ಕಿಂತಕಳಗಿರುವಅಡ್ಡಾದಿಡ್ಡಭಾಗದಲ್ಲಮೊದಲುಗುರುತಿಸಲಾಗುತ್ತದೆಮತ್ತುನಂತರ ಮೂತ್ರಪಿಂಡದಪೂರ್ಣಉದ್ದದವರೆಗೂತೆಸಿಉದ್ದವಾಗಿಸುತ್ತುವರೆತಮಾಡಬೇಕು.

ಮೂತ್ರಪಿಂಡದಉದ್ದವುಮೂತ್ರಜನಕಾಂಗದಮಾಪನವಾಗಿಎಚ್ಚರಿಕೆಯಿಂದಹೊರತುಪಡಿಸಿಅಡ್ರಿನಾಲ್ಗಳನ್ನುಹೊರತುಪಡಿಸಬೇಕು. ಮೂತ್ರಪಿಂಡಒಂದುಹೊರಗಿನಕೆಂಬದಿಂದಇನ್ನೊಂದಕ್ಕಉದ್ದದಅಳತೆಮಾಡಬೇಕು. . ಮೂತ್ರಪಿಂಡದಸೆಂಟಿಮೀಟರ್ಗಳಲ್ಲ ೩ ಮಾಪನಗಳುಸರಾಸರಿಮಾಪನವಾಗಿದಾಖಲಿಸಲ್ಪಟ್ಟಿವೆ. 3.5-5

ಮೆಗಾಹರ್ಟ್ಜ್ ಕರ್ವಿಲಿನಾರ್ಸಂಜ್ಞಾಪರಿವರ್ತಕದೊಂದಿಗೆಬೂದುಪ್ರಮಾಣದನೈಜಸಮಯದಲ್ಲಅಲ್ಟ್ರಾಸಾನಿಕ್ ಸ್ಕ್ಯಾನರ್ಗಳಸಮಾಪನಗಳನ್ನುನಡೆಸಲಾಗುತ್ತದೆ .

ಕಾರ್ಯವಿಧಾನಕ್ಕಒಳಪಟ್ಟದ :

ಅಧ್ಯಯನದರೋಗಿಗಳಆಯ್ಕೆಮತ್ತುತಿಳುವಳಿಕೆಯುಳ್ಳಸಮ್ಮತಿಯನ್ನುಪಡೆಯುವನಂತರ,
ರೋಗಿಯಇತಿಹಾಸದಪ್ರಕಾರಮೌಲ್ಯಮಾಪನಮಾಡಲಾಗುತ್ತದೆ, ಸಾಮಾನ್ಯದೈಹಿಕಪರೀಕ್ಷೆ,
ದಿನನಿತ್ಯದಪ್ರಸವಪೂರ್ವತನಿಖೆಗಳುಮತ್ತುಅಲ್ಟ್ರಾಸಾನೋಗ್ರಫಿ.
ಭ್ರೂಣದಮೂತ್ರಪಿಂಡದಉದ್ದವನ್ನುದಿನನಿತ್ಯಪ್ರಸವಪೂರ್ವಸ್ಕ್ಯಾನ್ನಭಾಗವಾಗಿಅಳೆಯಲಾಗುವುದುಮತ್ತುಗರ್ಭಾವಸ್ಥೆಯವಯಸ್ಸನ್ನುಎಲ್ಎಂಪಿಬಿಪಿಡಿ/ಮೊದಲತ್ರೈಮಾಸಿಕಸಿಆರ್ಎಲ್ಗೆಹೋಲಿಸಲಾಗುವುದುಮತ್ತುಭ್ರೂಣದಮೂತ್ರಪಿಂಡದಉದ್ದದಿಂದಜಿಎಯಅಂದಾಜಿನನಿಖರತೆಯುಮೌಲ್ಯಮಾಪನಗೊಳ್ಳುತ್ತದೆ .

ಅಡ್ಡಪರಿಣಾಮಗಳು

ಈಅಧ್ಯಯನದಯಾವುದೇಅಡ್ಡಪರಿಣಾಮಗಳಲ್ಲ .

ಅಪಾಯಗಳು

ಈಅಧ್ಯಯನಕ್ಕಸಂಬಂಧಿಸಿದಯಾವುದೇಅಪಾಯಗಳಲ್ಲ

ಪ್ರಯೋಜನಗಳು

ಈಅಧ್ಯಯನದಲ್ಲಪಾಲ್ಗೊಳ್ಳುವಮೂಲಕಪ್ರಸ್ತುತನಿಮಗೆಯಾವುದೇಪ್ರಯೋಜನವಿಲ್ಲಎಂದುನಿಮಗೆತಿಳಿಸಲುನಾವುಬಯಸುತ್ತೇವೆ
.
ಭಾಗವಹಿಸುವಮೂಲಕಭವಿಷ್ಯದಲ್ಲಮಹಿಳೆಯರುಉತ್ತಮಕಾಳಜಿಯನ್ನುಮತ್ತುಫಲಿತಾಂಶವನ್ನುಪಡೆಯಲುಖಚಿತಪಡಿಸಿಕೊಳ್ಳಲುಸಹಾಯಮಾಡುತ್ತಾರೆ .
ಅಲ್ಟ್ರಾಸಾನೋಗ್ರಫಿಯಮೂಲಕಗರ್ಭಾವಸ್ಥೆಯವಯಸ್ಸನ್ನುಅಂದಾಜುಮಾಡುವಕ್ಷೇತ್ರದಲ್ಲವೈದ್ಯಕೀಯಸಂಶೋಧನೆಗಅಮೂಲ್ಯಕೊಡುಗೆನೀಡುವುದುನಿಮ್ಮಭಾಗವಹಿಸುವಿಕೆ

ಭಾಗವಹಿಸುವಿಕೆಗಾಗಿಹಣಕಾಸಿನಉತ್ತೇಜಕಗಳು :

ನೋಂದಾಯಿತರೋಗಿಗಳಿಗೆಹಣಕಾಸಿನಉತ್ತೇಜನನೀಡಲಾಗುವುದಿಲ್ಲ.
ಇದುಕೇವಲಸಂಶೋಧನೆಯಪರಿಕಲ್ಪನೆಯಿಂದಮಾಡಲ್ಪಟ್ಟದೆಮತ್ತುಅಧ್ಯಯನದವೆಚ್ಚವೆಲ್ಲವನ್ನುತನಿಖಾದಾರರುಹೊಂದುತ್ತಾರೆ.

ಗೌಪ್ಯತೆಮತ್ತುಗೋಪ್ಯತೆ:

ನೀವುಸಂಶೋಧನಾವಿಷಯಎಂದುತಿಳಿಯುವವ್ಯಕ್ತಿಗಳುಸಂಶೋಧನಾತಂಡದಸದಸ್ಯರಾಗಿದ್ದಾರೆ.
ಹೊರತುಪಡಿಸಿನಿಮ್ಮಲಿಖಿತಅನುಮತಿಯಿಲ್ಲದೆಯೇಸಂಶೋಧನೆಯಸಮಯದಲ್ಲನಿಮಗೆಅಥವಾಮಾಹಿತಿಯಬಗ್ಗೆಯಾವುದೇಮಾಹಿತಿಯುಬಹಿರಂಗಗೊಳ್ಳುವುದಿಲ್ಲ :

1. ನಮ್ಮಹಕ್ಕುಗಳನ್ನುಮತ್ತುಕಲ್ಯಾಣವನ್ನುರಕ್ಷಿಸಲುತುರ್ತುಪರಿಸ್ಥಿತಿಯಿಲ್ಲ.
2. ಕಾನೂನಿನಿಂದಅಗತ್ಯವಿದ್ದರೆ.

ಫಲಿತಾಂಶಗಳನ್ನುಪ್ರಕಟಿಸಲುಅಧಿಕಾರ :

ಸಂಶೋಧನೆಯಫಲಿತಾಂಶಗಳನ್ನುಪ್ರಕಟಿಸಿದಾಗಅಥವಾಚರ್ಚಿಸದಾಗ, ಒಂದುಸಮ್ಮೇಳನದಲ್ಲ,
ನಿಮ್ಮಗುರುತನ್ನುಬಹಿರಂಗಪಡಿಸುವಯಾವುದೇಮಾಹಿತಿಯನ್ನುಪ್ರದರ್ಶಿಸಲಾಗುವುದಿಲ್ಲ.
ಈಅಧ್ಯಯನಕ್ಕೆಸಂಬಂಧಿಸಿದಂತೆಪಡೆದಮತ್ತುನಿಮ್ಮೊಂದಿಗೆಗುರುತಿಸಬಹುದಾದಯಾವುದೇಮಾಹಿತಿಗೌಪ್ಯವಾಗಿರುತ್ತದ.
ತಾಯಿಯಫಲಿತಾಂಶವನ್ನುಸುಧಾರಿಸಲುಅಧ್ಯಯನದಫಲಿತಾಂಶಗಳನ್ನುಬಳಸಲಾಗುತ್ತದೆ .

ಅಧ್ಯಯನದಿಂದನಿರಾಕರಿಸುವಅಥವಾಹಿಂದಕ್ಕೆಹಿಂದಕ್ಕೆಹೋಗುವಹಕ್ಕು :

ನೀವುಬಯಸದಿದ್ದರೆಈಸಂಶೋಧನೆಯಲ್ಲಿಪಾಲ್ಗೊಳ್ಳಬೇಕಾಗಿಲ್ಲ.ನೀವುಅಧ್ಯಯನದಿಂದಯಾವುದೇಸಮಯದಲ್ಲಹಿಂತಕ್ಕೆಹೋಗಬಹುದು. ವಾಪಸಾತಿಗಾಯಾವುದೇದಂಡವಿಲ್ಲ.
ಈಆಸ್ಪತ್ರೆಯಲ್ಲನಮ್ಮವೈದ್ಯಕೀಯಸೇವೆಮತ್ತುಆರೈಕೆನೀವುಭಾಗವಹಿಸಲುಅಥವಾಒಪ್ಪಿಕೊಳ್ಳುತ್ತದಯೇಹೊರತುಬಿದಲಾಗುವುದಲ್ಲ.
ಅಗತ್ಯವಿದ್ದರೆನೀವುಅಧ್ಯಯನದಿಂದಹಿಂತೆಗೆದುಕೊಳ್ಳಬಹುದು.

ಪರ್ಯಾಯ :

ಈಅಧ್ಯಯನದಿಂದನಮ್ಮನ್ನುಯಾವುದೇಸಮಯದಲ್ಲೂಹಿಂಪಡೆಯಲುನೀವುಮುಕ್ತರಾಗಿದ್ದೀರಿ.
ನೀವುಅಧ್ಯಯನದಲ್ಲಿಪಾಲ್ಗೊಳ್ಳಲುನಿರಾಕರಿಸಿದರೂಸಹದಿನನಿತ್ಯದಆರೈಕೆಯನ್ನುನೀವುಪಡೆಯುತ್ತೀರಿ.
ಅಧ್ಯಯನದಲ್ಲಪಾಲ್ಗೊಳ್ಳುವನಿಮ್ಮನಿರ್ಧಾರದಮೇಲಪರಿಣಾಮಬೀರುವಯಾವುದೇಹೊಸಮಾಹಿತಿಯಿದ್ದರುನಿಮಗೆತಳಿಸಲಾಗುವುದು .

ಸಾಂಸ್ಥಿಕ / ಪ್ರಾಯೋಜಕರನೀತಿಗಳು :

ಅಧ್ಯಯನಕ್ಕೆಸಂಬಂಧಿಸಿದಯಾವುದೇಗಾಯದಸಂದರ್ಭದಲ್ಲ, ಕಎಲ್ಐಎಸ್ಟಾಸ್ಪಟಲ್ಮತ್ತುಎಂಆರ್ಸಿ,
ಬೆಳಗಾಮ್ಮೂಲಕಚಿಕಿತ್ಸೆಲಭ್ಯವಾಗುತ್ತದೆ.
ಕಾನೂನಿನಮೂಲಕಇಂತಹವೈದ್ಯಕೀಯಚಿಕಿತ್ಸೆಗೆಯಾವುದೇಪರಿಹಾರಅಥವಾಪಾವತಿಇಲ್ಲ. ನೀವುಗಾಯಿಗೊಂಡರೆREG. NO. BJ0118005, ಪೋಸ್ಟ್ದವೀಧರವಿದ್ಯಾರ್ಥಿ, ಪ್ರಸೂತಿಮತ್ತುಸ್ತ್ರೀರೋಗಶಾಸ್ತ್ರವಿಭಾಗ, ಕಎಲ್ಐಎಸ್ಟಾಸ್ಪಟಲ್&ಎಮ್ಆರ್ಸಿಅಥವಾದೂರವಾಣಿಮೂಲಕಸಂಪರ್ಕಿಸಬಹುದು.

ಸಂಪರ್ಕವಿವರಗಳು :

ನೀವುಯಾವುದೇಪ್ರಶ್ನೆಗಳನ್ನುಹೊಂದಿದ್ದರೆನೀವುಈಗಅಥವಾನಂತರಕೇಳಬಹುದು.

ನೀವುನಂತರಪ್ರಶ್ನೆಗಳನ್ನುಕೇಳಲುಬಯಸಿದರೆ,

ನೀವುಈಸಮಯದಲ್ಲಿನಿಮ್ಮನ್ನುಭೇಟಿನೀಡುವಜವಾಬ್ದಾರಿಯುತವ್ಯಕ್ತಿಯನ್ನುಸಂಪರ್ಕಿಸಬಹುದುಅಥವಾನೀವುಸಂಪರ್ಕಿಸಬಹು
ದು,

1. **REG. NO. BJ0118005**

ಪ್ರಸೂತಿಮತ್ತುಸ್ತ್ರೀರೋಗಶಾಸ್ತ್ರಇಲಾಖೆಯಸ್ನಾತಕೋತ್ತರಪದವಿ,
ಕೆಎಲ್ಇಯೂನಿವರ್ಸಿಟಿಯಜವಾಹರಲಾಲ್ನೆಹರೂಮೆಡಿಕಲ್ಕಾಲೇಜ್,
ಬೆಳಗಾವಿ.

2. ಡಾ. ______________,
ಪ್ರಸೂತಿಮತ್ತುಸ್ತ್ರೀರೋಗಶಾಸ್ತ್ರಇಲಾಖೆಯಪ್ರಾಧ್ಯಾಪಕ,
ಕೆಎಲ್ಇಯೂನಿವರ್ಸಿಟಿಯಜವಾಹರಲಾಲ್ನೆಹರೂಮೆಡಿಕಲ್ಕಾಲೇಜ್,
ಬೆಳಗಾವಿ.

ಅಧ್ಯಯನವಿಷಯವಾಗಿನಿಮ್ಮಹಕ್ಕುಗಳಕುರಿತುನೀವುಯಾವುದೇಪ್ರಶ್ನೆಗಳನ್ನುಹೊಂದಿದ್ದರೆ, ನೀವುಕರೆಮಾಡಬಹುದು

3. ಡಾ. ರೂಪಾಎಂಬಲ್ಲಾಡ್,
ಮಾನವವಿಷಯಗಳಸಂಶೋಧನೆ
ಜೆಎನ್ಎಮ್ಮೆಡಿಕಲ್ಕಾಲೇಜ್
ಇನ್ಸ್ಟಿಟ್ಯೂಷನಲ್ಎಥಿಕ್ಸ್ಕಮಿಟಿಅಧ್ಯಕ್ಷರಾಗಿಪೀಡಿಯಾ ,
ದೂರವಾಣಿಸಂಖ್ಯೆ. 0831 2473777 . ಬೆಳಗಾವಿ ಜೆಎನ್ಎಮ್ಮೆಡಿಕಲ್ಕಾಲೇಜನಲ್ಲಿ

ಒಪ್ಪಿಗೆಯಹೇಳಿಕೆ

ನಾನು, _____ ಈಅಧ್ಯಯನದಲ್ಲಿಪಾಲ್ಗೊಳ್ಳಲುಸ್ವಯಿಂಪ್ರೇರಣೆಯಿಂದಒಪ್ಪುತ್ತೇನೆ.

ಈಸಮ್ಮತಿಯನಮೂನೆಯಲ್ಲಿಸಹಿಹಾಕುವಮೂಲಕನನ್ನಯಾವುದೇಕಾನೂನುಹಕ್ಕುಗಳನ್ನುನಾನುಬಿಡುತ್ತಿಲ್ಲ.

ನಾನುಯಾವಸಮಯದಲ್ಲಾದರೂಅಧ್ಯಯನವನ್ನುಹಿಂತೆಗೆದುಕೊಳ್ಳಬಹುದು.

ನನ್ನಸ್ಥಳೀಯಭಾಷೆಯಲ್ಲಿಓದಿದನಂತರಅಥವಾಫಾರ್ಮ್‌ಅನ್ನುಓದಿದನಂತರನಾನುಒಪ್ಪಿಗೆಫಾರ್ಮ್‌ಸಹಿಹಾಕುತ್ತಿದ್ದೇನೆ.

ಅಪಾಯಗಳುಮತ್ತುಪ್ರಯೋಜನಗಳನ್ನುಒಳಗೊಂಡಂತೆಮತ್ತುನನ್ನಎಲ್ಲಪ್ರಶ್ನೆಗಳಿಗೆಉತ್ತರಿಸಿದೆ.

ಭಾಗವಹಿಸುವವರು: _____

ಪಾಲ್ಗೊಳ್ಳುವವರಎಡತಮ್ಮುದ್ರಣದಸಹಿ: _____

ತನಿಖಾಧಿಕಾರಿಗಳುಹಸರು: _____ ಸಹಿ: _____

ಬಟ್ನೆಸ್ಹಸರು: _____ ಸಹಿ: _____

ದಿನಾಂಕ: _____

संशोधनअभ्यासातसहभागासाठीसहमती

श्रीमती _____ आम्हीएम.एस. मधीलपोस्टग्रेजुएटREG. NO. BJ0118005द्वाराआयोजित 18 ते 38 आठवडेम्हणजेगर्भाच्यावयातीललांबलचकगर्भधारणेच्यावयोगटाच्यागर्भधारणेच्याआयुष्याचीअचूकता "नावाच्याअभ्यासामध्येनावनोंदणीकरण्यासविनंतीकरीतआहोत. डॉ. _____, ओबस्टेट्रीक्सआणिगायनॉकॉलॉजीविभाग, जे.एन. मेडिकलकॉलेज, केएलईयुनिव्हर्सिटी, बेलगवीच्याअंतर्गतबेलगामयांच्यामार्गदर्शनाखालीओबस्टेट्रिक्सआणिगायनॉकॉलॉजी.

संशोधनअभ्यासाचाहेतूम्हणजेगर्भाशयाच्यावयाचीलांबीमोजण्यासाठी 18-38 आठवड्यांपर्यंतगर्भधारणाहोण्याचाअंदाजघेण्याचीअचूकताजाणूनघेणे.

मीआमच्याअभ्यासासाठीचौकशीकरणारआहे. याअभ्यासाचानिधीयेतनाही.

मीयासंशोधनप्रकल्पाबद्दलमाहितीदेणारआहे. आपणनिर्णयघेण्यापूर्वी, आपणसंशोधनासहसहजतेनेकोणालाहीबोलूशकता.

अभ्यासाचाउद्देशः

18 आठवड्यापासूनते 38 आठवडेदरम्यानगर्भधारणाच्यागर्भधारणावयोगटाचाअंदाजघेण्यासाठीऔदासिनलगर्भाचीलांबीलांबीच्याअचूकते चेमूल्यांकनकरणेयाअभ्यासाचाउद्देशआहे.

गर्भधारणेचेवयमूल्यांकनमहत्वाचेआहेकारणचुकीच्यागर्भधारणाचीवयाचीप्रारंभीची, पोस्टमेटीरिटीआणिपोस्टडेटिटिजच्याघटनांमध्येवाढहोऊशकते, यामुळेमातृआणिगर्भाच्याप्रतिकूलप्रभावांनावाढते. गर्भधारणाचाकालावधीअचूकपणेअंदाजकरून, आम्हीयाप्रतिकूलप्रभावांनाकमीकरूशकतो.

अभ्यासप्रकार

हे 18 ते 38 आठवडेदरम्यानगर्भधारणाकरणाऱ्यास्त्रियांच्यागर्भाच्याकालावधीचेअनुमानकाढण्यासाठीभ्रूणमूत्रपिंडाच्याअल्ट्रो नोग्राफीसहसंभाव्यक्रॉसविभागीयअभ्यासआहे.

सहभागीनिवड

आम्हीसर्वमहिलांनाओ.बी. जीच्याआउटपेशंटविभागातउपस्थितहोण्याच्यागर्भधारणेच्या 18 -38 आठवड्यांच्यादरम्याननिमंत्रितकरीतआहोतआणिआम्हीत्यांच्याएलएमपीचीखात्रीकरुनठेवलीआहेआणिबहिष्का रमानदंडलागूकेल्यानंतरप्रथमत्रैमासिकडेटा िंग्जअसल्याचेसुनिश्चितकेलेआहे.

स्वयंसेवीसहभाग

संशोधनमध्येआपलेसहभागस्वैच्छिकआहे.
अभ्यासातसहभागीव्हायचेआहेकिंवानाहीहेआपल्यानिर्णयामुळेआपल्यालादिलेलीवर्तमानकिंवाभविष्यातीलआरोग्यसेवासेवाबदलणारनाहीतआणिजेएनमेडिकलकॉलेजशीआपलेसंबंधप्रभावितहोणारनाहीत.

स्कॅनवरमाहिती

गर्भाशयाचेमूत्रपिंडअल्ट्राजोनिकदृष्ट्याकाहीप्रमाणातइकोजेनिकपायलोकॅलिसीलसाइनसच्याआसपासअसलेल्यापेशींच्यासौम्यस्वरुपाच्यास्वरूपातदिसतात.
मूत्रपिंडांचीप्रथमएसीमापनपातळीच्याखालीट्रान्सव्हससेक्शनमध्येप्रथमओळखलीजातेआणिनंतरमूत्रपिंडांचीसंपूर्णलांबीओळखलीजातनाहीतोपर्यंततपासणीलादीर्घकाळापर्यंतफिरवावेलागते.
मूत्रपिंडाचीलांबीकाळजीपूर्वकऍड्रेनल्सवगळताद्विवार्षिकमापनम्हणूनघेतलीपाहिजे.
किडनीएकाबाहेरीलध्रुवापासूनदुस-याखोऱ्यातलांबीलावलीपाहिजे. . किडनीच्यासेंटीमीटरमध्ये 3 मापांचीसरासरीअंतिममोजमापम्हणूननोंदविलीगेलीआहे. मापग्रे-स्केलरीयलटाइमअल्ट्रासोनोग्राफिकस्कॅनरवापरून 3.5-5 मेगाहर्ट्जकव्हेलीनेरट्रान्सड्यूसरसहकेलेजातात

प्रक्रियासमाविष्ट

अभ्यासासाठीरुग्णांचीनिवडकेल्यानंतरआणिसूचितसंमतीप्राप्तकेल्यानंतर, रुग्णाचाइतिहास, सामान्यशारीरिकतपासणी, नियमितप्रसवपूर्वतपासणीआणिअल्ट्रासोनोग्राफीनुसारमूल्यांकनकेलेजाईल. गर्भाशयाच्यामूत्रपिंडाचीलांबीनियमितपणेगर्भाशयाच्यास्कॅनचाभागम्हणूनमोजलीजाईलआणिगर्भधारणाचीवयोगटाचीअनुमानलावलाजाईलज्याचीतुलनाएलएमपीजीए /
प्रथमत्रैमासिकाजीएबरोबरकेलीजाईलआणिजीएच्याअंदाजानुसारगर्भाच्यारानटीलांबीच्याअचूकतेचेमूल्यांकनकेलेजाईल.

दुष्परिणाम

याअभ्यासाचेकोणतेहीदुष्परिणामनाहीत.

धोके

याअभ्यासाशीसंबंधितज्ञातधोकेनाही

फायदे

आम्हीआपल्यालाहेसांगूइच्छितोकीसध्यायाअभ्यासातभागघेतल्यामुळेआपल्यालाकोणतेहीफायदेमिळणारनाहीत. भागघेतल्यानेभविष्यातमहिलांनाकाळजीआणिपरिणाममिळतीलहेसुनिश्चितकरण्यातमदतहोईल.

अल्ट्रासनोग्राफीद्वारेगर्भावस्थेच्याअंदाजाच्याक्षेत्रामध्येवैद्यकीयसंशोधनामध्येआपलेसहभागमहत्त्वपूर्णयोगदानआहे

सहभागासाठीआर्थिकप्रोत्साहनः

नामांकितरुग्णांनाआर्थिकप्रोत्साहनदिलेजातनाही.
हेपूर्णपणेसंशोधनसंकल्पनेसहकेलेजातआहेआणिसर्वखर्चांचीतपासणीकरणाऱ्यांकडूनकेलीजाईल.

गोपनीयताआणिगुप्तता:

केवळआपणचसंशोधनविषयआहातहेचलोकशोधसंघाचेसदस्यअसतील.
आपल्याबद्दलकोणतीहीमाहितीकिंवासंशोधनदरम्यानआपल्याद्वारेप्रदानकेलेलीमाहितीआपल्यालिखितपरवान गीशिवायइतरांनाप्रकटकेलीजाणारनाही.

1. आपल्याअधिकारांचेआणिकल्याणाचेरक्षणकरण्यासाठीआणीबाणीमध्ये.
2. कायद्यानुसारआवश्यकअसल्यास.

परिणामप्रकाशितकरण्यासाठीअधिकृतताः

जेव्हाशोधपरिणामांचेप्रकाशनकिंवाचर्चाकेलीजातेतेव्हाकॉन्फरन्समध्येकोणतीहीमाहितीप्रदर्शितकेलीजाणारनाही जीआपलीओळखउघडकरेल.
याअभ्यासाशीसंबंधितकोणतीहीमाहितीआणिआपल्यासहओळखलीजाऊशकतेतीगोपनीयराहील.
अभ्यासाच्यानिकालांचामातृपरिणामसुधारण्यासाठीवापरकेलाजाईल.

अभ्यासातूननकारकिवामागेघेण्याचाअधिकारः

आपणइच्छितनसल्यासआपल्यालायासंशोधनातसहभागीहोण्याचीआवश्यकतानाही.
आपणकोणत्याहीवेळीअभ्यासपासूनमागेघेऊशकता. पैसेकाढण्यासाठीकोणतीहीदंडहोणारनाही.
आपणयासहभागाससहमतीदेताकीनाहीयाबाबतीतयाहॉस्पिटलमध्येआपलाउपचारआणिकाळजीबदलीजाणारना ही. आवश्यकअसल्यासअभ्यासमधूनआपणकाढलेजाऊशकता.

पर्यायीः

आपणकोणत्याहीवेळीयाअभ्यासातूनस्वतःलामागेघेण्यासमुक्तआहात.
आपणअभ्यासातभागघेण्यासनकारदिलाअसलातरीहीआपल्यालानियमितदेखभालमिळतराहील.
अभ्यासातभागघेण्यासाठीआपल्यानिणेयावरपरिणामकरणायोकोणत्याहीनवीनमाहितीबद्दलआपल्यालासूचितके लेजाईल.

संस्थात्मक / प्रायोजकधोरण:

अभ्याससंबंधितकोणत्याहीजखमझाल्यास, केएलईएसहॉस्पिटलआणिएमआरसी, बेलगामद्वारेउपचारउपलब्धकेलेजातील.
कायद्याद्वारेअशावैद्यकीयउपचारांसाठीकोणतेहीनुकसानभरपाईकिंवापेमेंटनाही.
जरआपणजखमीझालाअसालतरआपणडॉ. REG. NO. BJ0118005, पोस्टग्रेजुएटविद्यार्थी, ओबस्टेट्रीक्सआणिगायनॉकॉलॉजीविभाग, केएलईएसहॉस्पिटलआणिएमआरसीकिंवाफोननं. शीसंपकेसाधूशकता._____

संपर्कोचीमाहिती:

आपल्याकडेकाहीप्रश्नअसल्यासआपणआताकिंवानंतरविचारुशकता.
आपणासनंतरप्रश्नविचारुइच्छितअसल्यास,
आपणयाक्षणीउपस्थितअसलेल्याजबाबदारडॉक्टरशीसंपकेसाधूशकताकिंवाआपणसंपकेसाधूशकता,

1. REG. NO. BJ0118005
ओबस्टेट्रिक्सआणिगायनॉकॉलॉजीविभाग,
पदवीविद्यापीठातजवाहरलालनेहरूमेडिकलकॉलेज,

बेलागवी.

2. डॉ. _____

ओबस्टेट्रीक्सआणिगायनकोलॉजीविभाग,

प्राध्यापककेएलईयुनिव्हर्सिटीचेजवाहरलालनेहरूमेडिकलकॉलेज,

बेलगावी.

अभ्यासाच्याविषयाबद्दलआपल्यासकाहीप्रश्नअसतीलतरआपणकॉलकरूशकता

डॉ. रूपप्पाएमबेलद,

मानवविषयासंशोधनसंशोधनसंस्था, जेएनमेडिकलकॉलेजचेअध्यक्ष

पेडियाट्रिक्सचेप्राध्यापक बेलागवी, येथीलजेएनमेडिकलकॉलेजमध्ये. फोननं. 0831 2473777

मंजूरीविधानः

मी, _____ याअभ्यासातसहभागीहोण्यासाठीस्वेच्छेनेसहमतआहे.

यासंमतीफॉर्मेवरस्वाक्षरीकरुनमीमाझेकोणतेहीकायदेशीरअधिकारसोडूनदेतनाही.

मीकोणत्याहीवेळीअभ्यासमागेघेऊशकते. मीमाझ्यास्वत:

च्यास्थानिकभाषेतीलवाच किंवावाचनकेल्यानंतरजोखमीआणिफायदेआणिमाझ्यासर्वप्रश्नांचीउत्तरेघेतल्यानंत

रसंमतीफॉर्मेवरस्वाक्षरीकरीतआहे.

सहभागीनाव: _____

सहभागींच्याडाव्याथंबप्रिंटचीस्वाक्षरी: _____

तपासकर्त्याचेनाव: _____ स्वाक्षरी: _____

साक्षीदारांचीनावे: _____ स्वाक्षरी: _____

तारीख: _____

अनुसंधानअध्ययनमेंभागलेनेकेलिएसहमति

मती _____ हमआपकोएमएसमेंपोस्टग्रेजुएटREG. NO. BJ0118005द्वाराआयोजित "भ्रूणगुर्देकीलंबाईकेअनुसार 18-38 सप्ताहसेगर्भावस्थाकीउम्रकेआकलनकीशुद्धता" शीर्षकमेंअध्ययनकरनेकाअनुरोधकररहेहैं।डॉ_____, ओबस्टेट्रिक्सएंडगायनकोलॉजीविभाग, जेएनमेडिकलकॉलेज, बेलगामकेएलएलयूनिवर्सिटी, बेलगावीकेतहतबेलगामकेमार्गदर्शनमेंओबस्टेट्रिक्सऔरगायनॉकॉलॉजी.

शोधअध्ययनकाउद्देश्य 18-38

सप्ताहसेगर्भावस्थाकीआयुकाअनुमानलगाकरगर्भावस्थाकीगुर्देकीलंबाईकोमापनेकीसटीकताकोजाननाहै।मैंअपने अध्ययनकेलिएजांचकर्ताबनूंगा।इसअध्ययनकोवित्तपोषितनहींकियाजारहाहै।मैंआपकोइसशोधपरियोजनाकेबारे मेंजानकारीदेनेजारहाहूं।निर्णयलेनेसेपहले, आपअनुसंधानकेबारेमेंसहजमहसूसकरनेवालेकिसीभीव्यक्तिसेबातकरसकतेहैं।

अध्ययनकाउद्दे :

इसअध्ययनकाउद्देश्यमध्यगर्भकीगर्भावस्थाकीउम्र 18 सप्ताहसे 38 सप्ताहकेबीचअनुमानितकरनेकेलिएउपकरणकेरूपमेंउपयोगकिएजानेवालेऔसतभ्रूणगुर्देकीलंबाईकीसटीकताका मूल्यांकनकरनाहै।गर्भावस्थाआयुनिर्धारणमहत्वपूर्णहैक्योंकिगलतगर्भावस्थाकीआयुसमयपूर्वता, पोस्टमैटोरिटीऔरपोस्ट-डेटिज्मकीघटनाओंकोबढ़ासकतीहै, जिससेमातृऔरभ्रूणप्रतिकूलप्रभावबढ़ताजासकताहै।गर्भावस्थाकीअवधिकासहीआकलनकरके, हमइनप्रतिकूलप्रभावोंकोकमकरसकतेहैं।

अध्ययनकाप्रकार

यह 18-38
सप्ताहकेबीचप्रसवोत्तरमहिलाओंमेंगर्भधारणकीअवधिकाआकलनकरनेकेलिएभ्रूणगुर्देकीअल्ट्रासोनोग्राफीशामिलएकसंभावितपारअनुभागीयअध्ययनहै,

प्रतिभागीचयन

हमसभीमहिलाओंकोओबीजीकेआउटपेशेंटविभागमेंउपस्थितहोनेकेलिएगर्भपातकी 18-38
सप्ताहकीअवधिकेबीचआमंत्रितकररहेहैंऔरवार्डऔरश्रमकक्षमेंभर्तीहुएहैंजोअपनेएलएमपीकेबारेमेंसुनिश्चितहैं / बहिष्करणमानदंडलागूकरनेकेबादपहलीतिमाहीडेटा िंगकैनहैं।

स्वैच्छिकभागीदारी

शोधमेंआपकीभागीदारीस्वैच्छिकहै।अध्ययनमेंभागलेनेकेलिएआपकानिर्णययानहीं, आपकोपेशकीजानेवालीवर्तमानयाभविष्यकीस्वास्थ्यदेखभालसेवाओंकोनहींबदलेगाऔरजेएनमेडिकल कॉलेजकेसाथआपकेरिश्तेकोप्रभावितनहींकरेगा।

स्कैनपरजानकारी

भ्रूणगुर्दैअल्ट्रासोनिकरूपसेकुछहदतकअधिकइकोजेनिकपायलोसाइसेसिलसाइनसकेआस-पासऊतकोंकेसोनोल्यूसेंटहेलोकेरूपमेंदिखाईदेतेहैं।गुर्दैकीपहचानएसीमापकेस्तरसेनीचेट्रांसवर्सेक्शनमेंपहलेकी जातीहै,

औरउसकेबादजांचकोलंबेसमयतकघुमायाजानाचाहिएजबतककिगुर्दैकीपूरीलंबाईकीपहचाननहो।गुर्दैकीलंबाईको द्विधुवीयमापकेरूपमेंसावधानीपूर्वकएड्रेनलकोछोड़करलेजानाहोताहै।गुर्दोलंबाईकोएकबाहरीध्रुवसेदूसरेमेंबीमसुर कियाजानाचाहिए।।गुर्दैकेसेंटीमीटरमें 3 मापोंकाऔसतअंतिममापकेरूपमेंदर्जेकियाजाताहै।माप 3.5-5 मेगाहट्जवक्रीयट्रांसड्यूसरकेसाथग्रेस्केलवास्तविकसमयअल्ट्रासोनोग्राफिकस्कैनरकाउपयोगकरकियाजाताहै

प्रक्रियाशामिल :

अध्ययनकेलिएमरीजोंकेचयनऔरसूचितसहमतिप्राप्तकरनेकेबाद, रोगीकामूल्यांकनइतिहास, सामान्यशारीरिकपरीक्षा,

नियमितप्रसवपूर्वजांचऔरअल्ट्रासोनोग्राफीकेअनुसारकियाजाएगा।भ्रूणगुर्दैकीलंबाईनियमितएंटीटलस्कैनकेहिस्सेकेरूपमेंमापीजाएगीऔरगर्भावस्थाकीउम्रकाअनुमानलगायाजाएगा, इसकीतुलनाएलएमपीजीए / प्रथमतिमाहीजीएसेकीजाएगीऔरभ्रूणगुर्दैकीलंबाईसेजीएकेआकलनकीसटीकताकाआकलनकियाजाएगा।

दुष्प्रभाव

इसअध्ययनकेकोईज्ञातदुष्प्रभावनहींहैं।

जोखिम

इसअध्ययनसेजुड़ेकोईज्ञातजोखिमनहींहैं

लाभ

हमआपकोयहबतानाचाहतेहैंकिइसअध्ययनमेंभागलेनेसेवर्तमानमेंआपकेलिएकोईलाभनहींहोसकताहै।भागलेनेसे आपयहसुनिश्चितकरनेमेंमददकरेंगेकिभविष्यमेंमहिलाओंकोसबसेअच्छीदेखभालऔरपरिणामिलेंगे। अल्ट्रासोनोग्राफीद्वारागर्भावस्थाकीउम्रकेआकलनकेक्षेत्रमेंचिकित्साअनुसंधानमेंआपकीभागीदारीमहत्वपूर्णयोग दानहै

भागीदारीकेलिएवित्तीयप्रोत्साहन:

नामांकितमरीजोंकोकोईवित्तीयप्रोत्साहननहींदियाजारहाहै।यहपूरीतरहसेशोधकेविचारसेकियाजारहाहैऔरअध्यय नकीसभीलागतजांचकर्तोद्वारालीजाएगी।

गोपनीयताऔरगोपनीयता:

एकमात्रलोगजोजानतेहोंगेकिआपशोधविषयहैं,
वेशोधदलकेसदस्यहोंगे।शोधकेदौरानआपकेद्वाराप्रदानकीगईजानकारीयाजानकारीकेबारेमेंकोईजानका रीआपकेलिखितअनुमतिकेबिनादूसरोंकोप्रकटनहींकीजाएगी:

1. अपनेअधिकारोंऔरकल्याणकीरक्षाकेलिएआपातकालमें।
2. यदिकानूनद्वाराआवश्यकहै।

परिणामप्रकाशितकरनेकेलिएप्राधिकरण:

जबशोधकेपरिणामप्रकाशितहोतेहैंयाचर्चाकरतेहैं, एकसम्मेलनमें, कोईजानकारीप्रदर्शितनहींकीजाएगीजोआपकीपहचानकाखुलासाकरेगी।इसअध्ययनकेसंबंधमेंप्राप्तकीगईकोईभी जानकारीऔरआपकेसाथपहचानाजासकताहैगोपनीयरहेगा।अध्ययनकेनतीजेमातृपरिणाममेंसुधारकेलिएइस्तेमा लकिएजाएंगे।

अध्ययनसेइनकारकरनेयावापसलेनेकाअधिकार:

यदिआपचाहेंतोआपकोइसशोधमेंभागलेनेकीज़रूरतनहींहै।आपअध्ययनसेकिसीभीसमयवापसलेसकतेहैं।वापसीके लिएकोईदंडनहींहोगा।इसअस्पतालमेंआपकाउपचारऔरदेखभालइसबातकेबावजूदनहींबदलेगीकिआपभागलेनेके लिएसहमतहैंयानहीं।यदिआवश्यकहोतोआपकोअध्ययनसेनिकालदियाजासकताहै।

वैकल्पिक:

आपकिसीभीसमयइसअध्ययनसेखुदकोवापसलेनेकेलिएस्वतंत्रहैं।यदिआपअध्ययनमेंभागलेनेसेइनकारकरतेहैंतो भीआपकोनियमितदेखभालजारीरहेगी।आपकोकिसीभीनईजानकारीकेबारेमेंसूचितकियाजाएगाजोअध्ययनमेंभा गलेनेकेआपकेफैसलेकोप्रभावितकरसकताहै।

संस्थागत / प्रायोजककीनीति:

अध्ययनसेसंबंधितकिसीभीचोटकीस्थितिमें, उपचारकेएलईएसअस्पतालऔरएमआरसी, बेलगामकेमाध्यमसेउपलब्धकरायाजाएगा।कानूनद्वाराइसतरहकेचिकित्साउपचारकेलिएकोईमुआवजायाभुगता ननहींहै।यदिआपघायलहैंतोआपREG. NO. BJ0118005, स्नातकोत्तरछात्र, ओबस्टेट्रिक्सऔरगायनॉकॉलॉजी विभाग, केएलईएसअस्पतालऔरएमआरसीयाफोननंबरसेसंपर्ककरसकतेहैं।_____.

संपर्कविवरण:

यदिआपकेकोईप्रश्नहैंतोआपअबयाबादमेंपूछसकतेहैं।यदिआपबादमेंप्रश्नपूछनाचाहतेहैं,
तोआपइससमयउपस्थितहोनेवालेजिम्मेदारडॉक्टरसेसंपकेकरसकतेहैंयाआपसंपकेकरसकतेहैं,

1. REG. NO. BJ0118005
ओबस्टेट्रिक्स औरगायनॉकॉलॉजीविभाग,
पदवीविद्यापीठातजवाहरलालनेहरूमेडिकलकॉलेज,
बेलागवी.

2. डॉ._____,
ओबस्टेट्रीक्सऔरगायनकोलॉजीविभाग,
प्राध्यापककेएलईयुनिव्हर्सिटीचेजवाहरलालनेहरूमेडिकलकॉलेज,
बेलगावी.

यदिअध्ययनअध्ययनकेरूपमेंआपकेअधिकारोंकेबारेमेंआपकेकोईप्रश्नहैं, तोआपकॉलकरसकतेहैं

डॉ. रूपप्पाएमबेल ,
मानवविषयासंशोधनसंशोधनसंस्था, जेएनमेडिकलकॉलेजचेअध्यक्ष
पेडियाट्रिक्सचेप्राध्यापक बेलागवी, जेएनमेडिकलकॉलेज. फोननं. 0831 2473777

सहमतिकथन :

मैं, _____

स्वेच्छासेइसअध्ययनमेंभागलेनेकेलिएसहमतहूं।इससहमतिफॉर्मपरहस्ताक्षरकरकेमैंअपनेकिसीभीका
नूनीअधिकारकोनहींछोड़रहाहूं,
मैंकिसीभीसमयअध्ययनसेवापसआसकताहूं।मैंअपनेस्वयंकेस्थानीयभाषामेंपढ़नेयापढ़नेकेबादसहमति
फॉर्मपरहस्ताक्षरकररहा , जिसमेंजोखिमऔरलाभशामिलहैंऔरमेरेसभीसवालोंकेजवाबदिएगएहैं।

भागलेनेवालेकानाम : _____

प्रतिभागीकेबाएंथंबप्रिंटकाहस्ताक्षर: _____

जांचकर्ताकानाम: _____ हस्ताक्षर: _____

साक्षीकानाम: _____ हस्ताक्षर: _____

तारीख: _____

ANNEXURE III

CASE PROFORMA

FIRST NAME: _____

MIDDLE NAME: _____

LAST NAME: _____

HUSBAND'S NAME: _____

IP NO./ OP NO: _____

AGE: _____

ADDRESS: _____

_____

PHONE NUMBER: _____

ASSOCIATED RISK FACTORS

	YES	NO
DIABETES		
HYPERTENSION		
FGR		
MULTIPLE PREGNANCY		
CONGENITAL ANOMALY		

RENAL PELVIC DILATATION		
OLIGO/POLYHYDRAMNIOS		
OTHERS		

OBSTETRIC HISTORY

GRAVIDA ☐

PARA ☐

ABORTION ☐

LIVING ☐

MENSTRUAL HISTORY

LAST MENSTRUAL PERIOD: _____

ESTIMATED DATE OF DELIVERY: _____

CRL OF FIRST TRIMESTER SCAN: _____

EDD ACCORDING TO FIRST TRIMESTER: _____

GESTATIONAL AGE: _____

GA

BPD		
HC		
AC		
FL		

GA ACCORDING TO HADLOCK FORMULA: _____

RENAL LENGTH

	RIGHT KIDNEY	LEFT KIDNEY
L1		
L2		
L3		
MEAN LENGTH		

MEAN FETAL RENAL LENGTH: _____

GA ACCORDING TO RENAL LENGTH: _____

ANNEXURE IV

KEY TO MASTER CHART

SL. No. Serial Number

OP. No. Outpatient Number

IP. No. Inpatient number

LSCS - Lower segment caesarean section

LMP- Last Menstrual Period

EDD- Expected date of delivery

C-EDD- Corrected Expected date of delivery

CRL- Crown Rump Length

GA - Gestational age

BPD- Biparietal diameter

HC- Head circumference

AC- Abdominal circumference

FL- Femur length

FRL- Fetal renal length

SL.NO.	Age	OP/IP NO.	PARITY	RISK FACTORS	LMP	EDD	C- EDD	CRL DATING SCAN	ACTUAL GA	DATE OF SCAN	BPD(mm)	GA ACC. TO BPD	HC(mm)	GA ACC. TO HC	AC(mm)	GA ACC. TO AC	FL	GA ACC. TO FL	GA ACC. TO COMPOSITE BIOMETRY	MEAN FRL(mm)	GA ACC. TO MEAN FRL
1	23yrs	4989040	primi	nil	7/29/2018	5/5/2019	5/2/2019	2.6cms (9w2d)	36 + 5 weeks	4/12/2019	83.2	33+3 weeks	318	35+6 weeks	321	36 weeks	69.1	36+3 weeks	35+4 weeks	41.2	38.2
2	24yrs	3794057	G2P1L1	nil	9/6/2018	6/13/2019	6/15/2019	2.1cms (8w5d)	31+ 1 weeks	4/12/2019	72.9	29+2 weeks	265	28+6 weeks	235	27+6 weeks	57	29+6 weeks	28+3 weeks	32.2	30.6
3	38yrs	5157209	G4P1L0A2	nil	2/18/2019	11/25/2019	11/28/2019	1.46cms (7w5d)	19 weeks	7/1/2019	43	19+1 weeks	151	18+ 1 weeks	128	18+3weeks	27	18+3weeks	18+3 weeks	19	19.4
4	23yrs	5249997	G3P1L1A1	nil	1/18/2019	10/25/2019	11/2/2019	0.7cms (6w3d)	23+3 weeks	7/1/2019	59	23+4 weeks	201	23+6 weeks	172	22+ 3 weeks	42	23+2 weeks	23+5 weeks	23.6	23.3
5	35yrs	5260171	G3P2L1	nil	12/20/2018	9/27/2019	9/26/2019	7.7cms (13w2d)	27+4 weeks	7/1/2019	69.5	28 weeks	257	28weeks	221	26+4weeks	50.5	27+1weeks	26+5weeks	31.9	30.3
6	25yrs	5237398	primi	nil	2/2/2019	11/9/2019	11/15/2019	5.2cms (11w5d)	21+3 weeks	7/2/2019	47.6	20+3 weeks	177	20+2 weeks	169	21+6 weeks	35.4	21+1 weeks	21+2 weeks	21.9	21.9
7	24yrs	954199	primi	nil	10/26/2018	8/2/2019	8/8/2019	3.7cms (10w3d)	35+4weeks	7/2/2019	78	31+2 weeks	292	32+2 weeks	261	30+2 weeks	64.6	33+2 weeks	31+1 weeks	37.3	34.9
8	19yrs	5285691	primi	nil	11/25/2018	9/1/2019	9/4/2019	0.8cms (6w5d)	31+4 weeks	7/4/2019	78	31+2 weeks	277	30+2 weeks	247	28+6 weeks	59.5	31weeks	29+4 weeks	37.4	35.0
9	24yrs	5108588	G3P1L1A1	nil	11/5/2018	8/12/2019	8/5/2019	6.74cms (12w5d)	34 +4 weeks	7/5/2019	88.2	35+5 weeks	313	35+1 weeks	309	34+6 weeks	59.6	31 weeks	33+4 weeks	39.1	36.4
10	23yrs	2742121	G3P2L2	nil	1/15/2019	10/22/2019	10/20/2019	4.42cms (11w)	24+3 weeks	7/5/2019	57.3	23+4 weeks	217	23+6 weeks	191	23+6 weeks	42.1	23+5 weeks	23+4 weeks	27	26.2
11	21yrs	5223815	primi	nil	2/10/2019	11/17/2019	11/17/2019	4.34 cms (11w)	20+5 weeks	7/5/2019	47	20+3 weeks	177	19+5 weeks	130	18+4 weeks	31.8	19+6 weeks	19+1 weeks	19.6	19.9
12	25yrs	5299374	G4P2L2A1	nil	11/23/2018	8/30/2019	9/2/2019	2.47cms (9w)	32weeks	7/5/2019	77.4	31weeks	287	31+4 weeks	265	30+5weeks	62.1	32+1weeks	30+6weeks	36.8	34.5
13	23yrs	5232698	primi	nil	2/15/2019	11/22/2019	11/25/2019	4.13cms (10w6d)	20weeks	7/5/2019	47	20+3 weeks	178	20+2 weeks	156	20+6 weeks	34	20+6 weeks	20+5 weeks	21.2	21.3
14	23yrs	5192879	G4P2L2A1	nil	1/19/2019	11/26/2019	11/22/2019	1.9cms (8w3d)	24+2 weeks	7/8/2019	58.2	23+5 weeks	222	24+2 weeks	181	23 weeks	43	24+1 weeks	23+3 weeks	27.4	26.5
15	28yrs	5189845	primi	nil	1/5/2019	10/12/2019	10/16/2019	2.5cms (9w1d)	26+6 weeks	7/12/2019	71.4	28+5weeks	252	28+4weeks	214	26weeks	51.6	27+4weeks	26+5weeks	33.4	31.6
16	23yrs	5187310	primi	nil	1/23/2019	10/30/2019	11/3/2019	1.9cms (8w3d)	24+2 weeks	7/12/2019	53.7	25+5 weeks	232	25+5weeks	216	25+3weeks	42.8	24weeks	25weeks	26.8	26.0
17	24yrs	5314004	G3P1L1A1	nil	1/7/2019	10/14/2019	10/17/2019	2.8cms (9w4d)	26+4 weeks	7/12/2019	68	27+4weeks	254	27+5 weeks	198	24+4weeks	51	27+4weeks	27+5weeks	25.6	25.0
18	23yrs	5327848	G4P3L3	nil	12/20/2018	1/26/2019	10/1/2019	3.4cms (10w1d)	29+2weeks	7/13/2019	73.1	29+2weeks	259	29+3weeks	221	29+4weeks	56.7	29+5weeks	27+5weeks	28.3	27.3
19	22yrs	4412277	G6P1L1A4	ANA positive	2/3/2019	11/10/2019	11/12/2019	2.4cms (9w)	22+6weeks	7/13/2019	61.5	25weeks	217	23+6weeks	184	23+2weeks	43	24weeks	23+4weeks	28.4	27.4
20	21yrs	5311967	primi	nil	1/10/2019	10/17/2019	10/21/2091	6.9cms (12w6d)	26+4weeks	7/15/2019	65.1	25+2 weeks	245	25+5weeks	219	25+2weeks	50.1	27weeks	25+6weeks	30.5	29.2
21	24yrs	5281791	primi	nil	2/26/2019	12/5/2019	12/5/2019	4.0cms (10w5d)	19+6weeks	7/15/2019	46.1	20weeks	170	19+4weeks	137	19+1weeks	30.5	19+3weeks	19+2weeks	18.8	19.3
22	24yrs	3390221	G2A1	nil	1/13/2019	10/20/2019	10/23/2019	2.2cms (8w6d)	26+2weeks	7/16/2019	67.3	27+1weeks	248	27weeks	211	25+5weeks	48	26+1weeks	25+5weeks	25.5	24.9
23	34yrs	5272655	G3P2L2	nil	11/23/2019	8/30/2019	9/4/2019	3.5cms (10w2d)	33+6weeks	7/18/2019	90.4	36+4weeks	310	34+5weeks	305	34weeks	55	33+5weeks	34weeks	33.5	31.7
24	45yrs	4837511	G2P1L0	nil	1/16/2019	10/23/2019	10/23/2019	2.6cms (9w2d)	26+1weeks	7/18/2019	62.3	25+2weeks	242	26+2weeks	213	25+6weeks	47.8	28weeks	25+5weeks	27.6	26.7
25	24yrs	963016	primi	nil	11/30/2019	9/6/2019	9/8/2019	2.9cms (9w4d)	36weeks	8/9/2019	77	31+1weeks	297	32+5weeks	285	32+3weeks	66.7	34+2weeks	32+4weeks	36.2	34.0
26	24yrs	5224671	primi	nil	1/11/2019	10/18/2019	10/15/2019	2.84cms (10w4d)	29+5weeks	8/14/2019	71	28+2weeks	284	31weeks	255	29+4weeks	59.6	31weeks	29weeks	29.1	28.8

27	30yrs	3188734	G3P1L1A1	nil	2/24/2019	12/1/2019	11/28/2019	1.9cms (8w3d)	25+1weeks	8/19/2019	58.1	25+3weeks	236	25weeks	219	24+4weeks	46.1	24+6weeks	24+5weeks	24.8	24.3
28	25yrs	4209035	primi	Hypothyroidism	3/1/2019	12/6/2019	12/6/2019	0.9cms (6w6d)	24+3weeks	8/19/2019	55	22weeks	203	22+6weeks	181	23+1weeks	40	22+4weeks	23+1weeks	24.8	24.3
29	26yrs	4027111	G3P1L1A1	nil	3/14/2019	12/19/2019	12/21/2019	2.69cms (9w2d)	22+4weeks	8/19/2019	54	22+3weeks	203	22+4weeks	175	22+3weeks	36.6	22+3weeks	22+3weeks	23.5	23.2
30	25yrs	5295028	primi	nil	1/8/2019	10/15/2019	10/17/2019	2.1cms (8w5d)	31+6weeks	8/19/2019	77.1	31weeks	295	32+4weeks	257	30+6weeks	61	31+5weeks	30+6weeks	36.9	34.6
31	21yrs	4551377	G2P1L1	nil	3/6/2019	12/11/2019	12/1/2019	3.0cms (9w5d)	23+5weeks	8/19/2019	53.9	23+3weeks	190	23+4weeks	173	23weeks	41.5	23+6weeks	23+3weeks	28	27.0
32	19yrs	5384313	primi	nil	12/25/2018	10/2/2019	10/8/2019	3.6cms (10w3d)	34+2weeks	8/22/2019	82	33weeks	291	32+1weeks	285	32+5weeks	67	34+6weeks	33weeks	35.4	33.3
33	25yrs	5141234	G2P1L1	nil	12/31/2018	10/7/2019	10/7/2019	7.0cms (13w)	33+1weeks	8/20/2019	79.3	31+6weeks	299	33weeks	277	32+6weeks	66.7	34+5weeks	32+4weeks	34.1	32.2
34	26yrs	5197196	primi	IGT	2/20/2019	9/27/2019	9/24/2019	0.9cms (6w6d)	25+6weeks	8/20/2019	62	25+2weeks	231	25+4weeks	202	24+2weeks	48	25+1weeks	25weeks	22.7	22.6
35	20yrs	4264629	G2P1L1	nil	3/29/2019	1/5/2020	1/3/2020	3.76cms (10w3d)	23+6weeks	9/12/2019	59.3	24+2weeks	214	23+3weeks	181	23weeks	45.1	24+5weeks	23+4weeks	26.7	25.9
36	21yrs	3826675	G2P1L1	nil	3/15/2019	12/22/2019	12/26/2019	2.2cms (8w6d)	26+3 weeks	9/16/2019	63.3	25+4weeks	241	26+2weeks	208	25+5weeks	48.4	26+2weeks	25+4weeks	28.2	27.2
37	25yrs	5341999	G3P1L1A1	nil	4/15/2019	1/20/2020	1/25/2020	3.1cms (9w6d)	22weeks	9/16/2019	51.7	21+5weeks	193	21+4weeks	150	21+1weeks	37.8	22+1weeks	21+3weeks	24.7	24.3
38	24yrs	3846007	primi	nil	5/9/2019	2/13/2020	2/10/2020	0.8cms (6w5d)	19+4weeks	9/23/2019	41.2	19+3weeks	154	18+3weeks	148	20+1weeks	31.1	19+5weeks	18+3weeks	17.7	18.3
39	39yrs	5345529	primi	Hypothyroidism	3/5/2019	12/10/2019	12/12/2019	4.5cms (11w1d)	28+6weeks	9/23/2019	64.5	28+1weeks	253	27+4weeks	222	26+5weeks	50.1	27weeks	26+4weeks	31.5	30.0
40	20yrs	4213831	G2P1L1	nil	8/12/2018	5/19/2018	5/22/2019	2.5cms (9w1d)	23+2weeks	1/22/2019	52.1	22+5weeks	190	23weeks	172	22+4weeks	40.2	23+3weeks	22+6weeks	24.3	23.9
41	20yrs	5008159	primi	nil	5/1/2018	2/5/2019	2/10/2019	3.4cms (10w1d)	38weeks	1/22/2019	86	34+6weeks	315	36+2weeks	297	35+6weeks	70	37weeks	36+1weeks	36.7	34.4
42	22yrs	4382863	G2P1L1	nil	8/22/2018	5/29/2019	6/2/2019	3.9cms (10w5d)	28+3weeks	3/9/2019	63.8	27+5weeks	253	28weeks	231	27+6weeks	51.2	28+1weeks	28weeks	31.7	30.2
43	26yrs	5156550	primi	nil	11/27/2018	9/3/2019	9/9/2019	4.6cms (11w2d)	21+2weeks	4/25/2019	46.1	20weeks	178	20+2weeks	148	20+1weeks	32.3	20weeks	20weeks	22.2	22.1
44	21yrs	5123965	primi	nil	12/5/2019	9/11/2019	9/12/2019	2.0cms (8w4d)	20+1weeks	4/25/2019	51.6	21+4weeks	188	21+1weeks	154	20+4weeks	31.9	19weeks 5 days	20+2weeks	22.7	22.6
45	25yrs	4019946	G2P1L1	nil	10/26/2018	8/2/2019	8/6/2019	3.6cms (10w3d)	24weeks	4/12/2019	57.2	23+4weeks	210	23+1 weeks	180	22+ 6weeks	40.11	23 +2weeks	23+1weeks	23.2	23.0
46	34yrs	2172982	G4P1L1A2	Previous LSCS	11/15/2018	8/22/2019	8/25/2019	2.4cms (9w)	21+5weeks	4/16/2019	48.2	20+4weeks	191	21+3weeks	189	22weeks	36.5	21+4weeks	21+4weeks	22.7	22.6
47	22yrs	5378996	primi	nil	2/11/2019	11/18/2019	11/16/2019	2.8cms (9w4d)	27+1weeks	8/20/2019	58.9	27+6days	255	27+5weeks	211	26+4weeks	50.1	27+1weeks	25+6weeks	28.5	27.5
48	35yrs	3761511	G2P1L1	Rh Negative pregnancy	3/25/2019	12/30/2019	12/25/2019	4.4cms (11w1d)	26+1weeks	9/24/2019	63.9	25+6weeks	238	26weeks	209	25+5weeeks	47	26+1weeks	26weeks	27.2	26.4
49	21yrs	4625667	G2P1L1	nil	3/18/2019	12/23/2019	12/23/2019	2.5cms (9w1d)	30+4weeks	10/18/2019	76	30+3weeks	281	30+6weeks	254	29+4weeks	57	30+2weeks	29+5weeks	35.7	33.6
50	24yrs	5372104	primi	nil	5/21/2019	2/25/2020	2/25/2020	1.9cms (8w3d)	20+1weeks	10/9/2019	48.3	20+4weeks	180	20+3weeks	150	20+2weeks	33.5	20+3weeks	20+2weeks	22.9	22.7
51	26yrs	5219094	primi	nil	11/24/2018	8/31/2019	8/28/2019	2.7cms (9w3d)	21+5weeks	4/25/2019	50.4	21+2weeks	188	21+1weeks	157	21+5weeks	37.9	22+1weeks	21+5weeks	23.5	23.2
52	23yrs	5191573	primi	nil	9/14/2018	6/21/2019	6/26/2019	3.1cms (9w6d)	27+6weeks	3/28/2019	73.9	29+5weeks	267	29+1weeks	241	28+3weeks	51	27+3weeks	28weeks	27.8	26.9
53	23yrs	5191108	primi	nil	12/23/2018	7/30/2019	7/28/2019	2.7cms (9w3d)	22+2weeks	3/28/2019	57	23+5weeks	199	22weeks	171	22+1weeks	40.5	23+1weeks	22+3weeks	23.9	23.6
54	28yrs	5112395	G4P3L1	nil	10/4/2018	7/11/2019	7/14/2019	4.0cms (10w5d)	25+1weeks	3/29/2019	61	25+2weeks	232	25+4weeks	200	24+5weeks	47	25+6weeks	25+3weeks	25.4	24.8
55	20yrs	4159215	G3P2L0	nil	12/29/2018	10/5/2019	10/8/2019	1.8cms (8w2d)	18+6weeks	5/9/2019	42.3	18+6weeks	153	19+1weeks	132	18+5weeks	30.6	19+3weeks	19weeks	19.5	19.9
56	25yrs	4125971	G2P1L1	nil	10/27/2018	8/3/2019	8/4/2019	3.3cms (10w)	27+5weeks	5/9/2019	63.9	25+6weeks	249	27+1weeks	199	24+4weeks	50.2	27weeks	26+4weeks	28.1	27.1
57	24yrs	4562523	G2P1L1	Previous LSCS	3/29/2019	1/3/2020	1/12/2020	2.07cms (8w4d)	22+4weeks	10/31/2019	52.4	21+6weeks	200.8	22+2weeks	179.6	22+6weeks	37.5	22weeks	22+2weeks	22.5	22.4

59	28yrs	5278840	G2P1L1	Previous LSCS and Hypothyroidism	1/10/2019	10/17/2019	10/22/2019	3.8cms (10w4d)	34+5weeks	9/10/2019	83.7	33+5weeks	314	35+1weeks	297.5	33+5weeks	55.7	34+2weeks	33+6weeks	33.1	31.4
60	22yrs	5349514	primi	nil	3/13/2019	12/18/2019	12/22/2020	2.4cms (9w)	24+6weeks	9/3/2019	63	26+4weeks	227	24+6weeks	181.4	23weeks	44.7	24+5weeks	23+5weeks	25.2	24.7
61	23yrs	5347456	Primi	nil	6/5/2019	3/11/2020	3/15/2020	3.9cms (10w5d)	20+3weeks	10/26/2019	52.8	22weeks	195.6	21+5weeks	160.7	21+1weeks	35.3	21+1weeks	21+1weeks	21.8	21.8
62	24yrs	5353818	G2P1L1	nil	4/29/2019	2/3/2020	2/9/2020	3.0cms (9w5d)	23+4weeks	10/11/2019	51.9	21+5weeks	189	21+2weeks	168.7	22weeks	38.9	22+3weeks	21+6weeks	22	22.0
63	22yrs	5295604	G2P1L1	nil	3/6/2019	12/13/2019	12/12/2019	2.0cms (8w4d)	31+2weeks	10/11/2019	80.1	32+1weeks	291.7	32+1weeks	268.8	31weeks	58.5	30+4weeks	30+5weeks	32.5	30.9
64	30yrs	975766	G4P3L3	nil	3/5/2019	12/10/2019	12/15/2019	1.9cms (8w3d)	31+1weeks	10/9/2019	69.6	28weeks	267	29weeks	245	28+5weeks	55.1	29weeks	28+4weeks	30.1	28.8
65	22yrs	5265165	G2P1L1	Previous LSCS	3/3/2019	12/10/2019	12/12/2019	4.5cms (11w1d)	24+5weeks	8/23/2019	59.2	24+1weeks	221	24+1weeks	187.9	23+4weeks	45.9	25+2weeks	24weeks	25.3	24.8
66	25yrs	5289567	G3P2L2	nil	2/10/2019	11/17/2019	11/22/2019	2.8cms (9w4d)	27+5weeks	8/23/2019	71.3	28+4weeks	265.3	28+6weeks	234.9	27+6weeks	56.8	29+6weeks	28+2weeks	28.7	27.6
67	22yrs	5286012	Primi	nil	11/17/2018	8/24/2019	8/20/2019	1.5cms (7w6d)	29+3weeks	6/11/2019	57.2	27weeks	252.5	27+3weeks	234.8	27+6weeks	53.1	28+1weeks	27+5weeks	28.5	27.5
68	19yrs	3296142	G2P1L1	nil	3/8/2019	12/15/2019	12/19/2019	3cms (9w5d)	26+4weeks	9/3/2019	60	25+2weeks	231	26+1weeks	207	26weeks	48	26+2weeks	25+6weeks	27.4	26.5
69	25yrs	5343800	G2A1	nil	3/18/2019	12/23/2019	12/28/2019	2.5cms (9w1d)	22+4weeks	8/23/2019	51.8	21+5weeks	203	22+3weeks	170.3	22weeks	40.9	23+2weeks	22+3weeks	22.9	22.7
70	23yrs	5289189	Primi	nil	1/10/2019	8/17/2019	8/19/2019	1.4cms (7w5d)	24+6weeks	8/23/2019	61.8	25+1weeks	234.3	25+3weeks	191.7	23+6weeks	41.5	23+4weeks	23+5weeks	24.5	24.1
71	30yrs	5325333	Primi	nil	11/5/2018	8/12/2019	8/16/2019	2.2cms (8w6d)	22weeks	4/4/2019	49.1	20+6weeks	181.1	20+4weeks	161.9	21+2weeks	35.4	21+1weeks	21weeks	22.6	22.5
72	20yrs	5181889	primi	nil	9/30/2018	7/7/2019	7/12/2019	3.1cms (9w6d)	27+2weeks	4/9/2019	50.7	24+5weeks	233.7	25+3weeks	226	27weeks	50.7	27+1weeks	26+4weeks	29.8	28.6
73	23yrs	5111286	primi	nil	11/23/2018	8/30/2019	8/27/2019	1.9cms (8w3d)	19+4weeks	4/9/2019	45.2	20weeks	158.7	19+4weeks	149.2	20+2weeks	32	22weeks	19+4weeks	19.8	20.1
74	21yrs	5358433	Primi	nil	11/8/2018	8/15/2019	8/19/2019	2.8cms (9w4d)	22+3weeks	5/10/2019	45.9	21+2weeks	178.4	20+2weeks	184	21+4weeks	35.7	21+2weeks	21+1weeks	22.5	22.4
75	22yrs	5465344	G2P1L1	nil	11/15/2018	8/22/2019	8/24/2019	1.6cms (8w)	21+1weeks	4/12/2019	51.6	21+5weeks	192.8	21+4weeks	173.7	22+2weeks	36.4	21+4weeks	21+5weeks	21.5	21.5
76	23yrs	5081978	primi	nil	10/21/2018	7/28/2019	7/27/2019	2.03cms (8w4d)	24+5weeks	4/12/2019	56	23+1weeks	215.5	23+4weeks	199.9	24+4weeks	47.1	25+5weeks	24+4weeks	24.5	24.1
77	21yrs	5169066	primi	nil	10/10/2018	7/17/2019	7/18/2019	2.4cms (9w)	26+2weekss	4/12/2019	66.4	28+5weeks	254.6	27+5weeks	211.2	26+5weeks	51.8	27+5weeks	28+2weeks	26.8	26.0
78	22yrs	5107663	primi	nil	11/9/2018	8/16/2019	8/21/2019	3.1cms (9w6d)	22weeks	4/12/2019	54.3	22+4weeks	204	22+4weeks	172	22+1weeks	39.1	22+4weeks	22+2weeks	22.3	22.2
79	29yrs	4267613	G2P1L1	Previous LSCS	11/29/2018	9/5/2019	9/9/2019	1.5cms (7w6d)	19+1weeks	4/12/2019	44	18+5weeks	168	19+5weeks	144.9	19+6weeks	30.1	19+2weeks	19+4weeks	19.4	19.8
80	24yrs	5082896	Primi	nil	10/29/2018	8/5/2019	8/8/2019	2.0cms (8w4d)	24+1weeks	4/16/2019	54.6	22+4weeks	204.7	22+4weeks	181.5	23weeks	41.4	22+6weeks	23+1weeks	24.5	24.1
81	26yrs	5107518	G2P1L1	Previous LSCS	10/15/2018	7/22/2019	8/20/2019	1.2cms (7w3d)	24+4weeks	4/16/2019	61.7	25weeks	222.8	24+2weeks	189.2	23+5weeks	43.5	24+2weeks	23+6weeks	24.6	24.2
82	27yrs	5217545	G3P2L2	Previous LSCS	10/3/2018	7/10/2019	7/14/2019	1.1cms (7w1d)	29+1weeks	4/25/2019	64.1	25+5weeks	242.6	26+2weeks	204	25weeks	52.3	27+6weeks	26weeks	29.5	28.3
83	30yrs	5227182	G2P1L1	nil	12/2/2018	9/8/2019	9/10/2019	1.8cms (8w2d)	20+6weeks	4/27/2019	46.2	20weeks	180	20+3weeks	156	20+5weeks	33.3	20+3weeks	20+3weeks	20.4	20.6
84	25yrs	5111289	Primi	Hypothyroidism	12/11/2018	9/17/2019	9/22/2019	2.6cms (9w2d)	20weeks	4/30/2019	44.4	19+3weeks	170.6	19+5weeks	149	20+1weeks	30.9	19+4weeks	19+5weeks	19.9	20.2
85	19yrs	5131541	Primi	nil	10/21/2018	7/28/2019	8/1/2019	1.3cms (7w4d)	22+4weeks	3/28/2019	50.3	21+2weeks	192.5	21+3weeks	156.8	20+6weeks	35.2	21+3weeks	21weeks	26.3	25.6
86	20yrs	5098235	Primi	nil	11/12/2018	8/19/2019	8/15/2019	2.0cms (8w4d)	20+4weeks	4/5/2019	48.6	20+5weeks	182.7	20+5weeks	156.3	20+6weeks	33.2	20+3weeks	20+4weeks	20.6	20.8
87	26yrs	5148038	G2P1L1	previous LSCS	10/16/2018	7/23/2019	7/30/2019	1.1cms (7w1d)	26+2weeks	4/25/2019	68.1	27+3weeks	238.8	26weeks	191.5	23+6weeks	48.1	26+1weeks	24+6weeks	27.2	26.4
88	22yrs	5224601	Primi	nil	12/10/2018	9/16/2019	9/20/2019	2.6cms (9w2d)	20+1weeks	4/30/2019	43.1	19weeks	164.5	19+1weeks	142.5	19+4weeks	30.7	19+3weeks	19+3weeks	20.8	21.0
89	22yrs	5490949	Primi	nil	7/9/2019	4/14/2020	4/17/2020	1.8cms (8w2d)	21weeks	12/3/2019	51.2	21+4weeks	194.3	21+5weeks	170.5	22weeks	39.2	22+4weeks	22+1weeks	21.8	21.8

91	27yrs	5397324	Primi	nil	7/23/2019	4/30/2020	5/2/2020	1.3cms (7w4d)	20+4weeks	12/14/2019	52	21+5weeks	181.6	20+4weeks	149.8	20+2weeks	36.1	21+3weeks	20+5weeks	20.6	20.8
92	26yrs	5510144	G2A1	nil	7/20/2019	4/25/2020	4/29/2020	1.9cms (8w3d)	21weeks	12/14/2019	48.1	20+4weeks	185	20+5weeks	150	20+2weeks	38.1	22+1weeks	21weeks	21.3	21.4
93	25yrs	5403472	G2P1L1	Previous LSCS	7/10/2019	4/15/2020	4/19/2020	5.53cms (12w)	22+3weeks	12/14/2019	52.8	22weeks	192.4	21+3weeks	170	22weeks	37.8	22+1weeks	21+5weeks	22.6	22.5
94	20yrs	5486045	primi	nil	6/29/2019	4/4/2020	4/2/2020	0.7cms (6w3d)	23+3weeks	12/10/2019	55.9	23weeks	213.1	23+3weeks	185.9	23+3weeks	42.6	23+6weeks	23+3weeks	23.8	23.5
95	21yrs	5399304	primi	nil	5/16/2019	2/20/2020	2/24/2020	1.03cms (7w)	29+5weeks	10/15/2019	70	29+1weeks	258.8	29weeks	245	28+5weeks	55	28+6weeks	29+1weeks	33.8	32.0
96	30yrs	5454555	G3P2L1	nil	7/20/2019	4/25/2020	4/29/2020	1.82cms (8w2d)	21+6days	12/20/2019	49.3	20+6weeks	195.3	21+6weeks	185.3	23+2weeks	39.7	22+6weeks	22+5weeks	25.1	24.6
97	21yrs	5547777	primi	Hypothyroidism	4/20/2019	1/25/2020	1/26/2020	6.5cms (12w5d)	35+2weeks	12/23/2019	88.2	35+5weeks	318.7	35+6weeks	289.4	33weeks	64.6	33+2weeks	33+2weeks	41.2	38.2
98	28yrs	4545127	G2P1L1	Previous LSCS	7/10/2019	4/17/2020	4/17/2020	7.04cms (13w)	23+5weeks	12/23/2019	56.7	23+2weeks	207.4	22+6weeks	184.3	23+2weeks	40.9	23+1weeks	23weeks	23.7	23.4
99	23yrs	5489372	G2A1	nil	8/5/2019	5/11/2020	5/7/2020	7.4cms (13w1d)	20weeks	12/23/2019	47.3	20+2weeks	173.1	19+5weeks	140.5	19+3weeks	30.7	19+3weeks	19+3weeks	20.3	20.5
100	20yrs	5444233	primi	nil	8/6/2019	5/12/2020	5/10/2020	1.08cms (7w)	20+6weeks	12/23/2019	40.7	18+2weeks	165.3	19+2weeks	149.7	20+2weeks	32.5	20+1weeks	20weeks	18.7	19.2
101	21yrs	4336778	G2P1L1	short stature	10/27/2018	8/3/2019	8/8/2019	1.7cms (8w1d)	27+6weeks	5/10/2019	63.8	25+6weeks	248.2	27weeks	227.4	27+1weeks	49.4	26+5weeks	26+4weeks	27.7	26.8
102	21yrs	5391606	primi	nil	12/22/2018	9/28/2019	10/2/2019	2.1cms (8w5d)	19+6weeks	5/10/2019	46	19+6weeks	187.3	19+3weeks	138.6	19+2weeks	31.2	19+5weeks	19+3weeks	19.6	19.9
103	30yrs	5150600	G2P1L1	nil	1/1/2019	10/8/2019	10/5/2019	2.4cms (9w)	20weeks	5/21/2019	44.1	19+2weeks	170	19+5weeks	150.3	20+2weeks	33.2	20+3weeks	20+1weeks	20.4	20.6
104	19yrs	4957341	G2P1L0	Rh Negative pregnancy	12/3/2018	9/11/2019	9/13/2019	2.2cms (8w6d)	19+6weeks	4/30/2019	41.4	18+weeks	163.8	19+1weeks	145.5	19+6weeks	31.1	19+5weeks	19+4weeks	19.4	19.8
105	26yrs	5132196	G2P1L1	nil	12/31/2018	10/7/2019	10/10/2019	2.8cms (9w4d)	20+4weeks	5/24/2019	48.1	20weeks	178.1	20+2weeks	153.4	20+4weeks	34.5	20+6weeks	20+4weeks	20.2	20.4
106	21yrs	5187547	G2P1L1	nil	1/22/2019	10/29/2019	10/9/2019	2.8cms (9w4d)	20+2weeks	5/24/2019	44.1	19+2weeks	169.4	19+4weeks	151.8	20+3weeks	32.6	20+1weeks	20+1weeks	19.6	19.9
107	24yrs	5341026	primi	nil	12/21/2018	9/27/2019	9/25/2019	1.9cms (8w3d)	22+1weeks	5/25/2019	54	22+3weeks	200.5	22+1weeks	168.8	21+6weeks	37.7	22weeks	21+6weeks	21.8	21.8
108	21yrs	5251956	G2P1L1	nil	12/22/2018	9/28/2019	9/26/2019	4.6cms (11w2d)	22+4weeks	5/28/2019	52	21+5weeks	200.5	22+1weeks	168.4	21+6weeks	36.4	21+4weeks	21+4weeks	22.1	22.1
109	20yrs	4606851	G2P1L1	nil	12/14/2018	9/20/2019	10/10/2019	2.1cms (8w5d)	20+5weeks	5/28/2019	44.4	19+3weeks	164.9	19+1weeks	150.5	20+2weeks	33.7	20+3weeks	20+1weeks	20.6	20.8
110	25yrs	5168387	G2P1L1	Previous LSCS	1/4/2019	10/11/2019	10/7/2019	1.6cms (8w)	20+4weeks	5/28/2019	49.8	21+1weeks	181.8	20+4weeks	163.4	21+3weeks	34.8	21weeks	21weeks	20	20.3
111	27yrs	5246748	G2P1L1	Previous LSCS	12/23/2018	9/29/2019	9/25/2019	2.5cms (9w1d)	22+2weeks	5/28/2019	51.9	21+6weeks	201.6	22+2weeks	176.7	22+4weeks	43	24weeks	22+6weeks	22.1	22.1
112	22yrs	5158833	Primi	nil	12/8/2018	9/14/2019	9/17/2019	1.7cms (8w1d)	24+3weeks	5/28/2019	58.3	23+6weeks	219.3	24weeks	192.4	24weeks	40.2	23weeks	23+3weeks	24.6	24.2
113	22yrs	5229071	G4P1L1A2	previous LSCS	12/3/2018	9/9/2019	9/5/2019	2.7cms (9w3d)	25+1weeks	5/28/2019	62.7	25+3weeks	227.4	24+5weeks	210.6	25+4weeks	44.1	24+4weeks	24+5weeks	25.4	24.8
114	23yrs	5202042	Primi	nil	11/17/2018	8/24/2019	8/25/2019	1.2cms (7w3d)	27+5weeks	5/30/2019	65.2	26+2weeks	251.8	27+2weeks	203.2	24+6weeks	49.6	26+5weeks	26+4weeks	27.2	26.4
115	19yrs	5681240	primi	nil	6/18/2019	3/24/2020	3/27/2020	3.8cms (10w4d)	29+6weeks	1/13/2020	78.5	31+4weeks	288.1	31+6weeks	252.8	29+3weeks	56.3	29+4weeks	29+4weeks	30.95	29.5
116	22yrs	5681209	primi	nil	7/5/2019	4/10/2020	4/14/2020	2.8cms (9w4d)	28weeks	1/17/2020	76.1	30+4weeks	271.3	29+4weeks	242.5	28+4weeks	53.5	28+3weeks	28+3weeks	29.3	28.1
117	22yrs	5168786	primi	nil	1/13/2019	10/20/2019	10/24/2019	3.1cms (9w6d)	20+2weeks	6/14/2019	49.8	21+1weeks	182.3	20+4weeks	160.3	21+1weeks	34.2	20+5weeks	20+6weeks	20.1	20.4
118	20yrs	5164026	primi	nil	1/7/2019	10/14/2019	10/17/2019	3.1cms (9w6d)	21+1weeks	6/14/2019	46	19+1weeks	175	20+1weeks	149	20weeks	35	21weeks	20+3weeks	21.1	21.2
119	24yrs	5465888	primi	nil	8/11/2019	5/17/2020	5/20/2020	3.7cms (10w3d)	20+2weeks	12/13/2019	43.9	19+2weeks	161	18+6weeks	147.8	20weeks	31	19+4weeks	19+5weeks	20.25	20.5
120	18yrs	5440103	primi	nil	8/12/2019	5/18/2020	5/20/2020	2.2cms (8w6d)	20+1weeks	12/31/2019	44.3	19+3weeks	174	20weeks	152	20+3weeks	33	20+2weeks	20+2weeks	20.2	20.4
121	20yrs	5513941	primi	nil	7/28/2019	5/3/2020	5/4/2020	2.9cms (9w4d)	22+2weeks	12/31/2019	50.7	21+3weeks	188.3	21+1weeks	168.2	21+6weeks	35.6	21+2weeks	21+3weeks	22.4	22.3

123	20yrs	5220039	primi	nil	1/10/2019	10/17/2019	10/14/2019	3.4cms (10w1d)	24weeks	6/27/2019	54	22+3weeks	210.9	23+1weeks	181.6	23weeks	41.2	23+3weeks	23weeks	24.35	24.0
124	23yrs	5270939	G2P1L1	nil	11/10/2018	8/17/2019	8/15/2019	4.7cms (11w2d)	30+3weeks	6/11/2019	73.5	29+3weeks	281.4	30+6weeks	244.5	28+5weeks	58	30+2weeks	29+1weeks	30	28.7
125	24yrs	4949796	G2P1L0	nil	3/15/2019	12/20/2019	12/19/2019	2.8cms (9w4d)	22+6weeks	8/20/2019	51.8	21+5weeks	195.2	21+5weeks	167.1	21+5weeks	41.6	23+4weeks	22+2weeks	21.9	21.9
126	38yrs	5269923	G3P2L1	nil	2/4/2019	11/11/2019	11/14/2019	3.8cms (10w4d)	18+4weeks	6/14/2019	40.9	18+3weeks	152.5	18+2weeks	125.8	18+1weeks	26.9	18+1weeks	18+1weeks	18.6	19.1
127	30yrs	5251733	G3P2L1	nil	2/5/2019	11/12/2019	11/15/2019	2.2cms (8w6d)	19weeks	6/18/2019	49.2	20+6weeks	178.4	20+2weeks	157	20weeks	32.8	20+2weeks	20+1weeks	19.5	19.9
128	26yrs	5197909	G2P1L1	nil	1/28/2019	11/4/2019	11/6/2019	2.9cms (9w4d)	20+1weeks	6/18/2019	46.9	20+1weeks	177.1	20+1weeks	160.2	20+2weeks	33.5	20+3weeks	20+2weeks	20.05	20.3
129	23yrs	5169233	primi	nil	2/1/2019	11/8/2019	11/11/2019	3.6cms (10w3d)	19+4weeks	6/18/2019	46.9	20+1weeks	180	20+3weeks	149.5	20+1weeks	33.2	20+3weeks	20+1weeks	19.95	20.2
130	26yrs	4301865	G2P1L1	nil	1/29/2019	11/5/2019	11/2/2019	2.6cms (9w2d)	20+2weeks	6/22/2019	47.8	20+3weeks	179	20+2weeks	160.8	21+1weeks	36.9	21+5weeks	21+1weeks	20.15	20.4
131	36yrs	5304943	G2P1L1	nil	4/11/2019	1/16/2020	1/8/2020	1.9cms (8w3d)	20+6weeks	8/27/2019	48.5	20+5weeks	178.9	20+2weeks	162.4	21+2weeks	32.3	20weeks	20+4weeks	20.4	20.6
132	24yrs	5304883	primi	nil	5/4/2019	2/8/2020	2/6/2020	3.1cms (9w6d)	20+6weeks	9/27/2019	46.1	20weeks	173.9	19+6weeks	152.4	20+3weeks	31.9	19+6weeks	20+1weeks	20.65	20.8
133	20yrs	5308518	primi	nil	2/4/2019	11/11/2019	11/10/2019	2.1cms (8w5d)	20+4weeks	6/28/2019	46.6	20+1weeks	174.1	20weeks	152.3	20+3weeks	35.1	21+1weeks	20+4weeks	20.4	20.6
134	22yrs	5114894	G2P1L1	nil	12/9/2018	9/22/2019	9/20/2019	3.2cms (10w)	29+4weeks	6/28/2019	73.6	29+3weeks	270.8	29+1weeks	251.9	28+6weeks	55.1	29+4weeks	29+2weeks	29.7	28.5
135	31yrs	5461328	G2P1L1	nil	4/1/2019	1/6/2020	1/9/2020	1.7cms (8w1d)	20+3weeks	8/22/2019	50	21+1weeks	184.5	20+6weeks	155.3	20+5weeks	33	20+2weeks	20+3weeks	20.6	20.8
136	24yrs	990681	G3P1L1A1	anemia	6/14/2019	3/20/2020	3/24/2020	2.6cms (9w2d)	27weeks	12/20/2019	65.4	26+3weeks	242.7	26+3weeks	213.4	25+6weeks	47.4	25+6weeks	25+5weeks	27.05	26.2
137	20yrs	5577046	Primi	short stature	9/7/2019	6/13/2020	6/17/2020	4.4cms (11w1d)	23+2weeks	1/31/2020	52.6	22weeks	199.1	22+1weeks	170.3	22weeks	36.9	21+5weeks	21+5weeks	24.3	23.9
138	29yrs	5407757	Primi	nil	6/9/2019	3/16/2020	3/18/2020	2.8cms (9w4d)	27+1weeks	12/16/2019	64.7	28+1weeks	240	28weeks	210.4	25+4weeks	48.3	28+1weeks	26+4weeks	27.4	26.5
139	22yrs	5527257	Primi	nil	8/5/2019	5/11/2020	5/15/2020	3.4cms (10w1d)	26weeks	2/3/2020	66.8	26+6weeks	246.1	26+6weeks	228.2	27+1weeks	51.6	27+4weeks	27weeks	26.9	26.1
140	21yrs	5606819	Primi	anemia	6/18/2019	3/24/2020	3/25/2020	2.9cms (9w4d)	32+6weeks	2/3/2020	73.2	29+3weeks	271.4	29+4weeks	253	29+3weeks	71.7	32weeks	30weeks	33.8	32.0
141	31yrs	5669612	G2P1L1	nil	8/3/2019	5/9/2020	5/13/2020	3.1cms (9w6d)	26+6weeks	2/7/2020	67.3	27+1weeks	249.2	27weeks	212.7	25+5weeks	50.8	27+2weeks	26+2weeks	25.8	25.2
142	24yrs	5582859	primi	nil	8/20/2019	5/26/2020	5/23/2020	2.2cms (8w6d)	24+3weeks	2/7/2020	76.1	30+4weeks	274.8	30weeks	231.5	27+4weeks	57.7	30+1weeks	28+4weeks	25.25	24.7
143	27yrs	5458892	G3P1L1A1	nil	8/2/2019	5/8/2020	5/10/2020	4.1cms (10w6d)	29+3weeks	2/24/2020	73.4	29+3weeks	271.4	29+4weeks	274.8	31+4weeks	58.6	30+4weeks	30+4weeks	31.4	29.9
144	31yrs	3601283	G3P2L2	nil	8/21/2019	5/27/2020	5/25/2020	3.3cms (10w)	24+3weeks	2/8/2020	63.6	25+5weeks	227	24+5weeks	198.5	24+4weeks	46.5	25weeks	24+4weeks	24.35	24.0
145	34yrs	5615190	G4P1L1A2	Previous LSCS	9/17/2019	6/23/2020	6/26/2020	2.5cms (9w1d)	20+4weeks	2/8/2020	44.4	19+3weeks	175.7	20+1weeks	142.9	19+4weeks	33.2	20+3weeks	19+6Weeks	20.5	20.7
146	22yrs	4111386	primi	Rh Negative pregnancy	7/2/2019	4/7/2020	4/10/2020	2.9cms (9w4d)	31+2weeks	2/6/2020	72.4	29weeks	172.8	29+5weeks	248.4	29weeks	57.2	30weeks	29+1weeks	31.5	30.0
147	28yrs	5592499	G3P2L2	nil	8/10/2019	5/16/2020	5/20/2020	1.9cms (8w3d)	25+5weeks	2/6/2020	65.1	26+2weeks	237.2	25+5weeks	189.5	23+6weeks	43.2	24+1weeks	24weeks	25.35	24.8
148	25yrs	5560336	primi	Hypothyroidism	8/23/2019	5/29/2020	5/28/2020	1.8cms (8w2d)	25+6weeks	2/20/2020	54.6	26+1weeks	241.8	26+2weeks	210	25+4weeks	49.7	26+5weeks	26+6weeks	25.7	25.1
149	27yrs	5029176	G2P1L1	nil	9/7/2019	6/13/2020	6/16/2020	3.3cms (10w)	24+2weeks	2/24/2020	56.2	23+1weeks	213	23+3weeks	187	23+3weeks	45.2	25weeks	23+6weeks	24.4	24.0
150	23yrs	5494115	G3P1L1A1	nil	9/29/2019	7/5/2020	7/8/2020	2.7cms (9w3d)	23+6weeks	3/14/2020	50.9	21+3weeks	188.7	21+1weeks	157	20+6weeks	38.3	21+4weeks	21weeks	23.6	23.3
151	24yrs	5348792	G3P1L1A1	nil	5/25/2019	2/29/2020	3/10/2020	2.2cms (8w6d)	20+3weeks	10/25/2019	49	20+1weeks	182	20+6weeks	156	20+6weeks	35.3	21+1weeks	20+6weeks	20.1	20.4
152	29yrs	1354390	G2P1L1	nil	4/17/2019	1/22/2020	1/25/2020	3.2cms (10w)	20+6weeks	9/10/2019	48.8	20+5weeks	191.2	21+3weeks	166.7	21.+5weeks	37	21+5weeks	21+4weeks	20.55	20.7
153	26yrs	5261840	primi	nil	3/23/2019	12/30/2019	12/28/2019	2.5cms (9w1d)	20+3weeks	8/13/2019	50.8	21+3weeks	188.4	21+1weeks	151.1	20+2weeks	36.3	21+4weeks	20+6weeks	20.45	20.7

155	24yrs	4199735	G3P2L1	Previous LSCS	2/26/2019	12/3/2019	12/11/2019	1.9cms (8w3d)	22+6weeks	8/13/2019	49.9	21+1weeks	198.8	22weeks	167	21+5weeks	39.2	22+4weeks	22weeks	22.5	22.4
156	22yrs	5319647	primi	nil	3/5/2019	12/10/2019	12/14/2019	3.9cms (10w5d)	23+3weeks	8/16/2019	52.1	21+6weeks	208.1	22+6weeks	177.6	22+4weeks	40.8	23+1weeks	22+5weeks	22.9	22.7
157	28yrs	5342748	G3P2L2	nil	6/6/2019	3/12/2020	3/14/2020	2.4cms (9w)	23+4weeks	11/18/2019	55.8	23weeks	211.6	23+2WEEKS	195.5	24+2weeks	47	26+6WEEKS	24+3WEEKS	23.35	23.1
158	24yrs	5375551	Primi	nil	4/8/2019	1/13/2020	1/10/2020	2.1cms (8w5d)	18+5weeks	8/17/2019	39.9	18+1weeks	149.8	18weeks	127.8	18+2weeks	28.6	18+5weeks	18+3weeks	18.4	18.9
159	30yrs	5377055	G3A2	nil	3/12/2019	12/17/2019	12/15/2019	3.8cms (10w4d)	27+6weeks	9/23/2019	75.6	30+2WEEKS	272.3	29+5weeks	247.2	29weeks	50	28+6weeks	28+1WEEKS	27.6	26.7
160	23yrs	3632205	G3P2L2	nil	5/21/2019	2/25/2020	2/28/2020	1.5cms (7w6d)	22+3weeks	10/25/2019	51.9	21+5weeks	190.1	21+2weeks	174.2	22+2weeks	41.4	23+3weeks	22+3weeks	22.35	22.3
161	31yrs	4900527	Primi	nil	6/28/2019	4/3/2020	4/6/2020	2.5cms (9w1d)	20+4weeks	11/19/2019	48	20+4weeks	183.6	20+5weeks	145.3	20weeks	31.3	19+5weeks	20+3weeks	20.4	20.6
162	32YRS	5295968	G5P4L4	nil	3/21/2019	12/26/2019	12/24/2019	2.9cms (9w4d)	22+1weeks	8/23/2019	51.9	21+5weeks	199.5	22+1weeks	179.1	22+3weeks	38.8	22+3weeks	22+2weeks	22.2	22.1
163	32YRS	5308014	G3P2L0	Hypothyroidism	4/24/2019	7/29/2020	7/25/2020	3.7cms (10w3d)	21+1weeks	9/19/2019	48.2	20+4weeks	182.3	20+4weeks	148.5	20+1weeks	32.2	20weeks	20+1weeks	21.2	21.3
164	24yrs	5386939	Primi	nil	6/7/2019	3/13/2020	3/16/2020	1.8cms (8w2d)	21+6WEEKS	11/7/2019	56.4	23+2weeks	201.8	22+2weeks	153.2	21+3weeks	39.8	22+6weeks	22weeks	21.45	21.5
165	24yrs	5359130	G4P3L2	nil	12/4/2018	10/5/2019	10/8/2019	3.7cms (10w3d)	35+3WEEKS	9/3/2019	84.3	34WEEKS	304.6	33+6WEEKS	283.2	32+2WEEKS	66.7	34+2weeks	33weeks	35.7	33.6
166	22yrs	5373242	primi	nil	2/4/2019	11/11/2019	11/8/2019	2.4cms (9w)	30+1weeks	9/3/2019	77.7	31+1weeks	288.6	31+2weeks	242.21	28+3weeks	54.9	29weeks	30+6weeks	30.35	29.0
167	21yrs	4678167	G4P1L1A2	thalassemia trait	3/27/2019	1/1/2020	12/28/2019	3.1cms (9w6d)	22+6weeks	9/3/2019	54	22+3weeks	199.4	22+1weeks	164.3	21+3weeks	39.7	22+6weeks	22weeks	22.2	22.1
168	32YRS	5400689	primi	nil	12/12/2018	9/18/2019	9/22/2019	1.8cms (8w2d)	37+6WEEKS	9/3/2019	91.5	37+1weeks	334.6	38+2weeks	306.1	34+4weeks	70.5	36+1weeks	35+4weeks	37.55	35.1
169	19yrs	5287892	primi	Hypothyroidism	4/24/2019	1/29/2020	1/25/2020	2.1cms (8w5d)	20+6weeks	9/17/2019	49.5	21weeks	183.4	20+5weeks	150.9	20+2weeks	35.3	21+1weeks	20+4weeks	20.6	20.8
170	22yrs	4644798	G2P1L1	nil	4/12/2019	1/17/2020	1/19/2020	2.2cms (8w6d)	20+6weeks	9/5/2019	48	20+4weeks	184.4	20+6weeks	156.2	20+5weeks	33.8	20+4WEEKS	20+4weeks	20.1	20.4
171	23yrs	5420635	primi	nil	6/20/2019	3/26/2020	3/24/2020	3.6cms (10w3d)	23+1WEEKS	11/29/2019	51.9	21+6weeks	192.8	21+4weeks	157.8	20+6weeks	35.8	21+2weeks	21weeks	23.2	23.0
172	19yrs	5300101	primi	nil	3/29/2019	1/3/2020	1/6/2020	1.8cms (8w2d)	23WEEKS	9/6/2019	58.6	24WEEKS	213.2	23+3weeks	171.5	22+1weeks	42.5	23+6weeks	22+6weeks	23.2	23.0
173	28yrs	5232672	primi	POLIOMYELITIS	1/25/2019	11/1/2019	12/5/2019	2.5cms (9w1d)	26+1weeks	8/30/2019	58.4	23+6weeks	230.6	25+1weeks	196.8	24+2weeks	44.8	24+5weeks	24+2WEEKS	26.15	25.5
174	27yrs	5405086	primi	nil	2/6/2019	11/13/2019	11/18/2019	2.8cms (9w4d)	30+5WEEKS	9/9/2019	78.4	31+3weeks	289.3	31+6weeks	272.3	31+2WEEKS	58.1	29+4weeks	30+3WEEKS	30.9	29.5
175	21yrs	5295554	primi	nil	1/21/2019	10/28/2019	10/25/2019	2.9cms (9w4d)	24+1weeks	7/9/2019	67.2	23+4weeks	218.4	23+6weeks	202.2	24+6weeks	44.6	24+5weeks	24+3WEEKS	24.45	24.0
176	23yrs	4014676	G2P1L1	nil	4/14/2019	1/19/2020	1/22/2020	3.2cms (10w)	21+2weeks	9/19/2019	52.3	21+6weeks	193.9	21+4weeks	104.7	21+4weeks	37.5	22weeks	21+4weeks	21.35	21.4
177	29yrs	5376009	G3P1L1A1	nil	2/6/2019	11/13/2019	11/10/2019	2.6cms (9w2d)	30+6WEEKS	9/19/2019	78.6	31+4weeks	300.4	33+2WEEKS	280	32WEEKS	59.8	31+1WEEKS	31+4WEEKS	31.05	29.6
178	19yrs	5321619	primi	nil	4/7/2019	1/12/2020	1/8/2020	3.5cms (10w2d)	22+5WEEKS	9/13/2019	51	21+3weeks	194.7	21+5weeks	171.7	22+1weeks	39.5	22+5WEEKS	22+1weeks	22.55	22.4
179	24yrs	5408440	primi	nil	8/5/2019	5/11/2020	5/6/2020	2.9cms (9w4d)	20+4weeks	12/27/2019	41.5	18+4WEEKS	188	19+3weeks	131.5	18+5weeks	33.8	20+4WEEKS	19+3weeks	20.65	20.8
180	23yrs	5296014	primi	nil	3/25/2019	12/30/2019	12/25/2019	3.6cms (10w3d)	22+1weeks	8/27/2019	52.9	22weeks	192.5	21+3weeks	182.7	23+1weeks	39.5	22+5WEEKS	22+4WEEKS	22.3	22.2
181	35yrs	5250001	primi	ELDERLY PRIMI	3/4/2019	12/9/2019	12/13/2019	2.9cms (9w4d)	25WEEKS	8/26/2019	59.8	24+3WEEKS	227.2	24+5weeks	206	25+1WEEKS	45.1	24+6weeks	24+5weeks	25.1	24.6
182	30yrs	3644623	G2P1L1	nil	6/24/2019	3/30/2020	3/25/2020	2.2cms (8w6d)	22+3weeks	11/28/2019	53.9	22+3weeks	203.8	22+4weeks	171.8	22+1weeks	39.2	22+4weeks	22+2weeks	22.45	22.4
183	28yrs	2304758	G3P1L1A1	nil	7/20/2019	4/25/2020	4/15/2020	1.8cms (8w2d)	20+6weeks	12/3/2019	49.5	21weeks	179.9	20+3weeks	150.5	20+2weeks	35.7	21+2weeks	20+5weeks	20.35	20.6
184	24yrs	4517607	G2P1L1	Hypothyroidism	7/26/2019	5/1/2020	5/4/2020	2.6cms (9w2d)	22+6WEEKS	1/2/2020	53.2	22+1WEEKS	204.2	22+6weeks	180.6	22+6weeks	39.6	22+5WEEKS	22+6weeks	22.6	22.5
185	23yrs	5354953	primi	nil	5/14/2019	2/18/2020	2/22/2020	3.2cms (10w)	24+5weeks	11/11/2019	68	27+3weeks	246	26+5WEEKS	204.5	25weeks	48.1	26+1weeks	25+3weeks	24.5	24.1

187	21yrs	4218919	G3P1L1A1	nil	2/1/2019	11/8/2019	11/7/2019	4.1cms (10w6d)	19+4weeks	7/12/2019	52.2	21+6weeks	202.9	22+3weeks	158.1	21WEEKS	38.1	22+1weeks	21+3weeks	19.4	19.8
188	28yrs	3591866	G4P1L1A2	nil	3/1/2019	12/6/2019	12/5/2019	2.9cms (9w4d)	32weeks	10/11/2019	84.1	33+6WEEKS	309.6	32+4weeks	284.2	34weeks	60	31+6WEEKS	33weeks	32.8	31.1
189	26yrs	5353772	G2A1	nil	5/4/2019	2/8/2020	2/10/2020	1.9cms (8w3d)	22+6weeks	10/11/2019	52.7	22weeks	201.7	22+2weeks	174	22+4weeks	41	23+2weeks	22+5weeks	22.8	22.6
190	26yrs	5420926	G2A1	nil	5/15/2019	2/19/2020	2/15/2020	2.1cms (8w5d)	21+2weeks	10/15/2019	52.2	21weeks	189	21+3weeks	163.8	21+3weeks	31.8	19+6weeks	21+2WEEKS	21.25	21.3
191	27yrs	5434035	G3P1L1A1	nil	7/15/2019	4/20/2020	4/18/2020	1.3cms (7w4d)	19+4weeks	11/29/2019	46.3	19+6weeks	168.6	19+3weeks	136.2	19WEEKS	32	19+4weeks	19+2weeks	19.6	19.9
192	21yrs	5312907	G2P1	nil	4/14/2019	1/19/2020	2/21/2020	1.8cms (8w2d)	23WEEKS	10/25/2019	52.6	22weeks	209.3	23weeks	175.6	22+3weeks	40	22+6weeks	22+4WEEKS	23.25	23.0
193	22yrs	5629246	G3P2L1	nil	6/1/2019	3/7/2020	3/4/2020	1.5cms (7w6d)	20+3weeks	10/22/2019	48.6	20+5weeks	188.3	21+1weeks	154.5	20+4weeks	34.1	20+5weeks	20+4weeks	20.55	20.7
194	26yrs	3600928	G3P2L2	nil	4/28/2019	2/2/2020	2/18/2020	2.5cms (9w1d)	23+5weeks	10/25/2019	52.8	22weeks	197.7	22weeks	174.9	22+3weeks	38.5	22+2WEEKS	22+1Weeks	23.65	23.4
195	21yrs	4711229	G3P2L2	PREV.2LSCS	7/15/2019	4/20/2020	3/25/2020	1.9cms (8w3d)	23+2weeks	11/29/2019	55.7	23weeks	212.9	23+2WEEKS	180.5	22+6weeks	43	24weeks	23+1weeks	23.25	23.0
196	27yrs	5455547	G3P2L2	PREV.2LSCS	7/10/2019	4/15/2020	4/20/2020	3.5cms (10w2d)	20+4weeks	12/3/2019	41.4	18+4WEEKS	162	19WEEKS	149.8	20+2weeks	32.8	20+2weeks	20+6weeks	20.5	20.7
197	25yrs	3929280	G2P1L1	nil	6/8/2019	3/14/2020	3/18/2020	1.8cms (8w2d)	21+3WEEKS	11/5/2019	51.9	21weeks	191.3	21+3weeks	164	21+4weeks	37.2	21+6WEEKS	21+3weeks	21.45	21.5
198	25yrs	5455608	primi	nil	5/17/2019	2/21/2020	2/24/2020	2.2cms (8w6d)	24+4weeks	11/5/2019	54	22+3weeks	210.1	23+1weeks	191.5	23+6weeks	44.4	24+4weeks	23+6weeks	24.55	24.1
199	20yrs	5470767	G2P1	PREV.LSCS	5/20/2019	2/24/2020	2/26/2020	2.3cms (9w)	24+1weeks	11/5/2019	53	22+1WEEKS	205.3	22+4weeks	180.7	22+6weeks	43.2	24+1weeks	23+1weeks	24.65	24.2
200	22yrs	2768080	G4P3L2	nil	6/3/2019	3/9/2020	3/12/2020	1.8cms (8w2d)	22+1weeks	11/5/2019	52.5	22weeks	198.5	22weeks	173.7	22+2weeks	36.7	21+5weeks	21+6weeks	20.75	20.9
201	32YRS	5451516	G3P2L2	nil	6/21/2019	3/27/2020	3/30/2020	3.4cms (10w1d)	20weeks	11/8/2019	46.9	20+1weeks	169	19+4weeks	137.9	19+1weeks	30.6	19+3weeks	19+1WEEKS	19.75	20.1
202	27yrs	3623428	G2P1L1	PREV.LSCS	8/5/2019	5/15/2020	5/8/2020	2.8cms (9w4d)	23+1WEEKS	1/14/2020	59.2	23+6weeks	213.2	23+3weeks	186.8	23+3weeks	41	23+2weeks	23+2WEEKS	23.45	23.2
203	20yrs	5379550	primi	short stature	5/13/2019	2/17/2020	3/7/2020	2.1cms (8w5d)	20+3weeks	10/22/2019	46.2	20weeks	171.3	19+5weeks	153.5	20+4weeks	31.7	19+5weeks	20+1weeks	20.6	20.8
204	21yrs	3660928	G2P1L1	nil	5/31/2019	3/6/2020	3/8/2020	3.8cms (10w4d)	23WEEKS	11/8/2019	56.5	23+2weeks	204.2	22+4weeks	168.5	21+6weeks	42	23+5WEEKS	22+4WEEKS	23.3	23.1
205	33YRS	5451028	G4P3L3	nil	7/14/2019	4/19/2020	4/15/2020	3.7cms (10w3d)	19+5WEEKS	11/29/2019	47.5	20+3weeks	180	20+3weeks	162.3	20+3weeks	35.2	21+1weeks	20+4weeks	19.65	20.0
206	27yrs	4647409	G2P1L1	PREV.LSCS	7/15/2019	4/20/2020	4/16/2020	2.9cms (9w4d)	19+4weeks	11/29/2019	45.4	19+5WEEKS	172.4	19+6weeks	155.9	20+5weeks	30.6	19+3weeks	20weeks	19.45	19.8
207	21yrs	5244849	primi	nil	3/27/2019	1/1/2020	12/29/2019	3.1cms (9w6d)	33+6weeks	11/19/2019	90.2	36+4weeks	317.6	35+5WEEKS	302.2	34+1WEEKS	65.7	33+6WEEKS	34+3WEEKS	33.9	32.0
208	27yrs	5466055	primi	nil	5/28/2019	3/3/2020	3/1/2020	1.9cms (8w3d)	25WEEKS	11/19/2019	58.6	23+2weeks	216	23+6weeks	195.4	24+6weeks	45.2	24+6weeks	24+2WEEKS	25.45	24.9
209	34yrs	3304416	G4P2L2A1	nil	6/29/2019	4/4/2020	4/8/2020	2.3cms (9w)	20+3weeks	11/19/2019	46.7	20+1weeks	177.7	20+2weeks	151.4	20+2weeks	33.1	20+1weeks	20+2weeks	20.4	20.6
210	33YRS	5439664	G3P1L1A1	PREV.LSCS	6/26/2019	4/1/2020	4/5/2020	4.1cms (10w6d)	21+2weeks	11/22/2019	51.2	21+4weeks	199.8	22+1weeks	185.7	23+3weeks	37.4	21+6WEEKS	21+6weeks	21.25	21.3
211	20yrs	5465388	primi	nil	7/7/2019	3/13/2020	3/9/2020	1.7cms (8w1d)	24+4weeks	11/26/2019	60.4	24+4WEEKS	227	24+5weeks	184.4	24+1weeks	44	24+3weeks	24+1WEEKS	24.2	23.8
212	29yrs	5500667	G2P1L1	nil	6/10/2019	3/16/2020	3/12/2020	2.2cms (8w6d)	24+1weeks	11/26/2019	61.8	25+1weeks	228.3	24+5weeks	188.4	23+4weeks	41.5	23+3weeks	23+4weeks	24.15	23.8
213	28yrs	5509609	primi	nil	4/22/2019	1/27/2020	1/30/2020	2.9cms (9w4d)	31+4WEEKS	11/29/2019	76.1	30+4weeks	283.8	31+1WEEKS	247.6	29weeks	56.9	29+6weeks	29+2WEEKS	31.5	30.0
214	27yrs	5466526	primi	Rh Negative pregnancy	6/2/2019	3/8/2020	3/12/2020	2.7cms (9w3d)	25+5weeks	11/29/2019	64.1	25+2weeks	247.3	26weeks	213.6	25+4weeks	46.2	26+2weeks	25+6weeks	25.4	24.8
215	34yrs	4950006	G3P2L1	PREV.LSCS	6/11/2019	3/17/2020	3/22/2020	4.6cms (11w2d)	24+3weeks	11/29/2019	60.7	24+5weeks	230	25weeks	217.2	26+1WEEKS	46.2	25+4WEEKS	24+3WEEKS	24.1	23.7
216	23yrs	5491286	primi	Rh Negative pregnancy	6/27/2019	4/2/2020	4/6/2020	3.6cms (10w3d)	22+1weeks	11/29/2019	49.9	21+1weeks	189.5	21+2weeks	168.1	21+6weeks	34.9	21weeks	22+1weeks	22	22.0
217	24yrs	5457215	G3P2L2	PREV.2LSCS	5/7/2019	2/11/2020	2/15/2020	3.1cms (9w6d)	31WEEKS	12/10/2019	74.7	30WEEKS	288.2	31+5WEEKS	262.2	30+3WEEKS	60.3	31+3WEEKS	30+3WEEKS	32.05	30.5

219	25yrs	5481880	primi	nil	7/7/2019	4/12/2020	4/8/2020	3.1cms (9w6d)	22+2weeks	12/10/2019	55	23+1weeks	211.2	23+1weeks	176.5	22+4weeks	38.5	22+2WEEKS	22+3weeks	22.15	22.1
220	31yrs	3943333	G2P1L1	PREV.LSCS	4/18/2019	1/23/2020	1/19/2020	2.8cms (9w4d)	34+5weeks	12/17/2019	85.2	34+2weeks	324.2	36+5weeks	302.2	34+1WEEKS	67.9	34+5weeks	34+3WEEKS	34.85	32.8
221	26yrs	5465887	G3P2L2	nil	7/30/2019	5/5/2020	5/8/2020	3.8cms (10w4d)	20weeks	12/17/2019	46.5	20weeks	172.8	19+6weeks	159.5	21WEEKS	36.3	21+4weeks	21weeks	20.4	20.6
222	23yrs	5490481	primi	Rh Negative pregnancy	8/8/2019	5/14/2020	5/12/2020	1.9cms (8w3d)	18+5weeks	12/17/2019	42.3	18+6weeks	158.1	18+5weeks	136	18+6weeks	28.8	18+6weeks	18+6weeks	18.25	18.8
223	26yrs	5403237	primi	nil	5/14/2019	2/18/2020	2/20/2020	2.9cms (9w4d)	19+2WEEKS	9/26/2019	44.8	19+4weeks	165.7	19+2weeks	143	19+5weeks	32.8	20+2weeks	19+5weeks	19.35	19.7
224	23yrs	4052122	G3P2L2	nil	3/25/2019	12/30/2019	12/27/2019	3.5cms (10w2d)	21+3WEEKS	8/22/2019	49.8	21+1weeks	191.1	21+3weeks	165.9	21+4weeks	37.3	21+6WEEKS	21+4weeks	21.4	21.5
225	28yrs	5383874	G4P3L2	nil	6/16/2019	3/22/2020	3/26/2020	3.4cms (10w1d)	19+4weeks	10/31/2019	44.6	19+3weeks	168.9	19+4weeks	149.4	20+1weeks	31.3	19+5weeks	20+1weeks	19.35	19.7
226	24yrs	4426242	G2P1L1	nil	5/5/2019	2/9/2020	2/7/2020	3.5cms (10w2d)	20+4weeks	9/26/2019	49.3	20+6weeks	180.5	20+3weeks	147	20weeks	35.7	21+2weeks	20+3weeks	20.6	20.8
227	28yrs	2448964	G2P1L1	nil	6/14/2019	3/20/2020	3/17/2020	4.1cms (10w6d)	23+3weeks	11/25/2019	51.8	25+1weeks	216.9	23+5weeks	183.9	23+1weeks	39.3	22+5WEEKS	23weeks	23.5	23.2
228	25yrs	5398889	G6P3L3A2	nil	3/6/2019	12/11/2019	12/14/2019	2.9cms (9w4d)	25+6weeks	9/3/2019	62.6	26+3weeks	244.7	26+4weeks	226.4	27weeks	48.1	26+1weeks	26+2weeks	25.3	24.8
229	29yrs	5420179	G3P1L1A1	PREV.LSCS	5/2/2019	2/6/2020	2/10/2020	2.1cms (8w5d)	23+4weeks	10/14/2019	58.6	24WEEKS	215.3	23+4weeks	181.5	23weeks	40.7	23+1weeks	23weeks	23.75	23.5
230	26yrs	5346916	G2P1L1	NIL	4/24/2019	1/29/2020	1/28/2020	3.2cms (10w)	23+2weeks	10/4/2019	59.3	24+2weeks	227.9	24+6weeks	208.7	25+2weeks	40.6	23+1weeks	24+1WEEKS	23.65	23.4